

2022

# THE PROFESSIONAL ENDMILL

초정밀 가공의 TOWA가 제작한 엔드밀  
총합 카탈로그

엔드밀 총합 카탈로그  
End mill general catalog



# WHAT'S

TOWA는 반도체 제조용 초정밀금형에 대해 세계 톱클래스의 점유율을 가진 리딩 컴퍼니입니다.

그 초정밀 금형 제조 기술은, TOWA가 자체 제작하고 있는 「TOWA 엔드밀」에 의해 실현되고 있다고 말해도 과언이 아닙니다. 고정밀로 내마모성이 뛰어나고 절삭날이 날카롭고 긴 수명의 「TOWA 엔드밀」.

이 「TOWA 엔드밀」의 우수성은 그 「최대 유저」= 「TOWA」임이 증명하고 있습니다. 제조사인 동시에 유저이기도 한 TOWA는 고객별 니즈에 세심하게 부응한 제품을 전달할 수 있습니다. 또, 「유저」의 입장에서 가공 조건의 어드바이스에서도 오랜 경험을 마음껏 발휘할 수 있습니다.

저희 TOWA는 절삭 공구의 종합 메이커로서, 여러분에게 보다 나은 원가 절감이나 이상적인 금속 가공을 실현해 드릴 수 있도록, 향후도 매진하고 있습니다.

# TOWA End Mill?

Towa is a World Leader in the manufacturing of Ultra-Precision Molds for the Semiconductor Industry. It is no exaggeration to state that the manufacturing of TOWA's Ultra-Precision Molds is achieved through the use of TOWA's own "TOWA End Mill".

"TOWA End Mill" is designed for high accuracy, with excellent wear resistance, sharpness and long life. The superiority of the "TOWA End Mill" is continuously shown by its use with their Number One Customer, TOWA!

TOWA, which is both a manufacturer and a user, can deliver products that meet the needs of each customer in detail.

In addition, from the standpoint of the "user", we can fully demonstrate our many years of experience in giving recommendations regarding the part's machining process.

As a comprehensive manufacturer of cutting tools, TOWA will continue to strive for a greater cost performance ratio with efficient metal processing.

# 초정밀 가공의 프로 TOWA가 제작한 엔드밀

End mill created by TOWA for ultra-precision machining

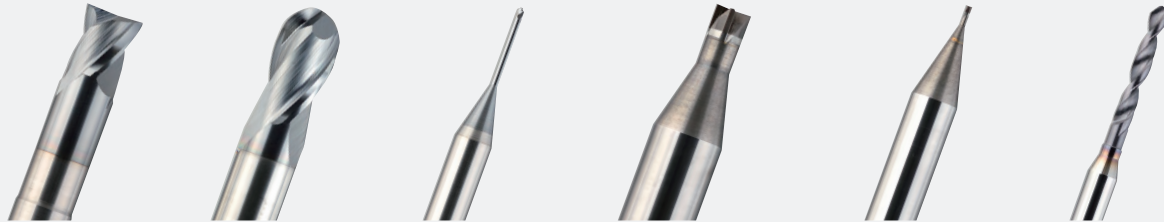
# CBN & 초경 엔드밀

당사 엔드밀은 초정밀 금형 가공의 필요성에 의한 사내 요구로부터 비롯되었습니다. 해마다 엄격해지는 고객의 금형 요구 사양에 대해, 당사가 소유한 기술력을 최대한으로 발휘하기 위해서는 보다 고정밀도에 내구성이 높은 공구가 필요하여 자사 자체 제작한 절삭 공구입니다.

Our end mills were born out of our in-house needs for ultra-precision mold machining. In order to meet the customer's mold specifications, which are becoming stricter each year, TOWA tapped into our company's technological capabilities to the maximum. Proven design and developed cutting tools manufactured in-house, because tools with higher precision and durability are indispensable.

## 기존품보다 더 긴 수명! 공구 구입비를 절감할 수 있습니다!!

Longer life than conventional tooling. Reduced number of tools needed = reduced cost.



### 고정밀도 High precision

- 공구경 : 고객이 요구한 사이즈에 맞춰서  $-3\mu\text{m}$  이내로 제작하여 드립니다.

Tool diameter: For required dimensions We will produce within  $3\mu\text{m}$ !

- R정밀도 :  $\pm 2\mu\text{m}$

R accuracy:  $\pm 2\mu\text{m}$

### 복수날 Multiple Flutes

- 3~6날의 활용에 따라 가공시간의 단축

Processing time is shortened by utilizing 3 to 6 flutes

### 긴 수명 Long life

- 오리지널 코팅으로 긴 수명

Long life with original coating



### 재연마 Regrinding

- CBN 엔드밀은 최대 8회까지 재연마가 가능하므로 전체 원가 반감!

We can regrind CBN end mills up to 8 times with overall cost reduction for the Customer up to 50%.

- 초경 엔드밀 코팅의 완전 박리를 실현! 코팅을 완전히 벗겨, 재연마 후 재코팅을 통하여 초경 엔드밀을 재생시켜 합리적인 가격으로 제공 드립니다.

We remove the carbide coating completely. Completely remove the coating, re-grind and then re-coat. We offer recondition carbide end mills at a reasonable cost.

### 단납기 Quick delivery

- 카탈로그품 당일·익일 출하 가능  
Catalog products can be shipped on the day of order or the next day

- 특수품·재연마 7일 이내 출하 가능

Custom-made products and regrinding tools will be shipped within 7 days.



## Point 1. 초정밀 가공용 고정밀 공구

Our high-precision tools are capable of ultra-precision machining.

## Point 2. 재연마로 가공 원가 대폭 절감

Significant cost reduction with Re-grinding end mills.

## Point 3. 고객 요청에 따른 공구 단납기 제공

Providing custom-made tools that meet customer requirements in a short delivery time.

## 재연마(재생)와 스페셜제품은 1pc부터 제작 가능합니다.

Re-grinding (recondition) and Custom-made products can be quoted, even if one pack of tool.

## CONTENTS

### 엔드밀 / End Mill

	CBN Series	CBN Series
	Hard Star A Series	Hard Star A Series
	Hard Star TI Series	Hard Star TI Series
	Hard Star TT Series	Hard Star TT Series
	ion Depo A Series	ion Depo A Series
	ion Depo U Series	ion Depo U Series
	DLC Series	DLC Series
	Non-Coat Series	Non-Coat Series
<b>드릴 / Drill</b>		
	ion Depo R Series	ion Depo R Series

코팅 Coating

**Hard A** Hard Star Type A Coating

**Hard TI** Hard Star Type TI Coating

**Hard TT** Hard Star Type TT Coating

**ion A** ion Depo Type A Coating

**ion U** ion Depo Type U Coating

**ion R** ion Depo Type R Coating

**DLC** DLC Coating

**Non** Non Coating

**BANCERA** BANCERA Coating

소재 Material

**CBN** CBN (입방정질화붕소)  
Cubic Boron Nitride

**super MG** 초미립자 초경합금  
Super Micro Grain Carbide

날 수 Number of Flutes

**날 수 2** 2날  
2Flutes

**날 수 4** 4날  
4Flutes

**날 수 2·3** 2날·3날  
2Flutes·3Flutes

**날 수 2·4** 2날·4날  
2Flutes·4Flutes

**날 수 2~6** 2날·3날·4날·6날  
2Flutes·3Flutes·4Flutes·6Flutes

헬릭스각 Helix Angle

**헬릭스각 0°** Angle 0°

**헬릭스각 30°** Angle 30°

**헬릭스각 45°** Angle 45°

**헬릭스각 40°/42°** Angle 40/42°

목각 Neck Taper Angle

**목각 15°** Angle 15°

생크경 공차 Shank Diameter Tolerance

**Shank**  
Tolerance 0/-0.005

「 피삭재 」로 찾기  
Search from Material

P007

「 시리즈 」로 찾기  
Search from Series

P009

「 형상 」으로 찾기  
Search from Shape

P019

「 형번 」으로 찾기  
Search from Model

P029

카테고리 Category				CBN End Mill			Carbide End Mill							Carbide Drill	
경도 Hardness	기호 Mark	분류 Classification	피삭재 Material	CBN	CBN BANCERA	HARD STAR Type A	HARD STAR Type TI	HARD STAR Type TT	HARD STAR Type TN	ion Depo Type A	ion Depo Type U	DLC	Non-Coat	ion Depo Type R	
Hardness ~HRC50	K	주철 Cast Iron	FCD							○				○	
	P	탄소강 Carbon Steels	S50C/SS400								○				○
		프리하든강 Prehardened Steels	PX5/NAK80								○				○
		다이스강 Die Steels	SKD11·SKD61								○				○
		고속도강 High Speed Steels	HAP5R·HAP72/ASP23								○				○
	M	스테인리스강 Stainless Steels	SUS304					○		○				○	
HPM/STAVAX								○					○		
~HRC55	H	스테인리스강 Stainless Steels	HPM	○	○(★)	○			○(★)		○황삭Roughing				
			정삭 Finishing							○정삭Finishing					
		STAVAX	○	○(★)	○				○(★)		○황삭Roughing				
		정삭 Finishing								○정삭Finishing					
~HRC60	H	다이스강 Die Steels	SKD61			○					○황삭Roughing				
			정삭 Finishing							○정삭Finishing					
HRC60 over	H	고속도강 High Speed Steels	SKD11	○	○(★)	○								○황삭Roughing	
			정삭 Finishing											○정삭Finishing	
		SKH51	○	○(★)	○									○황삭Roughing	
		정삭 Finishing												○정삭Finishing	
HRC60 over	H	고속도강 High Speed Steels	ASP23	○	○(★)	○								○황삭Roughing	
			정삭 Finishing											○정삭Finishing	
			HAP5R	○	○(★)	○								○황삭Roughing	
			정삭 Finishing											○정삭Finishing	
HRC60 over	H	고속도강 High Speed Steels	HAP72	○	○(★)	○								○황삭Roughing	
			정삭 Finishing											○정삭Finishing	
			동 합금 Copper Alloy	동 Copper	○	○(★)				○(★)	○				
			동 텅스텐 Copper Tungsten								○				
비철계 Non-ferrous Metal	N	알루미늄 합금 Aluminum Alloy	A5000계열 A5000 Series			○				○		○	○		
			정삭 Finishing												
		A7000계열 A7000 Series			○					○		○	○		
		정삭 Finishing													
	흑연 Graphite	흑연 Graphite										○			
	S	내열 합금 Heat Resistant Alloy	인코넬 Inconel					○							
코발 Kovar					○										
정삭 Finishing															
티타늄 합금 Titanium Alloy							○		○						
3D Printer	P	철 합금 Iron Alloy	마레이징강 Maraging Steels											○황삭Roughing	
	정삭 Finishing												○정삭Finishing		
M	스테인리스강 Stainless Steels								○(★)						

○:최적 Excellent ○적용 Good ★:주문품 Ordered product































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카테고리 Category	시리즈명 Series	페이지 Page
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	<b>HARD STAR Type TI Series</b>	P131
	<b>HARD STAR Type TT Series</b>	P137
	<b>ion Depo Type A Series</b>	P143
	<b>ion Depo Type U Series</b>	P251
	<b>DLC Series</b>	P301
	<b>Non-Coat Series</b>	P305
드릴 Drill	<b>ion Depo Type R Series</b>	P317

CBN Series

Hard Star A Series

Hard Star TI Series

Hard Star TT Series

ion Depo A Series

ion Depo U Series

DLC Series

Non-Coat Series

ion Depo R Series

## CBN 엔드밀 CBN End Mill



### 특징

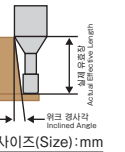
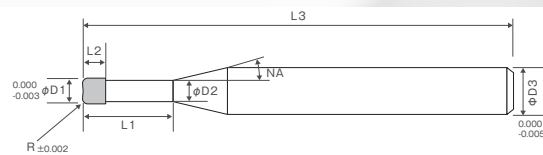
- 당사 CBN 엔드밀은 고정밀, 긴 수명에 의해 초정밀 가공을 실현!
- 재연마 최대 8회 가능, 원가 절감은 압도적!
- 내마모 효과를 업할 수 있는 BANCERA 코팅(세라믹계)도 제공 가능!
- 표준품 라인업은 외경  $\phi 0.1 \sim 6.0$ 을 완비, 특수 제작품도 단납기로 제공 가능

### Features

- TOWA CBN end mill realizes ultra-precision machining with high accuracy and long life.
- Re-grinding is possible up to 8 times, reducing overall tooling cost.
- BANCERA coating (ceramic type) for improved wear resistance is available.
- Standard product lineup with diameters of  $\phi 0.1$  to  $6.0$ , custom diameter/length available.

## CBN 라디우스 엔드밀 CBN Radius End Mill

■ 형번: CR200 Model number: CR200

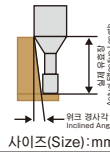


●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>o</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
CR200-0010-0010-0020	0.1	0.01	0.2	0.07	0.08	15	4	50	32,160	0.24	0.25	0.26	0.27	0.29
CR200-0010-0020-0020		0.02	0.2	0.04	0.08	15	4	50	32,160	0.24	0.25	0.26	0.27	0.29
CR200-0010-0020-0030		0.02	0.3	0.04	0.08	15	4	50	32,640	0.35	0.36	0.37	0.38	0.41
CR200-0010-0030-0020		0.03	0.2	0.04	0.08	15	4	50	30,720	0.24	0.25	0.26	0.27	0.29
CR200-0010-0030-0030		0.03	0.3	0.04	0.08	15	4	50	31,200	0.35	0.36	0.37	0.38	0.41
CR200-0015-0020-0020	0.15	0.02	0.2	0.06	0.13	15	4	50	32,160	0.24	0.25	0.26	0.27	0.29
CR200-0015-0020-0030		0.02	0.3	0.06	0.13	15	4	50	32,640	0.35	0.36	0.37	0.38	0.41
CR200-0015-0030-0020		0.03	0.2	0.06	0.13	15	4	50	30,720	0.24	0.25	0.26	0.27	0.29
CR200-0015-0030-0030	0.03	0.3	0.06	0.13	15	4	50	31,200	0.35	0.36	0.37	0.38	0.41	
CR200-0020-0010-0050	0.2	0.01	0.5	0.3	0.17	15	4	50	24,480	0.57	0.59	0.62	0.64	0.69
CR200-0020-0020-0030		0.02	0.3	0.08	0.17	15	4	50	24,480	0.37	0.38	0.39	0.41	0.44
CR200-0020-0020-0050		0.02	0.5	0.08	0.17	15	4	50	24,480	0.57	0.59	0.61	0.64	0.69
CR200-0020-0030-0030		0.03	0.3	0.08	0.17	15	4	50	22,000	0.37	0.38	0.39	0.40	0.44
CR200-0020-0030-0050		0.03	0.5	0.3	0.17	15	4	50	22,000	0.57	0.59	0.61	0.63	0.68
CR200-0020-0050-0030	0.05	0.3	0.08	0.17	15	4	50	22,000	0.37	0.38	0.39	0.40	0.43	
CR200-0020-0050-0050	0.05	0.5	0.08	0.17	15	4	50	22,000	0.57	0.59	0.61	0.63	0.68	
CR200-0030-0020-0050	0.3	0.02	0.5	0.3	0.27	15	4	50	24,160	0.57	0.59	0.61	0.64	0.69
CR200-0030-0020-0075		0.02	0.75	0.13	0.27	15	4	50	24,320	0.83	0.86	0.89	0.92	1.00
CR200-0030-0030-0050		0.03	0.5	0.13	0.27	15	4	50	21,760	0.57	0.59	0.61	0.63	0.68
CR200-0030-0030-0075		0.03	0.75	0.13	0.27	15	4	50	21,920	0.83	0.86	0.89	0.92	0.99
CR200-0030-0050-0050		0.05	0.5	0.3	0.27	15	4	50	21,760	0.57	0.59	0.61	0.63	0.68
CR200-0030-0050-0075	0.05	0.75	0.13	0.27	15	4	50	21,920	0.83	0.86	0.89	0.92	0.99	
CR200-0040-0020-0050	0.4	0.02	0.5	0.24	0.37	15	4	50	22,960	0.57	0.59	0.61	0.64	0.69
CR200-0040-0020-0100		0.02	1	0.24	0.37	15	4	50	23,120	1.09	1.13	1.17	1.21	1.31
CR200-0040-0030-0050		0.03	0.5	0.3	0.37	15	4	50	20,640	0.57	0.59	0.61	0.63	0.68
CR200-0040-0030-0100		0.03	1	0.24	0.37	15	4	50	20,800	1.09	1.13	1.17	1.21	1.31
CR200-0040-0050-0050		0.05	0.5	0.3	0.37	15	4	50	20,640	0.57	0.59	0.61	0.63	0.68
CR200-0040-0050-0100	0.05	1	0.24	0.37	15	4	50	20,800	1.09	1.13	1.17	1.21	1.30	
CR200-0040-0100-0050	0.1	0.5	0.3	0.37	15	4	50	20,640	0.57	0.59	0.61	0.62	0.67	
CR200-0040-0100-0100	0.1	1	0.24	0.37	15	4	50	20,800	1.09	1.12	1.16	1.20	1.29	
CR200-0050-0020-0050	0.5	0.02	0.5	0.3	0.47	15	4	50	18,880	0.57	0.59	0.61	0.64	0.69
CR200-0050-0020-0100		0.02	1	0.3	0.47	15	4	50	19,040	1.09	1.13	1.17	1.21	1.31
CR200-0050-0030-0050		0.03	0.5	0.3	0.47	15	4	50	16,960	0.57	0.59	0.61	0.63	0.68
CR200-0050-0030-0100		0.03	1	0.3	0.47	15	4	50	17,120	1.09	1.13	1.17	1.21	1.31
CR200-0050-0050-0050		0.05	0.5	0.3	0.47	15	4	50	16,960	0.57	0.59	0.61	0.63	0.68
CR200-0050-0050-0100	0.05	1	0.3	0.47	15	4	50	17,120	1.09	1.13	1.17	1.21	1.30	
CR200-0050-0100-0050	0.1	0.5	0.3	0.47	15	4	50	16,960	0.57	0.59	0.61	0.62	0.67	
CR200-0050-0100-0100	0.1	1	0.3	0.47	15	4	50	17,120	1.09	1.12	1.16	1.20	1.29	
CR200-0060-0020-0050	0.6	0.02	0.5	0.3	0.57	15	4	50	18,880	0.57	0.59	0.61	0.64	0.69
CR200-0060-0020-0100		0.02	1	0.3	0.57	15	4	50	19,040	1.09	1.13	1.17	1.21	1.31
CR200-0060-0020-0150		0.02	1.5	0.3	0.57	15	4	50	19,200	1.61	1.66	1.72	1.79	1.93
CR200-0060-0030-0050		0.03	0.5	0.3	0.57	15	4	50	16,960	0.57	0.59	0.61	0.63	0.68
CR200-0060-0030-0100		0.03	1	0.3	0.57	15	4	50	17,120	1.09	1.13	1.17	1.21	1.31
CR200-0060-0030-0150	0.03	1.5	0.3	0.57	15	4	50	17,280	1.61	1.66	1.72	1.78	1.93	
CR200-0060-0030-0170	0.03	1.7	0.7	0.57	15	4	50	17,280	1.81	1.88	1.94	2.01	2.18	

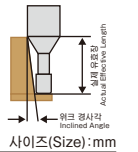
CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
Ion Depo A Series  
Ion Depo U Series  
DLC Series  
Non-Coat Series  
Ion Depo R Series





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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
CR200-0060-0050-0050	0.6	0.05	0.5	0.3	0.57	15	4	50	16,960	0.57	0.59	0.61	0.63	0.68	
CR200-0060-0050-0100		0.05	1	0.3	0.57	15	4	50	17,120	1.09	1.13	1.17	1.21	1.30	
CR200-0060-0050-0150		0.05	1.5	0.3	0.57	15	4	50	17,280	1.61	1.66	1.72	1.78	1.92	
CR200-0060-0050-0170		0.05	1.7	0.7	0.57	15	4	50	17,280	1.81	1.87	1.94	2.01	2.17	
CR200-0060-0100-0050		0.1	0.5	0.3	0.57	15	4	50	16,960	0.57	0.59	0.61	0.62	0.67	
CR200-0060-0100-0100		0.1	1	0.3	0.57	15	4	50	17,120	1.09	1.12	1.16	1.20	1.29	
CR200-0060-0100-0150		0.1	1.5	0.3	0.57	15	4	50	17,280	1.61	1.66	1.71	1.77	1.91	
CR200-0060-0100-0170		0.1	1.7	0.7	0.57	15	4	50	17,280	1.81	1.87	1.94	2.00	2.16	
CR200-0060-0200-0170		0.2	1.7	0.7	0.57	15	4	50	17,280	1.81	1.86	1.92	1.99	2.14	
CR200-0080-0020-0150		0.8	0.02	1.5	0.56	0.77	15	4	50	19,200	1.61	1.66	1.72	1.79	1.93
CR200-0080-0030-0150	0.03		1.5	0.56	0.77	15	4	50	17,280	1.61	1.66	1.72	1.78	1.93	
CR200-0080-0050-0150	0.05		1.5	0.56	0.77	15	4	50	17,280	1.61	1.66	1.72	1.78	1.92	
CR200-0080-0100-0150	0.1		1.5	0.56	0.77	15	4	50	17,280	1.61	1.66	1.71	1.77	1.91	
CR200-0100-0020-0100	1	0.02	1	0.7	0.96	15	4	50	17,600	1.11	1.15	1.19	1.23	1.33	
CR200-0100-0020-0200		0.02	2	0.7	0.96	15	4	50	17,600	2.14	2.22	2.30	2.38	2.57	
CR200-0100-0030-0100		0.03	1	0.7	0.96	15	4	50	15,840	1.11	1.15	1.19	1.23	1.33	
CR200-0100-0030-0200		0.03	2	0.7	0.96	15	4	50	15,840	2.14	2.22	2.30	2.38	2.57	
CR200-0100-0050-0100		0.05	1	0.7	0.96	15	4	50	15,840	1.11	1.15	1.19	1.23	1.32	
CR200-0100-0050-0200		0.05	2	0.7	0.96	15	4	50	15,840	2.14	2.22	2.29	2.38	2.57	
CR200-0100-0050-0220		0.05	2.2	1.2	0.96	15	4	50	15,840	2.35	2.43	2.52	2.61	2.82	
CR200-0100-0100-0100		0.1	1	0.7	0.96	15	4	50	15,840	1.11	1.14	1.18	1.22	1.31	
CR200-0100-0100-0200		0.1	2	0.7	0.96	15	4	50	15,840	2.14	2.21	2.29	2.37	2.56	
CR200-0100-0100-0220		0.1	2.2	1.2	0.96	15	4	50	15,840	2.35	2.43	2.51	2.60	2.80	
CR200-0100-0200-0100		0.2	1	0.7	0.96	15	4	50	15,840	1.10	1.14	1.17	1.21	1.29	
CR200-0100-0200-0200		0.2	2	0.7	0.96	15	4	50	15,840	2.14	2.21	2.28	2.36	2.53	
CR200-0100-0200-0220		0.2	2.2	1.2	0.96	15	4	50	15,840	2.34	2.42	2.50	2.59	2.78	
CR200-0100-0300-0220		0.3	2.2	1.2	0.96	15	4	50	15,840	2.34	2.41	2.49	2.57	2.76	
CR200-0150-0020-0200		1.5	0.02	2	1	1.44	15	4	50	20,720	2.18	2.26	2.34	2.43	2.62
CR200-0150-0020-0300			0.02	3	1	1.44	15	4	50	20,720	3.22	3.33	3.45	3.58	3.86
CR200-0150-0030-0200	0.03		2	1	1.44	15	4	50	18,640	2.18	2.26	2.34	2.42	2.62	
CR200-0150-0030-0300	0.03		3	1	1.44	15	4	50	18,640	3.22	3.33	3.45	3.57	3.86	
CR200-0150-0050-0200	0.05		2	1	1.44	15	4	50	18,640	2.18	2.26	2.34	2.42	2.61	
CR200-0150-0050-0300	0.05		3	1.5	1.44	15	4	50	18,640	3.22	3.33	3.44	3.57	3.86	
CR200-0150-0100-0200	0.1		2	1	1.44	15	4	50	18,640	2.18	2.25	2.33	2.41	2.60	
CR200-0150-0100-0300	0.1		3	1.5	1.44	15	4	50	18,640	3.21	3.32	3.44	3.56	3.85	
CR200-0150-0200-0200	0.2		2	1	1.44	15	4	50	18,640	2.18	2.25	2.32	2.40	2.58	
CR200-0150-0200-0300	0.2		3	1.5	1.44	15	4	50	18,640	3.21	3.31	3.43	3.55	3.82	
CR200-0150-0300-0200	0.3	2	1	1.44	15	4	50	18,640	2.17	2.24	2.31	2.38	2.56		
CR200-0150-0300-0300	0.3	3	1.5	1.44	15	4	50	18,640	3.21	3.31	3.42	3.53	3.80		
CR200-0200-0020-0300	2	0.02	3	1.2	1.96	15	4	50	21,360	3.18	3.29	3.41	3.53	3.82	
CR200-0200-0020-0400		0.02	4	1.2	1.96	15	4	50	21,360	4.21	4.36	4.51	4.68	5.06	
CR200-0200-0030-0300		0.03	3	1.2	1.96	15	4	50	19,200	3.18	3.29	3.40	3.53	3.82	
CR200-0200-0030-0400		0.03	4	1.2	1.96	15	4	50	19,200	4.21	4.36	4.51	4.68	5.06	
CR200-0200-0050-0300		0.05	3	1.2	1.96	15	4	50	19,200	3.18	3.29	3.40	3.53	3.81	
CR200-0200-0050-0400		0.05	4	1.2	1.96	15	4	50	19,200	4.21	4.36	4.51	4.68	5.05	



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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
CR200-0200-0050-0500	2	0.05	5	2	1.96	15	4	50	19,200	5.24	5.42	5.62	5.83	6.30
CR200-0200-0100-0300		0.1	3	1.2	1.96	15	4	50	19,200	3.17	3.28	3.40	3.52	3.80
CR200-0200-0100-0400		0.1	4	1.2	1.96	15	4	50	19,200	4.21	4.35	4.51	4.67	5.04
CR200-0200-0100-0500		0.1	5	2	1.96	15	4	50	19,200	5.24	5.42	5.61	5.82	6.29
CR200-0200-0200-0300		0.2	3	1.2	1.96	15	4	50	19,200	3.17	3.28	3.39	3.51	3.78
CR200-0200-0200-0400		0.2	4	1.2	1.96	15	4	50	19,200	4.21	4.34	4.49	4.66	5.02
CR200-0200-0200-0500		0.2	5	2	1.96	15	4	50	19,200	5.24	5.41	5.60	5.81	6.26
CR200-0200-0300-0300		0.3	3	1.2	1.96	15	4	50	19,200	3.17	3.27	3.38	3.49	3.75
CR200-0200-0300-0400		0.3	4	1.2	1.96	15	4	50	19,200	4.20	4.34	4.48	4.64	5.00
CR200-0200-0300-0500		0.3	5	2	1.96	15	4	50	19,200	5.24	5.41	5.59	5.79	6.24
CR200-0200-0500-0300	3	0.5	3	1.2	1.96	15	4	50	19,200	3.16	3.25	3.35	3.46	3.71
CR200-0200-0500-0400		0.5	4	1.2	1.96	15	4	50	19,200	4.20	4.32	4.46	4.61	4.95
CR200-0300-0050-0500		0.05	5	2	2.92	15	6	50	21,120	5.32	5.50	5.70	5.91	6.39
CR200-0300-0100-0500		0.1	5	2	2.92	15	6	50	21,120	5.32	5.50	5.70	5.91	6.38
CR200-0300-0200-0500		0.2	5	2	2.92	15	6	50	21,120	5.32	5.49	5.69	5.89	6.35
CR200-0300-0300-0500	0.3	5	2	2.92	15	6	50	21,120	5.31	5.49	5.67	5.88	6.33	



## CBN 추천 절삭 조건표 Recommended Milling Conditions

■ **형번: CR200**  
Model number: CR200

### 라디우스 엔드밀 Radius End Mill

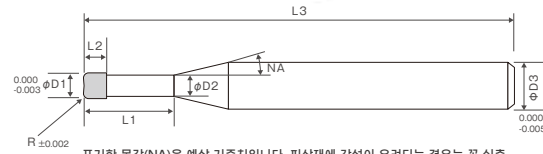
피삭재 Work Material			동 Copper				고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	0.1	0.2	0.002	0.015	200	50,000	0.002	0.015	200	50,000	0.002	0.01	150	50,000	0.001	0.01	100	50,000
		0.3	0.002	0.015	150	50,000	0.002	0.015	150	50,000	0.001	0.01	100	50,000	0.001	0.01	50	50,000
	0.15	0.2	0.003	0.02	200	50,000	0.003	0.02	200	50,000	0.003	0.02	150	50,000	0.002	0.015	100	50,000
		0.3	0.003	0.02	200	50,000	0.003	0.02	200	50,000	0.003	0.02	150	50,000	0.002	0.015	100	50,000
	0.2	0.3	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000
		0.5	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000
	0.3	0.5	0.003	0.05	500	50,000	0.003	0.05	500	50,000	0.003	0.05	400	50,000	0.002	0.03	300	50,000
		0.75	0.003	0.05	500	50,000	0.003	0.05	500	50,000	0.003	0.05	400	50,000	0.002	0.03	300	50,000
	0.4	0.5	0.005	0.1	700	50,000	0.005	0.1	700	50,000	0.005	0.1	600	50,000	0.003	0.03	400	50,000
		1	0.005	0.1	700	50,000	0.005	0.1	700	50,000	0.005	0.1	600	50,000	0.003	0.03	400	50,000
	0.5	0.5	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.1	700	50,000
		1	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.1	700	50,000
	0.6	0.5	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.005	0.2	500	50,000
		1	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.005	0.2	500	50,000
		1.5	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.01	0.2	600	50,000	0.005	0.2	500	50,000
	0.8	1.5	0.02	0.3	1,400	50,000	0.02	0.3	1,400	50,000	0.02	0.2	1,200	50,000	0.01	0.1	1,000	40,000
		2	0.02	0.4	1,500	48,000	0.02	0.4	1,500	48,000	0.02	0.3	1,200	48,000	0.01	0.2	1,000	32,000
	1	2	0.02	0.4	1,500	48,000	0.02	0.4	1,500	48,000	0.02	0.3	1,200	48,000	0.01	0.2	1,000	32,000
		2.2	0.02	0.4	1,500	48,000	0.02	0.4	1,500	48,000	0.02	0.3	1,200	48,000	0.01	0.2	1,000	32,000
		3	0.03	0.5	1,000	32,000	0.03	0.5	1,000	32,000	0.03	0.4	1,000	32,000	0.01	0.2	800	20,000
1.5	2	0.02	0.5	2,000	32,000	0.02	0.5	2,000	32,000	0.02	0.4	1,500	32,000	0.01	0.2	1,200	20,000	
	3	0.03	0.8	2,000	24,000	0.03	0.8	2,000	24,000	0.03	0.7	1,500	24,000	0.01	0.5	1,100	16,000	
2	4	0.03	0.8	2,000	24,000	0.03	0.8	2,000	24,000	0.03	0.7	1,500	24,000	0.01	0.5	1,100	16,000	
	5	0.03	0.8	2,000	24,000	0.03	0.8	2,000	24,000	0.03	0.7	1,500	24,000	0.01	0.5	1,200	16,000	
3	5	0.03	0.6	2,000	24,000	0.03	0.6	2,000	24,000	0.03	0.5	1,500	24,000	0.01	0.3	1,200	16,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입량은, 장식 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●RPM & FEED는 동결된 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

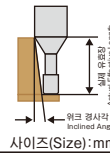
## CBN 라디우스 엔드밀 CBN Radius End Mill

■형번:CR300 Model number:CR300

Non
BANCERA
CBN
날 수 3
헬릭스각 0°
목각 15°
Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA)° Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
CR300-0060-0020-0050	0.6	0.02	0.5	0.3	0.57	15	4	50	22,720	0.57	0.59	0.61	0.64	0.69
CR300-0060-0020-0100		0.02	1	0.3	0.57	15	4	50	22,880	1.09	1.13	1.17	1.21	1.31
CR300-0060-0020-0150		0.02	1.5	0.3	0.57	15	4	50	23,040	1.61	1.66	1.72	1.79	1.93
CR300-0060-0020-0200		0.02	2	0.3	0.57	15	4	50	24,960	2.12	2.20	2.28	2.36	2.55
CR300-0060-0020-0250		0.02	2.5	0.3	0.57	15	4	50	25,200	2.64	2.73	2.83	2.94	3.17
CR300-0060-0030-0170		0.03	1.7	0.7	0.57	15	4	50	20,800	1.81	1.88	1.94	2.01	2.18
CR300-0060-0050-0050		0.05	0.5	0.3	0.57	15	4	50	20,400	0.57	0.59	0.61	0.63	0.68
CR300-0060-0050-0100		0.05	1	0.3	0.57	15	4	50	20,560	1.09	1.13	1.17	1.21	1.30
CR300-0060-0050-0150		0.05	1.5	0.3	0.57	15	4	50	20,800	1.61	1.66	1.72	1.78	1.92
CR300-0060-0050-0170		0.05	1.7	0.7	0.57	15	4	50	20,800	1.81	1.87	1.94	2.01	2.17
CR300-0060-0050-0200		0.05	2	0.3	0.57	15	4	50	21,600	2.12	2.20	2.27	2.36	2.54
CR300-0060-0050-0250		0.05	2.5	0.3	0.57	15	4	50	22,720	2.64	2.73	2.83	2.93	3.17
CR300-0060-0100-0050		0.1	0.5	0.3	0.57	15	4	50	20,400	0.57	0.59	0.61	0.62	0.67
CR300-0060-0100-0100		0.1	1	0.3	0.57	15	4	50	20,560	1.09	1.12	1.16	1.20	1.29
CR300-0060-0100-0150		0.1	1.5	0.3	0.57	15	4	50	20,800	1.61	1.66	1.71	1.77	1.91
CR300-0060-0100-0170		0.1	1.7	0.7	0.57	15	4	50	20,800	1.81	1.87	1.94	2.00	2.16
CR300-0060-0100-0200		0.1	2	0.3	0.57	15	4	50	21,600	2.12	2.19	2.27	2.35	2.53
CR300-0060-0100-0250		0.1	2.5	0.3	0.57	15	4	50	22,720	2.64	2.73	2.82	2.92	3.15
CR300-0060-0200-0170		0.2	1.7	0.7	0.57	15	4	50	20,800	1.81	1.86	1.92	1.99	2.14
CR300-0080-0020-0150		0.8	0.02	1.5	0.56	0.77	15	4	50	23,040	1.61	1.66	1.72	1.79
CR300-0080-0020-0250	0.02		2.5	0.56	0.77	15	4	50	25,280	2.64	2.73	2.83	2.94	3.17
CR300-0080-0020-0500	0.02		5	0.56	0.77	15	4	50	26,160	5.23	5.41	5.60	5.81	6.28
CR300-0080-0050-0150	0.05		1.5	0.56	0.77	15	4	50	20,800	1.61	1.66	1.72	1.78	1.92
CR300-0080-0050-0250	0.05		2.5	0.56	0.77	15	4	50	22,720	2.64	2.73	2.83	2.93	3.17
CR300-0080-0050-0500	0.05		5	0.56	0.77	15	4	50	23,440	5.22	5.40	5.60	5.81	6.27
CR300-0080-0100-0150	0.1		1.5	0.56	0.77	15	4	50	20,800	1.61	1.66	1.71	1.77	1.91
CR300-0080-0100-0250	0.1		2.5	0.56	0.77	15	4	50	22,720	2.64	2.73	2.82	2.92	3.15
CR300-0080-0100-0500	0.1		5	0.56	0.77	15	4	50	23,440	5.22	5.40	5.59	5.80	6.26

## CBN 추천 절삭 조건표 Recommended Milling Conditions

■형번:CR300  
Model number:CR300

### 라디우스 엔드밀 Radius End Mill

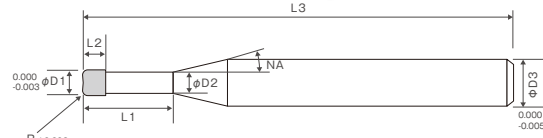
날 수 Number of Flutes	외경 Dia.	유효장 Effective Length	동 Copper			고경도강 Hardened Steels STAVAX/HPM (~55HRC)			고경도강 Hardened Steels SKD11/SKH51 (~60HRC)			고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)						
			Depth of Cut		Feed	Depth of Cut		Feed	Depth of Cut		Feed	Depth of Cut		Feed				
			∂p mm	∂e mm	mm/min	min <sup>-1</sup>	∂p mm	∂e mm	mm/min	min <sup>-1</sup>	∂p mm	∂e mm	mm/min	min <sup>-1</sup>	∂p mm	∂e mm	mm/min	min <sup>-1</sup>
3	0.6	0.5	0.008	0.2	1,500	50,000	0.008	0.2	1,500	50,000	0.005	0.15	800	50,000	0.003	0.1	600	50,000
		1	0.008	0.2	1,500	50,000	0.008	0.2	1,500	50,000	0.005	0.15	800	50,000	0.003	0.1	600	50,000
		1.5	0.008	0.2	1,500	50,000	0.008	0.2	1,500	50,000	0.005	0.15	800	50,000	0.003	0.1	600	50,000
		1.7	0.006	0.15	1,000	40,000	0.006	0.15	1,000	40,000	0.005	0.1	500	40,000	0.003	0.05	300	40,000
		2	0.006	0.15	1,000	40,000	0.006	0.15	1,000	40,000	0.005	0.1	500	40,000	0.003	0.05	300	40,000
	0.8	1.5	0.012	0.4	2,000	40,000	0.012	0.4	2,000	40,000	0.007	0.25	1,000	40,000	0.006	0.15	800	35,000
		2.5	0.012	0.4	2,000	40,000	0.012	0.4	2,000	40,000	0.007	0.25	1,000	40,000	0.006	0.15	800	35,000
		5	0.008	0.3	1,500	30,000	0.008	0.3	1,500	30,000	0.005	0.15	800	30,000	0.004	0.1	400	25,000

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 절삭 가공을 행하는 경우의 최대치입니다. Depth of cut shows the maximum value for finishing.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

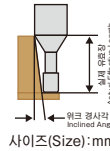
## CBN 라디우스 엔드밀 CBN Radius End Mill

■형번: CR400 Model number: CR400

Non
BANCERA
CBN
날 수 4
헬릭스각 0°
목각 15°
Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

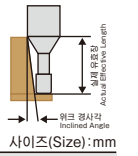


●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>o</sup> Neck Taper Angler	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
CR400-0100-0020-0100	1	0.02	1	0.7	0.96	15	4	50	21,120	1.11	1.15	1.19	1.23	1.33
CR400-0100-0020-0200		0.02	2	0.7	0.96	15	4	50	21,120	2.14	2.22	2.30	2.38	2.57
CR400-0100-0050-0100		0.05	1	0.7	0.96	15	4	50	19,040	1.11	1.15	1.19	1.23	1.32
CR400-0100-0050-0200		0.05	2	0.7	0.96	15	4	50	19,040	2.14	2.22	2.29	2.38	2.57
CR400-0100-0050-0220		0.05	2.2	1.2	0.96	15	4	50	19,040	2.35	2.43	2.52	2.61	2.82
CR400-0100-0100-0100		0.1	1	0.7	0.96	15	4	50	19,040	1.11	1.14	1.18	1.22	1.31
CR400-0100-0100-0200		0.1	2	0.7	0.96	15	4	50	19,040	2.14	2.21	2.29	2.37	2.56
CR400-0100-0100-0220		0.1	2.2	1.2	0.96	15	4	50	19,040	2.35	2.43	2.51	2.60	2.80
CR400-0100-0200-0100		0.2	1	0.7	0.96	15	4	50	19,040	1.10	1.14	1.17	1.21	1.29
CR400-0100-0200-0200		0.2	2	0.7	0.96	15	4	50	19,040	2.14	2.21	2.28	2.36	2.53
CR400-0100-0200-0220		0.2	2.2	1.2	0.96	15	4	50	19,040	2.34	2.42	2.50	2.59	2.78
CR400-0100-0300-0220		0.3	2.2	1.2	0.96	15	4	50	19,040	2.34	2.41	2.49	2.57	2.76
CR400-0150-0020-0200		1.5	0.02	2	1	1.44	15	4	50	24,880	2.18	2.26	2.34	2.43
CR400-0150-0020-0300	0.02		3	1	1.44	15	4	50	24,880	3.22	3.33	3.45	3.58	3.86
CR400-0150-0050-0200	0.05		2	1	1.44	15	4	50	22,400	2.18	2.26	2.34	2.42	2.61
CR400-0150-0050-0300	0.05		3	1.5	1.44	15	4	50	22,400	3.22	3.33	3.44	3.57	3.86
CR400-0150-0100-0200	0.1		2	1	1.44	15	4	50	22,400	2.18	2.25	2.33	2.41	2.60
CR400-0150-0100-0300	0.1		3	1.5	1.44	15	4	50	22,400	3.21	3.32	3.44	3.56	3.85
CR400-0150-0200-0200	0.2		2	1	1.44	15	4	50	22,400	2.18	2.25	2.32	2.40	2.58
CR400-0150-0200-0300	0.2		3	1.5	1.44	15	4	50	22,400	3.21	3.31	3.43	3.55	3.82
CR400-0150-0300-0300	0.3		3	1.5	1.44	15	4	50	22,400	3.21	3.31	3.42	3.53	3.80
CR400-0200-0020-0300	2		0.02	3	1.2	1.96	15	4	50	25,680	3.18	3.29	3.41	3.53
CR400-0200-0020-0400		0.02	4	1.2	1.96	15	4	50	25,680	4.21	4.36	4.51	4.68	5.06
CR400-0200-0050-0300		0.05	3	1.2	1.96	15	4	50	23,040	3.18	3.29	3.40	3.53	3.81
CR400-0200-0050-0400		0.05	4	1.2	1.96	15	4	50	23,040	4.21	4.36	4.51	4.68	5.05
CR400-0200-0050-0500		0.05	5	2	1.96	15	4	50	23,040	5.24	5.42	5.62	5.83	6.30
CR400-0200-0100-0300		0.1	3	1.2	1.96	15	4	50	23,040	3.17	3.28	3.40	3.52	3.80
CR400-0200-0100-0400		0.1	4	1.2	1.96	15	4	50	23,040	4.21	4.35	4.51	4.67	5.04
CR400-0200-0100-0500		0.1	5	2	1.96	15	4	50	23,040	5.24	5.42	5.61	5.82	6.29
CR400-0200-0200-0300		0.2	3	1.2	1.96	15	4	50	23,040	3.17	3.28	3.39	3.51	3.78

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>o</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
CR400-0200-0200-0400	2	0.2	4	1.2	1.96	15	4	50	23,040	4.21	4.34	4.49	4.66	5.02
CR400-0200-0200-0500		0.2	5	2	1.96	15	4	50	23,040	5.24	5.41	5.60	5.81	6.26
CR400-0200-0300-0500		0.3	5	2	1.96	15	4	50	23,040	5.24	5.41	5.59	5.79	6.24
CR400-0300-0050-0500	3	0.05	5	2	2.92	15	6	50	29,760	5.32	5.50	5.70	5.91	6.39
CR400-0300-0100-0500		0.1	5	2	2.92	15	6	50	29,760	5.32	5.50	5.70	5.91	6.38
CR400-0300-0200-0500		0.2	5	2	2.92	15	6	50	29,760	5.32	5.49	5.69	5.89	6.35
CR400-0300-0300-0500	4	0.3	5	2	2.92	15	6	50	29,760	5.31	5.49	5.67	5.88	6.33
CR400-0400-0100-1000		0.1	10	2	3.92	15	6	50	36,480	10.49	10.85	11.24	11.66	12.59
CR400-0400-0300-1000		0.3	10	2	3.92	15	6	50	36,480	10.48	10.84	11.22	11.63	12.55
CR400-0600-0050-1500	6	0.05	15	2	5.92	15	6	50	52,590	FREE	FREE	FREE	FREE	FREE
CR400-0600-0100-1000		0.1	10	2	5.92	15	6	50	50,460	FREE	FREE	FREE	FREE	FREE
CR400-0600-0100-1500		0.1	15	2	5.92	15	6	50	52,590	FREE	FREE	FREE	FREE	FREE
CR400-0600-0300-1000		0.3	10	2	5.92	15	6	50	50,460	FREE	FREE	FREE	FREE	FREE
CR400-0600-0300-1500		0.3	15	2	5.92	15	6	50	52,590	FREE	FREE	FREE	FREE	FREE
CR400-0600-0500-1500		0.5	15	2	5.92	15	6	50	52,590	FREE	FREE	FREE	FREE	FREE



CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
Ion Depo A Series  
Ion Depo U Series  
DLC Series  
Non-Coat Series  
Ion Depo R Series

## CBN 추천 절삭 조건표 Recommended Milling Conditions

■ **형번: CR400**  
Model number: CR400

### 라디우스 엔드밀 Radius End Mill

피삭재 Work Material			동 Copper				고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>	ap mm	ae mm	mm/min	min <sup>-1</sup>
4	1	1	0.02	0.4	2,200	40,000	0.02	0.4	2,200	40,000	0.02	0.3	2,000	40,000	0.01	0.2	1,500	36,000
		2	0.02	0.4	2,200	40,000	0.02	0.4	2,200	40,000	0.02	0.3	2,000	40,000	0.01	0.2	1,500	36,000
		2.2	0.02	0.3	2,200	40,000	0.02	0.3	2,200	40,000	0.02	0.2	2,000	40,000	0.01	0.1	1,500	36,000
	1.5	2	0.04	0.6	4,000	36,000	0.04	0.6	4,000	36,000	0.03	0.5	3,200	30,000	0.015	0.3	2,000	24,000
		3	0.04	0.6	3,500	36,000	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.015	0.3	1,800	24,000
	2	3	0.05	0.8	4,000	30,000	0.05	0.8	4,000	30,000	0.04	0.7	3,200	24,000	0.02	0.4	1,500	16,000
		4	0.05	0.8	3,500	30,000	0.05	0.8	3,500	30,000	0.04	0.7	2,800	24,000	0.02	0.3	1,500	16,000
	3	5	0.05	0.8	3,500	30,000	0.05	0.8	3,500	30,000	0.04	0.7	2,800	24,000	0.02	0.3	1,500	16,000
		5	0.05	1	3,500	24,000	0.05	1	3,500	24,000	0.04	0.85	3,200	20,000	0.02	0.6	1,500	12,000
	4	10	0.05	1.5	3,500	22,000	0.05	1.5	3,500	22,000	0.04	1	2,800	18,000	0.02	0.7	1,500	10,000
		10	0.07	2.5	3,000	18,000	0.07	2.5	3,000	18,000	0.06	2	2,800	16,000	0.05	1.5	1,400	9,000
	6	10	0.07	2	2,700	18,000	0.07	2	2,700	18,000	0.06	1.5	2,500	16,000	0.05	1	1,200	9,000
15		0.07	2	2,700	18,000	0.07	2	2,700	18,000	0.06	1.5	2,500	16,000	0.05	1	1,200	9,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량(절삭 깊이)을 늘리는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●ap 축 방향, ae 반경 방향. ap=Axial Depth of Cut ae=Radial Depth of Cut.  
 ●오일 미스트 분사 또는 물수용성 절삭유를 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 작지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

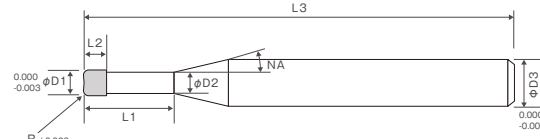
CBN Series  
 Radius  
 Hard Star A Series  
 Hard Star Ti Series  
 Hard Star TT Series  
 Ion Depo A Series  
 Ion Depo U Series  
 DLC Series  
 Non-Coat Series  
 Ion Depo R Series



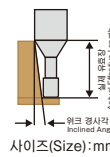
## CBN 롱 넥 래디우스 엔드밀 CBN Long Neck Radius End Mill

■ 型番: CLR200 Model number: CLR200

Non
BANCERA
CBN
날 수 2
헬릭스각 0°
목각 15°
Shank  
φ0/-0.005

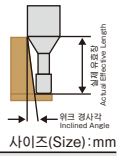


표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

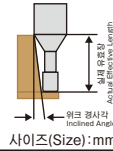
코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직) (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
CLR200-0010-0020-0050	0.1	0.02	0.5	0.04	0.08	15	4	50	33,600	0.55	0.57	0.59	0.61	0.66	
CLR200-0010-0030-0050		0.03	0.5	0.04	0.08	15	4	50	32,160	0.55	0.57	0.59	0.61	0.66	
CLR200-0015-0020-0050	0.15	0.02	0.5	0.06	0.13	15	4	50	33,600	0.55	0.57	0.59	0.61	0.66	
CLR200-0015-0030-0050		0.03	0.5	0.06	0.13	15	4	50	32,160	0.55	0.57	0.59	0.61	0.66	
CLR200-0020-0020-0100	0.2	0.02	1	0.08	0.17	15	4	50	25,200	1.09	1.13	1.17	1.21	1.31	
CLR200-0020-0030-0100		0.03	1	0.08	0.17	15	4	50	22,640	1.09	1.13	1.17	1.21	1.31	
CLR200-0020-0050-0100		0.05	1	0.08	0.17	15	4	50	22,640	1.09	1.13	1.17	1.21	1.30	
CLR200-0030-0020-0100		0.02	1	0.3	0.27	15	4	50	24,480	1.09	1.13	1.17	1.21	1.31	
CLR200-0030-0020-0150	0.3	0.02	1.5	0.13	0.27	15	4	50	24,800	1.61	1.66	1.72	1.79	1.93	
CLR200-0030-0020-0200		0.02	2	0.13	0.27	15	4	50	25,200	2.12	2.20	2.28	2.36	2.55	
CLR200-0030-0030-0100		0.03	1	0.13	0.27	15	4	50	22,000	1.09	1.13	1.17	1.21	1.31	
CLR200-0030-0030-0150		0.03	1.5	0.13	0.27	15	4	50	22,320	1.61	1.66	1.72	1.78	1.93	
CLR200-0030-0030-0200		0.03	2	0.13	0.27	15	4	50	22,640	2.12	2.20	2.28	2.36	2.55	
CLR200-0030-0050-0100		0.05	1	0.3	0.27	15	4	50	22,000	1.09	1.13	1.17	1.21	1.30	
CLR200-0030-0050-0150		0.05	1.5	0.13	0.27	15	4	50	22,320	1.61	1.66	1.72	1.78	1.92	
CLR200-0030-0050-0200		0.05	2	0.13	0.27	15	4	50	22,640	2.12	2.20	2.27	2.36	2.54	
CLR200-0040-0020-0150		0.4	0.02	1.5	0.24	0.37	15	4	50	23,360	1.61	1.66	1.72	1.79	1.93
CLR200-0040-0020-0200			0.02	2	0.24	0.37	15	4	50	23,680	2.12	2.20	2.28	2.36	2.55
CLR200-0040-0030-0135	0.03		1.35	0.4	0.37	15	4	50	20,960	1.45	1.50	1.56	1.61	1.74	
CLR200-0040-0030-0150	0.03		1.5	0.24	0.37	15	4	50	20,960	1.61	1.66	1.72	1.78	1.93	
CLR200-0040-0030-0200	0.03		2	0.24	0.37	15	4	50	21,280	2.12	2.20	2.28	2.36	2.55	
CLR200-0040-0050-0135	0.05		1.35	0.4	0.37	15	4	50	20,800	1.45	1.50	1.55	1.61	1.74	
CLR200-0040-0050-0150	0.05		1.5	0.24	0.37	15	4	50	20,800	1.61	1.66	1.72	1.78	1.92	
CLR200-0040-0050-0200	0.05		2	0.24	0.37	15	4	50	21,280	2.12	2.20	2.27	2.36	2.54	
CLR200-0040-0100-0135	0.1		1.35	0.4	0.37	15	4	50	20,800	1.45	1.50	1.55	1.60	1.72	
CLR200-0040-0100-0150	0.1		1.5	0.24	0.37	15	4	50	20,800	1.61	1.66	1.71	1.77	1.91	
CLR200-0040-0100-0200	0.1	2	0.24	0.37	15	4	50	20,800	2.12	2.19	2.27	2.35	2.53		
CLR200-0050-0020-0150	0.5	0.02	1.5	0.5	0.47	15	4	50	19,200	1.61	1.66	1.72	1.79	1.93	
CLR200-0050-0020-0250		0.02	2.5	0.3	0.47	15	4	50	21,040	2.64	2.73	2.83	2.94	3.17	
CLR200-0050-0030-0150		0.03	1.5	0.3	0.47	15	4	50	17,280	1.61	1.66	1.72	1.78	1.93	



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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
CLR200-0050-0030-0250	0.5	0.03	2.5	0.3	0.47	15	4	50	18,880	2.64	2.73	2.83	2.93	3.17	
CLR200-0050-0050-0150		0.05	1.5	0.5	0.47	15	4	50	17,280	1.61	1.66	1.72	1.78	1.92	
CLR200-0050-0050-0250		0.05	2.5	0.3	0.47	15	4	50	18,880	2.64	2.73	2.83	2.93	3.17	
CLR200-0050-0100-0150		0.1	1.5	0.5	0.47	15	4	50	17,280	1.61	1.66	1.71	1.77	1.91	
CLR200-0050-0100-0250		0.1	2.5	0.3	0.47	15	4	50	18,880	2.64	2.73	2.82	2.92	3.15	
CLR200-0060-0020-0250	0.6	0.02	2.5	0.3	0.57	15	4	50	21,040	2.64	2.73	2.83	2.94	3.17	
CLR200-0060-0030-0250		0.03	2.5	0.3	0.57	15	4	50	18,880	2.64	2.73	2.83	2.93	3.17	
CLR200-0060-0050-0250		0.05	2.5	0.3	0.57	15	4	50	18,880	2.64	2.73	2.83	2.93	3.17	
CLR200-0060-0100-0250	0.6	0.1	2.5	0.3	0.57	15	4	50	18,880	2.64	2.73	2.82	2.92	3.15	
CLR200-0080-0020-0250		0.02	2.5	0.56	0.77	15	4	50	18,880	2.64	2.73	2.83	2.94	3.17	
CLR200-0080-0020-0500		0.02	5	0.56	0.77	15	4	50	21,760	5.23	5.41	5.60	5.81	6.28	
CLR200-0080-0030-0250		0.03	2.5	0.56	0.77	15	4	50	18,880	2.64	2.73	2.83	2.93	3.17	
CLR200-0080-0030-0500		0.03	2.5	0.56	0.77	15	4	50	18,880	2.64	2.73	2.83	2.93	3.17	
CLR200-0080-0030-0500	0.8	0.03	5	0.56	0.77	15	4	50	19,520	5.23	5.41	5.60	5.81	6.28	
CLR200-0080-0050-0250		0.05	2.5	0.56	0.77	15	4	50	18,880	2.64	2.73	2.83	2.93	3.17	
CLR200-0080-0050-0500	0.8	0.05	5	0.56	0.77	15	4	50	19,520	5.22	5.40	5.60	5.81	6.27	
CLR200-0080-0100-0250		0.1	2.5	0.56	0.77	15	4	50	18,880	2.64	2.73	2.82	2.92	3.15	
CLR200-0080-0100-0500		0.1	5	0.56	0.77	15	4	50	19,520	5.22	5.40	5.59	5.80	6.26	
CLR200-0100-0020-0300		1	0.02	3	0.7	0.96	15	4	50	17,600	3.18	3.29	3.41	3.53	3.82
CLR200-0100-0020-0500			0.02	5	0.7	0.96	15	4	50	19,920	5.24	5.43	5.62	5.83	6.30
CLR200-0100-0030-0300	0.03		3	0.7	0.96	15	4	50	15,840	3.18	3.29	3.40	3.53	3.82	
CLR200-0100-0030-0500	0.03		5	0.7	0.96	15	4	50	17,920	5.24	5.43	5.62	5.83	6.30	
CLR200-0100-0050-0300	0.05		3	1.2	0.96	15	4	50	15,840	3.18	3.29	3.40	3.53	3.81	
CLR200-0100-0050-0500	0.05		5	1.2	0.96	15	4	50	17,920	5.24	5.42	5.62	5.83	6.30	
CLR200-0100-0050-1000	0.05		10	1.2	0.96	15	4	50	20,000	10.41	10.77	11.16	11.58	12.51	
CLR200-0100-0100-0300	0.1		3	1.2	0.96	15	4	50	15,840	3.17	3.28	3.40	3.52	3.80	
CLR200-0100-0100-0500	0.1		5	1.2	0.96	15	4	50	17,920	5.24	5.42	5.61	5.82	6.29	
CLR200-0100-0100-1000	0.1		10	1.2	0.96	15	4	50	20,000	10.41	10.77	11.16	11.57	12.50	
CLR200-0100-0200-0300	0.2		3	0.7	0.96	15	4	50	15,840	3.17	3.28	3.39	3.51	3.78	
CLR200-0100-0200-0500	0.2		5	0.7	0.96	15	4	50	17,920	5.24	5.41	5.60	5.81	6.26	
CLR200-0150-0020-0450	1.5		0.02	4.5	1	1.44	15	4	50	20,720	4.77	4.93	5.11	5.30	5.73
CLR200-0150-0020-0750			0.02	7.5	1	1.44	15	4	50	23,520	7.87	8.14	8.43	8.75	9.46
CLR200-0150-0030-0450			0.03	4.5	1	1.44	15	4	50	18,640	4.77	4.93	5.11	5.30	5.73
CLR200-0150-0030-0750		0.03	7.5	1	1.44	15	4	50	21,120	7.87	8.14	8.43	8.75	9.46	
CLR200-0150-0050-0450		0.05	4.5	1	1.44	15	4	50	18,640	4.77	4.93	5.11	5.30	5.72	
CLR200-0150-0050-0500		0.05	5	1.5	1.44	15	4	50	18,640	5.28	5.46	5.66	5.87	6.34	
CLR200-0150-0050-0750		0.05	7.5	1	1.44	15	4	50	21,120	7.87	8.14	8.43	8.75	9.45	
CLR200-0150-0050-1000		0.05	10	1.5	1.44	15	4	50	21,120	10.45	10.81	11.20	11.62	12.56	
CLR200-0150-0100-0450		0.1	4.5	1	1.44	15	4	50	18,640	4.76	4.93	5.10	5.29	5.71	
CLR200-0150-0100-0500		0.1	5	1.5	1.44	15	4	50	18,640	5.28	5.46	5.65	5.86	6.33	
CLR200-0150-0100-0750		0.1	7.5	1	1.44	15	4	50	21,120	7.86	8.14	8.43	8.74	9.44	
CLR200-0150-0100-1000		0.1	10	1.5	1.44	15	4	50	21,120	10.45	10.81	11.20	11.61	12.55	
CLR200-0150-0200-0450		0.2	4.5	1	1.44	15	4	50	18,640	4.76	4.92	5.09	5.27	5.69	
CLR200-0150-0200-0750		0.2	7.5	1	1.44	15	4	50	21,120	7.86	8.13	8.42	8.72	9.42	
CLR200-0150-0300-0450		0.3	4.5	1	1.44	15	4	50	18,640	4.76	4.91	5.08	5.26	5.66	
CLR200-0150-0300-0750	0.3	7.5	1	1.44	15	4	50	21,120	7.86	8.12	8.40	8.71	9.39		





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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
CLR200-0200-0020-0600	2	0.02	6	1.2	1.96	15	4	50	21,360	6.28	6.50	6.73	6.98	7.55	
CLR200-0200-0020-1000		0.02	10	1.2	1.96	15	4	50	23,840	10.41	10.78	11.16	11.58	12.52	
CLR200-0200-0030-0600		0.03	6	1.2	1.96	15	4	50	19,200	6.28	6.50	6.73	6.98	7.54	
CLR200-0200-0030-1000		0.03	10	1.2	1.96	15	4	50	21,440	10.41	10.77	11.16	11.58	12.52	
CLR200-0200-0050-0600		0.05	6	1.2	1.96	15	4	50	19,200	6.28	6.49	6.73	6.98	7.54	
CLR200-0200-0050-1000		0.05	10	2	1.96	15	4	50	21,440	10.41	10.77	11.16	11.58	12.51	
CLR200-0200-0050-1500		0.05	15	2	1.96	15	4	50	23,520	15.58	16.12	16.70	17.33	18.73	
CLR200-0200-0100-0600		0.1	6	1.2	1.96	15	4	50	19,200	6.28	6.49	6.72	6.97	7.53	
CLR200-0200-0100-1000		0.1	10	2	1.96	15	4	50	21,440	10.41	10.77	11.16	11.57	12.50	
CLR200-0200-0100-1500		0.1	15	2	1.96	15	4	50	23,520	15.58	16.12	16.70	17.32	18.72	
CLR200-0200-0200-0600		0.2	6	1.2	1.96	15	4	50	19,200	6.27	6.48	6.71	6.96	7.51	
CLR200-0200-0300-0600		0.3	6	1.2	1.96	15	4	50	19,200	6.27	6.48	6.70	6.94	7.48	
CLR200-0200-0300-1000		0.3	10	1.2	1.96	15	4	50	21,360	10.40	10.76	11.13	11.54	12.45	
CLR200-0200-0500-0600		0.5	6	1.2	1.96	15	4	50	19,200	6.26	6.46	6.68	6.91	7.44	
CLR200-0200-0500-1000		0.5	10	1.2	1.96	15	4	50	21,360	10.40	10.74	11.11	11.51	12.41	
CLR200-0300-0050-1000		3	0.05	10	2	2.92	15	6	50	25,336	10.49	10.85	11.24	11.66	12.61
CLR200-0300-0050-1500			0.05	15	2	2.92	15	6	50	26,400	15.66	16.20	16.78	17.41	18.82
CLR200-0300-0100-1000			0.1	10	2	2.92	15	6	50	25,336	10.49	10.85	11.24	11.66	12.59
CLR200-0300-0100-1500	0.1		15	2	2.92	15	6	50	26,400	15.66	16.20	16.78	17.40	18.81	

## CBN 추천 절삭 조건표 Recommended Milling Conditions

■형번: CLR200  
Model number: CLR200

### 롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

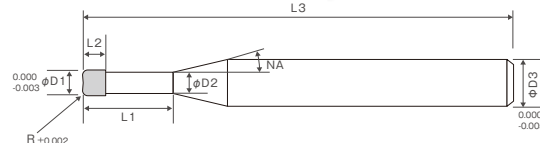
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	동 Copper				고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
			Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	
2	0.1	0.5	0.002	0.01	150	50,000	0.002	0.01	150	50,000	0.001	0.01	100	50,000	0.001	0.01	50	50,000	
			0.002	0.02	200	50,000	0.002	0.02	200	50,000	0.002	0.02	150	50,000	0.001	0.015	100	50,000	
		0.2	1	0.003	0.02	200	50,000	0.003	0.02	200	50,000	0.003	0.02	200	50,000	0.002	0.01	100	50,000
			1	0.003	0.05	500	50,000	0.003	0.05	500	50,000	0.003	0.05	400	50,000	0.002	0.03	300	50,000
		0.3	1.5	0.003	0.03	400	50,000	0.003	0.03	400	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000
			2	0.003	0.03	400	50,000	0.003	0.03	400	50,000	0.003	0.03	300	50,000	0.002	0.02	200	50,000
	0.4	1.35	0.005	0.05	500	50,000	0.005	0.05	500	50,000	0.005	0.05	400	50,000	0.003	0.02	300	50,000	
		1.5	0.005	0.05	500	50,000	0.005	0.05	500	50,000	0.005	0.05	400	50,000	0.003	0.02	300	50,000	
		2	0.005	0.05	500	50,000	0.005	0.05	500	50,000	0.005	0.05	400	50,000	0.003	0.02	300	50,000	
	0.5	1.5	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.2	800	50,000	0.01	0.1	700	50,000	
		2.5	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.003	0.05	500	50,000	
	0.6	2.5	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.005	0.1	600	50,000	0.003	0.05	500	50,000	
		2.5	0.005	0.2	800	50,000	0.005	0.2	800	50,000	0.005	0.2	800	50,000	0.003	0.1	600	40,000	
	0.8	5	0.01	0.2	1,400	50,000	0.01	0.2	1,400	50,000	0.01	0.1	1,200	50,000	0.01	0.05	1,000	40,000	
		3	0.02	0.4	1,500	48,000	0.02	0.4	1,500	48,000	0.02	0.3	1,200	48,000	0.01	0.2	1,000	32,000	
			5	0.02	0.4	1,400	48,000	0.02	0.4	1,400	48,000	0.02	0.3	1,100	48,000	0.01	0.2	1,000	32,000
	1.5	10	0.02	0.4	1,300	48,000	0.02	0.4	1,300	48,000	0.02	0.3	1,000	48,000	0.01	0.2	1,000	32,000	
			4.5	0.02	0.5	2,000	32,000	0.02	0.5	2,000	32,000	0.02	0.4	1,500	32,000	0.01	0.2	1,200	20,000
5			0.02	0.5	1,800	32,000	0.02	0.5	1,800	32,000	0.02	0.4	1,300	32,000	0.01	0.2	1,000	20,000	
7.5			0.02	0.5	1,700	32,000	0.02	0.5	1,700	32,000	0.02	0.4	1,200	32,000	0.01	0.2	900	20,000	
2	10	0.02	0.5	1,500	32,000	0.02	0.5	1,500	32,000	0.02	0.4	1,100	32,000	0.01	0.2	800	20,000		
		6	0.03	0.8	1,800	24,000	0.03	0.8	1,800	24,000	0.03	0.7	1,400	24,000	0.01	0.5	1,000	16,000	
		10	0.03	0.8	1,600	24,000	0.03	0.8	1,600	24,000	0.03	0.7	1,200	24,000	0.01	0.5	900	16,000	
3	15	0.03	0.8	1,400	24,000	0.03	0.8	1,400	24,000	0.03	0.7	1,000	24,000	0.01	0.5	800	16,000		
		10	0.03	0.6	2,000	24,000	0.03	0.6	2,000	24,000	0.03	0.5	1,500	24,000	0.01	0.3	1,200	16,000	
3	15	0.03	0.6	1,800	22,000	0.03	0.6	1,800	22,000	0.03	0.5	1,300	22,000	0.01	0.3	1,000	16,000		

●공구는 홀더에 확실하게 고정되고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭방향, 정삭 방향을 평하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.  
 ●오일 미스트 Coolant, 또는 물수용성 절삭액을 사용해주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

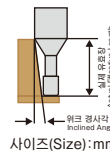
## CBN 롱 넥 래디우스 엔드밀 CBN Long Neck Radius End Mill

■형번: CLR400 Model number: CLR400

Non
BANCERA
CBN
날 수 4
헬릭스각 0°
목각 15°
Shank 0/-0.005

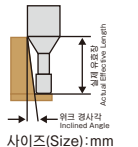


표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
CLR400-0100-0020-0300	1	0.02	3	0.7	0.96	15	4	50	21,120	3.18	3.29	3.41	3.53	3.82	
CLR400-0100-0020-0500		0.02	5	0.7	0.96	15	4	50	23,920	5.24	5.43	5.62	5.83	6.30	
CLR400-0100-0050-0300		0.05	3	1.2	0.96	15	4	50	19,040	3.18	3.29	3.40	3.53	3.81	
CLR400-0100-0050-0500		0.05	5	1.2	0.96	15	4	50	21,520	5.24	5.42	5.62	5.83	6.30	
CLR400-0100-0050-1000		0.05	10	1.2	0.96	15	4	50	24,000	10.41	10.77	11.16	11.58	12.51	
CLR400-0100-0100-0300		0.1	3	1.2	0.96	15	4	50	19,040	3.17	3.28	3.40	3.52	3.80	
CLR400-0100-0100-0400		0.1	4	1.2	0.96	15	4	50	20,280	4.21	4.35	4.51	4.67	5.04	
CLR400-0100-0100-0500		0.1	5	1.2	0.96	15	4	50	21,520	5.24	5.42	5.61	5.82	6.29	
CLR400-0100-0100-1000		0.1	10	1.2	0.96	15	4	50	24,000	10.41	10.77	11.16	11.57	12.50	
CLR400-0100-0200-0300		0.2	3	0.7	0.96	15	4	50	19,040	3.17	3.28	3.39	3.51	3.78	
CLR400-0100-0200-0500		0.2	5	0.7	0.96	15	4	50	21,520	5.24	5.41	5.60	5.81	6.26	
CLR400-0150-0020-0450		1.5	0.02	4.5	1	1.44	15	4	50	24,880	4.77	4.93	5.11	5.30	5.73
CLR400-0150-0020-0750			0.02	7.5	1	1.44	15	4	50	28,240	7.87	8.14	8.43	8.75	9.46
CLR400-0150-0050-0450			0.05	4.5	1	1.44	15	4	50	22,400	4.77	4.93	5.11	5.30	5.72
CLR400-0150-0050-0500			0.05	5	1.5	1.44	15	4	50	22,400	5.28	5.46	5.66	5.87	6.34
CLR400-0150-0050-0750			0.05	7.5	1	1.44	15	4	50	25,360	7.87	8.14	8.43	8.75	9.45
CLR400-0150-0050-1000	0.05		10	1.5	1.44	15	4	50	25,360	10.45	10.81	11.20	11.62	12.56	
CLR400-0150-0100-0450	0.1		4.5	1	1.44	15	4	50	22,400	4.76	4.93	5.10	5.29	5.71	
CLR400-0150-0100-0500	0.1		5	1.5	1.44	15	4	50	22,400	5.28	5.46	5.65	5.86	6.33	
CLR400-0150-0100-0750	0.1		7.5	1	1.44	15	4	50	25,360	7.86	8.14	8.43	8.74	9.44	
CLR400-0150-0100-1000	0.1		10	1.5	1.44	15	4	50	25,360	10.45	10.81	11.20	11.61	12.55	
CLR400-0150-0200-0450	0.2		4.5	1	1.44	15	4	50	22,400	4.76	4.92	5.09	5.27	5.69	
CLR400-0150-0200-0750	0.2		7.5	1	1.44	15	4	50	25,360	7.86	8.13	8.42	8.72	9.42	
CLR400-0200-0020-0600	2		0.02	6	1.2	1.96	15	4	50	25,680	6.28	6.50	6.73	6.98	7.55
CLR400-0200-0050-0600			0.05	6	1.2	1.96	15	4	50	23,040	6.28	6.49	6.73	6.98	7.54
CLR400-0200-0050-1000-00120			0.05	10	1.2	1.96	15	4	50	25,760	10.41	10.77	11.16	11.58	12.51
CLR400-0200-0050-1000-00200			0.05	10	2	1.96	15	4	50	25,760	10.41	10.77	11.16	11.58	12.51
CLR400-0200-0050-1500		0.05	15	2	1.96	15	4	50	28,220	15.58	16.12	16.70	17.33	18.73	
CLR400-0200-0100-0600		0.1	6	1.2	1.96	15	4	50	23,040	6.28	6.49	6.72	6.97	7.53	
CLR400-0200-0100-1000		0.1	10	2	1.96	15	4	50	25,760	10.41	10.77	11.16	11.57	12.50	



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.						
										30'	1°	1°30'	2°	3°		
CLR400-0200-0100-1500	2	0.1	15	2	1.96	15	4	50	28,220	15.58	16.12	16.70	17.32	18.72		
CLR400-0200-0200-0600		0.2	6	1.2	1.96	15	4	50	23,040	6.27	6.48	6.71	6.96	7.51		
CLR400-0200-0200-1000		0.2	10	1.2	1.96	15	4	50	25,680	10.41	10.76	11.14	11.55	12.48		
CLR400-0200-0300-0500		0.3	5	2	1.96	15	4	50	23,040	5.24	5.41	5.59	5.79	6.24		
CLR400-0200-0300-1000		0.3	10	2	1.96	15	4	50	25,680	10.40	10.76	11.13	11.54	12.45		
CLR400-0300-0050-0600	3	0.05	6	1.8	2.92	15	6	50	29,760	6.35	6.57	6.81	7.06	7.63		
CLR400-0300-0050-0900		0.05	9	1.8	2.92	15	6	50	30,400	9.46	9.78	10.13	10.51	11.36		
CLR400-0300-0050-1000		0.05	10	2	2.92	15	6	50	30,400	10.49	10.85	11.24	11.66	12.61		
CLR400-0300-0050-1200		0.05	12	1.8	2.92	15	6	50	31,040	12.56	12.99	13.46	13.96	15.09		
CLR400-0300-0050-1500-00180		0.05	15	1.8	2.92	15	6	50	31,680	15.66	16.20	16.78	17.41	18.82		
CLR400-0300-0050-1500-00200		0.05	15	2	2.92	15	6	50	31,680	15.66	16.20	16.78	17.41	18.82		
CLR400-0300-0100-0600		0.1	6	1.8	2.92	15	6	50	29,760	6.35	6.57	6.80	7.06	7.62		
CLR400-0300-0100-0900		0.1	9	1.8	2.92	15	6	50	30,400	9.45	9.78	10.13	10.51	11.35		
CLR400-0300-0100-1000		0.1	10	2	2.92	15	6	50	30,400	10.49	10.85	11.24	11.66	12.59		
CLR400-0300-0100-1200		0.1	12	1.8	2.92	15	6	50	31,040	12.55	12.99	13.45	13.96	15.08		
CLR400-0300-0100-1500-00180		0.1	15	1.8	2.92	15	6	50	31,680	15.66	16.20	16.78	17.40	18.81		
CLR400-0300-0100-1500-00200		0.1	15	2	2.92	15	6	50	31,680	15.66	16.20	16.78	17.40	18.81		
CLR400-0300-0200-0600		4	0.2	6	1.8	2.92	15	6	50	29,760	6.35	6.56	6.79	7.04	7.60	
CLR400-0300-0200-0900			0.2	9	1.8	2.92	15	6	50	30,400	9.45	9.77	10.12	10.49	11.33	
CLR400-0300-0200-1200			0.2	12	1.8	2.92	15	6	50	31,040	12.55	12.98	13.44	13.94	15.06	
CLR400-0300-0200-1500			0.2	15	1.8	2.92	15	6	50	31,680	15.65	16.19	16.77	17.39	18.79	
CLR400-0300-0300-1000	0.3		10	2	2.92	15	6	50	30,400	10.48	10.84	11.22	11.63	12.55		
CLR400-0400-0050-1500	5		0.05	15	2	3.92	15	6	50	38,020	15.66	16.20	16.78	17.41	18.82	
CLR400-0400-0100-1500			0.1	15	2	3.92	15	6	50	38,020	15.66	16.20	16.78	17.40	18.81	
CLR400-0400-0300-1500			0.3	15	2	3.92	15	6	50	38,020	15.65	16.18	16.76	17.38	18.76	
CLR400-0400-0500-1500			0.5	15	2	3.92	15	6	50	38,020	15.64	16.17	16.74	17.35	18.72	
CLR400-0500-0050-1500			5	0.05	15	2	4.92	15	6	50	44,320	15.66	16.20	16.78	FREE	FREE
CLR400-0500-0100-1500				0.1	15	2	4.92	15	6	50	44,320	15.66	16.20	16.78	FREE	FREE
CLR400-0500-0300-1500				0.3	15	2	4.92	15	6	50	44,320	15.65	16.18	16.76	FREE	FREE
CLR400-0500-0500-1500				0.5	15	2	4.92	15	6	50	44,320	15.64	16.17	16.74	FREE	FREE

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
Ion Depo A Series  
Ion Depo U Series  
DLC Series  
Non-Coat Series  
Ion Depo R Series

## CBN 추천 절삭 조건표 Recommended Milling Conditions

■형번: CLR400  
Model number: CLR400

### 롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			동 Copper				고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
4	1	3	0.03	0.4	2,500	40,000	0.03	0.4	2,500	40,000	0.03	0.3	2,000	40,000	0.01	0.2	1,500	36,000
		4	0.02	0.3	2,500	40,000	0.02	0.3	2,500	40,000	0.02	0.2	2,000	40,000	0.01	0.1	1,500	36,000
		5	0.02	0.3	2,500	40,000	0.02	0.3	2,500	40,000	0.02	0.2	2,000	40,000	0.007	0.1	1,500	36,000
		10	0.02	0.3	2,500	40,000	0.02	0.3	2,500	40,000	0.02	0.2	2,000	40,000	0.007	0.1	1,500	36,000
	1.5	4.5	0.04	0.6	3,500	36,000	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.015	0.3	1,800	24,000
		5	0.04	0.6	3,500	36,000	0.04	0.6	3,500	36,000	0.03	0.5	2,800	30,000	0.01	0.3	1,800	24,000
		7.5	0.03	0.5	3,000	36,000	0.03	0.5	3,000	36,000	0.02	0.4	2,500	30,000	0.01	0.2	1,600	24,000
	2	10	0.03	0.5	3,000	36,000	0.03	0.5	3,000	36,000	0.02	0.4	2,500	30,000	0.01	0.2	1,600	24,000
		5	0.04	0.8	3,500	30,000	0.04	0.8	3,500	30,000	0.03	0.7	2,800	24,000	0.02	0.3	1,500	16,000
		6	0.04	0.8	3,500	30,000	0.04	0.8	3,500	30,000	0.03	0.7	2,800	24,000	0.02	0.3	1,500	16,000
		10	0.03	0.6	3,000	30,000	0.03	0.6	3,000	30,000	0.02	0.5	2,400	24,000	0.01	0.3	1,300	16,000
	3	15	0.03	0.6	3,000	30,000	0.03	0.6	3,000	30,000	0.02	0.5	2,400	24,000	0.01	0.3	1,300	16,000
		6	0.05	1	4,000	24,000	0.05	1	4,000	24,000	0.04	0.85	3,200	20,000	0.02	0.6	1,500	12,000
		9	0.05	1	3,500	24,000	0.05	1	3,500	24,000	0.04	0.85	2,800	20,000	0.02	0.6	1,500	12,000
		10	0.05	1	3,500	24,000	0.05	1	3,500	24,000	0.04	0.85	2,800	20,000	0.02	0.6	1,500	12,000
4	12	0.04	0.85	3,500	24,000	0.04	0.85	3,500	24,000	0.04	0.7	2,800	20,000	0.02	0.5	1,500	12,000	
	15	0.03	0.85	3,000	24,000	0.03	0.85	3,000	24,000	0.03	0.7	2,400	20,000	0.015	0.5	1,300	12,000	
	4	15	0.03	1	3,000	22,000	0.03	1	3,000	22,000	0.03	0.8	2,400	18,000	0.015	0.6	1,300	10,000
5	15	0.03	2	2,300	20,000	0.03	2	2,300	20,000	0.03	1	1,800	20,000	0.03	0.75	1,000	20,000	

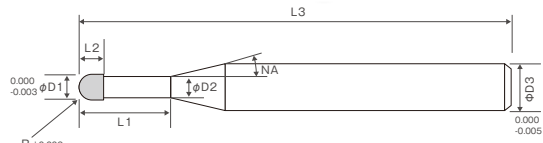
●공구는 물체에 확실하게 고정시키고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절임정온, 절삭 가동할 때는 절삭 깊이를 최대한 낮추세요. Depth of Cut shows the maximum value for finishing.  
 ●공구 돌출은 필요 이상으로 짧아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

CBN Series  
 Hard Star A Series  
 Hard Star TT Series  
 Hard Star TT Series  
 Ion Depo A Series  
 Ion Depo U Series  
 DLC Series  
 Non-Coat Series  
 Ion Depo R Series

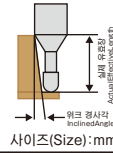
## CBN 볼 엔드밀 CBN Ball End Mill

■형번:CB200 Model number:CB200

Non
BANCERA
CBN
날수 2
헬릭스각 0°
목각 15°
Shank 0/-0.005

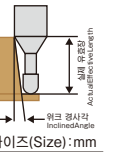


표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	볼 반경 (R) Ball R	유효장 (L1) Effective Length	차장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
CB200-0010-0050-0020	0.05	0.2	0.07	0.1	0.08	15	4	50	21,600	0.24	0.25	0.26	0.27	0.28
CB200-0010-0050-0030		0.3	0.08	0.1	0.08	15	4	50	30,560	0.35	0.36	0.37	0.38	0.41
CB200-0010-0050-0050		0.5	0.08	0.1	0.08	15	4	50	30,560	0.55	0.57	0.59	0.61	0.66
CB200-0015-0075-0045	0.075	0.45	0.12	0.15	0.13	15	4	50	30,560	0.50	0.52	0.53	0.55	0.59
CB200-0015-0075-0075		0.75	0.12	0.15	0.13	15	4	50	31,840	0.81	0.84	0.86	0.89	0.96
CB200-0020-0100-0030	0.1	0.3	0.15	0.2	0.17	15	4	50	24,400	0.36	0.37	0.38	0.39	0.42
CB200-0020-0100-0050		0.5	0.3	0.2	0.17	15	4	50	20,800	0.57	0.59	0.61	0.62	0.67
CB200-0020-0100-0060		0.6	0.15	0.2	0.17	15	4	50	25,200	0.67	0.69	0.72	0.74	0.79
CB200-0020-0100-0100		1	0.15	0.2	0.17	15	4	50	24,000	1.09	1.12	1.16	1.20	1.29
CB200-0030-0150-0030	0.15	0.3	0.23	0.3	0.27	15	4	50	24,000	0.36	0.37	0.38	0.39	0.41
CB200-0030-0150-0050-00023		0.5	0.23	0.3	0.27	15	4	50	24,400	0.57	0.58	0.60	0.62	0.66
CB200-0030-0150-0050-00030		0.5	0.3	0.3	0.27	15	4	50	24,400	0.57	0.58	0.60	0.62	0.66
CB200-0030-0150-0075	0.2	0.75	0.23	0.3	0.27	15	4	50	24,800	0.83	0.85	0.88	0.90	0.97
CB200-0040-0200-0050		0.5	0.3	0.4	0.37	15	4	50	20,000	0.57	0.58	0.59	0.61	0.64
CB200-0040-0200-0075		0.75	0.3	0.4	0.37	15	4	50	22,080	0.83	0.85	0.87	0.90	0.96
CB200-0040-0200-0100		1	0.3	0.4	0.37	15	4	50	22,480	1.08	1.12	1.15	1.18	1.27
CB200-0040-0200-0120		1.2	0.3	0.4	0.37	15	4	50	22,880	1.29	1.33	1.37	1.41	1.52
CB200-0040-0200-0135		1.35	0.4	0.4	0.37	15	4	50	20,400	1.45	1.49	1.54	1.59	1.70
CB200-0040-0200-0200		2	0.3	0.4	0.37	15	4	50	24,000	2.12	2.19	2.26	2.33	2.51
CB200-0040-0200-0300	3	0.3	0.4	0.37	15	4	50	24,000	3.15	3.26	3.37	3.48	3.75	
CB200-0050-0250-0100	0.25	1	0.38	0.5	0.47	15	4	50	22,480	1.08	1.11	1.14	1.18	1.26
CB200-0050-0250-0150		1.5	0.38	0.5	0.47	15	4	50	23,200	1.60	1.65	1.70	1.75	1.88
CB200-0050-0250-0250		2.5	0.38	0.5	0.47	15	4	50	23,200	2.63	2.72	2.81	2.90	3.12
CB200-0050-0250-0350		3.5	0.38	0.5	0.47	15	4	50	23,200	3.67	3.79	3.91	4.05	4.36
CB200-0060-0300-0120	0.3	1.2	0.5	0.6	0.57	15	4	50	20,720	1.29	1.32	1.36	1.40	1.49
CB200-0060-0300-0150		1.5	0.5	0.6	0.57	15	4	50	21,120	1.60	1.64	1.69	1.74	1.87
CB200-0060-0300-0170		1.7	0.7	0.6	0.57	15	4	50	19,200	1.81	1.86	1.91	1.97	2.11
CB200-0060-0300-0300		3	0.5	0.6	0.57	15	4	50	22,400	3.15	3.25	3.35	3.47	3.73
CB200-0060-0300-0400		4	0.5	0.6	0.57	15	4	50	22,400	4.18	4.32	4.46	4.62	4.97
CB200-0060-0300-0500		5	0.5	0.6	0.57	15	4	50	22,800	5.22	5.39	5.57	5.77	6.22



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	볼 반경 (R) Ball R	유효장 (L1) Effective Length	날경 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
CB200-0060-0300-0600	0.3	6	0.5	0.6	0.57	15	4	50	22,800	6.25	6.46	6.68	6.92	7.46
CB200-0080-0400-0160	0.4	1.6	0.6	0.8	0.77	15	4	50	20,720	1.70	1.74	1.79	1.85	1.97
CB200-0080-0400-0200		2	0.6	0.8	0.77	15	4	50	21,120	2.11	2.17	2.24	2.31	2.46
CB200-0080-0400-0400		4	0.6	0.8	0.77	15	4	50	22,400	4.18	4.31	4.45	4.60	4.95
CB200-0080-0400-0600		6	0.6	0.8	0.77	15	4	50	22,400	6.25	6.45	6.67	6.90	7.44
CB200-0100-0500-0200	0.5	2	0.7	1	0.96	15	4	50	20,720	2.13	2.18	2.25	2.31	2.46
CB200-0100-0500-0220		2.2	1.2	1	0.96	15	4	50	19,200	2.33	2.40	2.47	2.54	2.71
CB200-0100-0500-0250		2.5	0.7	1	0.96	15	4	50	21,120	2.64	2.72	2.80	2.89	3.09
CB200-0120-0600-0240	0.6	2.4	0.8	1.2	1.16	15	4	50	21,600	2.54	2.61	2.68	2.76	2.94
CB200-0120-0600-0300		3	0.8	1.2	1.16	15	4	50	22,000	3.16	3.25	3.34	3.45	3.68
CB200-0120-0600-0600		6	0.8	1.2	1.16	15	4	50	23,200	6.26	6.46	6.67	6.90	7.41
CB200-0150-0750-0300	0.75	3	1.5	1.5	1.44	15	4	50	20,000	3.19	3.28	3.37	3.47	3.70
CB200-0200-1000-0500	1	5	2	2	1.96	15	4	50	20,000	5.21	5.36	5.52	5.69	6.08
CB200-0300-1500-0500	1.5	5	2	3	2.92	15	6	50	23,200	5.27	5.40	5.55	5.70	6.06

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
Hard Star TT Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series

## CBN 추천 절삭 조건표 Recommended Milling Conditions

■형번:CB200  
Model number:CB200

### 볼 엔드밀 Ball End Mill

피삭재 Work Material			동 Copper				고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	0.1	0.2	0.005	0.005	600	40,000	0.005	0.005	600	40,000	0.005	0.005	450	40,000	0.003	0.003	300	40,000
		0.3	0.005	0.005	600	40,000	0.005	0.005	600	40,000	0.005	0.005	450	40,000	0.003	0.003	300	40,000
		0.5	0.005	0.005	500	40,000	0.005	0.005	500	40,000	0.005	0.005	350	40,000	0.003	0.003	250	40,000
	0.15	0.45	0.005	0.005	750	40,000	0.005	0.005	750	40,000	0.005	0.005	550	40,000	0.003	0.003	400	40,000
		0.75	0.005	0.005	700	40,000	0.005	0.005	700	40,000	0.005	0.005	500	40,000	0.003	0.003	400	40,000
	0.2	0.3	0.005	0.01	1,200	40,000	0.005	0.01	1,200	40,000	0.005	0.01	900	40,000	0.005	0.005	600	40,000
		0.5	0.005	0.01	1,200	40,000	0.005	0.01	1,200	40,000	0.005	0.01	900	40,000	0.005	0.005	600	40,000
		0.6	0.005	0.01	1,100	40,000	0.005	0.01	1,100	40,000	0.005	0.01	850	40,000	0.005	0.005	550	40,000
	0.3	1	0.005	0.01	1,000	40,000	0.005	0.01	1,000	40,000	0.005	0.01	800	40,000	0.005	0.005	500	40,000
		0.3	0.01	0.02	1,800	40,000	0.01	0.02	1,800	40,000	0.01	0.02	1,500	40,000	0.005	0.01	1,000	40,000
		0.5	0.01	0.02	1,800	40,000	0.01	0.02	1,800	40,000	0.01	0.02	1,500	40,000	0.005	0.01	1,000	40,000
	0.4	0.75	0.01	0.02	1,800	40,000	0.01	0.02	1,800	40,000	0.01	0.02	1,500	40,000	0.005	0.01	1,000	40,000
		1	0.01	0.02	1,800	40,000	0.01	0.02	1,800	40,000	0.01	0.02	1,500	40,000	0.005	0.01	1,000	40,000
		1.2	0.01	0.02	1,500	40,000	0.01	0.02	1,500	40,000	0.01	0.02	1,200	40,000	0.005	0.01	800	40,000
	0.5	1.35	0.01	0.02	1,500	40,000	0.01	0.02	1,500	40,000	0.01	0.02	1,200	40,000	0.005	0.01	800	40,000
		2	0.01	0.02	1,500	40,000	0.01	0.02	1,500	40,000	0.01	0.02	1,200	40,000	0.005	0.01	800	40,000
		3	0.01	0.02	1,500	40,000	0.01	0.02	1,500	40,000	0.01	0.02	1,200	40,000	0.005	0.01	800	40,000
	0.6	1	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	1,800	40,000	0.01	0.02	1,200	40,000
		1.5	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	1,800	40,000	0.01	0.02	1,200	40,000
		2.5	0.02	0.04	2,000	40,000	0.02	0.04	2,000	40,000	0.02	0.03	1,500	40,000	0.01	0.02	1,000	40,000
		3.5	0.02	0.04	2,000	40,000	0.02	0.04	2,000	40,000	0.02	0.03	1,500	40,000	0.01	0.02	1,000	40,000
	0.8	1.2	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000
		1.5	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000
		1.7	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000
3		0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000	
4		0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000	
5		0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000	
1	6	0.02	0.04	2,500	40,000	0.02	0.04	2,500	40,000	0.02	0.03	2,000	40,000	0.01	0.02	1,500	40,000	
	1.6	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.02	0.03	2,000	30,000	
	2	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.02	0.03	2,000	30,000	
1.2	4	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.02	0.03	2,000	30,000	
	6	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.03	0.05	3,000	40,000	0.02	0.03	2,000	30,000	
	2	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000	
1.5	2.2	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000	
	2.5	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000	
	2.4	0.08	0.15	2,300	20,000	0.08	0.15	2,300	20,000	0.05	0.075	2,100	20,000	0.04	0.06	1,300	15,000	
2	3	0.08	0.15	2,300	20,000	0.08	0.15	2,300	20,000	0.05	0.075	2,100	20,000	0.04	0.06	1,300	15,000	
	6	0.04	0.12	2,200	20,000	0.04	0.12	2,200	20,000	0.03	0.06	2,000	20,000	0.03	0.05	1,200	15,000	
3	3	0.08	0.15	2,300	20,000	0.08	0.15	2,300	20,000	0.05	0.075	2,100	20,000	0.04	0.06	1,300	15,000	
	5	0.08	0.15	2,000	17,000	0.08	0.15	2,000	17,000	0.05	0.08	1,700	15,000	0.04	0.06	1,200	12,000	
3	5	0.11	0.21	1,700	10,000	0.11	0.21	1,700	10,000	0.08	0.12	1,400	10,000	0.07	0.1	1,000	10,000	

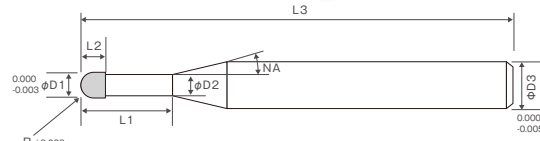
●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량은, 정삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●공구 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

CBN Series  
Ball End Mill  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
Ion Depo A Series  
Ion Depo U Series  
DLC Series  
Non-Coat Series  
Ion Depo R Series

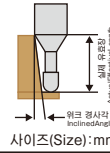


## CBN 롱 넥 볼 엔드밀 CBN Long Neck Ball End Mill

■형번:CLB200 Model number:CLB200



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. CodeNo.	볼 반경 (R) Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
										사이즈(Size)-mm					
CLB200-0100-0500-0300	0.5	3	1.2	1	0.96	15	4	50	20,480	3.16	3.25	3.35	3.46	3.71	
CLB200-0100-0500-0400		4	0.7	1	0.96	15	4	50	22,400	4.20	4.32	4.46	4.61	4.95	
CLB200-0100-0500-0500		5	1.2	1	0.96	15	4	50	20,480	5.23	5.39	5.57	5.76	6.19	
CLB200-0100-0500-0600		6	0.7	1	0.96	15	4	50	22,400	6.26	6.46	6.68	6.91	7.44	
CLB200-0100-0500-0800		8	0.7	1	0.96	15	4	50	22,800	8.33	8.60	8.90	9.21	9.92	
CLB200-0100-0500-1000		10	1.2	1	0.96	15	4	50	21,280	10.40	10.74	11.11	11.51	12.41	
CLB200-0150-0750-0380	0.75	3.8	1	1.5	1.44	15	4	50	22,000	4.02	4.13	4.26	4.39	4.69	
CLB200-0150-0750-0500		5	1.5	1.5	1.44	15	4	50	22,080	5.26	5.42	5.59	5.77	6.18	
CLB200-0150-0750-0750		7.5	1	1.5	1.44	15	4	50	23,200	7.84	8.09	8.36	8.64	9.29	
CLB200-0150-0750-1000		10	1.5	1.5	1.44	15	4	50	22,080	10.43	10.76	11.13	11.52	12.40	
CLB200-0150-0750-1500		15	1	1.5	1.44	15	4	50	23,200	15.60	16.11	16.67	17.27	18.61	
CLB200-0200-1000-0400		1	4	1.2	2	1.96	15	4	50	22,000	4.18	4.29	4.41	4.54	4.83
CLB200-0200-1000-0500	5		2	2	1.96	15	4	50	20,000	5.21	5.36	5.52	5.69	6.08	
CLB200-0200-1000-0600	6		1.2	2	1.96	15	4	50	23,200	6.25	6.43	6.63	6.84	7.32	
CLB200-0200-1000-0800	8		1.2	2	1.96	15	4	50	23,200	8.31	8.57	8.84	9.14	9.81	
CLB200-0200-1000-1000	10		2	2	1.96	15	4	50	22,080	10.38	10.71	11.06	11.44	12.29	
CLB200-0200-1000-1400	14		1.2	2	1.96	15	4	50	23,600	14.51	14.99	15.49	16.04	17.27	
CLB200-0200-1000-1500	15		2	2	1.96	15	4	50	22,080	15.55	16.06	16.60	17.19	18.51	
CLB200-0200-1000-2000	20		1.2	2	1.96	15	4	50	23,600	20.72	21.40	22.14	22.94	FREE	
CLB200-0300-1500-0600	1.5		6	1.8	3	2.92	15	6	50	23,200	6.31	6.47	6.65	6.85	7.30
CLB200-0300-1500-0900			9	1.8	3	2.92	15	6	50	24,000	9.41	9.68	9.98	10.30	11.03
CLB200-0300-1500-1000		10	2	3	2.92	15	6	50	24,000	10.44	10.75	11.09	11.45	12.27	
CLB200-0300-1500-1500		15	2	3	2.92	15	6	50	24,800	15.61	16.10	16.63	17.20	18.49	

## CBN 추천 절삭 조건표 Recommended Milling Conditions

■형번:CLB200  
Model number:CLB200

### 롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material	동 Copper	고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)								
		Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed					
		∅pmm	∅emm	mm/min	min <sup>-1</sup>	∅pmm	∅emm	mm/min	min <sup>-1</sup>	∅pmm	∅emm	mm/min	min <sup>-1</sup>					
날수 Number of Flutes	1	3	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000
		4	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000
		5	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000
		6	0.05	0.1	3,000	30,000	0.05	0.1	3,000	30,000	0.03	0.05	3,000	30,000	0.03	0.03	2,000	25,000
		8	0.04	0.09	2,800	28,000	0.04	0.09	2,800	28,000	0.02	0.04	2,800	28,000	0.02	0.02	1,800	23,000
	1.5	10	0.03	0.08	2,600	28,000	0.03	0.08	2,600	28,000	0.01	0.03	2,800	28,000	0.01	0.01	1,600	23,000
		3.8	0.08	0.15	2,300	20,000	0.08	0.15	2,300	20,000	0.05	0.075	2,100	20,000	0.04	0.06	1,300	16,000
		5	0.08	0.15	2,300	20,000	0.08	0.15	2,300	20,000	0.05	0.075	2,100	20,000	0.04	0.06	1,300	16,000
		7.5	0.07	0.12	2,100	20,000	0.07	0.12	2,100	20,000	0.04	0.065	2,000	20,000	0.03	0.05	1,200	16,000
		10	0.07	0.12	2,100	20,000	0.07	0.12	2,100	20,000	0.04	0.065	2,000	20,000	0.03	0.05	1,200	16,000
	2	15	0.06	0.1	2,000	18,000	0.06	0.1	2,000	18,000	0.03	0.06	1,900	18,000	0.02	0.04	1,100	15,000
		4	0.08	0.15	2,000	17,000	0.08	0.15	2,000	17,000	0.05	0.08	1,700	17,000	0.04	0.06	1,200	12,000
		5	0.08	0.15	2,000	17,000	0.08	0.15	2,000	17,000	0.05	0.08	1,700	17,000	0.04	0.06	1,200	12,000
		6	0.08	0.15	2,000	17,000	0.08	0.15	2,000	17,000	0.05	0.08	1,700	17,000	0.04	0.06	1,200	12,000
		8	0.07	0.13	1,800	17,000	0.07	0.13	1,800	17,000	0.04	0.06	1,500	17,000	0.03	0.04	1,100	12,000
10		0.07	0.13	1,800	16,000	0.07	0.13	1,800	16,000	0.04	0.06	1,500	16,000	0.03	0.04	1,100	11,000	
14		0.06	0.12	1,700	16,000	0.06	0.12	1,700	16,000	0.03	0.05	1,400	16,000	0.02	0.04	1,000	11,000	
15		0.06	0.12	1,700	16,000	0.06	0.12	1,700	16,000	0.03	0.05	1,400	16,000	0.01	0.03	900	11,000	
20		0.04	0.1	1,600	16,000	0.04	0.1	1,600	16,000	0.02	0.04	1,300	16,000	0.01	0.02	800	11,000	
3		6	0.1	0.2	1,700	10,000	0.1	0.2	1,700	10,000	0.08	0.12	1,400	10,000	0.07	0.1	1,000	10,000
	9	0.1	0.2	1,700	10,000	0.1	0.2	1,700	10,000	0.08	0.12	1,400	10,000	0.07	0.1	1,000	10,000	
	10	0.08	0.18	1,500	10,000	0.08	0.18	1,500	10,000	0.07	0.1	1,300	10,000	0.06	0.08	800	10,000	
	15	0.07	0.16	1,500	10,000	0.07	0.16	1,500	10,000	0.05	0.09	1,300	10,000	0.04	0.07	800	10,000	

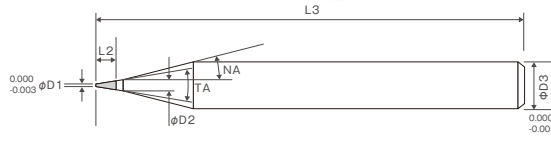
●공구는 홀더에 확실하게 고정되고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입방향을, 절삭 깊이를 표시하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●공구 뒤편은 필요 이상으로 하지 않아주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



## CBN 테이퍼 엔드밀 CBN Taper End Mill (for Engraving)

■형번:CTP200 Model number:CTP200

Non
BANCERA
CBN
날 수 2
헬릭스각 0°
목각 15°
Shank  
0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	테이퍼 각 (TA) <sup>°</sup> Taper Angle	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
CTP200-0005	0.05	40	0.7	0.6	15	4	50	36,000
CTP200-0010	0.1	40	0.68	0.6	15	4	50	27,200

## CBN 추천 절삭 조건표 Recommended Milling Conditions

■형번:CTP200  
Model number:CTP200

### 테이퍼 엔드밀 Taper End Mill

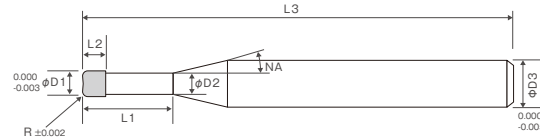
피삭재 Work Material	동 Copper														
	고경도강 Hardened Steels STAVAX/HPM (~55HRC)			고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
	날 수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
2	0.05	0.7	0.003	∂p mm	∂e mm	mm/min	min <sup>-1</sup>	∂p mm	∂e mm	mm/min	min <sup>-1</sup>	∂p mm	∂e mm	mm/min	min <sup>-1</sup>
				0.003	0.03	300	50,000	0.003	0.03	300	50,000	0.003	0.03	300	50,000
2	0.1	0.68	0.003	∂p mm	∂e mm	mm/min	min <sup>-1</sup>	∂p mm	∂e mm	mm/min	min <sup>-1</sup>	∂p mm	∂e mm	mm/min	min <sup>-1</sup>
				0.003	0.03	400	50,000	0.003	0.03	400	50,000	0.003	0.03	350	50,000

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 장식 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∂p 축 방향, ∂e 반경 방향. ∂p=Axial Depth of Cut ∂e=Radial Depth of Cut.  
●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 중립인 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

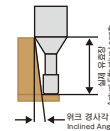
## CBN 래핑 래디우스 엔드밀 CBN Lapping Radius End Mill

■형번: CRL200 Model number: CRL200

Non
BANCERA
CBN
날 수 2
헬릭스각 0°
목각 15°
Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.



사이즈(Size): mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA)° Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
CRL200-0040-0100-0135	0.4	0.1	1.35	0.4	0.37	15	4	50	22,880	1.45	1.50	1.55	1.60	1.72
CRL200-0050-0100-0150	0.5	0.1	1.5	0.5	0.47	15	4	50	19,010	1.61	1.66	1.71	1.77	1.91
CRL200-0060-0100-0170	0.6	0.1	1.7	0.7	0.57	15	4	50	19,010	1.81	1.87	1.94	2.00	2.16
CRL200-0060-0200-0170		0.2	1.7	0.7	0.57	15	4	50	19,010	1.81	1.86	1.92	1.99	2.14
CRL200-0100-0100-0220	1	0.1	2.2	1.2	0.96	15	4	50	17,420	2.35	2.43	2.51	2.60	2.80
CRL200-0100-0200-0220		0.2	2.2	1.2	0.96	15	4	50	17,420	2.34	2.42	2.50	2.59	2.78
CRL200-0100-0300-0220		0.3	2.2	1.2	0.96	15	4	50	17,420	2.34	2.41	2.49	2.57	2.76
CRL200-0150-0100-0300	1.5	0.1	3	1.5	1.44	15	4	50	20,500	3.21	3.32	3.44	3.56	3.85
CRL200-0150-0200-0300		0.2	3	1.5	1.44	15	4	50	20,500	3.21	3.31	3.43	3.55	3.82
CRL200-0150-0300-0300		0.3	3	1.5	1.44	15	4	50	20,500	3.21	3.31	3.42	3.53	3.80
CRL200-0200-0100-0500	2	0.1	5	2	1.96	15	4	50	21,120	5.24	5.42	5.61	5.82	6.29
CRL200-0200-0200-0500		0.2	5	2	1.96	15	4	50	21,120	5.24	5.41	5.60	5.81	6.26
CRL200-0200-0300-0500		0.3	5	2	1.96	15	4	50	21,120	5.24	5.41	5.59	5.79	6.24
CRL200-0300-0100-0500	3	0.1	5	2	2.92	15	6	50	23,230	5.32	5.50	5.70	5.91	6.38
CRL200-0300-0200-0500		0.2	5	2	2.92	15	6	50	23,230	5.32	5.49	5.69	5.89	6.35
CRL200-0300-0300-0500		0.3	5	2	2.92	15	6	50	23,230	5.31	5.49	5.67	5.88	6.33

## CBN 추천 절삭 조건표 Recommended Milling Conditions

■형번: CRL200  
Model number: CRL200

### 래핑 래디우스 엔드밀 Radius End Mill (for Lap)

피삭재 Work Material	동 Copper																	
	고경도강 Hardened Steels STAVAX/HPM (~55HRC)			고경도강 Hardened Steels SKD11/SKH51 (~60HRC)			고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)					
	날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut	Feed	Spindle Speed	Depth of Cut	Feed	Spindle Speed	Depth of Cut	Feed	Spindle Speed	Depth of Cut	Feed	Spindle Speed			
2	0.4	1.35	0.005	0.01	900	30,000	0.005	0.05	800	30,000	0.005	0.05	700	30,000	0.005	0.05	600	30,000
	0.5	1.5	0.005	0.01	900	30,000	0.005	0.05	800	30,000	0.005	0.05	700	30,000	0.005	0.05	600	30,000
	0.6	1.7	0.005	0.01	900	30,000	0.005	0.1	800	30,000	0.005	0.1	700	30,000	0.005	0.1	600	30,000
	1	2.2	0.01	0.015	1,100	30,000	0.01	0.2	1,000	30,000	0.01	0.2	900	30,000	0.01	0.2	800	30,000
	1.5	3	0.01	0.02	1,100	20,000	0.01	0.5	1,000	20,000	0.01	0.5	900	20,000	0.01	0.5	800	20,000
	2	5	0.01	0.03	1,100	20,000	0.01	0.7	1,000	20,000	0.01	0.7	900	20,000	0.01	0.7	800	20,000
3	5	0.01	0.04	1,100	20,000	0.01	1	1,000	20,000	0.01	1	900	20,000	0.01	1	800	20,000	

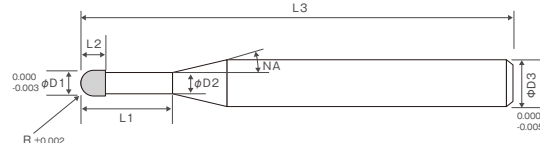
●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭깊은, 정삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●공구 돌출은 절삭 가공의 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
●rpm & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

CBN Series  
Hard Star A Series  
Hard Star T1 Series  
Hard Star TT Series  
Ion Depo A Series  
Ion Depo U Series  
DLC Series  
Non-Coat Series  
Ion Depo R Series

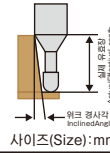
## CBN 래핑 볼 엔드밀 CBN Lapping Ball End Mill

■형번:CBL200 Model number:CBL200

Non
BANCERA
CBN
날 수 2
헬릭스각 0°
목각 15°
Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	볼 반경 (R) Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA)° Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30°	1°	1°30'	2°	3°
CBL200-0040-0200-0135	0.2	1.35	0.4	0.4	0.37	15	4	50	22,880	1.45	1.49	1.54	1.59	1.70
CBL200-0060-0300-0170	0.3	1.7	0.7	0.6	0.57	15	4	50	21,120	1.81	1.86	1.91	1.97	2.11
CBL200-0100-0500-0220	0.5	2.2	1.2	1	0.96	15	4	50	20,720	2.33	2.40	2.47	2.54	2.71
CBL200-0150-0750-0300	0.75	3	1.5	1.5	1.44	15	4	50	21,600	3.19	3.28	3.37	3.47	3.70
CBL200-0150-0750-0500		5	1.5	1.5	1.44	15	4	50	23,200	5.26	5.42	5.59	5.77	6.18
CBL200-0150-0750-1000		10	1.5	1.5	1.44	15	4	50	23,200	10.43	10.76	11.13	11.52	12.40
CBL200-0200-1000-0500	1	5	2	2	1.96	15	4	50	22,000	5.21	5.36	5.52	5.69	6.08
CBL200-0200-1000-1000		10	2	2	1.96	15	4	50	23,600	10.38	10.71	11.06	11.44	12.29
CBL200-0200-1000-1500		15	2	2	1.96	15	4	50	23,600	15.55	16.06	16.60	17.19	18.51
CBL200-0300-1500-0500	1.5	5	2	3	2.92	15	6	50	23,200	5.27	5.40	5.55	5.70	6.06
CBL200-0300-1500-1000		10	2	3	2.92	15	6	50	24,000	10.44	10.75	11.09	11.45	12.27
CBL200-0300-1500-1500		15	2	3	2.92	15	6	50	24,800	15.61	16.10	16.63	17.20	18.49

## CBN 추천 절삭 조건표 Recommended Milling Conditions

■형번:CBL200  
Model number:CBL200

### 래핑 볼 엔드밀 Ball End Mill(for Lap)

피삭재 Work Material	동 Copper	고경도강 Hardened Steels STAVAX/HPM (~55HRC)			고경도강 Hardened Steels SKD11/SKH51 (~60HRC)			고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)													
		Depth of Cut		Feed	Depth of Cut		Feed	Depth of Cut		Feed	Depth of Cut		Feed								
		∅p mm	∅e mm	mm/min	∅p mm	∅e mm	mm/min	∅p mm	∅e mm	mm/min	∅p mm	∅e mm	mm/min								
날 수 Number of Flutes 2	외경 Dia.	유효장 Effective Length	Spindle Speed	0.4	1.35	0.005	0.01	900	30,000	0.005	0.01	800	30,000	0.005	0.01	700	30,000	0.005	0.01	600	30,000
				0.6	1.7	0.005	0.01	900	30,000	0.005	0.01	800	30,000	0.005	0.01	700	30,000	0.005	0.01	600	30,000
				1	2.2	0.01	0.015	1,100	30,000	0.01	0.015	1,000	30,000	0.01	0.015	900	30,000	0.01	0.015	800	30,000
				1.5	3	0.01	0.02	1,100	30,000	0.01	0.02	1,000	30,000	0.01	0.02	900	30,000	0.01	0.02	800	30,000
					5	0.01	0.02	1,100	30,000	0.01	0.02	1,000	30,000	0.01	0.02	900	30,000	0.01	0.02	800	30,000
				2	10	0.01	0.015	1,100	30,000	0.01	0.015	1,000	30,000	0.01	0.015	900	30,000	0.01	0.015	800	30,000
					5	0.01	0.03	1,100	20,000	0.01	0.03	1,000	20,000	0.01	0.03	900	20,000	0.01	0.03	800	20,000
				3	10	0.01	0.03	1,100	20,000	0.01	0.03	1,000	20,000	0.01	0.03	900	20,000	0.01	0.03	800	20,000
					15	0.01	0.025	1,100	20,000	0.01	0.025	1,000	20,000	0.01	0.025	900	20,000	0.01	0.025	800	20,000
				3	5	0.01	0.04	1,100	20,000	0.01	0.04	1,000	20,000	0.01	0.04	900	20,000	0.01	0.04	800	20,000
					10	0.01	0.04	1,100	20,000	0.01	0.04	1,000	20,000	0.01	0.04	900	20,000	0.01	0.04	800	20,000
				15	0.01	0.035	1,100	20,000	0.01	0.035	1,000	20,000	0.01	0.035	900	20,000	0.01	0.035	800	20,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량, 절삭 기공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

## 초경 엔드밀 Carbide End Mill

Hard A
super MG
날 수 2~6
헬릭스각 30°
목각 15°
Shank 0/-0.005



### 특징

- 당사 독자적인 스퍼터링 방식의 코팅기술을 사용한 코팅 Hard Star Type A는 폭넓은 피삭재 정삭 가공에 최적!
- 평활한 코팅으로 마모 진행을 균일화하고 우수한 수명 실현!
- 당사 독자적인 재연마, 재코팅 기술로 성능 열화를 억제해 한층 더 원가 절감에 공헌!
- 표준품 외 특별 주문품도 단납기에 제공 가능!

### Features

- Hard Star Type A coating with our original Sputtering Method Coating Technology is ideal for finishing a wide range of work materials.
- Smooth surface of the coating creates uniformed wear achieving greater tool life.
- TOWA re-polishing and re-coating technology enhances cutting tool life and reduces overall tooling cost.
- Non-standard custom-made products available.

## 초경 스퀘어 엔드밀 Carbide Square End Mill

Hard A
super MG
날 수 2
헬릭스각 30°
목각 15°
Shank 0/-0.005

■ 형번: HAS230 Model number: HAS230



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의에 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
HAS230-0010-00020	0.1	0.2	15	4	50	5,760
HAS230-0020-00040	0.2	0.4	15	4	50	3,680
HAS230-0030-00060	0.3	0.6	15	4	50	2,880
HAS230-0040-00080	0.4	0.8	15	4	50	3,360
HAS230-0050-00100	0.5	1	15	4	50	2,000
HAS230-0060-00120	0.6	1.2	15	4	50	2,800
HAS230-0070-00140	0.7	1.4	15	4	50	3,040
HAS230-0080-00160	0.8	1.6	15	4	50	2,000
HAS230-0090-00180	0.9	1.8	15	4	50	3,040
HAS230-0100-00200	1	2	15	4	50	1,760
HAS230-0110-00220	1.1	2.2	15	4	50	3,120
HAS230-0120-00240	1.2	2.4	15	4	50	2,000
HAS230-0130-00260	1.3	2.6	15	4	50	3,120
HAS230-0140-00280	1.4	2.8	15	4	50	3,120
HAS230-0150-00300	1.5	3	15	4	50	1,840
HAS230-0160-00320	1.6	3.2	15	4	50	3,120
HAS230-0170-00340	1.7	3.4	15	4	50	3,120
HAS230-0180-00360	1.8	3.6	15	4	50	2,000
HAS230-0190-00380	1.9	3.8	15	4	50	3,120
HAS230-0200-00400	2	4	15	4	50	1,840
HAS230-0210-00420	2.1	4.2	15	4	50	3,120
HAS230-0220-00440	2.2	4.4	15	4	50	3,120
HAS230-0230-00460	2.3	4.6	15	4	50	3,120
HAS230-0240-00480	2.4	4.8	15	4	50	3,120
HAS230-0250-00500	2.5	5	15	4	50	1,840
HAS230-0260-00520	2.6	5.2	15	4	50	4,000
HAS230-0270-00540	2.7	5.4	15	4	50	4,000
HAS230-0280-00560	2.8	5.6	15	4	50	4,000
HAS230-0290-00580	2.9	5.8	15	4	50	4,000
HAS230-0300-00600	3	6	15	4	50	2,320
HAS230-0350-00700	3.5	7	15	6	50	3,520
HAS230-0400-00800	4	8	15	6	50	2,560
HAS230-0450-00900	4.5	9	15	6	50	4,000
HAS230-0500-01000	5	10	15	6	50	2,720
HAS230-0550-01100	5.5	11	15	6	50	4,000
HAS230-0600-01200	6	12	—	6	50	2,960

CBN Series  
 Hard Star A Series  
 Hard Star TT Series  
 Hard Star TT Series  
 Ion Depo A Series  
 Ion Depo U Series  
 DLC Series  
 Non-Coat Series  
 Ion Depo R Series

# HARD STAR Type A Series

# HARD STAR Type A Series

**HARD STAR Type A 추천 절삭 조건표**  
Recommended Milling Conditions

**■형번:HAS230**  
Model number:HAS230

**스퀘어 엔드밀 Square End Mill**

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.1	0.2	0.1	0.002	130	40,000	0.1	0.002	100	40,000	0.1	0.002	70	40,000
	0.2	0.4	0.2	0.004	200	30,000	0.2	0.004	160	30,000	0.2	0.004	120	30,000
	0.3	0.6	0.3	0.006	300	30,000	0.3	0.006	250	30,000	0.3	0.006	200	30,000
	0.4	0.8	0.4	0.008	370	30,000	0.4	0.008	340	30,000	0.4	0.008	260	25,000
	0.5	1	0.5	0.01	450	25,000	0.5	0.01	400	23,000	0.5	0.01	360	20,000
	0.6	1.2	0.6	0.012	530	25,000	0.6	0.012	430	23,000	0.6	0.012	380	20,000
	0.7	1.4	0.7	0.014	650	25,000	0.7	0.014	500	23,000	0.7	0.014	450	20,000
	0.8	1.6	0.8	0.016	780	25,000	0.8	0.016	650	23,000	0.8	0.016	550	20,000
	0.9	1.8	0.9	0.018	800	25,000	0.9	0.018	700	23,000	0.9	0.018	600	20,000
	1	2	1	0.02	1,000	23,000	1	0.02	900	18,000	1	0.02	600	14,000
	1.1	2.2	1.1	0.022	1,000	23,000	1.1	0.022	900	18,000	1.1	0.022	600	14,000
	1.2	2.4	1.2	0.024	1,000	23,000	1.2	0.024	900	18,000	1.2	0.024	600	14,000
	1.3	2.6	1.3	0.026	1,000	23,000	1.3	0.026	900	18,000	1.3	0.026	600	14,000
	1.4	2.8	1.4	0.028	1,000	23,000	1.4	0.028	900	18,000	1.4	0.028	600	14,000
	1.5	3	1.5	0.03	900	20,000	1.5	0.03	800	18,000	1.5	0.03	600	14,000
	1.6	3.2	1.6	0.032	900	20,000	1.6	0.032	800	18,000	1.6	0.032	600	14,000
	1.7	3.4	1.7	0.034	900	20,000	1.7	0.034	800	18,000	1.7	0.034	600	14,000
	1.8	3.6	1.8	0.036	900	20,000	1.8	0.036	800	18,000	1.8	0.036	600	14,000
	1.9	3.8	1.9	0.038	900	20,000	1.9	0.038	800	18,000	1.9	0.038	600	14,000
	2	4	2	0.04	900	18,000	2	0.04	750	15,000	2	0.04	550	12,000
	2.1	4.2	2.1	0.042	900	18,000	2.1	0.042	750	15,000	2.1	0.042	550	12,000
	2.2	4.4	2.2	0.044	900	18,000	2.2	0.044	750	15,000	2.2	0.044	550	12,000
	2.3	4.6	2.3	0.046	900	18,000	2.3	0.046	750	15,000	2.3	0.046	550	12,000
	2.4	4.8	2.4	0.048	900	18,000	2.4	0.048	750	15,000	2.4	0.048	550	12,000
2.5	5	2.5	0.05	800	14,000	2.5	0.05	700	10,000	2.5	0.05	500	8,000	
2.6	5.2	2.6	0.052	800	14,000	2.6	0.052	700	10,000	2.6	0.052	500	8,000	
2.7	5.4	2.7	0.054	800	14,000	2.7	0.054	700	10,000	2.7	0.054	500	8,000	
2.8	5.6	2.8	0.056	800	14,000	2.8	0.056	700	10,000	2.8	0.056	500	8,000	
2.9	5.8	2.9	0.058	800	14,000	2.9	0.058	700	10,000	2.9	0.058	500	8,000	
3	6	3	0.06	850	14,000	3	0.06	750	10,000	3	0.06	550	8,000	
3.5	7	3.5	0.07	850	14,000	3.5	0.07	750	10,000	3.5	0.07	550	8,000	
4	8	4	0.08	850	10,000	4	0.08	750	9,000	4	0.08	650	9,000	
4.5	9	4.5	0.09	850	10,000	4.5	0.09	750	9,000	4.5	0.09	650	9,000	
5	10	5	0.1	800	6,000	5	0.1	700	5,000	5	0.1	600	4,500	
5.5	11	5.5	0.11	800	6,000	5.5	0.11	700	5,000	5.5	0.11	600	4,500	
6	12	6	0.12	800	5,000	6	0.12	700	4,000	6	0.12	700	3,500	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량은, 장삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p, ∅e 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 쿨런트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

**스퀘어 엔드밀 Square End Mill**

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발트(Kovar)			
날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.1	0.2	0.1	0.02	60	50,000	0.1	0.02	60	50,000	0.1	0.003	60	50,000
	0.2	0.4	0.2	0.04	90	50,000	0.2	0.04	90	50,000	0.2	0.006	90	50,000
	0.3	0.6	0.3	0.06	150	50,000	0.3	0.06	150	50,000	0.3	0.009	150	50,000
	0.4	0.8	0.4	0.08	200	50,000	0.4	0.08	200	50,000	0.4	0.012	200	50,000
	0.5	1	0.5	0.1	250	50,000	0.5	0.1	250	50,000	0.5	0.015	250	50,000
	0.6	1.2	0.6	0.12	250	50,000	0.6	0.12	250	50,000	0.6	0.018	250	50,000
	0.7	1.4	0.7	0.14	250	50,000	0.7	0.14	250	50,000	0.7	0.021	250	50,000
	0.8	1.6	0.8	0.16	450	50,000	0.8	0.16	450	50,000	0.8	0.024	450	50,000
	0.9	1.8	0.9	0.18	450	50,000	0.9	0.18	450	50,000	0.9	0.027	450	50,000
	1	2	1	0.2	550	48,000	1	0.2	550	48,000	0.2	0.03	550	48,000
	1.1	2.2	1.1	0.22	550	48,000	1.1	0.22	550	48,000	1.1	0.033	550	48,000
	1.2	2.4	1.2	0.24	550	48,000	1.2	0.24	550	48,000	1.2	0.036	550	48,000
	1.3	2.6	1.3	0.26	550	48,000	1.3	0.26	550	48,000	1.3	0.039	550	48,000
	1.4	2.8	1.4	0.28	550	48,000	1.4	0.28	550	48,000	1.4	0.042	550	48,000
	1.5	3	1.5	0.3	640	32,000	1	0.2	640	32,000	1	0.045	640	32,000
	1.6	3.2	1.6	0.32	640	32,000	1.6	0.32	640	32,000	1.6	0.048	640	32,000
	1.7	3.4	1.7	0.34	640	32,000	1.7	0.34	640	32,000	1.7	0.051	640	32,000
	1.8	3.6	1.8	0.36	640	32,000	1.8	0.36	640	32,000	1.8	0.054	640	32,000
	1.9	3.8	1.9	0.38	640	32,000	1.9	0.38	640	32,000	1.9	0.057	640	32,000
	2	4	2	0.4	720	24,000	2	0.4	720	24,000	2	0.06	720	24,000
	2.1	4.2	2.1	0.42	720	24,000	2.1	0.42	720	24,000	2.1	0.063	720	24,000
	2.2	4.4	2.2	0.44	720	24,000	2.2	0.44	720	24,000	2.2	0.066	720	24,000
	2.3	4.6	2.3	0.46	720	24,000	2.3	0.46	720	24,000	2.3	0.069	720	24,000
	2.4	4.8	2.4	0.48	720	24,000	2.4	0.48	720	24,000	2.4	0.072	720	24,000
2.5	5	2.5	0.5	760	20,000	2.5	0.5	760	20,000	2.5	0.075	760	20,000	
2.6	5.2	2.6	0.52	760	20,000	2.6	0.52	760	20,000	2.6	0.078	760	20,000	
2.7	5.4	2.7	0.54	760	20,000	2.7	0.54	760	20,000	2.7	0.081	760	20,000	
2.8	5.6	2.8	0.56	760	20,000	2.8	0.56	760	20,000	2.8	0.084	760	20,000	
2.9	5.8	2.9	0.58	760	20,000	2.9	0.58	760	20,000	2.9	0.087	760	20,000	
3	6	3	0.6	800	16,000	3	0.6	800	16,000	3	0.09	800	16,000	
3.5	7	3.5	0.7	800	16,000	3.5	0.7	800	16,000	3.5	0.105	800	16,000	
4	8	4	0.8	830	12,000	4	0.8	830	12,000	4	0.12	830	12,000	
4.5	9	4.5	0.9	830	12,000	4.5	0.9	830	12,000	4.5	0.135	830	12,000	
5	10	5	1	830	9,500	5	1	830	9,500	5	0.15	830	9,500	
5.5	11	5.5	1.1	860	9,500	5.5	1.1	860	9,500	5.5	0.165	860	9,500	
6	12	6	1.2	850	8,000	6	1.2	850	8,000	6	0.18	850	8,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량은, 장삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p, ∅e 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 쿨런트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

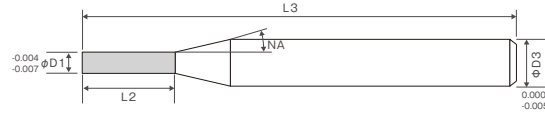


# HARD STAR Type A Series

# HARD STAR Type A Series

초경 스퀘어 엔드밀 Carbide Square End Mill

■형번:HAS430 Model number:HAS430



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
HAS430-0100-00200	1	2	15	4	50	5,040
HAS430-0150-00300	1.5	3	15	4	50	5,040
HAS430-0200-00400	2	4	15	4	50	5,040
HAS430-0300-00600	3	6	15	4	50	5,840
HAS430-0400-00800	4	8	15	6	50	6,320
HAS430-0600-01200	6	12	—	6	60	6,640
HAS430-0600-01800		18	—	6	60	7,120
HAS430-0800-01600	8	16	—	8	70	11,520
HAS430-0800-02400		24	—	8	70	12,000
HAS430-1000-02000	10	20	—	10	80	15,520
HAS430-1000-03000		30	—	10	80	16,000
HAS430-1200-02400	12	24	—	12	110	19,600
HAS430-1200-03600		36	—	12	110	20,320

HARD STAR Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:HAS430  
Model number:HAS430

스퀘어 엔드밀 Square End Mill

날수 Number of Flutes	외경 Dia.	날장 Length of Cut	고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
			Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	
4	4	2	1	0.02	280	6,400	1	0.015	240	5,400	1	0.01	200	4,800	
			1.5	0.03	300	4,200	1.5	0.02	230	3,600	1.5	0.01	180	3,200	
			2	0.04	320	3,200	2	0.03	230	2,700	2	0.02	180	2,400	
			3	0.06	520	3,700	3	0.05	380	3,200	3	0.05	260	2,600	
			4	0.08	450	2,800	4	0.07	380	2,400	4	0.06	260	2,000	
			6	12	0.12	500	2,300	6	0.1	400	2,000	6	0.08	300	1,900
				18	0.06	480	2,300	9	0.05	380	2,000	9	0.04	280	1,900
			8	16	0.16	300	1,800	8	0.13	250	1,700	8	0.1	200	1,600
				24	0.08	280	1,800	12	0.05	230	1,700	12	0.04	180	1,600
			10	20	0.2	250	1,600	10	0.17	200	1,500	10	0.13	200	1,400
				30	0.2	230	1,600	15	0.17	180	1,500	15	0.13	180	1,400
			12	24	0.24	240	1,500	12	0.2	200	1,400	12	0.15	200	1,300
36	0.12	220		1,500	18	0.09	180	1,400	18	0.06	180	1,300			

스퀘어 엔드밀 Square End Mill

날수 Number of Flutes	외경 Dia.	날장 Length of Cut	알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발 (Kovar)				
			Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	
4	4	2	1	0.2	840	6,400	1	0.2	840	6,400	1	0.02	280	6,400	
			1.5	0.3	900	4,200	1.5	0.3	900	4,200	1.5	0.03	300	4,200	
			2	0.4	960	3,200	2	0.4	960	3,200	2	0.04	320	3,200	
			3	0.6	1,560	3,700	3	0.6	1,560	3,700	3	0.06	520	3,700	
			4	0.8	1,350	2,800	4	0.8	1,350	2,800	4	0.08	450	2,800	
			6	12	1.2	1,500	2,500	6	1.2	1,500	2,500	6	0.12	400	2,300
				18	1.2	1,440	2,500	9	1.2	1,440	2,500	9	0.06	350	2,300
			8	16	1.6	900	1,800	8	1.6	900	1,800	8	0.16	300	1,800
				24	1.6	840	1,800	12	1.6	840	1,800	12	0.08	280	1,800
			10	20	2	750	1,600	10	2	750	1,600	10	0.2	250	1,600
				30	2	690	1,600	15	2	690	1,600	15	0.2	230	1,600
			12	24	2.4	720	1,500	12	2.4	720	1,500	12	0.24	240	1,500
36	2.4	660		1,500	18	2.4	660	1,500	18	0.12	220	1,500			

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입방은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은, 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

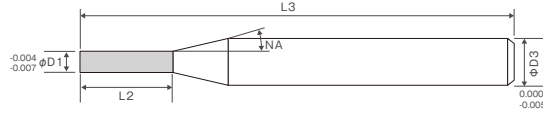
# HARD STAR Type A Series

# HARD STAR Type A Series

## 초경 스퀘어 엔드밀 Carbide Square End Mill

■형번:HAS630 Model number:HAS630

Hard A
super MG
날 수 6
헬릭스각 30°
목각 15°
Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
HAS630-0500-01000	5	10	15	6	50	6,720
HAS630-0500-01500		15	15	6	60	7,440
HAS630-0600-01200	6	12	—	6	60	7,280
HAS630-0600-01800		18	—	6	60	8,080
HAS630-0800-01600	8	16	—	8	70	9,920
HAS630-0800-02400		24	—	8	80	11,040
HAS630-1000-02000	10	20	—	10	80	13,200
HAS630-1000-03000		30	—	10	90	14,720
HAS630-1200-02400	12	24	—	12	110	16,880
HAS630-1200-03600		36	—	12	110	18,720

## HARD STAR Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번:HAS630  
Model number:HAS630

### 스퀘어 엔드밀 Square End Mill

피삭재 Work Material	고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)						고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
	날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
6	5	10	5	0.1	1,200	5,100	5	0.1	1,000	4,500	5	0.05	800	3,800	
		15	7.5	0.08	1,200	5,100	7.5	0.08	1,000	4,500	7.5	0.04	800	3,800	
	6	12	6	0.12	1,300	4,200	6	0.12	1,100	3,700	6	0.06	680	3,200	
		18	9	0.1	1,300	4,200	9	0.1	1,100	3,700	9	0.05	680	3,200	
	8	16	8	0.16	1,500	3,200	8	0.16	1,300	2,800	8	0.08	750	2,400	
		24	12	0.15	1,500	3,200	12	0.15	1,300	2,800	12	0.07	750	2,400	
	10	20	10	0.2	1,500	2,600	10	0.2	1,300	2,200	10	0.1	900	1,900	
		30	15	0.17	1,500	2,600	15	0.17	1,300	2,200	15	0.08	900	1,900	
	12	24	12	0.24	1,300	2,100	12	0.24	1,100	1,900	12	0.12	960	1,600	
		36	18	0.2	1,300	2,100	18	0.2	1,100	1,900	18	0.1	960	1,600	

### 스퀘어 엔드밀 Square End Mill

피삭재 Work Material	알루미늄 합금 Aluminum Alloy A5000번						알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발트 (Kovar)				
	날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
6	5	10	5	0.1	1,000	5,100	5	0.1	1,000	5,100	5	0.1	1,200	5,100	
		15	7.5	0.08	1,100	5,100	7.5	0.08	1,100	5,100	7.5	0.08	1,200	5,100	
	6	12	6	0.12	1,200	4,200	6	0.12	1,200	4,200	6	0.12	1,300	4,200	
		18	9	0.1	1,800	4,200	9	0.1	1,800	4,200	9	0.1	1,300	4,200	
	8	16	8	0.16	1,600	3,200	8	0.16	1,600	3,200	8	0.16	1,500	3,200	
		24	12	0.15	1,100	3,200	12	0.15	1,100	3,200	12	0.15	1,500	3,200	
	10	20	10	0.2	1,000	2,600	10	0.2	1,000	2,600	10	0.2	1,500	2,600	
		30	15	0.17	900	2,600	15	0.17	900	2,600	15	0.17	1,500	2,600	
	12	24	12	0.24	800	2,100	12	0.24	800	2,100	12	0.24	1,300	2,100	
		36	18	0.2	850	2,100	18	0.2	850	2,100	18	0.2	1,300	2,100	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 정삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 쿨런트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
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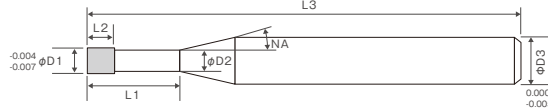
# HARD STAR Type A Series

# HARD STAR Type A Series

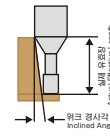
초경 롱 넥 스퀘어 엔드밀 Carbide Long Neck Square End Mill

■형번:HALS230 Model number:HALS230

Hard A
super MG
날 수 2
헬릭스각 30°
목각 15°
Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.



사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
HALS230-0010-0030	0.1	0.3	0.08	0.08	15	4	50	8,400	0.35	0.36	0.37	0.39	0.42
HALS230-0010-0050		0.5	0.08	0.08	15	4	50	9,120	0.56	0.57	0.60	0.62	0.67
HALS230-0015-0030	0.15	0.3	0.12	0.13	15	4	50	11,200	0.35	0.36	0.37	0.39	0.42
HALS230-0015-0050		0.5	0.12	0.13	15	4	50	8,400	0.56	0.57	0.60	0.62	0.67
HALS230-0020-0050	0.2	0.5	0.15	0.18	15	4	50	10,000	0.56	0.57	0.60	0.62	0.67
HALS230-0020-0075		0.75	0.15	0.18	15	4	50	5,760	0.81	0.84	0.87	0.91	0.98
HALS230-0020-0100	0.3	1	0.15	0.18	15	4	50	5,920	1.07	1.11	1.15	1.19	1.29
HALS230-0030-0100		1	0.25	0.27	15	4	50	8,800	1.09	1.13	1.17	1.21	1.31
HALS230-0030-0150	0.3	1.5	0.25	0.27	15	4	50	5,040	1.61	1.66	1.72	1.79	1.93
HALS230-0030-0200		2	0.25	0.27	15	4	50	5,040	2.13	2.20	2.28	2.36	2.56
HALS230-0030-0250	0.4	2.5	0.25	0.27	15	4	50	6,240	2.64	2.73	2.83	2.94	3.18
HALS230-0030-0300		3	0.25	0.27	15	4	50	6,480	3.16	3.27	3.39	3.51	3.80
HALS230-0040-0100	0.4	1	0.3	0.37	15	4	50	6,480	1.09	1.13	1.17	1.21	1.31
HALS230-0040-0150		1.5	0.3	0.37	15	4	50	3,680	1.61	1.66	1.72	1.79	1.93
HALS230-0040-0200	0.4	2	0.3	0.37	15	4	50	3,680	2.13	2.20	2.28	2.36	2.56
HALS230-0040-0250		2.5	0.3	0.37	15	4	50	3,680	2.64	2.73	2.83	2.94	3.18
HALS230-0040-0300	0.5	3	0.3	0.37	15	4	50	3,680	3.16	3.27	3.39	3.51	3.80
HALS230-0050-0100		1	0.4	0.47	15	4	50	2,640	1.09	1.13	1.17	1.21	1.31
HALS230-0050-0150	0.5	1.5	0.4	0.47	15	4	50	2,640	1.61	1.66	1.72	1.79	1.93
HALS230-0050-0200		2	0.4	0.47	15	4	50	2,640	2.13	2.20	2.28	2.36	2.56
HALS230-0050-0250	0.5	2.5	0.4	0.47	15	4	50	2,640	2.64	2.73	2.83	2.94	3.18
HALS230-0050-0300		3	0.4	0.47	15	4	50	2,640	3.16	3.27	3.39	3.51	3.80
HALS230-0050-0350	0.6	3.5	0.4	0.47	15	4	50	2,640	3.68	3.80	3.94	4.09	4.42
HALS230-0050-0400		4	0.4	0.47	15	4	50	2,640	4.19	4.34	4.50	4.66	5.04
HALS230-0060-0150	0.6	1.5	0.5	0.57	15	4	50	2,800	1.61	1.66	1.72	1.79	1.93
HALS230-0060-0200		2	0.5	0.57	15	4	50	2,800	2.13	2.20	2.28	2.36	2.56
HALS230-0060-0300	0.6	3	0.5	0.57	15	4	50	2,800	3.16	3.27	3.39	3.51	3.80
HALS230-0060-0400		4	0.5	0.57	15	4	50	2,800	4.19	4.34	4.50	4.66	5.04
HALS230-0060-0500	0.6	5	0.5	0.57	15	4	50	2,800	5.23	5.41	5.60	5.81	6.29
HALS230-0060-0600		6	0.5	0.57	15	4	50	2,800	6.26	6.48	6.71	6.96	7.53

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
HALS230-0070-0200	0.7	2	0.55	0.67	15	4	50	3,200	2.13	2.20	2.28	2.36	2.56
HALS230-0070-0400		4	0.55	0.67	15	4	50	3,200	4.19	4.34	4.50	4.66	5.04
HALS230-0070-0600	0.8	6	0.55	0.67	15	4	50	3,200	6.26	6.48	6.71	6.96	7.53
HALS230-0080-0300		3	0.65	0.77	15	4	50	3,120	3.16	3.27	3.39	3.51	3.80
HALS230-0080-0400	0.8	4	0.65	0.77	15	4	50	3,120	4.19	4.34	4.50	4.66	5.04
HALS230-0080-0500		5	0.65	0.77	15	4	50	3,120	5.23	5.41	5.60	5.81	6.29
HALS230-0080-0600	0.8	6	0.65	0.77	15	4	50	3,120	6.26	6.48	6.71	6.96	7.53
HALS230-0080-0800		8	0.65	0.77	15	4	50	3,120	8.33	8.62	8.93	9.26	10.01
HALS230-0100-0200	1	2	0.8	0.95	15	4	50	2,800	2.16	2.24	2.32	2.41	2.60
HALS230-0100-0300		3	0.8	0.95	15	4	50	2,800	3.20	3.31	3.43	3.56	3.85
HALS230-0100-0400	1	4	0.8	0.95	15	4	50	2,800	4.23	4.38	4.54	4.71	5.09
HALS230-0100-0500		5	0.8	0.95	15	4	50	2,800	5.26	5.45	5.64	5.86	6.33
HALS230-0100-0600	1	6	0.8	0.95	15	4	50	2,800	6.30	6.52	6.75	7.01	7.57
HALS230-0100-0700		7	0.8	0.95	15	4	50	2,800	7.33	7.59	7.86	8.16	8.82
HALS230-0100-0800	1.2	8	0.8	0.95	15	4	50	2,800	8.37	8.66	8.97	9.31	10.06
HALS230-0100-0900		9	0.8	0.95	15	4	50	2,800	9.40	9.73	10.08	10.46	11.30
HALS230-0100-1000	1.2	10	0.8	0.95	15	4	50	2,800	10.43	10.80	11.19	11.61	12.55
HALS230-0100-1200		12	0.8	0.95	15	4	50	2,800	12.50	12.94	13.40	13.91	15.03
HALS230-0120-0600	1.2	6	1	1.15	15	4	50	2,960	6.30	6.52	6.75	7.01	7.57
HALS230-0120-0800		8	1	1.15	15	4	50	2,960	8.37	8.66	8.97	9.31	10.06
HALS230-0120-1000	1.4	10	1	1.15	15	4	50	2,960	10.43	10.80	11.19	11.61	12.55
HALS230-0120-1200		12	1	1.15	15	4	50	2,960	12.50	12.94	13.40	13.91	15.03
HALS230-0120-1600	1.4	16	1	1.15	15	4	50	4,720	16.64	17.21	17.84	18.50	20.01
HALS230-0140-0600		6	1.1	1.35	15	4	50	3,040	6.30	6.52	6.75	7.01	7.57
HALS230-0140-1200	1.4	12	1.1	1.35	15	4	50	3,040	12.50	12.94	13.40	13.91	15.03
HALS230-0150-0400		1.5	4	1.2	1.45	15	4	50	2,960	4.23	4.38	4.54	4.71
HALS230-0150-0600	6		1.2	1.45	15	4	50	2,960	6.30	6.52	6.75	7.01	7.57
HALS230-0150-0800	1.5	8	1.2	1.45	15	4	50	2,960	8.37	8.66	8.97	9.31	10.06
HALS230-0150-1000		10	1.2	1.45	15	4	50	2,960	10.43	10.80	11.19	11.61	12.55
HALS230-0150-1200	1.5	12	1.2	1.45	15	4	50	2,960	12.50	12.94	13.40	13.91	15.03
HALS230-0150-1400		14	1.2	1.45	15	4	50	3,040	14.57	15.08	15.62	16.21	17.52
HALS230-0150-1600	1.6	16	1.2	1.45	15	4	50	3,040	16.64	17.21	17.84	18.50	20.01
HALS230-0160-0600		6	1.3	1.55	15	4	50	3,040	6.30	6.52	6.75	7.01	7.57
HALS230-0160-0800	1.6	8	1.3	1.55	15	4	50	3,040	8.37	8.66	8.97	9.31	10.06
HALS230-0180-0600		6	1.4	1.75	15	4	50	3,040	6.30	6.52	6.75	7.01	7.57
HALS230-0180-0800	1.8	8	1.4	1.75	15	4	50	3,040	8.37	8.66	8.97	9.31	10.06
HALS230-0180-1000		10	1.4	1.75	15	4	50	3,040	10.43	10.80	11.19	11.61	12.55
HALS230-0180-1200	1.8	12	1.4	1.75	15	4	50	3,040	12.50	12.94	13.40	13.91	15.03
HALS230-0180-1400		14	1.4	1.75	15	4	50	3,040	14.57	15.08	15.62	16.21	17.52
HALS230-0180-1600	2	16	1.4	1.75	15	4	50	3,040	16.64	17.21	17.84	18.50	20.01
HALS230-0200-0400		4	1.6	1.94	15	4	50	2,960	4.25	4.40	4.56	4.73	5.11
HALS230-0200-0600	2	6	1.6	1.94	15	4	50	2,960	6.32	6.54	6.77	7.03	7.60
HALS230-0200-0800		8	1.6	1.94	15	4	50	2,960	8.39	8.68	8.99	9.33	10.08
HALS230-0200-1000	2	10	1.6	1.94	15	4	50	2,960	10.45	10.82	11.21	11.63	12.57
HALS230-0200-1200		12	1.6	1.94	15	4	50	2,960	12.52	12.96	13.42	13.93	15.06



사이즈(Size):mm

CBN Series

Hard Star A Series

Hard Star TT Series

Hard Star TT Series

Ion Depo A Series

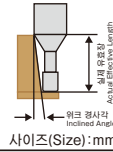
Ion Depo U Series

DLC Series

Non-Coat Series

Ion Depo R Series

Ion Depo R Series



●재연마가 가능한 공구의 세부사항에 관해서는 문의에 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부지)경 (D2) Neck Diameter	목각 (NA) <sup>1)</sup> Neck Taper Angle	샤희크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
HALS230-0200-1400	2	14	1.6	1.94	15	4	50	2,960	14.59	15.10	15.64	16.23	17.54
HALS230-0200-1600		16	1.6	1.94	15	4	50	2,960	16.65	17.23	17.86	18.53	FREE
HALS230-0200-1800		18	1.6	1.94	15	4	50	2,960	18.72	19.37	20.07	20.83	FREE
HALS230-0200-2000		20	1.6	1.94	15	4	50	2,960	20.79	21.51	22.29	23.13	FREE
HALS230-0250-0800	2.5	8	2	2.44	15	4	50	3,120	8.39	8.68	8.99	9.33	10.08
HALS230-0250-1200		12	2	2.44	15	4	50	3,120	12.52	12.96	13.42	13.93	FREE
HALS230-0250-1600		16	2	2.44	15	4	50	3,120	16.65	17.23	17.86	18.53	FREE
HALS230-0250-2000		20	2	2.44	15	4	50	3,120	20.79	21.51	22.29	23.13	FREE
HALS230-0300-0800	3	8	4.5	2.85	15	4	50	4,000	8.56	8.86	9.18	9.52	FREE
HALS230-0300-1200		12	4.5	2.85	15	4	50	4,000	12.69	13.14	13.61	14.12	FREE
HALS230-0300-1600		16	4.5	2.85	15	4	50	4,000	16.83	17.41	18.04	FREE	FREE
HALS230-0300-2000		20	4.5	2.85	15	4	50	4,000	20.96	21.69	FREE	FREE	FREE
HALS230-0300-2500		25	4.5	2.85	15	4	60	4,000	26.13	27.04	FREE	FREE	FREE
HALS230-0300-3000	30	4.5	2.85	15	4	60	4,800	31.30	FREE	FREE	FREE	FREE	
HALS230-0400-1000	4	10	3	3.8	15	6	50	4,180	10.72	11.10	11.50	11.93	12.89
HALS230-0400-1500		15	3	3.8	15	6	50	4,180	15.89	16.44	17.04	17.68	FREE
HALS230-0400-2000		20	3	3.8	15	6	50	4,180	21.06	21.79	22.58	23.43	FREE
HALS230-0500-1500	5	15	3.5	4.8	15	6	50	5,260	15.89	16.44	17.04	FREE	FREE
HALS230-0500-2000		20	3.5	4.8	15	6	50	5,490	21.06	21.79	FREE	FREE	FREE
HALS230-0600-1500	6	15	6	5.8	15	6	50	5,260	FREE	FREE	FREE	FREE	FREE
HALS230-0600-2000		20	6	5.8	15	6	50	5,260	FREE	FREE	FREE	FREE	FREE
HALS230-0600-3000		30	6	5.8	15	6	60	5,490	FREE	FREE	FREE	FREE	FREE

## HARD STAR Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번:HALS230  
Model number:HALS230

### 롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

날수 Number of Flutes	외경 Dia.	유효장 Effective Length	고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
			Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	
2	0.1	0.3	0.003	0.05	120	40,000	0.002	0.04	100	40,000	0.002	0.03	70	40,000	
			0.5	0.003	0.05	80	40,000	0.002	0.04	60	40,000	0.002	0.03	50	40,000
		0.15	0.3	0.003	0.07	150	40,000	0.002	0.06	120	40,000	0.002	0.04	100	40,000
			0.5	0.003	0.07	120	40,000	0.002	0.06	100	40,000	0.002	0.04	80	40,000
		0.2	0.5	0.003	0.1	200	30,000	0.003	0.08	160	30,000	0.003	0.06	120	30,000
			0.75	0.003	0.1	180	30,000	0.003	0.08	140	30,000	0.003	0.06	100	30,000
		0.3	1	0.003	0.1	150	30,000	0.003	0.08	120	30,000	0.003	0.06	80	30,000
			1.5	0.003	0.15	200	30,000	0.003	0.12	250	30,000	0.003	0.09	200	30,000
			2	0.003	0.15	150	30,000	0.003	0.12	120	30,000	0.003	0.09	100	25,000
		0.4	2.5	0.002	0.15	100	25,000	0.002	0.12	80	25,000	0.002	0.09	60	20,000
			3	0.002	0.15	50	25,000	0.002	0.12	40	25,000	0.002	0.09	30	20,000
			1	0.005	0.2	400	30,000	0.005	0.16	350	30,000	0.005	0.12	300	25,000
	0.5	1.5	0.005	0.2	360	30,000	0.005	0.16	330	30,000	0.005	0.12	250	25,000	
		2	0.005	0.2	320	30,000	0.005	0.16	280	25,000	0.005	0.12	220	25,000	
		2.5	0.005	0.2	280	25,000	0.004	0.16	250	25,000	0.004	0.12	200	20,000	
		3	0.004	0.2	260	25,000	0.003	0.16	220	20,000	0.003	0.12	180	18,000	
	0.6	1	0.01	0.25	500	25,000	0.007	0.2	450	23,000	0.005	0.15	400	20,000	
		1.5	0.01	0.25	450	25,000	0.007	0.2	400	23,000	0.005	0.15	360	20,000	
		2	0.01	0.25	420	25,000	0.007	0.2	380	23,000	0.005	0.15	320	20,000	
		2.5	0.008	0.25	400	25,000	0.006	0.2	360	23,000	0.004	0.15	300	20,000	
	0.7	3	0.007	0.25	350	25,000	0.005	0.2	320	23,000	0.003	0.15	280	20,000	
		3.5	0.006	0.25	320	25,000	0.003	0.2	280	23,000	0.003	0.15	240	20,000	
		4	0.005	0.25	280	25,000	0.003	0.2	240	23,000	0.002	0.15	200	20,000	
		1.5	0.01	0.3	550	25,000	0.007	0.25	450	23,000	0.005	0.18	400	20,000	
	0.8	2	0.01	0.3	500	25,000	0.007	0.25	400	23,000	0.005	0.18	350	20,000	
		3	0.007	0.3	450	25,000	0.005	0.25	350	23,000	0.003	0.18	300	20,000	
		4	0.005	0.3	400	25,000	0.003	0.25	300	23,000	0.002	0.18	250	20,000	
		5	0.003	0.3	350	20,000	0.003	0.25	250	18,000	0.002	0.18	200	16,000	
	0.9	6	0.002	0.3	300	20,000	0.002	0.25	200	18,000	0.001	0.18	150	16,000	
		2	0.03	0.35	600	25,000	0.02	0.28	450	23,000	0.012	0.21	400	20,000	
		4	0.02	0.35	560	25,000	0.015	0.28	400	23,000	0.007	0.21	320	20,000	
		6	0.015	0.35	410	20,000	0.012	0.28	300	18,000	0.007	0.21	240	16,000	
	1	3	0.03	0.4	780	25,000	0.02	0.32	650	23,000	0.012	0.24	550	20,000	
		4	0.025	0.4	700	25,000	0.015	0.32	600	23,000	0.007	0.24	500	20,000	
		5	0.02	0.4	630	23,000	0.012	0.32	530	20,000	0.006	0.24	450	18,000	
		6	0.02	0.4	550	20,000	0.01	0.32	450	18,000	0.005	0.24	350	16,000	
	1.1	8	0.007	0.4	400	16,000	0.005	0.32	300	14,000	0.003	0.24	200	12,000	
		2	0.06	0.5	1,000	23,000	0.05	0.4	900	18,000	0.035	0.3	600	14,000	
		3	0.05	0.5	1,000	23,000	0.04	0.4	900	18,000	0.03	0.3	600	14,000	
		4	0.04	0.5	900	23,000	0.03	0.4	800	18,000	0.02	0.3	500	14,000	
	1.2	5	0.03	0.5	800	20,000	0.02	0.4	700	16,000	0.012	0.3	450	12,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량은, 정삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	1	6	0.02	0.5	700	18,000	0.01	0.4	600	14,000	0.007	0.3	400	10,000
		7	0.02	0.5	650	18,000	0.01	0.4	550	14,000	0.006	0.3	370	10,000
		8	0.02	0.5	600	16,000	0.01	0.4	500	12,000	0.005	0.3	340	8,000
		9	0.015	0.5	550	16,000	0.007	0.4	450	12,000	0.005	0.3	300	8,000
		10	0.01	0.5	500	14,000	0.007	0.4	400	10,000	0.005	0.3	250	6,000
		12	0.01	0.5	400	13,000	0.005	0.4	300	10,000	0.004	0.3	180	6,000
	1.2	6	0.03	0.6	700	18,000	0.02	0.5	600	14,000	0.01	0.4	400	10,000
		8	0.02	0.6	600	16,000	0.01	0.5	500	12,000	0.007	0.4	340	8,000
		10	0.02	0.6	500	12,000	0.01	0.5	430	10,000	0.005	0.4	300	8,000
		12	0.01	0.6	500	10,000	0.007	0.5	400	9,000	0.005	0.4	250	7,000
	1.4	6	0.04	0.7	800	20,000	0.03	0.56	700	18,000	0.02	0.42	450	12,000
		12	0.01	0.7	500	13,000	0.007	0.56	400	11,000	0.005	0.42	280	8,000
	1.5	4	0.05	0.75	900	20,000	0.04	0.6	800	18,000	0.03	0.45	600	14,000
		6	0.04	0.75	800	20,000	0.03	0.6	700	18,000	0.02	0.45	500	14,000
		8	0.03	0.75	600	18,000	0.03	0.6	600	14,000	0.01	0.45	380	10,000
		10	0.03	0.75	500	16,000	0.02	0.6	500	14,000	0.01	0.45	350	10,000
		12	0.02	0.75	500	14,000	0.02	0.6	430	12,000	0.007	0.45	310	8,000
		14	0.02	0.75	400	12,000	0.01	0.6	380	10,000	0.007	0.45	250	7,500
	1.6	6	0.04	0.8	850	19,000	0.03	0.64	750	17,000	0.025	0.48	600	13,000
		8	0.03	0.8	750	17,000	0.03	0.64	600	14,000	0.015	0.48	430	10,000
	1.8	6	0.05	0.9	900	18,000	0.04	0.7	750	15,000	0.03	0.5	600	12,000
		8	0.04	0.9	800	16,000	0.03	0.7	600	12,000	0.02	0.5	500	9,500
		10	0.04	0.9	700	14,000	0.03	0.7	500	12,000	0.02	0.5	450	9,500
		12	0.03	0.9	600	12,000	0.02	0.7	500	10,000	0.01	0.5	400	8,200
14		0.03	0.9	600	12,000	0.02	0.7	430	10,000	0.01	0.5	360	8,200	
16		0.02	0.9	500	10,000	0.01	0.7	400	9,200	0.007	0.5	340	7,500	
2	4	0.08	1	1,000	18,000	0.06	0.8	800	15,000	0.04	0.6	600	12,000	
	6	0.06	1	900	18,000	0.05	0.8	750	15,000	0.03	0.6	600	12,000	
	8	0.05	1	800	16,000	0.04	0.8	600	12,000	0.02	0.6	500	9,500	
	10	0.05	1	700	14,000	0.04	0.8	500	12,000	0.02	0.6	450	9,500	
	12	0.04	1	600	12,000	0.03	0.8	500	10,000	0.01	0.6	400	8,200	
	14	0.03	1	600	12,000	0.02	0.8	430	10,000	0.007	0.6	360	8,200	
	16	0.03	1	500	10,000	0.02	0.8	400	9,200	0.007	0.6	340	7,500	
	18	0.02	1	410	9,200	0.01	0.8	370	8,500	0.005	0.6	320	6,000	
2.5	8	0.07	1.25	800	14,000	0.05	1	700	10,000	0.03	0.75	500	8,000	
	12	0.06	1.25	700	12,000	0.04	1	600	9,600	0.02	0.75	480	7,500	
	16	0.05	1.25	600	10,000	0.02	1	500	8,500	0.01	0.75	400	7,000	
	20	0.05	1.25	500	8,200	0.02	1	500	7,500	0.01	0.75	400	5,000	

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 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
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롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	3	8	0.1	1.5	900	14,000	0.07	1.2	800	10,000	0.05	0.9	600	8,000
		12	0.08	1.5	800	12,000	0.06	1.2	700	9,200	0.04	0.9	500	7,200
		16	0.07	1.5	700	10,000	0.05	1.2	600	8,500	0.03	0.9	400	6,500
		20	0.07	1.5	700	9,000	0.04	1.2	600	7,800	0.02	0.9	400	5,800
		25	0.06	1.5	600	8,200	0.03	1.2	500	7,000	0.01	0.9	360	5,000
		30	0.03	1.5	600	7,000	0.02	1.2	500	6,500	0.007	0.9	330	4,500
	4	10	0.1	2	900	10,000	0.07	1.8	800	9,000	0.05	1.5	700	9,000
		15	0.07	2	800	8,000	0.05	1.8	700	7,000	0.04	1.5	600	6,500
		20	0.06	2	750	7,000	0.04	1.8	650	6,000	0.03	1.5	550	5,500
		25	0.06	2	750	7,000	0.04	1.8	650	6,000	0.03	1.5	550	5,500
	5	15	0.1	2.5	850	6,000	0.07	2.3	750	5,000	0.06	2	650	4,500
		20	0.08	2.5	800	5,000	0.06	2.3	700	4,000	0.05	2	600	3,500
	6	15	0.12	3	850	5,000	0.09	2.8	750	4,000	0.08	2.5	650	3,500
		20	0.1	3	800	4,000	0.07	2.8	700	3,000	0.06	2.5	600	2,500
	30	0.08	3	700	3,000	0.06	2.8	600	2,000	0.05	2.5	500	1,500	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입량은, 정삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



## 롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발(Kovar)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>
2	3	8	0.4	1.5	900	14,000	0.4	1.5	900	14,000	0.1	1.5	900	14,000
		12	0.32	1.5	800	12,000	0.32	1.5	800	12,000	0.08	1.5	800	12,000
		16	0.28	1.5	700	10,000	0.28	1.5	700	10,000	0.07	1.5	700	10,000
		20	0.28	1.5	700	9,000	0.28	1.5	700	9,000	0.07	1.5	700	9,000
		25	0.24	1.5	600	8,200	0.24	1.5	600	8,200	0.06	1.5	600	8,200
		30	0.12	1.5	600	7,000	0.12	1.5	600	7,000	0.03	1.5	600	7,000
	4	10	0.4	2	900	10,000	0.4	2	900	10,000	0.1	2	900	10,000
		15	0.28	2	800	8,000	0.28	2	800	8,000	0.07	2	800	8,000
		20	0.24	2	750	7,000	0.24	2	750	7,000	0.06	2	750	7,000
	5	15	0.4	2.5	850	6,000	0.4	2.5	850	6,000	0.1	2.5	850	6,000
		20	0.32	2.5	800	5,000	0.32	2.5	800	5,000	0.08	2.5	800	5,000
	6	15	0.48	3	850	5,000	0.48	3	850	5,000	0.12	3	850	5,000
		20	0.4	3	800	4,000	0.4	3	800	4,000	0.1	3	800	4,000
		30	0.32	3	700	3,000	0.32	3	700	3,000	0.08	3	700	3,000

●공구는 홀더에 확실하게 고정되고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절임공은, 장식 기능을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



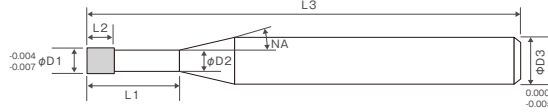
# HARD STAR Type A Series

# HARD STAR Type A Series

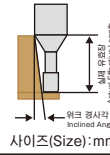
초경 롱 넥 스퀘어 엔드밀 Carbide Long Neck Square End Mill

■형번:HALS430 Model number:HALS430

Hard A
super MG
날 수 4
헬릭스각 30°
목각 15°
Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
HALS430-0100-0400	1	4	0.8	0.95	15	4	50	3,960	4.23	4.38	4.54	4.71	5.09
HALS430-0100-0600		6	0.8	0.95	15	4	50	3,960	6.30	6.52	6.75	7.01	7.57
HALS430-0100-0800		8	0.8	0.95	15	4	50	3,960	8.37	8.66	8.97	9.31	10.06
HALS430-0100-1000		10	0.8	0.95	15	4	50	3,960	10.43	10.80	11.19	11.61	12.55
HALS430-0120-0600		1.2	6	1	1.15	15	4	50	3,960	6.30	6.52	6.75	7.01
HALS430-0120-0800	8		1	1.15	15	4	50	3,960	8.37	8.66	8.97	9.31	10.06
HALS430-0120-1000	10		1	1.15	15	4	50	3,960	10.43	10.80	11.19	11.61	12.55
HALS430-0120-1200	1.5	12	1	1.15	15	4	50	3,960	12.50	12.94	13.40	13.91	15.03
HALS430-0150-0800		8	1.2	1.45	15	4	50	3,960	8.37	8.66	8.97	9.31	10.06
HALS430-0150-1000		10	1.2	1.45	15	4	50	3,960	10.43	10.80	11.19	11.61	12.55
HALS430-0150-1200		12	1.2	1.45	15	4	50	3,960	12.50	12.94	13.40	13.91	15.03
HALS430-0150-1400		14	1.2	1.45	15	4	50	3,960	14.57	15.08	15.62	16.21	17.52
HALS430-0150-1600	1.8	16	1.2	1.45	15	4	50	3,960	16.64	17.21	17.84	18.50	20.01
HALS430-0180-0600		6	1.4	1.75	15	4	50	3,960	6.30	6.52	6.75	7.01	7.57
HALS430-0180-0800		8	1.4	1.75	15	4	50	3,960	8.37	8.66	8.97	9.31	10.06
HALS430-0180-1000		10	1.4	1.75	15	4	50	3,960	10.43	10.80	11.19	11.61	12.55
HALS430-0180-1200		12	1.4	1.75	15	4	50	3,960	12.50	12.94	13.40	13.91	15.03
HALS430-0180-1400	2	14	1.4	1.75	15	4	50	3,960	14.57	15.08	15.62	16.21	17.52
HALS430-0180-1600		16	1.4	1.75	15	4	50	3,960	16.64	17.21	17.84	18.50	20.01
HALS430-0200-0600		6	1.6	1.94	15	4	50	3,960	6.32	6.54	6.77	7.03	7.60
HALS430-0200-0800		8	1.6	1.94	15	4	50	3,960	8.39	8.68	8.99	9.33	10.08
HALS430-0200-1000		10	1.6	1.94	15	4	50	3,960	10.45	10.82	11.21	11.63	12.57
HALS430-0200-1200	2.5	12	1.6	1.94	15	4	50	3,960	12.52	12.96	13.42	13.93	15.06
HALS430-0200-1400		14	1.6	1.94	15	4	50	3,960	14.59	15.10	15.64	16.23	17.54
HALS430-0200-1600		16	1.6	1.94	15	4	50	3,960	16.65	17.23	17.86	18.53	FREE
HALS430-0200-1800		18	1.6	1.94	15	4	50	3,960	18.72	19.37	20.07	20.83	FREE
HALS430-0200-2000		20	1.6	1.94	15	4	50	3,960	20.79	21.51	22.29	23.13	FREE
HALS430-0250-0800	2.5	8	2	2.44	15	4	50	3,960	8.39	8.68	8.99	9.33	10.08
HALS430-0250-1200		12	2	2.44	15	4	50	3,960	12.52	12.96	13.42	13.93	FREE
HALS430-0250-1600		16	2	2.44	15	4	50	3,960	16.65	17.23	17.86	18.53	FREE

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
HALS430-0250-2000	2.5	20	2	2.44	15	4	50	3,960	20.79	21.51	22.29	FREE	FREE
HALS430-0300-0800	3	8	4.5	2.85	15	4	50	5,600	8.56	8.86	9.18	9.52	FREE
HALS430-0300-1200		12	4.5	2.85	15	4	50	5,600	12.69	13.14	13.61	14.12	FREE
HALS430-0300-1600		16	4.5	2.85	15	4	50	5,600	16.83	17.41	18.04	FREE	FREE
HALS430-0300-2000		20	4.5	2.85	15	4	50	5,600	20.96	21.69	FREE	FREE	FREE
HALS430-0300-2500		25	4.5	2.85	15	4	60	5,920	26.13	27.04	FREE	FREE	FREE
HALS430-0300-3000		30	4.5	2.85	15	4	60	6,400	31.30	FREE	FREE	FREE	FREE
HALS430-0400-1200	4	12	6	3.8	15	6	50	5,840	12.79	13.24	13.71	14.23	15.38
HALS430-0400-1600		16	6	3.8	15	6	50	5,840	16.92	17.51	18.15	18.83	FREE
HALS430-0400-2000		20	6	3.8	15	6	50	5,840	21.06	21.79	22.58	23.43	FREE
HALS430-0400-2500		25	6	3.8	15	6	60	6,160	26.23	27.14	28.12	FREE	FREE
HALS430-0400-3000		30	6	3.8	15	6	60	6,800	31.40	32.49	33.66	FREE	FREE
HALS430-0400-3500		35	6	3.8	15	6	70	7,360	36.56	37.84	FREE	FREE	FREE
HALS430-0500-1600	5	16	7.5	4.8	15	6	50	7,360	16.92	17.51	18.15	FREE	FREE
HALS430-0500-2500		25	7.5	4.8	15	6	60	7,680	26.23	27.14	FREE	FREE	FREE
HALS430-0500-3500	6	35	7.5	4.8	15	6	70	8,000	36.56	FREE	FREE	FREE	FREE
HALS430-0600-2000		20	9	5.8	15	6	50	7,360	FREE	FREE	FREE	FREE	FREE
HALS430-0600-3000		30	9	5.8	15	6	60	7,680	FREE	FREE	FREE	FREE	FREE
HALS430-0600-4000		40	9	5.8	15	6	70	8,000	FREE	FREE	FREE	FREE	FREE
HALS430-0600-5000	50	9	5.8	15	6	80	11,200	FREE	FREE	FREE	FREE	FREE	



CBN Series | Hard Star A Series | Hard Star TT Series | Hard Star TT Series | Ion Depo A Series | Ion Depo U Series | DLC Series | Non-Coat Series | Ion Depo R Series

## HARD STAR Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번:HALS430  
Model number:HALS430

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>
4	1	4	0.04	0.5	1,800	23,000	0.03	0.4	1,600	18,000	0.02	0.3	1,000	14,000
		6	0.02	0.5	1,400	18,000	0.01	0.4	1,200	14,000	0.007	0.3	800	10,000
		8	0.02	0.5	1,200	16,000	0.01	0.4	1,000	12,000	0.005	0.3	680	8,000
		10	0.01	0.5	1,000	14,000	0.007	0.4	800	10,000	0.005	0.3	500	6,000
	1.2	6	0.03	0.6	1,400	18,000	0.02	0.5	1,200	14,000	0.01	0.4	800	10,000
		8	0.02	0.6	1,200	16,000	0.01	0.5	1,000	12,000	0.007	0.4	680	8,000
		10	0.02	0.6	1,000	12,000	0.01	0.5	850	10,000	0.005	0.4	600	8,000
		12	0.01	0.6	1,000	10,000	0.007	0.5	800	9,000	0.005	0.4	500	7,000
	1.5	8	0.03	0.75	1,200	18,000	0.03	0.6	1,200	14,000	0.01	0.45	750	10,000
		10	0.03	0.75	1,000	16,000	0.02	0.6	1,000	14,000	0.01	0.45	700	10,000
		12	0.02	0.75	1,000	14,000	0.02	0.6	850	12,000	0.007	0.45	620	8,000
		14	0.02	0.75	800	12,000	0.01	0.6	750	10,000	0.007	0.45	500	7,500
	1.8	6	0.05	0.9	1,800	18,000	0.04	0.7	1,500	15,000	0.03	0.5	1,200	12,000
		8	0.04	0.9	1,600	16,000	0.03	0.7	1,200	12,000	0.02	0.5	1,000	9,500
		10	0.04	0.9	1,400	14,000	0.03	0.7	1,000	12,000	0.02	0.5	900	9,500
		12	0.03	0.9	1,200	12,000	0.02	0.7	1,000	10,000	0.01	0.5	800	8,200
	2	6	0.06	1	1,800	18,000	0.05	0.8	1,500	15,000	0.03	0.6	1,200	12,000
		8	0.05	1	1,600	16,000	0.04	0.8	1,200	12,000	0.02	0.6	1,000	9,500
		10	0.05	1	1,400	14,000	0.04	0.8	1,000	12,000	0.02	0.6	900	9,500
		12	0.04	1	1,200	12,000	0.03	0.8	1,000	10,000	0.01	0.6	800	8,200
	2.5	6	0.03	1	1,000	10,000	0.02	0.8	800	9,200	0.007	0.6	680	7,500
		8	0.07	1.25	1,600	14,000	0.05	1	1,400	10,000	0.03	0.75	1,000	8,000
		12	0.06	1.25	1,400	12,000	0.04	1	1,200	9,600	0.02	0.75	960	7,500
		16	0.05	1.25	1,200	10,000	0.02	1	1,000	8,500	0.01	0.75	800	7,000
	3	8	0.08	1.5	1,600	14,000	0.07	1.2	1,600	10,000	0.05	0.9	1,200	8,000
		12	0.08	1.5	1,600	12,000	0.06	1.2	1,400	9,200	0.04	0.9	1,000	7,200
		16	0.07	1.5	1,400	10,000	0.05	1.2	1,200	8,500	0.03	0.9	800	6,500
		20	0.07	1.5	1,400	9,000	0.04	1.2	1,200	7,800	0.02	0.9	800	5,800
4	8	0.1	1.5	1,800	14,000	0.07	1.2	1,600	10,000	0.05	0.9	1,200	8,000	
	12	0.08	1.5	1,600	12,000	0.06	1.2	1,400	9,200	0.04	0.9	1,000	7,200	
	16	0.07	1.5	1,400	10,000	0.05	1.2	1,200	8,500	0.03	0.9	800	6,500	
	20	0.07	1.5	1,400	9,000	0.04	1.2	1,200	7,800	0.02	0.9	800	5,800	
4	12	0.15	2	2,000	9,500	0.08	1.6	1,600	8,000	0.06	1.2	1,000	7,000	
	16	0.1	2	1,800	8,000	0.06	1.6	1,400	7,000	0.05	1.2	1,200	6,000	
	20	0.08	2	1,600	7,000	0.05	1.6	1,200	6,500	0.04	1.2	1,000	5,500	
	25	0.07	2	1,400	6,000	0.04	1.6	1,200	5,200	0.03	1.2	1,000	4,500	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량은, 장삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 클린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>
4	5	30	0.05	2	1,000	4,800	0.03	1.6	850	4,200	0.02	1.2	620	3,500
		35	0.04	2	880	4,200	0.02	1.6	720	3,800	0.01	1.2	550	3,000
		16	0.12	2.5	1,800	7,000	0.08	2	1,600	5,500	0.06	1.5	1,000	4,500
		25	0.07	2.5	1,400	5,800	0.05	2	1,200	4,200	0.03	1.5	800	3,000
	6	35	0.05	2.5	900	4,200	0.03	2	800	3,500	0.02	1.5	600	2,500
		20	0.18	3	1,600	6,500	0.08	2.4	1,400	4,500	0.06	1.8	920	3,500
		30	0.12	3	1,200	4,500	0.06	2.4	1,000	3,500	0.04	1.8	660	2,500
		40	0.08	3	1,000	3,000	0.03	2.4	800	2,500	0.02	1.8	550	2,000
		50	0.05	3	700	2,500	0.02	2.4	500	2,000	0.01	1.8	380	1,500

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량은, 장삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
●오일 미스트 클린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



# HARD STAR Type A Series

# HARD STAR Type A Series

**HARD STAR Type A 추천 절삭 조건표**  
Recommended Milling Conditions

**■형번:HALS430**  
Model number:HALS430

**롱 넥 스퀘어 엔드밀 Long Neck Square End Mill**

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발(Kovar)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
4	1	4	0.16	0.5	1,800	23,000	0.16	0.5	1,800	23,000	0.04	0.5	1,800	23,000
			0.08	0.5	1,400	18,000	0.02	0.5	1,400	18,000				
			0.08	0.5	1,200	16,000	0.02	0.5	1,200	16,000				
			0.04	0.5	1,000	14,000	0.01	0.5	1,000	14,000				
	1.2	6	0.12	0.6	1,400	18,000	0.12	0.6	1,400	18,000	0.03	0.6	1,400	18,000
			0.08	0.6	1,200	16,000	0.02	0.6	1,200	16,000				
			0.08	0.6	1,000	12,000	0.02	0.6	1,000	12,000				
			0.04	0.6	1,000	10,000	0.01	0.6	1,000	10,000				
	1.5	8	0.12	0.75	1,200	18,000	0.12	0.75	1,200	18,000	0.03	0.75	1,200	18,000
			0.12	0.75	1,000	16,000	0.03	0.75	1,000	16,000				
			0.08	0.75	800	12,000	0.02	0.75	800	12,000				
			0.04	0.75	720	10,000	0.01	0.75	720	10,000				
	1.8	10	0.2	0.9	1,800	18,000	0.2	0.9	1,800	18,000	0.05	0.9	1,800	18,000
			0.16	0.9	1,600	16,000	0.04	0.9	1,600	16,000				
			0.16	0.9	1,400	14,000	0.04	0.9	1,400	14,000				
			0.12	0.9	1,200	12,000	0.03	0.9	1,200	12,000				
	2	12	0.12	0.9	1,200	12,000	0.12	0.9	1,200	12,000	0.03	0.9	1,200	12,000
			0.12	0.9	1,200	12,000	0.03	0.9	1,200	12,000				
			0.08	0.9	1,000	10,000	0.02	0.9	1,000	10,000				
			0.08	0.9	1,000	10,000	0.02	0.9	1,000	10,000				
	2.5	14	0.24	1	1,800	18,000	0.24	1	1,800	18,000	0.06	1	1,800	18,000
			0.2	1	1,600	16,000	0.05	1	1,600	16,000				
			0.2	1	1,400	14,000	0.05	1	1,400	14,000				
			0.16	1	1,200	12,000	0.04	1	1,200	12,000				
	3	16	0.12	1	1,200	12,000	0.12	1	1,200	12,000	0.03	1	1,200	12,000
			0.12	1	1,000	10,000	0.03	1	1,000	10,000				
			0.08	1	820	9,200	0.02	1	820	9,200				
			0.08	1	760	9,200	0.02	1	760	9,200				
4	18	0.28	1.25	1,600	14,000	0.28	1.25	1,600	14,000	0.07	1.25	1,600	14,000	
		0.24	1.25	1,400	12,000	0.06	1.25	1,400	12,000					
		0.2	1.25	1,200	10,000	0.05	1.25	1,200	10,000					
		0.2	1.25	1,000	8,200	0.05	1.25	1,000	8,200					
4	20	0.4	1.5	1,800	14,000	0.4	1.5	1,800	14,000	0.1	1.5	1,800	14,000	
		0.32	1.5	1,600	12,000	0.08	1.5	1,600	12,000					
		0.28	1.5	1,400	10,000	0.07	1.5	1,400	10,000					
		0.28	1.5	1,400	9,000	0.07	1.5	1,400	9,000					
4	25	0.24	1.5	1,200	8,200	0.24	1.5	1,200	8,200	0.06	1.5	1,200	8,200	
		0.12	1.5	1,200	7,000	0.03	1.5	1,200	7,000					
		0.6	2	2,000	9,500	0.15	2	2,000	9,500					
		0.4	2	1,800	8,000	0.1	2	1,800	8,000					
4	30	0.32	2	1,600	7,000	0.32	2	1,600	7,000	0.08	2	1,600	7,000	
		0.28	2	1,400	6,000	0.07	2	1,400	6,000					

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
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●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
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**롱 넥 스퀘어 엔드밀 Long Neck Square End Mill**

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발(Kovar)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
4	4	30	0.2	2	1,000	4,800	0.2	2	1,000	4,800	0.05	2	1,000	4,800
			0.16	2	880	4,200	0.04	2	880	4,200				
	5	16	0.48	2.5	1,800	7,000	0.48	2.5	1,800	7,000	0.12	2.5	1,800	7,000
			0.28	2.5	1,400	5,800	0.28	2.5	1,400	5,800				
	6	20	0.72	3	1,600	6,500	0.72	3	1,600	6,500	0.18	3	1,600	6,500
			0.48	3	1,200	4,500	0.48	3	1,200	4,500				
	6	30	0.32	3	1,000	3,000	0.32	3	1,000	3,000	0.08	3	1,000	3,000
			0.2	3	700	2,500	0.05	3	700	2,500				

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 정삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

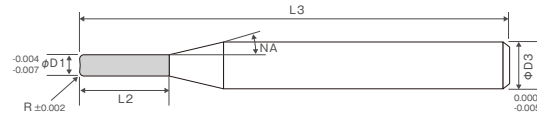
●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
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# HARD STAR Type A Series

## 초경 래디우스 엔드밀 Carbide Radius End Mill

■형번: HAR430 Model number: HAR430

Hard A
super MG
날 수 4
헬릭스각 30°
목각 15°
Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	날장 (L2) Length of Cut	목각 (NA) <sup>*)</sup> Neck Taper Angle	샤홙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
HAR430-0300-0200-00600	3	0.2	6	15	4	50	10,000
HAR430-0300-0300-00600		0.3	6	15	4	50	10,000
HAR430-0300-0500-00600		0.5	6	15	4	50	10,000
HAR430-0400-0200-00800	4	0.2	8	15	6	50	10,800
HAR430-0400-0300-00800		0.3	8	15	6	50	10,800
HAR430-0400-0500-00800		0.5	8	15	6	50	10,800
HAR430-0600-0200-01200	6	0.2	12	—	6	60	12,400
HAR430-0600-0300-01200		0.3	12	—	6	60	12,400
HAR430-0600-0500-01200		0.5	12	—	6	60	12,400
HAR430-0600-1000-01200	8	1	12	—	6	60	12,400
HAR430-0800-0300-01600		0.3	16	—	8	70	13,360
HAR430-0800-0500-01600		0.5	16	—	8	70	13,360
HAR430-0800-1000-01600	10	1	16	—	8	70	13,360
HAR430-1000-0300-02000		0.3	20	—	10	80	17,600
HAR430-1000-0500-02000		0.5	20	—	10	80	17,600
HAR430-1000-1000-02000	12	1	20	—	10	80	17,600
HAR430-1200-0500-02400		0.5	24	—	12	110	22,160
HAR430-1200-1000-02400		1	24	—	12	110	22,160
HAR430-1200-2000-02400	2	24	—	12	110	22,160	

# HARD STAR Type A Series

## HARD STAR Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번: HAR430  
Model number: HAR430

### 래디우스 엔드밀 Radius End Mill

피삭재 Work Material	고경도강 Hardened Steels STAVAX/HPM (~55HRC)						고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
	날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Spindle Speed	Depth of Cut		Spindle Speed	Depth of Cut		Spindle Speed		
				∅p mm	∅e mm		mm/min	min <sup>-1</sup>		∅p mm	∅e mm		mm/min	min <sup>-1</sup>
4	3	6	4.5	0.09	1,000	10,000	4.5	0.06	700	8,000	4.5	0.06	560	7,000
	4	8	6	0.12	1,200	8,500	6	0.08	800	7,000	6	0.08	600	6,000
	6	12	9	0.18	1,200	5,600	9	0.12	800	4,700	9	0.12	600	4,000
	8	16	12	0.23	1,400	4,800	12	0.16	800	4,000	12	0.16	500	3,400
	10	20	15	0.3	1,500	3,800	15	0.2	900	3,200	15	0.2	600	2,600
	12	24	18	0.35	1,600	3,200	18	0.24	1,000	2,600	18	0.24	700	2,200

### 래디우스 엔드밀 Radius End Mill

피삭재 Work Material	알루미늄 합금 Aluminum Alloy A5000번						알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발(Kovar)			
	날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Spindle Speed	Depth of Cut		Spindle Speed	Depth of Cut		Spindle Speed		
				∅p mm	∅e mm		mm/min	min <sup>-1</sup>		∅p mm	∅e mm		mm/min	min <sup>-1</sup>
4	3	6	4.5	0.25	1,000	10,000	4.5	0.25	1,000	10,000	4.5	0.08	1,000	10,000
	4	8	6	0.35	1,200	8,500	6	0.35	1,200	8,500	6	0.12	1,200	8,500
	6	12	9	0.55	1,200	5,600	9	0.55	1,200	5,600	9	0.18	1,200	5,600
	8	16	12	0.69	1,400	4,800	12	0.69	1,400	4,800	12	0.23	1,400	4,800
	10	20	15	0.9	1,500	3,800	15	0.9	1,500	3,800	15	0.3	1,500	3,800
	12	24	18	1.05	1,600	3,200	18	1.05	1,600	3,200	18	0.35	1,600	3,200

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
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●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.

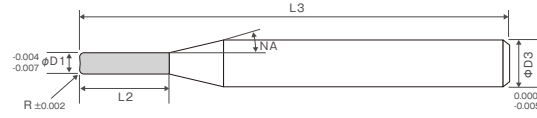
●오일 미스트 Coolant, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 말아 주세요. Length of tool overhang must be as short as possible.  
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# HARD STAR Type A Series

초경 래디우스 엔드밀 Carbide Radius End Mill

■형번: HAR630 Model number: HAR630

Hard A
super MG
날 수 6
헬릭스각 30°
목각 15°
Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	날장 (L2) Length of Cut	목각 (NA) <sup>*)</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
HAR630-0500-0200-01000	5	0.2	10	15	6	50	11,600
HAR630-0500-0300-01000		0.3	10	15	6	50	11,600
HAR630-0500-0500-01000		0.5	10	15	6	50	11,600
HAR630-0500-1000-01000		1	10	15	6	50	11,600
HAR630-0600-0200-01200	6	0.2	12	—	6	60	12,400
HAR630-0600-0300-01200		0.3	12	—	6	60	12,400
HAR630-0600-0500-01200		0.5	12	—	6	60	12,400
HAR630-0600-1000-01200		1	12	—	6	60	12,400
HAR630-0800-0300-01600	8	0.3	16	—	8	70	17,200
HAR630-0800-0500-01600		0.5	16	—	8	70	17,200
HAR630-0800-1000-01600		1	16	—	8	70	17,200
HAR630-0800-1500-01600		1.5	16	—	8	70	17,200
HAR630-1000-0300-02000	10	0.3	20	—	10	80	17,200
HAR630-1000-0500-02000		0.5	20	—	10	80	23,360
HAR630-1000-1000-02000		1	20	—	10	80	23,360
HAR630-1000-1500-02000		1.5	20	—	10	80	23,360
HAR630-1000-2000-02000	12	2	20	—	10	80	23,360
HAR630-1200-0500-02400		0.5	24	—	12	110	28,160
HAR630-1200-1000-02400		1	24	—	12	110	28,160
HAR630-1200-1500-02400		1.5	24	—	12	110	28,160
HAR630-1200-2000-02400	2	24	—	12	110	28,160	

# HARD STAR Type A Series

HARD STAR Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번: HAR630  
Model number: HAR630

래디우스 엔드밀 Radius End Mill

피삭재 Work Material	고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)						고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
	날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
6	5	10	7.5	0.15	1,600	7,600	7.5	0.1	1,200	6,200	7.5	0.1	800	5,300	
	6	12	9	0.18	1,800	6,400	9	0.12	1,200	5,300	9	0.12	800	4,600	
	8	16	12	0.23	2,000	4,800	12	0.16	1,400	4,000	12	0.16	1,000	3,400	
	10	20	15	0.3	2,000	3,800	15	0.2	1,600	3,200	15	0.2	1,000	2,600	
	12	24	18	0.35	2,000	3,200	18	0.24	1,600	2,600	18	0.24	1,000	2,200	

래디우스 엔드밀 Radius End Mill

피삭재 Work Material	알루미늄 합금 Aluminum Alloy A5000번					알루미늄 합금 Aluminum Alloy A7000번					내열 합금 Heat Resistant Alloy 코발(Kovar)				
	날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
6	5	10	7.5	0.45	1,600	7,600	7.5	0.45	1,600	7,600	7.5	0.15	1,600	7,600	
	6	12	9	0.54	1,800	6,400	9	0.54	1,800	6,400	9	0.18	1,800	6,400	
	8	16	12	0.69	2,000	4,800	12	0.69	2,000	4,800	12	0.23	2,000	4,800	
	10	20	15	0.9	2,000	3,800	15	0.9	2,000	3,800	15	0.3	2,000	3,800	
	12	24	18	1.05	2,000	3,200	18	1.05	2,000	3,200	18	0.35	2,000	3,200	

●공구는 홀더에 확실하게 고정되고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량은, 절삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

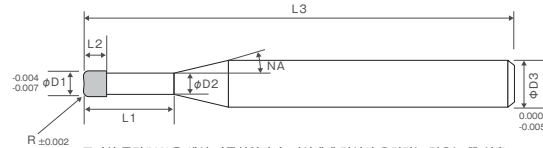
●오일 미스트 클린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# HARD STAR Type A Series

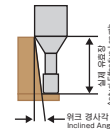
초경 롱 넥 래디우스 엔드밀 Carbide Long Neck Radius End Mill

■형번:HALR230 Model number:HALR230

Hard A
super MG
날 수 2
헬릭스각 30°
목각 15°
Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

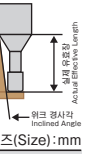


사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
HALR230-0020-0020-0050	0.2	0.02	0.5	0.15	0.18	15	4	50	8,080	0.55	0.57	0.59	0.61	0.66	
HALR230-0020-0020-0100		0.02	1	0.15	0.18	15	4	50	8,080	1.07	1.11	1.15	1.19	1.28	
HALR230-0020-0050-0050		0.05	0.5	0.15	0.18	15	4	50	8,080	0.55	0.57	0.59	0.61	0.66	
HALR230-0020-0050-0100		0.05	1	0.15	0.18	15	4	50	8,080	1.07	1.11	1.14	1.19	1.28	
HALR230-0030-0020-0100	0.3	0.02	1	0.25	0.27	15	4	50	7,840	1.09	1.13	1.17	1.21	1.31	
HALR230-0030-0020-0150		0.02	1.5	0.25	0.27	15	4	50	7,840	1.61	1.66	1.72	1.79	1.93	
HALR230-0030-0020-0200		0.02	2	0.25	0.27	15	4	50	7,840	2.12	2.20	2.28	2.36	2.55	
HALR230-0030-0020-0250		0.02	2.5	0.25	0.27	15	4	50	9,840	2.64	2.73	2.83	2.94	3.17	
HALR230-0030-0020-0300		0.02	3	0.25	0.27	15	4	50	9,840	3.16	3.27	3.38	3.51	3.79	
HALR230-0030-0050-0100		0.05	1	0.25	0.27	15	4	50	7,840	1.09	1.13	1.17	1.21	1.30	
HALR230-0030-0050-0150		0.05	1.5	0.25	0.27	15	4	50	7,840	1.61	1.66	1.72	1.78	1.92	
HALR230-0030-0050-0200		0.05	2	0.25	0.27	15	4	50	7,840	2.12	2.20	2.27	2.36	2.54	
HALR230-0030-0050-0250		0.05	2.5	0.25	0.27	15	4	50	9,840	2.64	2.73	2.83	2.93	3.17	
HALR230-0030-0050-0300		0.05	3	0.25	0.27	15	4	50	9,840	3.16	3.27	3.38	3.51	3.79	
HALR230-0040-0020-0100	0.4	0.02	1	0.3	0.37	15	4	50	5,200	1.09	1.13	1.17	1.21	1.31	
HALR230-0040-0020-0150		0.02	1.5	0.3	0.37	15	4	50	5,200	1.61	1.66	1.72	1.79	1.93	
HALR230-0040-0020-0200		0.02	2	0.3	0.37	15	4	50	5,200	2.12	2.20	2.28	2.36	2.55	
HALR230-0040-0020-0250		0.02	2.5	0.3	0.37	15	4	50	5,200	2.64	2.73	2.83	2.94	3.17	
HALR230-0040-0020-0300		0.02	3	0.3	0.37	15	4	50	5,200	3.16	3.27	3.38	3.51	3.79	
HALR230-0040-0050-0100		0.05	1	0.3	0.37	15	4	50	5,200	1.09	1.13	1.17	1.21	1.30	
HALR230-0040-0050-0150		0.05	1.5	0.3	0.37	15	4	50	5,200	1.61	1.66	1.72	1.78	1.92	
HALR230-0040-0050-0200		0.05	2	0.3	0.37	15	4	50	5,200	2.12	2.20	2.27	2.36	2.54	
HALR230-0040-0050-0250		0.05	2.5	0.3	0.37	15	4	50	5,200	2.64	2.73	2.83	2.93	3.17	
HALR230-0040-0050-0300		0.05	3	0.3	0.37	15	4	50	5,200	3.16	3.27	3.38	3.51	3.79	
HALR230-0040-0100-0100	0.5	0.1	1	0.3	0.37	15	4	50	5,200	1.09	1.12	1.16	1.20	1.29	
HALR230-0040-0100-0200		0.1	2	0.3	0.37	15	4	50	5,200	2.12	2.19	2.27	2.35	2.53	
HALR230-0040-0100-0300		0.1	3	0.3	0.37	15	4	50	5,200	3.16	3.26	3.38	3.50	3.78	
HALR230-0050-0020-0100		0.5	0.02	1	0.4	0.47	15	4	50	4,240	1.09	1.13	1.17	1.21	1.31
HALR230-0050-0020-0200			0.02	2	0.4	0.47	15	4	50	4,240	2.12	2.20	2.28	2.36	2.55
HALR230-0050-0020-0300			0.02	3	0.4	0.47	15	4	50	4,240	3.16	3.27	3.38	3.51	3.79

# HARD STAR Type A Series



사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
HALR230-0050-0020-0400	0.5	0.02	4	0.4	0.47	15	4	50	4,240	4.19	4.34	4.49	4.66	5.04
HALR230-0050-0050-0100		0.05	1	0.4	0.47	15	4	50	4,240	1.09	1.13	1.17	1.21	1.30
HALR230-0050-0050-0200		0.05	2	0.4	0.47	15	4	50	4,240	2.12	2.20	2.27	2.36	2.54
HALR230-0050-0050-0300		0.05	3	0.4	0.47	15	4	50	4,240	3.16	3.27	3.38	3.51	3.79
HALR230-0050-0050-0400		0.05	4	0.4	0.47	15	4	50	4,240	4.19	4.34	4.49	4.66	5.03
HALR230-0050-0100-0100		0.1	1	0.4	0.47	15	4	50	4,240	1.09	1.12	1.16	1.20	1.29
HALR230-0050-0100-0200		0.1	2	0.4	0.47	15	4	50	4,240	2.12	2.19	2.27	2.35	2.53
HALR230-0050-0100-0300		0.1	3	0.4	0.47	15	4	50	4,240	3.16	3.26	3.38	3.50	3.78
HALR230-0050-0100-0400		0.1	4	0.4	0.47	15	4	50	4,240	4.19	4.33	4.48	4.65	5.02
HALR230-0060-0020-0200		0.6	0.02	2	0.5	0.57	15	4	50	4,560	2.12	2.20	2.28	2.36
HALR230-0060-0020-0400	0.02		4	0.5	0.57	15	4	50	4,560	4.19	4.34	4.49	4.66	5.04
HALR230-0060-0020-0600	0.02		6	0.5	0.57	15	4	50	4,560	6.26	6.48	6.71	6.96	7.52
HALR230-0060-0050-0200	0.05		2	0.5	0.57	15	4	50	4,560	2.12	2.20	2.27	2.36	2.54
HALR230-0060-0050-0400	0.05		4	0.5	0.57	15	4	50	4,560	4.19	4.34	4.49	4.66	5.03
HALR230-0060-0050-0600	0.05		6	0.5	0.57	15	4	50	4,560	6.26	6.47	6.71	6.96	7.52
HALR230-0060-0100-0200	0.1		2	0.5	0.57	15	4	50	4,240	2.12	2.19	2.27	2.35	2.53
HALR230-0060-0100-0400	0.1		4	0.5	0.57	15	4	50	4,240	4.19	4.33	4.48	4.65	5.02
HALR230-0060-0100-0600	0.1		6	0.5	0.57	15	4	50	4,240	6.26	6.47	6.70	6.95	7.51
HALR230-0070-0020-0200	0.7		0.02	2	0.55	0.67	15	4	50	4,800	2.12	2.20	2.28	2.36
HALR230-0070-0020-0400		0.02	4	0.55	0.67	15	4	50	4,800	4.19	4.34	4.49	4.66	5.04
HALR230-0070-0020-0600		0.02	6	0.55	0.67	15	4	50	4,800	6.26	6.48	6.71	6.96	7.52
HALR230-0070-0050-0200		0.05	2	0.55	0.67	15	4	50	4,800	2.12	2.20	2.27	2.36	2.54
HALR230-0070-0050-0400		0.05	4	0.55	0.67	15	4	50	4,800	4.19	4.34	4.49	4.66	5.03
HALR230-0070-0050-0600		0.05	6	0.55	0.67	15	4	50	4,800	6.26	6.47	6.71	6.96	7.52
HALR230-0070-0100-0200		0.1	2	0.55	0.67	15	4	50	4,800	2.12	2.19	2.27	2.35	2.53
HALR230-0070-0100-0400		0.1	4	0.55	0.67	15	4	50	4,800	4.19	4.33	4.48	4.65	5.02
HALR230-0070-0100-0600		0.1	6	0.55	0.67	15	4	50	4,800	6.26	6.47	6.70	6.95	7.51
HALR230-0080-0020-0200		0.8	0.02	2	0.65	0.77	15	4	50	4,800	2.12	2.20	2.28	2.36
HALR230-0080-0020-0400	0.02		4	0.65	0.77	15	4	50	4,800	4.19	4.34	4.49	4.66	5.04
HALR230-0080-0020-0600	0.02		6	0.65	0.77	15	4	50	4,800	6.26	6.48	6.71	6.96	7.52
HALR230-0080-0020-0800	0.02		8	0.65	0.77	15	4	50	4,960	8.33	8.62	8.93	9.26	10.01
HALR230-0080-0050-0200	0.05		2	0.65	0.77	15	4	50	4,800	2.12	2.20	2.27	2.36	2.54
HALR230-0080-0050-0400	0.05		4	0.65	0.77	15	4	50	4,800	4.19	4.34	4.49	4.66	5.03
HALR230-0080-0050-0600	0.05		6	0.65	0.77	15	4	50	4,800	6.26	6.47	6.71	6.96	7.52
HALR230-0080-0050-0800	0.05		8	0.65	0.77	15	4	50	4,960	8.33	8.61	8.92	9.26	10.00
HALR230-0080-0100-0200	0.1		2	0.65	0.77	15	4	50	4,800	2.12	2.19	2.27	2.35	2.53
HALR230-0080-0100-0400	0.1		4	0.65	0.77	15	4	50	4,800	4.19	4.33	4.48	4.65	5.02
HALR230-0080-0100-0600	0.1	6	0.65	0.77	15	4	50	4,800	6.26	6.47	6.70	6.95	7.51	
HALR230-0080-0100-0800	0.1	8	0.65	0.77	15	4	50	4,960	8.32	8.61	8.92	9.25	9.99	
HALR230-0080-0200-0200	0.9	0.2	2	0.65	0.77	15	4	50	4,800	2.12	2.19	2.26	2.33	2.51
HALR230-0080-0200-0400		0.2	4	0.65	0.77	15	4	50	4,800	4.19	4.32	4.47	4.63	5.00
HALR230-0080-0200-0600		0.2	6	0.65	0.77	15	4	50	4,800	6.25	6.46	6.69	6.93	7.48
HALR230-0080-0200-0800		0.2	8	0.65	0.77	15	4	50	4,960	8.32	8.60	8.91	9.23	9.97
HALR230-0090-0100-0400		0.1	4	0.7	0.87	15	4	50	5,440	4.19	4.33	4.48	4.65	5.02
HALR230-0090-0100-0800		0.1	8	0.7	0.87	15	4	50	5,440	8.32	8.61	8.92	9.25	9.99

CBN Series  
 Hard Star A Series  
 Hard Star TT Series  
 Hard Star TT Series  
 Ion Depo A Series  
 Ion Depo U Series  
 DLC Series  
 Non-Coat Series  
 Ion Depo R Series

# HARD STAR Type A Series

**HARD STAR Type A 추천 절삭 조건표**  
Recommended Milling Conditions

**■형번:HALR230**  
Model number:HALR230

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.2	0.5	0.003	0.04	200	30,000	0.003	0.02	160	30,000	0.003	0.01	120	30,000
		1	0.003	0.04	150	30,000	0.002	0.02	120	30,000	0.002	0.01	80	30,000
	0.3	1	0.003	0.08	300	30,000	0.003	0.04	250	30,000	0.003	0.03	200	30,000
		1.5	0.003	0.08	200	30,000	0.003	0.04	160	30,000	0.003	0.03	120	30,000
		2	0.003	0.08	150	30,000	0.003	0.04	120	30,000	0.003	0.03	100	25,000
		2.5	0.002	0.08	100	25,000	0.002	0.04	80	25,000	0.002	0.03	60	20,000
		3	0.002	0.08	50	25,000	0.002	0.04	40	25,000	0.002	0.03	30	20,000
	0.4	1	0.005	0.1	400	30,000	0.005	0.05	350	28,000	0.004	0.04	300	25,000
		1.5	0.005	0.1	350	30,000	0.005	0.05	300	28,000	0.004	0.04	260	25,000
		2	0.005	0.1	300	30,000	0.005	0.05	250	25,000	0.003	0.04	220	25,000
		2.5	0.004	0.1	280	28,000	0.004	0.05	240	25,000	0.003	0.04	180	20,000
	0.5	1	0.008	0.15	500	25,000	0.006	0.1	450	23,000	0.004	0.08	400	20,000
		2	0.007	0.15	420	25,000	0.005	0.1	360	23,000	0.003	0.08	300	20,000
		3	0.006	0.15	350	25,000	0.004	0.1	320	23,000	0.003	0.08	280	20,000
		4	0.004	0.15	300	25,000	0.002	0.1	240	23,000	0.002	0.08	180	20,000
	0.6	2	0.012	0.2	500	25,000	0.006	0.15	400	23,000	0.004	0.1	320	20,000
		4	0.007	0.2	400	23,000	0.004	0.15	300	20,000	0.003	0.1	200	18,000
		6	0.005	0.2	200	20,000	0.003	0.15	150	18,000	0.002	0.1	100	12,000
	0.7	2	0.012	0.25	700	25,000	0.006	0.15	600	23,000	0.003	0.12	450	20,000
		4	0.008	0.25	600	25,000	0.005	0.15	500	23,000	0.002	0.12	350	20,000
		6	0.005	0.25	350	20,000	0.003	0.15	250	18,000	0.002	0.12	200	16,000
	0.8	2	0.014	0.25	800	25,000	0.006	0.16	700	23,000	0.005	0.14	500	20,000
		4	0.008	0.25	700	25,000	0.005	0.16	600	23,000	0.003	0.14	400	20,000
		6	0.006	0.25	550	20,000	0.004	0.16	450	18,000	0.002	0.14	320	16,000
8		0.003	0.25	400	16,000	0.002	0.16	300	14,000	0.002	0.14	200	12,000	
0.9	4	0.03	0.3	850	25,000	0.02	0.2	700	20,000	0.01	0.15	600	18,000	
	8	0.01	0.3	400	16,000	0.008	0.2	350	14,000	0.005	0.15	250	10,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입방은, 장삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 Coolant, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은, 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일된 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# HARD STAR Type A Series

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발트(Kovar)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.2	0.5	0.012	0.05	250	30,000	0.012	0.05	250	30,000	0.003	0.04	150	30,000
		1	0.008	0.05	200	30,000	0.008	0.05	200	30,000	0.003	0.04	100	30,000
	0.3	1	0.024	0.1	300	30,000	0.024	0.1	300	30,000	0.003	0.08	180	30,000
		1.5	0.018	0.1	260	30,000	0.018	0.1	260	30,000	0.003	0.08	130	30,000
		2	0.012	0.1	250	30,000	0.012	0.1	250	30,000	0.003	0.08	100	30,000
		2.5	0.008	0.1	240	30,000	0.008	0.1	240	30,000	0.002	0.08	80	25,000
		3	0.006	0.1	220	30,000	0.006	0.1	220	30,000	0.002	0.08	50	25,000
	0.4	1	0.03	0.12	450	30,000	0.03	0.12	450	30,000	0.005	0.1	300	30,000
		1.5	0.027	0.12	400	30,000	0.027	0.12	400	30,000	0.005	0.1	270	30,000
		2	0.024	0.12	360	30,000	0.024	0.12	360	30,000	0.005	0.1	180	25,000
		2.5	0.024	0.12	360	30,000	0.024	0.12	360	30,000	0.005	0.1	180	25,000
	0.5	1	0.036	0.14	650	30,000	0.036	0.14	650	30,000	0.01	0.12	400	25,000
		2	0.03	0.14	600	30,000	0.03	0.14	600	30,000	0.01	0.12	300	25,000
		3	0.024	0.14	480	30,000	0.024	0.14	480	30,000	0.008	0.12	250	25,000
		4	0.018	0.14	430	30,000	0.018	0.14	430	30,000	0.005	0.12	180	20,000
	0.6	2	0.04	0.16	800	30,000	0.04	0.16	800	30,000	0.02	0.13	400	25,000
		4	0.03	0.16	650	30,000	0.03	0.16	650	30,000	0.015	0.13	250	20,000
		6	0.018	0.16	400	25,000	0.018	0.16	400	25,000	0.008	0.13	150	16,000
	0.7	2	0.04	0.2	1,000	30,000	0.04	0.2	1,000	30,000	0.02	0.16	400	20,000
		4	0.04	0.2	1,000	30,000	0.04	0.2	1,000	30,000	0.02	0.16	400	20,000
		6	0.025	0.2	700	25,000	0.025	0.2	700	25,000	0.01	0.16	250	16,000
	0.8	2	0.055	0.25	1,400	30,000	0.055	0.25	1,400	30,000	0.025	0.2	600	20,000
		4	0.055	0.25	1,400	30,000	0.055	0.25	1,400	30,000	0.025	0.2	600	20,000
		6	0.04	0.25	1,000	25,000	0.04	0.25	1,000	25,000	0.02	0.2	400	16,000
8		0.025	0.25	600	22,000	0.025	0.25	600	22,000	0.01	0.2	250	14,000	
0.9	4	0.06	0.3	1,500	30,000	0.06	0.3	1,500	30,000	0.03	0.24	700	20,000	
	8	0.04	0.3	800	22,000	0.04	0.3	800	22,000	0.01	0.24	350	14,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
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 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
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 ●공구 돌출은, 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일된 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

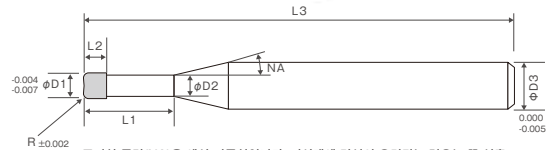


# HARD STAR Type A Series

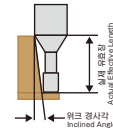
초경 롱 넥 래디우스 엔드밀 Carbide Long Neck Radius End Mill

■형번: HALR330 Model number: HALR330

Hard A
super MG
날 수 3
헬릭스각 30°
목각 15°
Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

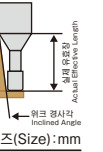


●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
HALR330-0060-0020-0200	0.6	0.02	2	0.5	0.57	15	4	50	6,160	2.12	2.20	2.28	2.36	2.55
HALR330-0060-0020-0400		0.02	4	0.5	0.57	15	4	50	6,160	4.19	4.34	4.49	4.66	5.04
HALR330-0060-0020-0600		0.02	6	0.5	0.57	15	4	50	6,160	6.26	6.48	6.71	6.96	7.52
HALR330-0060-0050-0200		0.05	2	0.5	0.57	15	4	50	6,160	2.12	2.20	2.27	2.36	2.54
HALR330-0060-0050-0400		0.05	4	0.5	0.57	15	4	50	6,160	4.19	4.34	4.49	4.66	5.03
HALR330-0060-0050-0600		0.05	6	0.5	0.57	15	4	50	6,160	6.26	6.47	6.71	6.96	7.52
HALR330-0060-0100-0200		0.1	2	0.5	0.57	15	4	50	5,760	2.12	2.19	2.27	2.35	2.53
HALR330-0060-0100-0400		0.1	4	0.5	0.57	15	4	50	5,760	4.19	4.33	4.48	4.65	5.02
HALR330-0060-0100-0600		0.1	6	0.5	0.57	15	4	50	5,760	6.26	6.47	6.70	6.95	7.51
HALR330-0070-0020-0200	0.7	0.02	2	0.55	0.67	15	4	50	6,480	2.12	2.20	2.28	2.36	2.55
HALR330-0070-0020-0400		0.02	4	0.55	0.67	15	4	50	6,480	4.19	4.34	4.49	4.66	5.04
HALR330-0070-0020-0600		0.02	6	0.55	0.67	15	4	50	6,480	6.26	6.48	6.71	6.96	7.52
HALR330-0070-0050-0200		0.05	2	0.55	0.67	15	4	50	6,480	2.12	2.20	2.27	2.36	2.54
HALR330-0070-0050-0400		0.05	4	0.55	0.67	15	4	50	6,480	4.19	4.34	4.49	4.66	5.03
HALR330-0070-0050-0600		0.05	6	0.55	0.67	15	4	50	6,480	6.26	6.47	6.71	6.96	7.52
HALR330-0070-0100-0200		0.1	2	0.55	0.67	15	4	50	6,480	2.12	2.19	2.27	2.35	2.53
HALR330-0070-0100-0400		0.1	4	0.55	0.67	15	4	50	6,480	4.19	4.33	4.48	4.65	5.02
HALR330-0070-0100-0600		0.1	6	0.55	0.67	15	4	50	6,480	6.26	6.47	6.70	6.95	7.51
HALR330-0080-0020-0200	0.8	0.02	2	0.65	0.77	15	4	50	6,480	2.12	2.20	2.28	2.36	2.55
HALR330-0080-0020-0400		0.02	4	0.65	0.77	15	4	50	6,480	4.19	4.34	4.49	4.66	5.04
HALR330-0080-0020-0600		0.02	6	0.65	0.77	15	4	50	6,480	6.26	6.48	6.71	6.96	7.52
HALR330-0080-0020-0800		0.02	8	0.65	0.77	15	4	50	6,720	8.33	8.62	8.93	9.26	10.01
HALR330-0080-0050-0200		0.05	2	0.65	0.77	15	4	50	6,480	2.12	2.20	2.27	2.36	2.54
HALR330-0080-0050-0400		0.05	4	0.65	0.77	15	4	50	6,480	4.19	4.34	4.49	4.66	5.03
HALR330-0080-0050-0600		0.05	6	0.65	0.77	15	4	50	6,480	6.26	6.47	6.71	6.96	7.52
HALR330-0080-0050-0800		0.05	8	0.65	0.77	15	4	50	6,720	8.33	8.61	8.92	9.26	10.00
HALR330-0080-0100-0200		0.1	2	0.65	0.77	15	4	50	6,480	2.12	2.19	2.27	2.35	2.53
HALR330-0080-0100-0400		0.1	4	0.65	0.77	15	4	50	6,480	4.19	4.33	4.48	4.65	5.02
HALR330-0080-0100-0600		0.1	6	0.65	0.77	15	4	50	6,480	6.26	6.47	6.70	6.95	7.51
HALR330-0080-0100-0800		0.1	8	0.65	0.77	15	4	50	6,720	8.32	8.61	8.92	9.25	9.99

# HARD STAR Type A Series



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
HALR330-0080-0200-0200	0.8	0.2	2	0.65	0.77	15	4	50	6,480	2.12	2.19	2.26	2.33	2.51
HALR330-0080-0200-0400		0.2	4	0.65	0.77	15	4	50	6,480	4.19	4.32	4.47	4.63	5.00
HALR330-0080-0200-0600		0.2	6	0.65	0.77	15	4	50	6,480	6.25	6.46	6.69	6.93	7.48
HALR330-0080-0200-0800		0.2	8	0.65	0.77	15	4	50	6,720	8.32	8.60	8.91	9.23	9.97

CBN Series  
 Hard Star A Series  
 Hard Star TT Series  
 Hard Star TT Series  
 Ion Depo A Series  
 Ion Depo U Series  
 DLC Series  
 Non-Coat Series  
 Ion Depo R Series



**HARD STAR Type A 추천 절삭 조건표**  
Recommended Milling Conditions

**■형번:HALR330**  
Model number:HALR330

**롱 넥 래디우스 엔드밀 Long Neck Radius End Mill**

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	
3	0.6	2	0.012	0.2	750	25,000	0.006	0.15	600	23,000	0.004	0.1	480	20,000	
		4	0.007	0.2	600	23,000	0.004	0.15	450	20,000	0.003	0.1	300	18,000	
		6	0.005	0.2	300	20,000	0.003	0.15	225	18,000	0.002	0.1	150	12,000	
	0.7	2	0.012	0.25	1,050	25,000	0.006	0.15	900	23,000	0.003	0.12	675	20,000	
		4	0.008	0.25	900	25,000	0.005	0.15	750	23,000	0.002	0.12	525	20,000	
		6	0.005	0.25	525	20,000	0.003	0.15	375	18,000	0.002	0.12	300	16,000	
	0.8	2	0.014	0.25	1,200	25,000	0.006	0.16	1,050	23,000	0.005	0.14	750	20,000	
		4	0.008	0.25	1,050	25,000	0.005	0.16	900	23,000	0.003	0.14	600	20,000	
		6	0.006	0.25	825	20,000	0.004	0.16	675	18,000	0.002	0.14	480	16,000	
			8	0.003	0.25	600	16,000	0.002	0.16	450	14,000	0.002	0.14	300	12,000

**롱 넥 래디우스 엔드밀 Long Neck Radius End Mill**

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발 (Kovar)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	
3	0.6	2	0.04	0.16	1,200	30,000	0.04	0.16	1,200	30,000	0.02	0.13	600	25,000	
		4	0.03	0.16	975	30,000	0.03	0.16	975	30,000	0.015	0.13	375	20,000	
		6	0.018	0.16	600	25,000	0.018	0.16	600	25,000	0.008	0.13	225	16,000	
	0.7	2	0.04	0.2	1,500	30,000	0.04	0.2	1,500	30,000	0.02	0.16	600	20,000	
		4	0.04	0.2	1,500	30,000	0.04	0.2	1,500	30,000	0.02	0.16	600	20,000	
		6	0.025	0.2	1,050	25,000	0.025	0.2	1,050	25,000	0.01	0.16	375	16,000	
	0.8	2	0.055	0.25	2,100	30,000	0.055	0.25	2,100	30,000	0.025	0.2	900	20,000	
		4	0.04	0.25	1,500	25,000	0.04	0.25	1,500	25,000	0.02	0.2	600	16,000	
		6	0.04	0.25	1,500	25,000	0.04	0.25	1,500	25,000	0.02	0.2	600	16,000	
			8	0.025	0.25	900	22,000	0.025	0.25	900	22,000	0.01	0.2	375	14,000

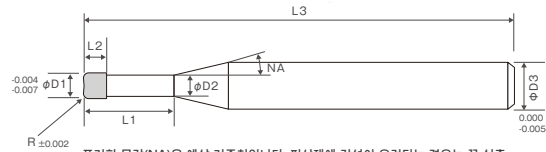
●공구는 절삭에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입량, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●공구는 절삭에 확실하게 고정하고, 진동을 억제해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 절입량은 절삭 가공을 행하는 경우의 최대치입니다. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일인 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# HARD STAR Type A Series

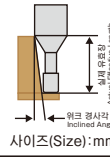
초경 롱 넥 래디우스 엔드밀 Carbide Long Neck Radius End Mill

■형번:HALR430 Model number:HALR430

Hard A
super MG
날 수 4
헬릭스각 30°
목각 15°
Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

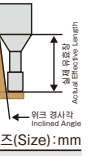


사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30°	1°	1°30'	2°	3°
HALR430-0090-0100-0400	0.9	0.1	4	0.7	0.87	15	4	50	7,360	4.19	4.33	4.48	4.65	5.02
HALR430-0090-0100-0800		0.1	8	0.7	0.87	15	4	50	7,360	8.32	8.61	8.92	9.25	9.99
HALR430-0100-0020-0200		0.02	2	0.8	0.95	15	4	50	4,960	2.16	2.24	2.32	2.40	2.60
HALR430-0100-0020-0300		0.02	3	0.8	0.95	15	4	50	4,960	3.20	3.31	3.43	3.55	3.84
HALR430-0100-0020-0400		0.02	4	0.8	0.95	15	4	50	4,960	4.23	4.38	4.53	4.70	5.08
HALR430-0100-0020-0500		0.02	5	0.8	0.95	15	4	50	4,960	5.26	5.45	5.64	5.85	6.33
HALR430-0100-0020-0600		0.02	6	0.8	0.95	15	4	50	5,440	6.30	6.52	6.75	7.00	7.57
HALR430-0100-0020-0800		0.02	8	0.8	0.95	15	4	50	5,440	8.37	8.66	8.97	9.30	10.06
HALR430-0100-0020-1000		0.02	10	0.8	0.95	15	4	50	5,440	10.43	10.80	11.18	11.60	12.54
HALR430-0100-0050-0200		0.05	2	0.8	0.95	15	4	50	4,960	2.16	2.24	2.31	2.40	2.59
HALR430-0100-0050-0300		0.05	3	0.8	0.95	15	4	50	4,960	3.20	3.31	3.42	3.55	3.83
HALR430-0100-0050-0400		0.05	4	0.8	0.95	15	4	50	4,960	4.23	4.38	4.53	4.70	5.08
HALR430-0100-0050-0500		0.05	5	0.8	0.95	15	4	50	4,960	5.26	5.44	5.64	5.85	6.32
HALR430-0100-0050-0600		0.05	6	0.8	0.95	15	4	50	5,440	6.30	6.51	6.75	7.00	7.56
HALR430-0100-0050-0800		0.05	8	0.8	0.95	15	4	50	5,440	8.36	8.65	8.96	9.30	10.05
HALR430-0100-0050-1000		0.05	10	0.8	0.95	15	4	50	5,440	10.43	10.79	11.18	11.60	12.54
HALR430-0100-0100-0200	1	0.1	2	0.8	0.95	15	4	50	4,960	2.16	2.23	2.31	2.39	2.58
HALR430-0100-0100-0300		0.1	3	0.8	0.95	15	4	50	4,960	3.19	3.30	3.42	3.54	3.82
HALR430-0100-0100-0400		0.1	4	0.8	0.95	15	4	50	4,960	4.23	4.37	4.53	4.69	5.07
HALR430-0100-0100-0500		0.1	5	0.8	0.95	15	4	50	4,960	5.26	5.44	5.63	5.84	6.31
HALR430-0100-0100-0600		0.1	6	0.8	0.95	15	4	50	5,440	6.30	6.51	6.74	6.99	7.55
HALR430-0100-0100-0800		0.1	8	0.8	0.95	15	4	50	5,440	8.36	8.65	8.96	9.29	10.04
HALR430-0100-0100-1000		0.1	10	0.8	0.95	15	4	50	4,960	10.43	10.79	11.18	11.59	12.52
HALR430-0100-0200-0200		0.2	2	0.8	0.95	15	4	50	4,960	2.16	2.23	2.30	2.38	2.56
HALR430-0100-0200-0300		0.2	3	0.8	0.95	15	4	50	4,960	3.19	3.30	3.41	3.53	3.80
HALR430-0100-0200-0400		0.2	4	0.8	0.95	15	4	50	4,960	4.22	4.36	4.52	4.68	5.04
HALR430-0100-0200-0500		0.2	5	0.8	0.95	15	4	50	4,960	5.26	5.43	5.62	5.83	6.29
HALR430-0100-0200-0600		0.2	6	0.8	0.95	15	4	50	5,440	6.29	6.50	6.73	6.98	7.53
HALR430-0100-0200-0800		0.2	8	0.8	0.95	15	4	50	5,440	8.36	8.64	8.94	9.26	9.99
HALR430-0100-0200-1000		0.2	10	0.8	0.95	15	4	50	5,440	10.43	10.78	11.17	11.58	12.50

# HARD STAR Type A Series



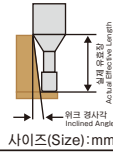
사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30°	1°	1°30'	2°	3°
HALR430-0100-0300-0200	1	0.3	2	0.8	0.95	15	4	50	4,960	2.15	2.22	2.29	2.36	2.53
HALR430-0100-0300-0300		0.3	3	0.8	0.95	15	4	50	4,960	3.19	3.29	3.40	3.51	3.78
HALR430-0100-0300-0400		0.3	4	0.8	0.95	15	4	50	4,960	4.22	4.36	4.50	4.66	5.02
HALR430-0100-0300-0500		0.3	5	0.8	0.95	15	4	50	4,960	5.25	5.43	5.61	5.81	6.26
HALR430-0100-0300-0600		0.3	6	0.8	0.95	15	4	50	5,440	6.29	6.50	6.72	6.96	7.51
HALR430-0100-0300-0800		0.3	8	0.8	0.95	15	4	50	5,440	8.36	8.64	8.94	9.26	9.99
HALR430-0100-0300-1000	0.3	10	0.8	0.95	15	4	50	5,440	10.42	10.78	11.15	11.56	12.48	
HALR430-0120-0100-0500	1.2	0.1	5	1	1.15	15	4	50	5,600	5.26	5.44	5.63	5.84	6.31
HALR430-0120-0100-1000		0.1	10	1	1.15	15	4	50	5,600	10.43	10.79	11.18	11.59	12.52
HALR430-0120-0200-0500		0.2	5	1	1.15	15	4	50	5,600	5.26	5.43	5.62	5.83	6.29
HALR430-0120-0200-1000		0.2	10	1	1.15	15	4	50	5,600	10.43	10.78	11.17	11.58	12.50
HALR430-0120-0300-0500		0.3	5	1	1.15	15	4	50	5,600	5.25	5.43	5.61	5.81	6.26
HALR430-0120-0300-1000		0.3	10	1	1.15	15	4	50	5,600	10.42	10.78	11.15	11.56	12.48
HALR430-0150-0020-0300	1.5	0.02	3	1.2	1.45	15	4	50	5,280	3.20	3.31	3.43	3.55	3.84
HALR430-0150-0020-0400		0.02	4	1.2	1.45	15	4	50	5,280	4.23	4.38	4.53	4.70	5.08
HALR430-0150-0020-0600		0.02	6	1.2	1.45	15	4	50	5,280	6.30	6.52	6.75	7.00	7.57
HALR430-0150-0020-0800		0.02	8	1.2	1.45	15	4	50	5,600	8.37	8.66	8.97	9.30	10.06
HALR430-0150-0020-1200		0.02	12	1.2	1.45	15	4	50	5,600	12.50	12.93	13.40	13.90	15.03
HALR430-0150-0020-1500		0.02	15	1.2	1.45	15	4	50	5,600	15.60	16.14	16.73	17.35	18.76
HALR430-0150-0050-0300		0.05	3	1.2	1.45	15	4	50	5,280	3.20	3.31	3.42	3.55	3.83
HALR430-0150-0050-0400		0.05	4	1.2	1.45	15	4	50	5,280	4.23	4.38	4.53	4.70	5.08
HALR430-0150-0050-0600		0.05	6	1.2	1.45	15	4	50	5,280	6.30	6.51	6.75	7.00	7.56
HALR430-0150-0050-0800		0.05	8	1.2	1.45	15	4	50	5,600	8.36	8.65	8.96	9.30	10.05
HALR430-0150-0050-1200		0.05	12	1.2	1.45	15	4	50	5,600	12.50	12.93	13.40	13.90	15.02
HALR430-0150-0050-1500		0.05	15	1.2	1.45	15	4	50	5,600	15.60	16.14	16.72	17.35	18.75
HALR430-0150-0100-0300		0.1	3	1.2	1.45	15	4	50	5,280	3.19	3.30	3.42	3.54	3.82
HALR430-0150-0100-0400		0.1	4	1.2	1.45	15	4	50	5,280	4.23	4.37	4.53	4.69	5.07
HALR430-0150-0100-0600	0.1	6	1.2	1.45	15	4	50	5,280	6.30	6.51	6.74	6.99	7.55	
HALR430-0150-0100-0800	0.1	8	1.2	1.45	15	4	50	5,600	8.36	8.65	8.96	9.29	10.04	
HALR430-0150-0100-1200	0.1	12	1.2	1.45	15	4	50	5,600	12.50	12.93	13.39	13.89	15.01	
HALR430-0150-0100-1500	0.1	15	1.2	1.45	15	4	50	5,600	15.60	16.14	16.72	17.34	18.74	
HALR430-0150-0200-0300	0.2	3	1.2	1.45	15	4	50	5,280	3.19	3.30	3.41	3.53	3.80	
HALR430-0150-0200-0400	0.2	4	1.2	1.45	15	4	50	5,280	4.22	4.36	4.52	4.68	5.04	
HALR430-0150-0200-0600	0.2	6	1.2	1.45	15	4	50	5,280	6.29	6.50	6.73	6.98	7.53	
HALR430-0150-0200-0800	0.2	8	1.2	1.45	15	4	50	5,600	8.36	8.64	8.95	9.28	10.01	
HALR430-0150-0200-1200	0.2	12	1.2	1.45	15	4	50	5,600	12.49	12.92	13.38	13.88	14.99	
HALR430-0150-0200-1500	0.2	15	1.2	1.45	15	4	50	5,600	15.59	16.13	16.71	17.33	18.72	
HALR430-0150-0300-0300	0.3	3	1.2	1.45	15	4	50	5,280	3.19	3.29	3.40	3.51	3.78	
HALR430-0150-0300-0400	0.3	4	1.2	1.45	15	4	50	5,280	4.22	4.36	4.50	4.66	5.02	
HALR430-0150-0300-0600	0.3	6	1.2	1.45	15	4	50	5,280	6.29	6.50	6.72	6.96	7.51	
HALR430-0150-0300-0800	0.3	8	1.2	1.45	15	4	50	5,600	8.36	8.64	8.94	9.26	9.99	
HALR430-0150-0300-1200	0.3	12	1.2	1.45	15	4	50	5,600	12.49	12.92	13.37	13.86	14.96	
HALR430-0150-0300-1500	0.3	15	1.2	1.45	15	4	50	5,600	15.59	16.12	16.70	17.31	18.69	
HALR430-0150-0500-0300	0.5	3	1.2	1.45	15	4	50	5,280	3.18	3.27	3.37	3.48	3.73	
HALR430-0150-0500-0400	0.5	4	1.2	1.45	15	4	50	5,280	4.21	4.34	4.48	4.63	4.97	

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
Ion Depo A Series  
Ion Depo U Series  
DLC Series  
Non-Coat Series  
Ion Depo R Series

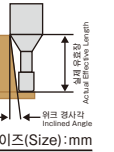
# HARD STAR Type A Series



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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
										사이즈(Size):mm					
HALR430-0150-0500-0600	1.5	0.5	6	1.2	1.45	15	4	50	5,280	6.28	6.48	6.70	6.93	7.46	
HALR430-0150-0500-0800		0.5	8	1.2	1.45	15	4	50	5,600	8.35	8.62	8.92	9.23	9.95	
HALR430-0150-0500-1200		0.5	12	1.2	1.45	15	4	50	5,600	12.48	12.90	13.35	13.83	14.92	
HALR430-0150-0500-1500		0.5	15	1.2	1.45	15	4	50	5,600	15.58	16.11	16.67	17.28	18.65	
HALR430-0200-0020-0400		0.02	4	1.6	1.94	15	4	50	5,280	4.25	4.40	4.56	4.73	5.11	
HALR430-0200-0020-0600		0.02	6	1.6	1.94	15	4	50	5,280	6.32	6.54	6.77	7.02	7.59	
HALR430-0200-0020-0800		0.02	8	1.6	1.94	15	4	50	5,600	8.38	8.68	8.99	9.32	10.08	
HALR430-0200-0020-1200		0.02	12	1.6	1.94	15	4	50	5,600	12.52	12.95	13.42	13.92	15.05	
HALR430-0200-0020-1600		0.02	16	1.6	1.94	15	4	50	5,600	16.65	17.23	17.85	18.52	FREE	
HALR430-0200-0020-2000		0.02	20	1.6	1.94	15	4	50	5,600	20.79	21.51	22.29	23.12	FREE	
HALR430-0200-0050-0400		0.05	4	1.6	1.94	15	4	50	5,280	4.25	4.40	4.55	4.72	5.10	
HALR430-0200-0050-0600		0.05	6	1.6	1.94	15	4	50	5,280	6.32	6.53	6.77	7.02	7.59	
HALR430-0200-0050-0800		0.05	8	1.6	1.94	15	4	50	5,600	8.38	8.67	8.99	9.32	10.07	
HALR430-0200-0050-1200		0.05	12	1.6	1.94	15	4	50	5,600	12.52	12.95	13.42	13.92	15.05	
HALR430-0200-0050-1600		0.05	16	1.6	1.94	15	4	50	5,600	16.65	17.23	17.85	18.52	FREE	
HALR430-0200-0050-2000		0.05	20	1.6	1.94	15	4	50	5,600	20.79	21.51	22.28	23.12	FREE	
HALR430-0200-0100-0400	2	0.1	4	1.6	1.94	15	4	50	5,280	4.25	4.39	4.55	4.71	5.09	
HALR430-0200-0100-0600		0.1	6	1.6	1.94	15	4	50	5,280	6.31	6.53	6.76	7.01	7.57	
HALR430-0200-0100-0800		0.1	8	1.6	1.94	15	4	50	5,600	8.38	8.67	8.98	9.31	10.06	
HALR430-0200-0100-1200		0.1	12	1.6	1.94	15	4	50	5,600	12.52	12.95	13.41	13.91	15.03	
HALR430-0200-0100-1600		0.1	16	1.6	1.94	15	4	50	5,600	16.65	17.23	17.85	18.51	FREE	
HALR430-0200-0100-2000		0.1	20	1.6	1.94	15	4	50	5,600	20.79	21.51	22.28	23.11	FREE	
HALR430-0200-0200-0400		0.2	4	1.6	1.94	15	4	50	5,280	4.24	4.38	4.54	4.70	5.07	
HALR430-0200-0200-0600		0.2	6	1.6	1.94	15	4	50	5,280	6.31	6.52	6.75	7.00	7.55	
HALR430-0200-0200-0800		0.2	8	1.6	1.94	15	4	50	5,600	8.38	8.66	8.97	9.30	10.04	
HALR430-0200-0200-1200		0.2	12	1.6	1.94	15	4	50	5,600	12.51	12.94	13.40	13.90	15.01	
HALR430-0200-0200-1600		0.2	16	1.6	1.94	15	4	50	5,600	16.65	17.22	17.84	18.50	FREE	
HALR430-0200-0200-2000		0.2	20	1.6	1.94	15	4	50	5,600	20.78	21.50	22.27	23.10	FREE	
HALR430-0200-0300-0400		3	0.3	4	1.6	1.94	15	4	50	5,280	4.24	4.38	4.53	4.68	5.04
HALR430-0200-0300-0600			0.3	6	1.6	1.94	15	4	50	5,280	6.31	6.52	6.74	6.98	7.53
HALR430-0200-0300-0800			0.3	8	1.6	1.94	15	4	50	5,600	8.37	8.66	8.96	9.28	10.02
HALR430-0200-0300-1200			0.3	12	1.6	1.94	15	4	50	5,600	12.51	12.94	13.39	13.88	14.99
HALR430-0200-0300-1600	0.3		16	1.6	1.94	15	4	50	5,600	16.64	17.21	17.83	18.48	FREE	
HALR430-0200-0300-2000	0.3		20	1.6	1.94	15	4	50	5,600	20.78	21.49	22.26	23.08	FREE	
HALR430-0200-0500-0400	0.5		4	1.6	1.94	15	4	50	5,280	4.23	4.36	4.50	4.65	5.00	
HALR430-0200-0500-0600	0.5		6	1.6	1.94	15	4	50	5,280	6.30	6.50	6.72	6.95	7.48	
HALR430-0200-0500-0800	0.5		8	1.6	1.94	15	4	50	5,600	8.37	8.64	8.94	9.25	9.97	
HALR430-0200-0500-1200	0.5		12	1.6	1.94	15	4	50	5,600	12.50	12.92	13.37	13.85	14.94	
HALR430-0200-0500-1600	0.5		16	1.6	1.94	15	4	50	5,600	16.64	17.20	17.80	18.45	FREE	
HALR430-0200-0500-2000	0.5		20	1.6	1.94	15	4	50	5,600	20.77	21.48	22.24	23.05	FREE	
HALR430-0250-0100-1000	2.5		0.1	10	2	2.44	15	4	50	5,760	10.45	10.81	11.20	11.61	12.55
HALR430-0250-0100-2000			0.1	20	2	2.44	15	4	50	6,000	20.79	21.51	22.28	FREE	FREE
HALR430-0250-0200-1000			0.2	10	2	2.44	15	4	50	5,760	10.45	10.80	11.19	11.60	12.52
HALR430-0250-0200-2000			0.2	20	2	2.44	15	4	50	6,000	20.78	21.50	22.27	FREE	FREE
HALR430-0250-0300-1000		0.3	10	2	2.44	15	4	50	5,760	10.44	10.80	11.18	11.58	12.50	

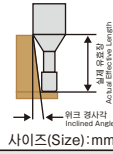
# HARD STAR Type A Series



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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
										사이즈(Size):mm				
HALR430-0250-0300-2000	2.5	0.3	20	2	2.44	15	4	50	6,000	20.78	21.49	22.26	FREE	FREE
HALR430-0250-0500-1000		0.5	10	2	2.44	15	4	50	5,760	10.44	10.78	11.15	11.55	12.46
HALR430-0250-0500-2000		0.5	20	2	2.44	15	4	50	6,000	20.77	21.48	22.24	FREE	FREE
HALR430-0300-0050-0400		0.05	4	2.5	2.85	15	4	50	4,800	4.42	4.57	4.74	4.91	5.31
HALR430-0300-0050-0600		0.05	6	2.5	2.85	15	4	50	4,800	6.49	6.71	6.95	7.21	7.79
HALR430-0300-0050-0800		0.05	8	2.5	2.85	15	4	50	4,800	8.56	8.85	9.17	9.51	FREE
HALR430-0300-0050-1200		0.05	12	2.5	2.85	15	4	50	5,760	12.69	13.13	13.60	14.11	FREE
HALR430-0300-0050-1600		0.05	16	2.5	2.85	15	4	50	7,200	16.83	17.41	18.04	FREE	FREE
HALR430-0300-0050-2000		0.05	20	2.5	2.85	15	4	50	7,200	20.96	21.69	FREE	FREE	FREE
HALR430-0300-0100-0400		0.1	4	2.5	2.85	15	4	50	4,800	4.42	4.57	4.73	4.91	5.30
HALR430-0300-0100-0600		0.1	6	2.5	2.85	15	4	50	4,800	6.49	6.71	6.95	7.21	7.78
HALR430-0300-0100-0800		0.1	8	2.5	2.85	15	4	50	4,800	8.56	8.85	9.17	9.51	FREE
HALR430-0300-0100-1200		0.1	12	2.5	2.85	15	4	50	5,760	12.69	13.13	13.60	14.11	FREE
HALR430-0300-0100-1600		0.1	16	2.5	2.85	15	4	50	7,200	16.82	17.41	18.03	FREE	FREE
HALR430-0300-0100-2000		0.1	20	2.5	2.85	15	4	50	7,200	20.96	21.69	FREE	FREE	FREE
HALR430-0300-0100-2500		0.1	25	2.5	2.85	15	4	60	7,200	26.13	27.03	FREE	FREE	FREE
HALR430-0300-0100-3000	0.1	30	2.5	2.85	15	4	60	8,080	31.30	FREE	FREE	FREE	FREE	
HALR430-0300-0200-0400	0.2	4	2.5	2.85	15	4	50	4,800	4.42	4.56	4.72	4.89	5.27	
HALR430-0300-0200-0600	0.2	6	2.5	2.85	15	4	50	4,800	6.48	6.70	6.94	7.19	7.76	
HALR430-0300-0200-0800	0.2	8	2.5	2.85	15	4	50	4,800	8.55	8.84	9.16	9.49	FREE	
HALR430-0300-0200-1200	0.2	12	2.5	2.85	15	4	50	5,760	12.69	13.12	13.59	14.09	FREE	
HALR430-0300-0200-1600	0.2	16	2.5	2.85	15	4	50	7,200	16.82	17.40	18.02	FREE	FREE	
HALR430-0300-0200-2000	0.2	20	2.5	2.85	15	4	50	7,200	20.96	21.68	FREE	FREE	FREE	
HALR430-0300-0200-2500	0.2	25	2.5	2.85	15	4	60	7,200	26.12	27.03	FREE	FREE	FREE	
HALR430-0300-0200-3000	0.2	30	2.5	2.85	15	4	60	8,080	31.29	FREE	FREE	FREE	FREE	
HALR430-0300-0300-0400	0.3	4	2.5	2.85	15	4	50	4,800	4.41	4.56	4.71	4.88	5.25	
HALR430-0300-0300-0600	0.3	6	2.5	2.85	15	4	50	4,800	6.48	6.70	6.93	7.18	7.74	
HALR430-0300-0300-0800	0.3	8	2.5	2.85	15	4	50	4,800	8.55	8.84	9.14	9.48	FREE	
HALR430-0300-0300-1200	0.3	12	2.5	2.85	15	4	50	5,760	12.68	13.11	13.58	14.08	FREE	
HALR430-0300-0300-1600	0.3	16	2.5	2.85	15	4	50	7,200	16.82	17.39	18.01	FREE	FREE	
HALR430-0300-0300-2000	0.3	20	2.5	2.85	15	4	50	7,200	20.95	21.67	FREE	FREE	FREE	
HALR430-0300-0300-2500	0.3	25	2.5	2.85	15	4	60	7,200	26.12	27.02	FREE	FREE	FREE	
HALR430-0300-0300-3000	0.3	30	2.5	2.85	15	4	60	8,080	31.29	FREE	FREE	FREE	FREE	
HALR430-0300-0500-0400	0.5	4	2.5	2.85	15	4	50	4,800	4.41	4.54	4.69	4.85	5.20	
HALR430-0300-0500-0600	0.5	6	2.5	2.85	15	4	50	4,800	6.47	6.68	6.91	7.15	7.69	
HALR430-0300-0500-0800	0.5	8	2.5	2.85	15	4	50	4,800	8.54	8.82	9.12	9.45	FREE	
HALR430-0300-0500-1200	0.5	12	2.5	2.85	15	4	50	5,760	12.68	13.10	13.56	14.05	FREE	
HALR430-0300-0500-1600	0.5	16	2.5	2.85	15	4	50							

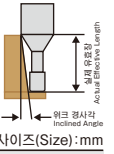
# HARD STAR Type A Series



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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
HALR430-0300-1000-2500	3	1	25	2.5	2.85	15	4	60	7,200	26.10	26.97	FREE	FREE	FREE	
HALR430-0300-1000-3000		1	30	2.5	2.85	15	4	60	8,080	31.27	FREE	FREE	FREE	FREE	
HALR430-0400-0100-0800		0.1	8	3.2	3.8	15	6	50	7,200	8.65	8.95	9.27	9.61	10.39	
HALR430-0400-0100-1200	0.1	12	3.2	3.8	15	6	50	7,200	12.79	13.23	13.70	14.21	15.36		
HALR430-0400-0100-1600	0.1	16	3.2	3.8	15	6	50	7,200	16.92	17.51	18.14	18.81	FREE		
HALR430-0400-0100-2400	0.1	24	3.2	3.8	15	6	60	8,000	25.19	26.06	27.00	28.01	FREE		
HALR430-0400-0100-3200	0.1	32	3.2	3.8	15	6	70	8,000	33.46	34.62	35.87	FREE	FREE		
HALR430-0400-0200-0800	0.2	8	3.2	3.8	15	6	50	7,200	8.65	8.94	9.26	9.60	10.36		
HALR430-0400-0200-1200	0.2	12	3.2	3.8	15	6	50	7,200	12.78	13.22	13.69	14.20	15.33		
HALR430-0400-0200-1600	0.2	16	3.2	3.8	15	6	50	7,200	16.92	17.50	18.13	18.80	FREE		
HALR430-0400-0200-2400	0.2	24	3.2	3.8	15	6	60	8,000	25.19	26.06	26.99	28.00	FREE		
HALR430-0400-0200-3200	0.2	32	3.2	3.8	15	6	70	8,000	33.46	34.62	35.86	FREE	FREE		
HALR430-0400-0300-0800	0.3	8	3.2	3.8	15	6	50	7,200	8.65	8.94	9.25	9.58	10.34		
HALR430-0400-0300-1200	0.3	12	3.2	3.8	15	6	50	7,200	12.78	13.21	13.68	14.18	15.31		
HALR430-0400-0300-1600	0.3	16	3.2	3.8	15	6	50	7,200	16.91	17.49	18.11	18.78	FREE		
HALR430-0400-0300-2400	0.3	24	3.2	3.8	15	6	60	8,000	25.18	26.05	26.98	27.98	FREE		
HALR430-0400-0300-3200	0.3	32	3.2	3.8	15	6	70	8,000	33.45	34.61	35.85	FREE	FREE		
HALR430-0400-0500-0800	0.5	8	3.2	3.8	15	6	50	7,200	8.64	8.92	9.23	9.55	10.29		
HALR430-0400-0500-1200	0.5	12	3.2	3.8	15	6	50	7,200	12.77	13.20	13.66	14.15	15.27		
HALR430-0400-0500-1600	0.5	16	3.2	3.8	15	6	50	7,200	16.91	17.48	18.09	18.75	FREE		
HALR430-0400-0500-2400	0.5	24	3.2	3.8	15	6	60	8,000	25.18	26.04	26.96	27.95	FREE		
HALR430-0400-0500-3200	0.5	32	3.2	3.8	15	6	70	8,000	33.45	34.59	35.83	FREE	FREE		
HALR430-0400-1000-0800	1	8	3.2	3.8	15	6	50	7,200	8.62	8.89	9.17	9.48	10.18		
HALR430-0400-1000-1200	1	12	3.2	3.8	15	6	50	7,200	12.76	13.17	13.61	14.08	15.15		
HALR430-0400-1000-1600	1	16	3.2	3.8	15	6	50	7,200	16.89	17.45	18.04	18.68	FREE		
HALR430-0400-1000-2400	1	24	3.2	3.8	15	6	60	8,000	25.16	26.00	26.91	27.88	FREE		
HALR430-0400-1000-3200	1	32	3.2	3.8	15	6	70	8,000	33.43	34.56	35.77	FREE	FREE		
HALR430-0500-0100-1500	5	0.1	15	4	4.8	15	6	50	10,240	15.89	16.44	17.03	FREE	FREE	
HALR430-0500-0100-2000		0.1	20	4	4.8	15	6	50	10,240	21.06	21.79	FREE	FREE	FREE	
HALR430-0500-0100-4000		0.1	40	4	4.8	15	6	70	12,800	41.73	FREE	FREE	FREE	FREE	
HALR430-0500-0200-1500		0.2	15	4	4.8	15	6	50	10,240	15.88	16.43	17.02	FREE	FREE	
HALR430-0500-0200-2000		0.2	20	4	4.8	15	6	50	10,240	21.05	21.78	FREE	FREE	FREE	
HALR430-0500-0200-4000		0.2	40	4	4.8	15	6	70	12,800	41.73	FREE	FREE	FREE	FREE	
HALR430-0500-0300-1500		0.3	15	4	4.8	15	6	50	10,240	15.88	16.42	17.01	FREE	FREE	
HALR430-0500-0300-2000		0.3	20	4	4.8	15	6	50	10,240	21.05	21.77	FREE	FREE	FREE	
HALR430-0500-0300-4000		0.3	40	4	4.8	15	6	70	12,800	41.72	FREE	FREE	FREE	FREE	
HALR430-0500-0500-1500		0.5	15	4	4.8	15	6	50	10,240	15.87	16.41	16.98	FREE	FREE	
HALR430-0500-0500-2000		0.5	20	4	4.8	15	6	50	10,240	21.04	21.76	FREE	FREE	FREE	
HALR430-0500-0500-4000		0.5	40	4	4.8	15	6	70	12,800	41.72	FREE	FREE	FREE	FREE	
HALR430-0500-1000-1500		1	15	4	4.8	15	6	50	10,240	15.86	16.38	16.93	FREE	FREE	
HALR430-0500-1000-2000		1	20	4	4.8	15	6	50	10,240	21.03	21.72	FREE	FREE	FREE	
HALR430-0500-1000-4000		1	40	4	4.8	15	6	70	12,800	41.70	FREE	FREE	FREE	FREE	
HALR430-0600-0100-1200		6	0.1	12	5	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0100-1800			0.1	18	5	5.8	15	6	50	13,200	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0100-2400			0.1	24	5	5.8	15	6	60	13,200	FREE	FREE	FREE	FREE	FREE

# HARD STAR Type A Series



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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
HALR430-0600-0100-4800	6	0.1	48	5	5.8	15	6	80	16,080	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0200-1200		0.2	12	5	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0200-1800		0.2	18	5	5.8	15	6	50	13,200	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0200-2400		0.2	24	5	5.8	15	6	60	13,200	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0200-4800		0.2	48	5	5.8	15	6	80	16,080	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0300-1200		0.3	12	5	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0300-1800		0.3	18	5	5.8	15	6	50	13,200	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0300-2400		0.3	24	5	5.8	15	6	60	13,200	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0300-4800		0.3	48	5	5.8	15	6	80	16,080	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0500-1200		0.5	12	5	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0500-1800		0.5	18	5	5.8	15	6	50	13,200	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0500-2400		0.5	24	5	5.8	15	6	60	13,200	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0500-4800		0.5	48	5	5.8	15	6	80	16,080	FREE	FREE	FREE	FREE	FREE
HALR430-0600-1000-1200		1	12	5	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
HALR430-0600-1000-1800		1	18	5	5.8	15	6	50	13,200	FREE	FREE	FREE	FREE	FREE
HALR430-0600-1000-2400		1	24	5	5.8	15	6	60	13,200	FREE	FREE	FREE	FREE	FREE
HALR430-0600-1000-4800		1	48	5	5.8	15	6	80	16,080	FREE	FREE	FREE	FREE	FREE

## HARD STAR Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번:HALR430  
Model number:HALR430

### 롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm			
4	0.9	4	0.03	0.3	1,700	25,000	0.02	0.2	1,400	20,000	0.01	0.15	1,200	18,000	
			8	0.01	0.3	800	16,000	0.008	0.2	700	14,000	0.005	0.15	500	10,000
	1.0	2	0.012	0.3	2,300	25,000	0.01	0.25	2,000	21,000	0.008	0.2	1,400	17,000	
			3	0.012	0.3	2,100	23,000	0.01	0.25	1,800	20,000	0.008	0.2	1,300	16,000
		4	0.01	0.3	1,800	21,000	0.008	0.25	1,500	18,000	0.005	0.2	1,100	14,000	
			5	0.008	0.3	1,600	19,000	0.005	0.25	1,400	16,000	0.003	0.2	1,000	13,000
			6	0.008	0.3	1,400	16,000	0.005	0.25	1,200	14,000	0.003	0.2	850	11,000
			8	0.006	0.3	1,100	15,000	0.005	0.25	900	13,000	0.002	0.2	650	10,000
	10	0.004	0.3	800	13,000	0.003	0.25	700	11,000	0.002	0.2	500	9,000		
		1.2	5	0.045	0.4	1,800	20,000	0.03	0.3	1,500	17,000	0.02	0.2	1,100	14,000
	10		0.03	0.4	1,100	13,000	0.01	0.3	950	11,000	0.005	0.2	700	9,000	
	1.5	3	0.012	0.5	2,300	23,000	0.01	0.4	2,000	20,000	0.008	0.3	1,400	16,000	
			4	0.012	0.5	2,000	21,000	0.01	0.4	1,700	18,000	0.008	0.3	1,200	14,000
		6	0.01	0.5	1,800	19,000	0.008	0.4	1,500	16,000	0.005	0.3	1,100	13,000	
			8	0.01	0.5	1,500	16,000	0.008	0.4	1,300	14,000	0.003	0.3	900	11,000
			12	0.008	0.5	1,100	13,000	0.005	0.4	950	11,000	0.002	0.3	650	9,000
			15	0.005	0.5	800	11,000	0.003	0.4	700	9,000	0.002	0.3	500	7,000
	2	4	0.015	0.6	2,300	20,000	0.012	0.5	2,000	17,000	0.008	0.35	1,400	14,000	
			6	0.015	0.6	2,100	18,000	0.012	0.5	1,800	15,000	0.008	0.35	1,300	12,000
		8	0.012	0.6	1,800	16,000	0.01	0.5	1,500	14,000	0.005	0.35	1,100	11,000	
			12	0.01	0.6	1,400	13,000	0.008	0.5	1,200	11,000	0.003	0.35	850	9,000
			16	0.008	0.6	1,100	11,000	0.005	0.5	950	9,500	0.002	0.35	650	7,500
			20	0.005	0.6	650	8,000	0.003	0.5	550	7,000	0.002	0.35	400	5,500
	2.5	10	0.07	0.7	1,800	13,000	0.05	0.5	1,500	11,000	0.03	0.5	1,100	9,000	
		20	0.04	0.7	1,100	9,000	0.02	0.5	950	7,500	0.01	0.5	650	6,000	
	3	4	0.1	0.8	2,300	15,000	0.07	0.7	550	13,000	0.05	0.6	1,400	10,000	
			6	0.1	0.8	2,100	13,000	0.07	0.7	2,000	11,000	0.05	0.6	1,300	9,000
		8	0.1	0.8	1,800	11,000	0.07	0.7	1,800	9,500	0.05	0.6	1,100	7,500	
12			0.08	0.8	1,600	11,000	0.06	0.7	1,400	9,500	0.04	0.6	1,000	7,500	
16			0.07	0.8	1,500	10,000	0.05	0.7	1,200	8,500	0.03	0.6	900	7,000	
20			0.05	0.8	1,100	8,000	0.04	0.7	950	7,000	0.02	0.6	700	5,500	
25			0.04	0.8	1,000	7,500	0.02	0.7	850	6,500	0.01	0.6	600	5,000	
30			0.03	0.8	650	6,500	0.02	0.7	550	5,500	0.007	0.6	400	4,500	
4	8	0.15	1.2	2,100	10,000	0.08	1	1,800	8,500	0.06	0.8	1,300	7,000		
	12	0.15	1.2	2,100	10,000	0.08	1	1,800	8,500	0.06	0.8	1,300	7,000		
	16	0.1	1.2	1,800	8,000	0.06	1	1,500	7,000	0.05	0.8	1,100	5,500		
	24	0.08	1.2	1,300	6,500	0.05	1	1,100	5,500	0.03	0.8	750	4,500		
5	32	0.04	1.2	1,100	5,500	0.02	1	950	4,500	0.01	0.8	650	3,500		
	15	0.15	2	2,000	8,000	0.08	1.6	1,700	7,000	0.06	1.2	1,200	5,500		
	20	0.1	2	1,600	6,500	0.07	1.6	1,400	5,500	0.05	1.2	1,000	4,500		
40	0.05	2	1,000	4,000	0.02	1.6	850	3,500	0.01	1.2	600	3,000			

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 정삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●코일 미스트 콜린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

### 롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm			
4	6	12	0.18	2.5	2,100	6,500	0.08	2	1,800	5,500	0.06	1.5	1,300	4,500	
			18	0.18	2.5	1,800	5,500	0.08	2	1,500	4,500	0.06	1.5	1,100	3,500
			24	0.15	2.5	1,500	5,000	0.07	2	1,300	4,000	0.05	1.5	900	3,000
			48	0.05	2.5	750	2,500	0.03	2	650	2,000	0.02	1.5	450	2,000

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 정삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●코일 미스트 콜린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



## HARD STAR Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번:HALR430  
Model number:HALR430

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발(Kovar)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min
4	0.9	4	0.18	0.2	1,000	17,000	0.18	0.2	1,000	17,000	0.18	0.2	800	13,000	
			8	0.15	0.2	1,000	17,000	0.15	0.2	1,000	17,000	0.15	0.2	700	13,000
		1.0	2	0.2	0.23	1,800	16,000	0.2	0.23	1,800	16,000	0.045	0.3	1,260	12,800
				3	0.15	0.23	1,500	16,000	0.15	0.23	1,500	16,000	0.04	0.3	1,050
			4	0.13	0.23	1,410	16,000	0.13	0.23	1,410	16,000	0.035	0.25	990	12,800
				5	0.12	0.2	1,200	14,500	0.12	0.2	1,200	14,500	0.03	0.25	840
	6			0.09	0.2	870	14,500	0.09	0.2	870	14,500	0.02	0.2	620	11,600
	8			0.075	0.15	660	11,100	0.075	0.15	660	11,100	0.015	0.1	470	8,900
	10	0.06	0.15	300	11,100	0.06	0.15	300	11,100	0.01	0.08	210	8,900		
		1.2	5	0.18	0.28	1,740	15,500	0.18	0.28	1,740	15,500	0.045	0.35	1,220	12,400
	10		0.12	0.28	1,290	12,000	0.12	0.28	1,290	12,000	0.03	0.25	900	9,600	
	1.5	3	0.24	0.35	1,910	14,000	0.24	0.35	1,910	14,000	0.05	0.4	1,340	11,200	
			4	0.24	0.35	1,910	14,000	0.24	0.35	1,910	14,000	0.05	0.4	1,340	11,200
		6	0.24	0.35	1,910	14,000	0.24	0.35	1,910	14,000	0.05	0.4	1,340	11,200	
			8	0.18	0.3	1,250	11,500	0.18	0.3	1,250	11,500	0.04	0.3	870	9,000
		12	0.18	0.3	1,250	11,500	0.18	0.3	1,250	11,500	0.04	0.3	870	9,000	
			15	0.08	0.25	560	8,500	0.08	0.25	560	8,500	0.01	0.15	390	6,800
	2	4	0.24	0.45	2,150	11,100	0.24	0.45	2,150	11,100	0.05	0.5	1,500	8,800	
			6	0.24	0.45	2,150	11,100	0.24	0.45	2,150	11,100	0.05	0.5	1,500	8,800
		8	0.24	0.45	2,150	11,100	0.24	0.45	2,150	11,100	0.05	0.5	1,500	8,800	
			12	0.2	0.43	1,800	11,100	0.2	0.43	1,800	11,100	0.045	0.5	1,260	8,800
		16	0.15	0.39	1,500	9,600	0.15	0.39	1,500	9,600	0.04	0.35	1,050	7,700	
			20	0.12	0.35	900	9,600	0.12	0.35	900	9,600	0.015	0.25	630	7,700
	2.5	10	0.3	0.5	2,280	9,200	0.3	0.5	2,280	9,200	0.07	0.7	1,590	7,400	
20		0.24	0.43	1,580	8,300	0.24	0.43	1,580	8,300	0.05	0.4	1,110	6,600		
3	4	0.38	0.55	2,400	8,000	0.38	0.55	2,400	8,000	0.1	0.8	1,680	6,400		
		6	0.37	0.55	2,400	8,000	0.37	0.55	2,400	8,000	0.09	0.8	1,680	6,400	
	8	0.36	0.55	2,400	8,000	0.36	0.55	2,400	8,000	0.08	0.8	1,680	6,400		
		12	0.36	0.55	2,400	8,000	0.36	0.55	2,400	8,000	0.08	0.8	1,680	6,400	
	16	0.3	0.5	1,850	7,700	0.3	0.5	1,850	7,700	0.06	0.6	1,250	6,200		
		20	0.3	0.5	1,850	7,700	0.3	0.5	1,850	7,700	0.06	0.6	1,250	6,200	
	25	0.3	0.45	1,620	7,500	0.3	0.45	1,620	7,500	0.06	0.5	1,140	6,000		
		30	0.15	0.4	1,050	6,000	0.15	0.4	1,050	6,000	0.03	0.4	740	4,800	
4	8	0.45	0.75	2,520	6,000	0.45	0.75	2,520	6,000	0.1	1	1,770	4,800		
		12	0.45	0.75	2,520	6,000	0.45	0.75	2,520	6,000	0.1	1	1,770	4,800	
	16	0.45	0.75	2,520	6,000	0.45	0.75	2,520	6,000	0.1	1	1,770	4,800		
		24	0.39	0.7	2,030	5,400	0.39	0.7	2,030	5,400	0.085	0.8	1,430	4,300	
5	20	0.25	0.6	1,350	4,800	0.25	0.6	1,350	4,800	0.04	0.7	950	3,800		
		15	0.52	1	2,300	5,100	0.52	1	2,300	5,100	0.12	1.2	1,610	4,100	
	40	0.52	1	2,300	5,100	0.52	1	2,300	5,100	0.12	1.2	1,610	4,100		
		0.25	0.8	1,020	3,200	0.25	0.8	1,020	3,200	0.05	0.9	720	2,600		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●공구 홀더를 클린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발(Kovar)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min
4	6	12	0.65	1.2	2,100	3,700	0.65	1.2	2,100	3,700	0.15	1.5	1,470	3,000	
			18	0.62	1.2	2,100	3,700	0.62	1.2	2,100	3,700	0.13	1.5	1,470	3,000
			24	0.32	0.9	950	2,600	0.32	0.9	950	2,600	0.05	1.2	660	2,100
			48	0.32	0.9	950	2,600	0.32	0.9	950	2,600	0.05	1.2	660	2,100

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●공구 홀더를 클린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



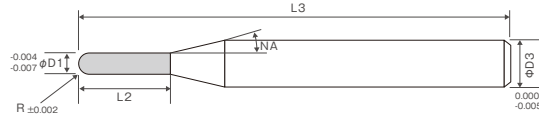
# HARD STAR Type A Series

# HARD STAR Type A Series

## 초경 볼 엔드밀 Carbide Ball End Mill

■형번:HAB230 Model number:HAB230

Hard A
super MG
날 수 2
헬릭스각 30°
목각 15°
Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	볼 반경 (R) Ball R	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목각 (NA) <sup>o</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
HAB230-0010-0050-00010	0.05	0.1	0.1	15	4	50	8,640
HAB230-0015-0075-00015	0.075	0.15	0.15	15	4	50	8,400
HAB230-0020-0100-00020	0.1	0.2	0.2	15	4	50	6,880
HAB230-0030-0150-00030	0.15	0.3	0.3	15	4	50	4,960
HAB230-0040-0200-00060	0.2	0.6	0.4	15	4	50	3,360
HAB230-0050-0250-00080	0.25	0.8	0.5	15	4	50	3,120
HAB230-0060-0300-00090	0.3	0.9	0.6	15	4	50	3,040
HAB230-0080-0400-00120	0.4	1.2	0.8	15	4	50	3,040
HAB230-0100-0500-00150	0.5	1.5	1	15	4	50	2,800
HAB230-0150-0750-00230	0.75	2.3	1.5	15	4	50	3,360
HAB230-0200-1000-00300	1	3	2	15	4	50	2,480
HAB230-0250-1250-00380	1.25	3.8	2.5	15	4	50	4,240
HAB230-0300-1500-00500	1.5	5	3	15	4	50	3,040
HAB230-0400-2000-00600	2	6	4	15	6	50	3,440
HAB230-0500-2500-00800	2.5	8	5	15	6	50	4,160
HAB230-0600-3000-01000	3	10	6	—	6	50	4,320
HAB230-0800-4000-01200	4	12	8	—	8	70	10,960
HAB230-1000-5000-01500	5	15	10	—	10	80	14,080
HAB230-1200-6000-02000	6	20	12	—	12	110	20,240

## HARD STAR Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번:HAB230  
Model number:HAB230

### 볼 엔드밀 Ball End Mill

피삭재 Work Material	고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)						고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
	날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.1	0.1	0.003	0.005	120	40,000	0.002	0.005	100	40,000	0.002	0.003	70	40,000	
	0.15	0.15	0.003	0.005	180	40,000	0.002	0.005	150	40,000	0.002	0.003	100	40,000	
	0.2	0.2	0.005	0.005	350	40,000	0.003	0.0025	300	40,000	0.0015	0.0015	200	40,000	
	0.3	0.3	0.005	0.0075	350	40,000	0.0035	0.005	300	40,000	0.0015	0.0025	280	40,000	
	0.4	0.6	0.015	0.025	800	40,000	0.015	0.015	720	40,000	0.0045	0.01	580	40,000	
	0.5	0.8	0.015	0.025	1,000	40,000	0.01	0.015	860	40,000	0.005	0.01	650	40,000	
	0.6	0.9	0.025	0.05	1,400	40,000	0.015	0.03	1,000	40,000	0.01	0.025	720	30,000	
	0.8	1.2	0.05	0.075	2,000	40,000	0.035	0.05	1,600	40,000	0.025	0.05	1,200	30,000	
	1	1.5	0.05	0.15	2,500	40,000	0.05	0.1	2,000	30,000	0.04	0.05	1,400	25,000	
	1.5	2.3	0.075	0.15	3,000	30,000	0.05	0.15	2,500	30,000	0.05	0.1	2,000	25,000	
	2	3	0.1	0.25	3,000	25,000	0.1	0.25	2,500	25,000	0.075	0.15	2,000	20,000	
	2.5	3.8	0.15	0.2	2,800	20,000	0.1	0.25	2,300	20,000	0.075	0.2	2,000	18,000	
3	5	0.1	0.4	3,000	20,000	0.1	0.3	2,500	18,000	0.1	0.25	2,000	14,000		
4	6	0.15	0.75	3,000	20,000	0.1	0.4	2,500	16,000	0.1	0.3	2,000	12,000		
5	8	0.15	0.75	3,000	18,000	0.1	0.6	2,500	12,000	0.1	0.35	2,000	9,200		
6	10	0.15	1	3,000	16,000	0.15	0.6	2,500	8,000	0.1	0.5	2,000	7,000		
8	12	0.2	1.2	450	3,600	0.175	0.9	400	2,600	0.175	0.9	350	2,600		
10	15	0.25	1	450	2,900	0.225	0.75	400	1,900	0.225	0.75	350	1,900		
12	20	0.3	1.5	450	2,400	0.275	1	400	1,400	0.275	1	350	1,400		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량, 절삭 가운뎃기를 절삭의 최대치입니다. Depth of Cut shows the maximum value for finishing.

●오일 미스트 Coolant, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

**HARD STAR Type A 추천 절삭 조건표**  
Recommended Milling Conditions

**■형번:HAB230**  
Model number:HAB230

**볼 엔드밀 Ball End Mill**

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발(Kovar)			
날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.1	0.1	0.008	0.0012	500	50,000	0.008	0.0012	500	50,000	0.003	0.005	120	40,000
	0.15	0.15	0.012	0.0018	500	50,000	0.012	0.0018	500	50,000	0.003	0.005	180	40,000
	0.2	0.2	0.016	0.0024	600	50,000	0.016	0.0024	600	50,000	0.005	0.005	350	40,000
	0.3	0.3	0.024	0.0036	600	50,000	0.024	0.0036	600	50,000	0.005	0.0075	350	40,000
	0.4	0.6	0.032	0.0048	600	50,000	0.032	0.0048	600	50,000	0.015	0.025	800	40,000
	0.5	0.8	0.04	0.006	600	50,000	0.04	0.006	600	50,000	0.015	0.025	1,000	40,000
	0.6	0.9	0.048	0.0144	750	50,000	0.048	0.0144	750	50,000	0.025	0.05	1,400	40,000
	0.8	1.2	0.064	0.0192	1,000	50,000	0.064	0.0192	1,000	50,000	0.05	0.075	2,000	40,000
	1	1.5	0.08	0.024	1,250	50,000	0.08	0.024	1,250	50,000	0.05	0.15	2,500	40,000
	1.5	2.3	0.12	0.036	1,250	50,000	0.12	0.036	1,250	50,000	0.075	0.15	3,000	30,000
	2	3	0.16	0.048	2,400	48,000	0.16	0.048	2,400	48,000	0.1	0.25	3,000	25,000
	2.5	3.8	0.2	0.06	2,400	48,000	0.2	0.06	2,400	48,000	0.15	0.2	2,800	20,000
	3	5	0.375	0.1125	2,400	32,000	0.375	0.1125	2,400	32,000	0.1	0.4	3,000	20,000
	4	6	0.6	0.18	2,400	24,000	0.6	0.18	2,400	24,000	0.15	0.75	3,000	20,000
5	8	0.75	0.225	2,400	19,000	0.75	0.225	2,400	19,000	0.15	0.75	3,000	18,000	
6	10	0.9	0.27	2,400	16,000	0.9	0.27	2,400	16,000	0.15	1	3,000	16,000	
8	12	1.2	0.36	2,400	12,000	1.2	0.36	2,400	12,000	0.2	1.2	450	3,600	
10	15	1.5	0.45	2,300	9,600	1.5	0.45	2,300	9,600	0.25	1	450	2,900	
12	20	1.8	0.54	2,100	8,000	1.8	0.54	2,100	8,000	0.3	1.5	450	2,400	

●공구는 볼더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량, 날장, 정삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.

●오일 미스트 콜린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 뿔출은 밀도 이상으로 하지 마세요. Length of tool overhang must be as short as possible.

●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
Ion Depo A Series  
Ion Depo U Series  
DLC Series  
Non-Coat Series  
Ion Depo R Series

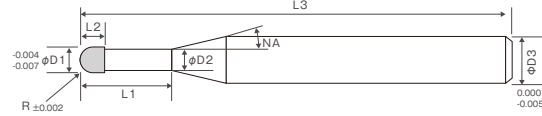
# HARD STAR Type A Series

# HARD STAR Type A Series

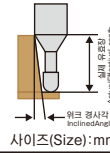
초경 롱 넥 볼 엔드밀 Carbide Long Neck Ball End Mill

■형번:HALB230 Model number:HALB230

Hard A
super MG
날 수 2
헬릭스각 30°
목각 15°
Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.



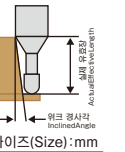
사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	볼 반경 (R) Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
HALB230-0010-0050-0020	0.05	0.2	0.07	0.1	0.08	15	4	50	9,360	0.24	0.25	0.26	0.27	0.28	
HALB230-0010-0050-0030		0.3	0.07	0.1	0.08	15	4	50	8,240	0.35	0.36	0.37	0.38	0.41	
HALB230-0010-0050-0050		0.5	0.07	0.1	0.08	15	4	50	8,960	0.55	0.57	0.59	0.61	0.66	
HALB230-0015-0075-0030	0.075	0.3	0.1	0.15	0.13	15	4	50	9,600	0.35	0.36	0.37	0.38	0.40	
HALB230-0015-0075-0050		0.5	0.1	0.15	0.13	15	4	50	10,160	0.55	0.57	0.59	0.61	0.65	
HALB230-0020-0100-0030	0.1	0.3	0.15	0.2	0.18	15	4	50	5,760	0.35	0.35	0.36	0.37	0.40	
HALB230-0020-0100-0050		0.5	0.15	0.2	0.18	15	4	50	5,760	0.55	0.57	0.58	0.60	0.64	
HALB230-0020-0100-0075		0.75	0.15	0.2	0.18	15	4	50	5,760	0.81	0.84	0.86	0.89	0.96	
HALB230-0020-0100-0100		1	0.15	0.2	0.18	15	4	50	5,760	1.07	1.10	1.14	1.18	1.27	
HALB230-0030-0150-0050	0.15	0.5	0.2	0.3	0.27	15	4	50	5,680	0.57	0.58	0.60	0.62	0.66	
HALB230-0030-0150-0060		0.6	0.2	0.3	0.27	15	4	50	5,680	0.67	0.69	0.71	0.73	0.78	
HALB230-0030-0150-0075		0.75	0.2	0.3	0.27	15	4	50	5,680	0.83	0.85	0.88	0.90	0.97	
HALB230-0030-0150-0100		1	0.2	0.3	0.27	15	4	50	5,680	1.09	1.12	1.15	1.19	1.28	
HALB230-0030-0150-0125		1.25	0.2	0.3	0.27	15	4	50	6,080	1.34	1.39	1.43	1.48	1.59	
HALB230-0030-0150-0150		1.5	0.2	0.3	0.27	15	4	50	6,080	1.60	1.65	1.71	1.77	1.90	
HALB230-0030-0150-0175		1.75	0.2	0.3	0.27	15	4	50	6,080	1.86	1.92	1.99	2.05	2.21	
HALB230-0030-0150-0200		2	0.2	0.3	0.27	15	4	50	6,080	2.12	2.19	2.26	2.34	2.52	
HALB230-0030-0150-0225		2.25	0.2	0.3	0.27	15	4	50	6,240	2.38	2.46	2.54	2.63	2.83	
HALB230-0030-0150-0250		2.5	0.2	0.3	0.27	15	4	50	6,240	2.64	2.72	2.82	2.92	3.14	
HALB230-0030-0150-0300	3	0.2	0.3	0.27	15	4	50	6,240	3.15	3.26	3.37	3.49	3.76		
HALB230-0040-0200-0050	0.2	0.5	0.3	0.4	0.37	15	4	50	3,920	0.57	0.58	0.59	0.61	0.64	
HALB230-0040-0200-0080		0.8	0.3	0.4	0.37	15	4	50	3,920	0.88	0.90	0.93	0.95	1.02	
HALB230-0040-0200-0100		1	0.3	0.4	0.37	15	4	50	3,920	1.08	1.12	1.15	1.18	1.27	
HALB230-0040-0200-0150		1.5	0.3	0.4	0.37	15	4	50	4,000	1.60	1.65	1.70	1.76	1.89	
HALB230-0040-0200-0200		2	0.3	0.4	0.37	15	4	50	4,080	2.12	2.19	2.26	2.33	2.51	
HALB230-0040-0200-0250		2.5	0.3	0.4	0.37	15	4	50	4,240	2.64	2.72	2.81	2.91	3.13	
HALB230-0040-0200-0300		3	0.3	0.4	0.37	15	4	50	4,480	3.15	3.26	3.37	3.48	3.75	
HALB230-0050-0250-0100		0.25	1	0.35	0.5	0.47	15	4	50	3,920	1.08	1.11	1.14	1.18	1.26
HALB230-0050-0250-0150			1.5	0.35	0.5	0.47	15	4	50	3,920	1.60	1.65	1.70	1.75	1.88
HALB230-0050-0250-0200			2	0.35	0.5	0.47	15	4	50	3,920	2.12	2.18	2.25	2.33	2.50

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코드 No. Code No.	볼 반경 (R) Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
HALB230-0050-0250-0250	0.25	2.5	0.35	0.5	0.47	15	4	50	3,920	2.63	2.72	2.81	2.90	3.12	
HALB230-0050-0250-0300		3	0.35	0.5	0.47	15	4	50	3,920	3.15	3.25	3.36	3.48	3.74	
HALB230-0050-0250-0350		3.5	0.35	0.5	0.47	15	4	50	3,920	3.67	3.79	3.91	4.05	4.36	
HALB230-0050-0250-0400		4	0.35	0.5	0.47	15	4	50	3,920	4.18	4.32	4.47	4.63	4.98	
HALB230-0060-0300-0100	0.3	1	0.45	0.6	0.57	15	4	50	3,360	1.08	1.11	1.14	1.17	1.24	
HALB230-0060-0300-0150		1.5	0.45	0.6	0.57	15	4	50	3,040	1.60	1.64	1.69	1.74	1.87	
HALB230-0060-0300-0200		2	0.45	0.6	0.57	15	4	50	3,040	2.12	2.18	2.25	2.32	2.49	
HALB230-0060-0300-0250		2.5	0.45	0.6	0.57	15	4	50	3,120	2.63	2.71	2.80	2.89	3.11	
HALB230-0060-0300-0300		3	0.45	0.6	0.57	15	4	50	3,120	3.15	3.25	3.35	3.47	3.73	
HALB230-0060-0300-0350		3.5	0.45	0.6	0.57	15	4	50	3,200	3.67	3.78	3.91	4.04	4.35	
HALB230-0060-0300-0400		4	0.45	0.6	0.57	15	4	50	3,200	4.18	4.32	4.46	4.62	4.97	
HALB230-0060-0300-0450		4.5	0.45	0.6	0.57	15	4	50	3,200	4.70	4.85	5.02	5.19	5.59	
HALB230-0060-0300-0500		5	0.45	0.6	0.57	15	4	50	3,200	5.22	5.39	5.57	5.77	6.22	
HALB230-0060-0300-0550		5.5	0.45	0.6	0.57	15	4	50	3,200	5.73	5.92	6.13	6.34	6.84	
HALB230-0060-0300-0600	6	0.45	0.6	0.57	15	4	50	3,200	6.25	6.46	6.68	6.92	7.46		
HALB230-0070-0350-0200	0.35	2	0.5	0.7	0.67	15	4	50	3,440	2.11	2.18	2.24	2.31	2.48	
HALB230-0070-0350-0400		4	0.5	0.7	0.67	15	4	50	3,680	4.18	4.31	4.46	4.61	4.96	
HALB230-0070-0350-0600		6	0.5	0.7	0.67	15	4	50	3,680	6.25	6.45	6.67	6.91	7.45	
HALB230-0080-0400-0200		0.4	2	0.6	0.8	0.77	15	4	50	3,040	2.11	2.17	2.24	2.31	2.46
HALB230-0080-0400-0300	3		0.6	0.8	0.77	15	4	50	3,200	3.15	3.24	3.34	3.46	3.71	
HALB230-0080-0400-0400	4		0.6	0.8	0.77	15	4	50	3,200	4.18	4.31	4.45	4.60	4.95	
HALB230-0080-0400-0500	5		0.6	0.8	0.77	15	4	50	3,200	5.21	5.38	5.56	5.75	6.19	
HALB230-0080-0400-0600	6		0.6	0.8	0.77	15	4	50	3,200	6.25	6.45	6.67	6.90	7.44	
HALB230-0080-0400-0700	7		0.6	0.8	0.77	15	4	50	3,200	7.28	7.52	7.78	8.05	8.68	
HALB230-0080-0400-0800	8		0.6	0.8	0.77	15	4	50	3,200	8.31	8.59	8.89	9.20	9.92	
HALB230-0090-0450-0200	0.45		2	0.65	0.9	0.87	15	4	50	3,440	2.11	2.17	2.23	2.30	2.45
HALB230-0090-0450-0400			4	0.65	0.9	0.87	15	4	50	3,680	4.18	4.31	4.45	4.60	4.94
HALB230-0090-0450-0600			6	0.65	0.9	0.87	15	4	50	3,680	6.24	6.45	6.66	6.90	7.42
HALB230-0090-0450-0800		8	0.65	0.9	0.87	15	4	50	3,680	8.31	8.59	8.88	9.20	9.91	
HALB230-0100-0500-0200	0.5	2	0.75	1	0.95	15	4	50	2,560	2.15	2.20	2.27	2.33	2.49	
HALB230-0100-0500-0250		2.5	0.75	1	0.95	15	4	50	2,560	2.66	2.74	2.82	2.91	3.11	
HALB230-0100-0500-0300		3	0.75	1	0.95	15	4	50	2,560	3.18	3.27	3.37	3.48	3.73	
HALB230-0100-0500-0400		4	0.75	1	0.95	15	4	50	2,880	4.21	4.34	4.48	4.63	4.97	
HALB230-0100-0500-0500		5	0.75	1	0.95	15	4	50	2,880	5.25	5.41	5.59	5.78	6.22	
HALB230-0100-0500-0600		6	0.75	1	0.95	15	4	50	3,120	6.28	6.48	6.70	6.93	7.46	
HALB230-0100-0500-0700		7	0.75	1	0.95	15	4	50	3,120	7.32	7.55	7.81	8.08	8.70	
HALB230-0100-0500-0800		8	0.75	1	0.95	15	4	50	3,120	8.35	8.62	8.92	9.23	9.95	
HALB230-0100-0500-0900		9	0.75	1	0.95	15	4	50	3,120	9.38	9.69	10.02	10.38	11.19	
HALB230-0100-0500-1000		10	0.75	1	0.95	15	4	50	3,120	10.42	10.76	11.13	11.53	12.43	
HALB230-0100-0500-1200		12	0.75	1	0.95	15	4	50	3,120	12.48	12.90	13.35	13.83	14.92	
HALB230-0120-0600-0240		0.6	2.4	0.9	1.2	1.15	15	4	50	3,840	2.56	2.63	2.70	2.78	2.96
HALB230-0120-0600-0400	4		0.9	1.2	1.15	15	4	50	3,840	4.21	4.34	4.47	4.62	4.95	
HALB230-0120-0600-0600	6		0.9	1.2	1.15	15	4	50	4,160	6.28	6.48	6.69	6.92	7.44	
HALB230-0120-0600-0800	8		0.9	1.2	1.15	15	4	50	4,160	8.35	8.62	8.91	9.22	9.92	
HALB230-0120-0600-1000	10	0.9	1.2	1.15	15	4	50	4,160	10.41	10.76	11.12	11.52	12.41		



사이즈(Size):mm

CBN Series

Hard Star A Series

Hard Star TT Series

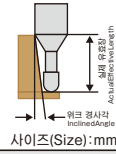
Hard Star TT Series

Ion Depo A Series

Ion Depo U Series

DLC Series

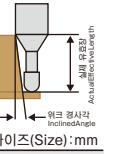
# HARD STAR Type A Series



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코드 No. Code No.	볼 반경 Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
HALB230-0120-0600-1200	0.6	12	0.9	1.2	1.15	15	4	50	4,160	12.48	12.89	13.34	13.82	14.90
HALB230-0140-0700-0800	0.7	8	1	1.4	1.35	15	4	50	3,600	8.34	8.61	8.90	9.20	9.90
HALB230-0140-0700-1200		12	1	1.4	1.35	15	4	50	3,600	12.48	12.89	13.33	13.80	14.87
HALB230-0140-0700-1600		16	1	1.4	1.35	15	4	50	3,600	16.61	17.17	17.76	18.40	19.84
HALB230-0150-0750-0300		3	1.1	1.5	1.45	15	4	50	2,960	3.17	3.26	3.35	3.45	3.67
HALB230-0150-0750-0400	0.75	4	1.1	1.5	1.45	15	4	50	2,960	4.21	4.33	4.46	4.60	4.92
HALB230-0150-0750-0600		6	1.1	1.5	1.45	15	4	50	2,960	6.27	6.47	6.67	6.90	7.40
HALB230-0150-0750-0800		8	1.1	1.5	1.45	15	4	50	3,120	8.34	8.61	8.89	9.20	9.89
HALB230-0150-0750-1000		10	1.1	1.5	1.45	15	4	50	3,360	10.41	10.74	11.11	11.50	12.37
HALB230-0150-0750-1200		12	1.1	1.5	1.45	15	4	50	3,600	12.48	12.88	13.32	13.80	14.86
HALB230-0150-0750-1400		14	1.1	1.5	1.45	15	4	50	3,600	14.54	15.02	15.54	16.09	17.35
HALB230-0150-0750-1600		16	1.1	1.5	1.45	15	4	50	3,600	16.61	17.16	17.76	18.39	19.83
HALB230-0160-0800-0800		0.8	8	1.2	1.6	1.55	15	4	50	4,160	8.34	8.60	8.88	9.19
HALB230-0160-0800-1200	12		1.2	1.6	1.55	15	4	50	4,160	12.47	12.88	13.32	13.79	14.85
HALB230-0160-0800-1600	16		1.2	1.6	1.55	15	4	50	4,160	16.61	17.16	17.75	18.39	19.82
HALB230-0200-1000-0300	1	3	1.5	2	1.94	15	4	50	2,560	3.18	3.26	3.34	3.43	3.64
HALB230-0200-1000-0400		4	1.5	2	1.94	15	4	50	2,560	4.22	4.33	4.45	4.58	4.88
HALB230-0200-1000-0600		6	1.5	2	1.94	15	4	50	2,880	6.28	6.47	6.67	6.88	7.37
HALB230-0200-1000-0800		8	1.5	2	1.94	15	4	50	3,120	8.35	8.61	8.88	9.18	9.85
HALB230-0200-1000-1000		10	1.5	2	1.94	15	4	50	3,120	10.42	10.75	11.10	11.48	12.34
HALB230-0200-1000-1200		12	1.5	2	1.94	15	4	50	3,120	12.49	12.89	13.32	13.78	14.83
HALB230-0200-1000-1300		13	1.5	2	1.94	15	4	50	3,120	13.52	13.96	14.43	14.93	16.07
HALB230-0200-1000-1400		14	1.5	2	1.94	15	4	50	3,120	14.55	15.03	15.53	16.08	17.31
HALB230-0200-1000-1600		16	1.5	2	1.94	15	4	50	3,120	16.62	17.17	17.75	18.38	19.80
HALB230-0200-1000-1800		18	1.5	2	1.94	15	4	50	3,120	18.69	19.30	19.97	20.68	FREE
HALB230-0200-1000-2000		20	1.5	2	1.94	15	4	50	3,120	20.76	21.44	22.18	22.98	FREE
HALB230-0250-1250-0600		1.25	6	2.3	2.5	2.44	15	4	50	3,840	6.28	6.45	6.64	6.84
HALB230-0250-1250-0800	8		2.3	2.5	2.44	15	4	50	3,360	8.34	8.59	8.86	9.14	9.80
HALB230-0250-1250-1000	10		2.3	2.5	2.44	15	4	50	4,080	10.41	10.73	11.07	11.44	12.28
HALB230-0250-1250-1500	15		2.3	2.5	2.44	15	4	50	4,160	15.58	16.08	16.62	17.19	FREE
HALB230-0250-1250-2000	20		2.3	2.5	2.44	15	4	50	4,880	20.75	21.43	22.16	FREE	FREE
HALB230-0300-1500-0600	1.5	6	2.5	3	2.85	15	4	50	3,120	6.44	6.61	6.80	7.00	7.46
HALB230-0300-1500-0800		8	2.5	3	2.85	15	4	50	3,120	8.51	8.75	9.02	9.30	9.95
HALB230-0300-1500-1000		10	2.5	3	2.85	15	4	50	3,600	10.58	10.89	11.23	11.60	FREE
HALB230-0300-1500-1200		12	2.5	3	2.85	15	4	50	3,760	12.64	13.03	13.45	13.90	FREE
HALB230-0300-1500-1400		14	2.5	3	2.85	15	4	50	4,160	14.71	15.17	15.67	FREE	FREE
HALB230-0300-1500-1600		16	2.5	3	2.85	15	4	50	4,160	16.78	17.31	17.88	FREE	FREE
HALB230-0300-1500-2000		20	2.5	3	2.85	15	4	50	4,000	20.91	21.59	FREE	FREE	FREE
HALB230-0300-1500-2500		25	2.5	3	2.85	15	4	60	4,000	26.08	26.94	FREE	FREE	FREE
HALB230-0300-1500-3000	30	2.5	3	2.85	15	4	60	4,560	31.25	FREE	FREE	FREE	FREE	
HALB230-0350-1750-1500	1.75	15	2.8	3.5	3.35	15	6	50	5,280	15.74	16.22	16.75	17.31	18.59
HALB230-0350-1750-2000		20	2.8	3.5	3.35	15	6	50	5,280	20.90	21.57	22.29	23.06	24.81
HALB230-0350-1750-2500		25	2.8	3.5	3.35	15	6	60	5,600	26.07	26.92	27.83	28.81	FREE
HALB230-0350-1750-3000		30	2.8	3.5	3.35	15	6	60	5,600	31.24	32.27	33.37	34.56	FREE
HALB230-0350-1750-3500		35	2.8	3.5	3.35	15	6	70	7,200	36.41	37.62	38.91	FREE	FREE

# HARD STAR Type A Series



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

코드 No. Code No.	볼 반경 Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
HALB230-0400-2000-0800	2	8	3	4	3.8	15	6	50	3,200	8.59	8.82	9.07	9.33	9.95
HALB230-0400-2000-1000		10	3	4	3.8	15	6	50	3,200	10.66	10.96	11.28	11.63	12.43
HALB230-0400-2000-1200		12	3	4	3.8	15	6	50	4,160	12.72	13.10	13.50	13.93	14.92
HALB230-0400-2000-1400		14	3	4	3.8	15	6	50	4,160	14.79	15.24	15.72	16.23	17.41
HALB230-0400-2000-1500		15	3	4	3.8	15	6	50	4,160	15.82	16.31	16.82	17.38	18.65
HALB230-0400-2000-2000		20	3	4	3.8	15	6	50	4,160	20.99	21.65	22.37	23.13	FREE
HALB230-0400-2000-2500		25	3	4	3.8	15	6	60	4,160	26.16	27.00	27.91	28.88	FREE
HALB230-0400-2000-3000		30	3	4	3.8	15	6	60	4,160	31.33	32.35	33.45	FREE	FREE
HALB230-0400-2000-3500		35	3	4	3.8	15	6	70	4,800	36.50	37.70	38.99	FREE	FREE
HALB230-0500-2500-1500		2.5	15	3.5	5	4.8	15	6	50	6,880	15.81	16.27	16.77	FREE
HALB230-0500-2500-2000	20		3.5	5	4.8	15	6	50	6,960	20.98	21.62	FREE	FREE	FREE
HALB230-0500-2500-2500	25		3.5	5	4.8	15	6	60	6,960	26.14	26.97	FREE	FREE	FREE
HALB230-0500-2500-3000	30		3.5	5	4.8	15	6	60	7,440	31.31	FREE	FREE	FREE	FREE
HALB230-0500-2500-4000	40		3.5	5	4.8	15	6	90	9,280	41.65	FREE	FREE	FREE	FREE
HALB230-0600-3000-1000	3		10	6	6	5.8	15	6	50	5,200	FREE	FREE	FREE	FREE
HALB230-0600-3000-1500		15	6	6	5.8	15	6	50	5,200	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-2000		20	6	6	5.8	15	6	50	5,200	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-2500		25	6	6	5.8	15	6	60	5,200	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-3000		30	6	6	5.8	15	6	60	5,360	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-3500		35	6	6	5.8	15	6	70	5,360	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-4000		40	6	6	5.8	15	6	90	5,840	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-5000		50	6	6	5.8	15	6	120	6,320	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-6000		60	6	6	5.8	15	6	120	6,800	FREE	FREE	FREE	FREE	FREE

# HARD STAR Type A Series

# HARD STAR Type A Series

**HARD STAR Type A 추천 절삭 조건표**  
Recommended Milling Conditions

**■형번:HALB230**  
Model number:HALB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.1	0.2	0.003	0.005	120	40,000	0.002	0.005	100	40,000	0.002	0.003	70	40,000
		0.3	0.003	0.005	100	40,000	0.002	0.005	70	40,000	0.002	0.003	50	40,000
		0.5	0.002	0.003	70	40,000	0.001	0.003	50	40,000	0.001	0.002	30	40,000
	0.15	0.3	0.003	0.005	180	40,000	0.002	0.005	150	40,000	0.002	0.003	100	40,000
		0.5	0.003	0.005	150	40,000	0.002	0.005	120	40,000	0.002	0.003	70	40,000
	0.2	0.3	0.01	0.01	350	40,000	0.006	0.005	300	40,000	0.003	0.003	200	40,000
		0.5	0.008	0.01	320	40,000	0.005	0.005	280	40,000	0.003	0.003	180	40,000
		0.75	0.005	0.01	280	40,000	0.003	0.005	200	40,000	0.002	0.003	150	40,000
	0.3	1	0.003	0.005	250	40,000	0.002	0.003	160	40,000	0.001	0.002	120	40,000
		0.5	0.01	0.015	350	40,000	0.007	0.01	300	40,000	0.003	0.005	280	40,000
		0.6	0.007	0.01	350	40,000	0.005	0.007	300	40,000	0.003	0.005	250	40,000
		0.75	0.007	0.01	330	40,000	0.005	0.007	280	40,000	0.003	0.005	230	40,000
		1	0.007	0.01	320	40,000	0.005	0.007	250	40,000	0.003	0.005	200	40,000
		1.25	0.005	0.007	280	40,000	0.003	0.005	200	40,000	0.002	0.003	160	40,000
		1.5	0.005	0.007	230	40,000	0.003	0.005	180	40,000	0.002	0.003	120	40,000
		1.75	0.003	0.005	180	40,000	0.002	0.003	150	40,000	0.002	0.002	100	40,000
		2	0.003	0.005	150	40,000	0.002	0.003	120	40,000	0.002	0.002	90	40,000
		2.25	0.002	0.003	120	40,000	0.001	0.002	100	40,000	0.001	0.001	80	40,000
	0.4	2.5	0.002	0.003	100	40,000	0.001	0.002	80	40,000	0.001	0.001	70	40,000
		3	0.001	0.003	80	40,000	0.001	0.002	70	40,000	0.001	0.001	60	40,000
		0.5	0.03	0.05	800	40,000	0.03	0.03	720	40,000	0.009	0.02	580	40,000
		0.8	0.02	0.05	800	40,000	0.02	0.03	720	40,000	0.008	0.02	580	40,000
		1	0.02	0.05	800	40,000	0.02	0.03	720	40,000	0.008	0.02	580	40,000
		1.5	0.01	0.03	620	40,000	0.01	0.02	500	40,000	0.005	0.01	400	40,000
2		0.01	0.02	500	40,000	0.01	0.01	380	40,000	0.005	0.007	300	40,000	
2.5		0.007	0.01	420	40,000	0.005	0.007	300	40,000	0.003	0.005	260	40,000	
3		0.007	0.01	300	40,000	0.005	0.007	240	40,000	0.003	0.005	200	40,000	
0.5		1	0.03	0.05	1,000	40,000	0.02	0.03	860	40,000	0.01	0.02	650	40,000
	1.5	0.02	0.05	850	40,000	0.01	0.03	720	40,000	0.007	0.02	520	40,000	
	2	0.02	0.03	720	40,000	0.01	0.02	650	40,000	0.007	0.01	400	40,000	
	2.5	0.01	0.02	600	40,000	0.007	0.01	530	40,000	0.005	0.007	360	40,000	
	3	0.01	0.02	500	40,000	0.007	0.01	420	40,000	0.005	0.007	320	40,000	
	3.5	0.007	0.01	420	40,000	0.005	0.007	360	40,000	0.003	0.005	280	40,000	
0.6	4	0.007	0.01	350	40,000	0.005	0.007	300	40,000	0.003	0.005	260	40,000	
	1	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	
	1.5	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	
	2	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	
	2.5	0.03	0.05	1,200	40,000	0.02	0.04	840	40,000	0.02	0.03	640	30,000	
	3	0.03	0.05	1,200	40,000	0.02	0.04	840	40,000	0.02	0.03	640	30,000	
	3.5	0.02	0.03	1,000	40,000	0.01	0.03	620	40,000	0.01	0.02	480	30,000	
	4	0.02	0.03	1,000	40,000	0.01	0.03	620	40,000	0.01	0.02	480	30,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm			
2	0.6	4.5	0.02	0.03	900	35,000	0.01	0.02	580	35,000	0.008	0.015	430	30,000	
		5	0.01	0.02	720	30,000	0.007	0.015	500	30,000	0.007	0.01	400	30,000	
		5.5	0.01	0.015	700	30,000	0.007	0.01	450	30,000	0.005	0.008	360	30,000	
		6	0.007	0.01	500	30,000	0.005	0.007	380	30,000	0.004	0.006	320	30,000	
		0.7	2	0.07	0.1	1,600	40,000	0.05	0.08	1,300	40,000	0.03	0.07	1,000	30,000
			4	0.04	0.06	1,300	40,000	0.03	0.04	820	40,000	0.015	0.02	600	30,000
	6		0.01	0.03	800	30,000	0.01	0.015	500	30,000	0.006	0.01	420	25,000	
	0.8	2	0.1	0.15	2,000	40,000	0.07	0.1	1,600	40,000	0.05	0.1	1,200	30,000	
		3	0.1	0.15	2,000	40,000	0.07	0.1	1,600	40,000	0.05	0.05	1,200	30,000	
		4	0.05	0.1	1,600	40,000	0.05	0.05	1,200	40,000	0.03	0.05	860	30,000	
		5	0.05	0.05	1,600	40,000	0.03	0.05	1,000	40,000	0.02	0.03	620	30,000	
		6	0.03	0.05	1,200	30,000	0.02	0.03	760	30,000	0.01	0.02	560	25,000	
		7	0.02	0.03	1,000	30,000	0.01	0.02	680	30,000	0.007	0.01	520	25,000	
	0.9	8	0.01	0.02	820	30,000	0.007	0.01	600	30,000	0.005	0.01	480	25,000	
		2	0.1	0.2	2,200	40,000	0.08	0.15	1,800	30,000	0.06	0.1	1,300	30,000	
		4	0.05	0.12	1,800	40,000	0.04	0.08	1,400	30,000	0.03	0.05	900	25,000	
		6	0.035	0.05	1,200	30,000	0.025	0.035	800	25,000	0.015	0.025	600	20,000	
		8	0.025	0.04	1,000	30,000	0.015	0.025	700	23,000	0.008	0.015	500	20,000	
		1	2	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000
	2.5		0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000	
	3		0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000	
	4		0.1	0.2	2,500	40,000	0.05	0.15	1,800	30,000	0.05	0.1	1,200	25,000	
	5		0.05	0.15	2,000	30,000	0.04	0.1	1,600	25,000	0.03	0.05	920	20,000	
	6		0.05	0.1	1,800	30,000	0.04	0.05	1,200	25,000	0.02	0.05	740	20,000	
	7		0.04	0.06	1,200	30,000	0.03	0.04	950	25,000	0.02	0.03	680	20,000	
	8		0.04	0.06	1,000	30,000	0.03	0.04	860	25,000	0.02	0.03	560	20,000	
	9		0.03	0.05	820	25,000	0.02	0.03	750	20,000	0.01	0.02	500	18,000	
	10		0.03	0.05	750	25,000	0.02	0.03	620	20,000	0.01	0.02	450	18,000	
	12		0.01	0.03	600	20,000	0.007	0.02	520	18,000	0.005	0.01	400	16,000	
	1.2		2.4	0.1	0.3	2,500	30,000	0.1	0.2	2,000	30,000	0.05	0.1	1,600	25,000
4		0.1	0.2	2,500	30,000	0.07	0.2	2,000	30,000	0.05	0.1	1,600	25,000		
6		0.07	0.1	2,000	30,000	0.05	0.1	1,600	25,000	0.03	0.07	1,200	20,000		
8		0.05	0.1	1,600	30,000	0.03	0.07	1,200	25,000	0.02	0.05	920	20,000		
10		0.03	0.07	1,200	20,000	0.02	0.05	860	20,000	0.01	0.03	680	18,000		
12		0.02	0.05	860	20,000	0.01	0.03	620	20,000	0.007	0.02	480	18,000		
1.4	8	0.12	0.2	2,500	30,000	0.08	0.15	1,800	20,000	0.03	0.08	1,000			



## HARD STAR Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번:HALB230  
Model number:HALB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	1.5	8	0.1	0.2	2,500	25,000	0.05	0.2	1,600	25,000	0.05	0.1	1,200	20,000
		10	0.1	0.1	2,500	25,000	0.05	0.1	1,200	25,000	0.05	0.05	860	20,000
		12	0.05	0.1	1,800	20,000	0.03	0.1	920	20,000	0.02	0.05	780	18,000
		14	0.05	0.07	1,200	20,000	0.03	0.05	820	20,000	0.02	0.03	650	18,000
		16	0.03	0.05	720	18,000	0.02	0.03	650	18,000	0.01	0.02	580	16,000
	1.6	8	0.1	0.2	2,500	25,000	0.07	0.15	2,000	20,000	0.05	0.1	1,600	18,000
		12	0.07	0.1	1,800	20,000	0.05	0.07	1,500	16,000	0.03	0.05	1,200	14,000
		16	0.03	0.05	720	16,000	0.02	0.03	600	14,000	0.015	0.02	480	12,000
		20	0.03	0.05	720	16,000	0.02	0.03	600	14,000	0.015	0.02	480	12,000
	2	3	0.2	0.5	3,000	25,000	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000
		4	0.2	0.5	3,000	25,000	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000
		6	0.2	0.5	2,500	25,000	0.2	0.3	2,000	25,000	0.15	0.3	1,600	20,000
		8	0.2	0.3	2,000	20,000	0.1	0.2	1,600	18,000	0.1	0.2	1,200	16,000
		10	0.1	0.3	2,000	18,000	0.1	0.2	1,600	16,000	0.1	0.1	1,200	14,000
		12	0.1	0.2	1,600	16,000	0.1	0.1	1,200	14,000	0.05	0.1	940	12,000
		13	0.08	0.2	1,600	16,000	0.06	0.1	1,200	14,000	0.04	0.08	940	12,000
		14	0.07	0.15	1,600	16,000	0.05	0.08	1,200	14,000	0.03	0.07	940	12,000
		16	0.07	0.15	1,600	16,000	0.05	0.08	1,200	14,000	0.03	0.07	940	12,000
		18	0.05	0.1	1,400	14,000	0.03	0.05	1,000	12,000	0.02	0.03	850	10,000
	20	0.05	0.1	1,000	14,000	0.03	0.05	820	12,000	0.02	0.03	720	10,000	
2.5	6	0.3	0.4	2,800	20,000	0.2	0.5	2,300	20,000	0.15	0.4	2,000	18,000	
	8	0.25	0.3	2,600	20,000	0.15	0.3	2,100	20,000	0.12	0.25	1,800	18,000	
	10	0.2	0.3	2,500	20,000	0.15	0.2	2,000	20,000	0.1	0.15	1,600	18,000	
	15	0.1	0.2	2,000	18,000	0.07	0.15	1,600	16,000	0.05	0.1	1,200	14,000	
3	6	0.2	0.8	3,000	20,000	0.2	0.6	2,500	18,000	0.2	0.5	2,000	14,000	
	8	0.2	0.8	3,000	20,000	0.2	0.6	2,500	18,000	0.2	0.5	2,000	14,000	
	10	0.2	0.6	2,500	20,000	0.2	0.4	2,000	18,000	0.1	0.3	1,500	14,000	
	12	0.2	0.6	2,500	20,000	0.2	0.4	2,000	18,000	0.1	0.3	1,500	14,000	
	14	0.1	0.4	2,000	18,000	0.1	0.3	1,600	16,000	0.1	0.2	1,200	12,000	
	16	0.1	0.4	2,000	18,000	0.1	0.3	1,600	16,000	0.1	0.2	1,200	12,000	
	20	0.1	0.3	1,600	18,000	0.1	0.2	1,200	16,000	0.1	0.1	960	12,000	
	25	0.1	0.2	1,200	16,000	0.07	0.15	920	14,000	0.05	0.07	800	10,000	
	30	0.07	0.1	750	14,000	0.05	0.07	640	12,000	0.03	0.05	600	8,600	
	35	0.07	0.1	750	14,000	0.05	0.07	640	12,000	0.03	0.05	600	8,600	
3.5	15	0.25	1	3,000	20,000	0.15	0.5	2,300	16,000	0.13	0.4	1,500	14,000	
	20	0.18	0.6	2,500	18,000	0.1	0.3	1,800	15,000	0.1	0.2	1,200	12,000	
	25	0.12	0.35	1,800	16,000	0.1	0.2	1,600	14,000	0.06	0.12	1,000	10,000	
	30	0.1	0.25	1,500	14,000	0.07	0.15	950	11,000	0.05	0.08	800	9,000	
4	8	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000	
	10	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000	
	12	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 장삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	4	14	0.3	1.5	3,000	20,000	0.2	0.8	2,000	16,000	0.2	0.6	1,600	12,000
		15	0.3	1.5	3,000	20,000	0.2	0.8	2,000	16,000	0.2	0.6	1,600	12,000
		20	0.2	1	2,400	16,000	0.1	0.6	1,800	14,000	0.1	0.4	1,400	10,000
		25	0.2	0.8	1,600	16,000	0.1	0.4	1,200	14,000	0.1	0.2	1,000	10,000
		30	0.1	0.3	1,600	14,000	0.07	0.2	1,200	10,000	0.05	0.15	1,000	8,200
		35	0.1	0.2	1,200	14,000	0.07	0.15	1,000	10,000	0.05	0.1	820	8,200
	5	15	0.3	1.5	3,000	18,000	0.2	1.2	2,500	12,000	0.2	0.7	2,000	9,200
		20	0.3	1.5	3,000	18,000	0.2	1.2	2,500	12,000	0.2	0.7	2,000	9,200
		25	0.3	1.2	3,000	15,000	0.2	1	2,000	10,000	0.15	0.5	1,600	8,000
		30	0.2	1	2,500	15,000	0.15	0.8	1,800	8,600	0.1	0.3	1,200	7,200
	6	40	0.2	0.8	2,000	12,000	0.15	0.5	1,500	7,600	0.1	0.2	860	6,400
		10	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
		15	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
		20	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
		25	0.3	1.5	3,000	16,000	0.2	1	2,000	8,000	0.15	0.7	1,500	7,000
		30	0.2	1.5	3,000	14,000	0.2	1	2,000	7,200	0.15	0.7	1,500	6,500
		35	0.2	1.2	2,400	13,000	0.17	0.8	1,600	6,800	0.12	0.5	1,200	5,800
		40	0.2	1	1,800	12,000	0.15	0.6	1,200	6,400	0.1	0.4	1,000	5,200
		50	0.1	0.6	1,200	8,200	0.1	0.3	860	4,800	0.05	0.2	620	4,000
		60	0.07	0.3	600	6,000	0.05	0.15	450	3,200	0.03	0.07	300	2,500

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 장삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



# HARD STAR Type A Series

# HARD STAR Type A Series

**HARD STAR Type A 추천 절삭 조건표**  
Recommended Milling Conditions

**■형번:HALB230**  
Model number:HALB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발(Kovar)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.1	0.2	0.005	0.005	80	50,000	0.005	0.005	80	50,000	0.003	0.005	120	40,000
		0.3	0.005	0.005	80	50,000	0.005	0.005	80	50,000	0.003	0.005	100	40,000
		0.5	0.005	0.005	70	50,000	0.005	0.005	70	50,000	0.002	0.003	70	40,000
	0.15	0.3	0.008	0.01	150	50,000	0.008	0.01	150	50,000	0.003	0.005	180	40,000
		0.5	0.007	0.008	150	50,000	0.007	0.008	150	50,000	0.003	0.005	150	40,000
	0.2	0.3	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.01	0.01	350	40,000
		0.5	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.008	0.01	320	40,000
		0.75	0.01	0.015	250	50,000	0.01	0.015	250	50,000	0.005	0.01	280	40,000
	0.3	1	0.008	0.015	250	50,000	0.008	0.015	250	50,000	0.003	0.005	250	40,000
		0.5	0.012	0.025	250	50,000	0.012	0.025	250	50,000	0.01	0.015	350	40,000
		0.6	0.012	0.025	250	50,000	0.012	0.025	250	50,000	0.007	0.01	350	40,000
		0.75	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.007	0.01	330	40,000
		1	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.007	0.01	320	40,000
		1.25	0.008	0.015	250	50,000	0.008	0.015	250	50,000	0.005	0.007	280	40,000
		1.5	0.008	0.015	200	50,000	0.008	0.015	200	50,000	0.005	0.007	230	40,000
		1.75	0.008	0.015	200	50,000	0.008	0.015	200	50,000	0.003	0.005	180	40,000
		2	0.005	0.012	150	50,000	0.005	0.012	150	50,000	0.003	0.005	150	40,000
		2.25	0.005	0.012	150	50,000	0.005	0.012	150	50,000	0.002	0.003	120	40,000
	0.4	2.5	0.005	0.01	150	50,000	0.005	0.01	150	50,000	0.002	0.003	100	40,000
		3	0.005	0.007	150	50,000	0.005	0.007	150	50,000	0.001	0.003	80	40,000
		0.5	0.03	0.07	800	50,000	0.03	0.07	800	50,000	0.03	0.05	800	40,000
		0.8	0.03	0.07	800	50,000	0.03	0.07	800	50,000	0.02	0.05	800	40,000
		1	0.03	0.07	800	50,000	0.03	0.07	800	50,000	0.02	0.05	800	40,000
		1.5	0.03	0.05	700	50,000	0.03	0.05	700	50,000	0.01	0.03	620	40,000
2		0.02	0.03	600	50,000	0.02	0.03	600	50,000	0.01	0.02	500	40,000	
2.5		0.02	0.03	450	50,000	0.02	0.03	450	50,000	0.007	0.01	420	40,000	
3		0.015	0.03	400	50,000	0.015	0.03	400	50,000	0.007	0.01	300	40,000	
0.5		1	0.045	0.07	800	50,000	0.045	0.07	800	50,000	0.03	0.05	1,000	40,000
	1.5	0.04	0.07	700	50,000	0.04	0.07	700	50,000	0.02	0.05	850	40,000	
	2	0.03	0.06	600	50,000	0.03	0.06	600	50,000	0.02	0.03	720	40,000	
	2.5	0.02	0.06	600	50,000	0.02	0.06	600	50,000	0.01	0.02	600	40,000	
	3	0.02	0.05	500	50,000	0.02	0.05	500	50,000	0.01	0.02	500	40,000	
	3.5	0.02	0.045	400	50,000	0.02	0.045	400	50,000	0.007	0.01	420	40,000	
	4	0.018	0.03	400	50,000	0.018	0.03	400	50,000	0.007	0.01	350	40,000	
	1	0.07	0.12	1,200	50,000	0.07	0.12	1,200	50,000	0.05	0.1	1,400	40,000	
0.6	1.5	0.07	0.12	1,200	50,000	0.07	0.12	1,200	50,000	0.05	0.1	1,400	40,000	
	2	0.07	0.12	1,200	50,000	0.07	0.12	1,200	50,000	0.05	0.1	1,400	40,000	
	2.5	0.05	0.12	1,200	50,000	0.05	0.12	1,200	50,000	0.03	0.05	1,200	40,000	
	3	0.04	0.1	1,000	50,000	0.04	0.1	1,000	50,000	0.03	0.05	1,200	40,000	
	3.5	0.04	0.1	1,000	50,000	0.04	0.1	1,000	50,000	0.02	0.03	1,000	40,000	
	4	0.035	0.08	800	50,000	0.035	0.08	800	50,000	0.02	0.03	1,000	40,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
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롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발(Kovar)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm			
2	0.6	4.5	0.035	0.08	750	50,000	0.035	0.08	750	50,000	0.02	0.03	900	35,000	
		5	0.03	0.06	500	30,000	0.03	0.06	500	30,000	0.01	0.02	720	30,000	
		5.5	0.02	0.03	500	30,000	0.02	0.03	500	30,000	0.01	0.015	700	30,000	
		6	0.015	0.03	450	30,000	0.015	0.03	450	30,000	0.007	0.01	500	30,000	
		0.7	2	0.1	0.15	1,500	30,000	0.1	0.15	1,500	30,000	0.07	0.1	1,600	40,000
			4	0.06	0.12	1,200	30,000	0.06	0.12	1,200	30,000	0.04	0.06	1,300	40,000
	6		0.04	0.07	600	30,000	0.04	0.07	600	30,000	0.01	0.03	800	30,000	
	0.8	2	0.15	0.2	2,000	50,000	0.15	0.2	2,000	50,000	0.1	0.15	2,000	40,000	
		3	0.12	0.2	1,800	50,000	0.12	0.2	1,800	50,000	0.1	0.15	2,000	40,000	
		4	0.1	0.2	1,500	50,000	0.1	0.2	1,500	50,000	0.05	0.1	1,600	40,000	
		5	0.08	0.15	1,200	50,000	0.08	0.15	1,200	50,000	0.05	0.05	1,600	40,000	
		6	0.07	0.12	900	30,000	0.07	0.12	900	30,000	0.03	0.05	1,200	30,000	
		7	0.05	0.08	700	30,000	0.05	0.08	700	30,000	0.02	0.03	1,000	30,000	
	0.9	8	0.02	0.05	500	24,000	0.02	0.05	500	24,000	0.01	0.02	820	30,000	
		2	0.2	0.3	2,800	50,000	0.2	0.3	2,800	50,000	0.1	0.2	2,200	40,000	
		4	0.15	0.25	2,000	50,000	0.15	0.25	2,000	50,000	0.05	0.12	1,800	40,000	
		6	0.1	0.2	1,300	30,000	0.1	0.2	1,300	30,000	0.035	0.05	1,200	30,000	
		8	0.055	0.08	800	24,000	0.055	0.08	800	24,000	0.025	0.04	1,000	30,000	
		2	0.25	0.4	3,500	50,000	0.25	0.4	3,500	50,000	0.1	0.3	2,500	40,000	
	1	2.5	0.25	0.4	3,200	50,000	0.25	0.4	3,200	50,000	0.1	0.3	2,500	40,000	
		3	0.25	0.4	3,000	50,000	0.25	0.4	3,000	50,000	0.1	0.3	2,500	40,000	
		4	0.2	0.4	2,500	50,000	0.2	0.4	2,500	50,000	0.1	0.2	2,500	40,000	
		5	0.15	0.35	2,000	50,000	0.15	0.35	2,000	50,000	0.05	0.15	2,000	30,000	
		6	0.15	0.3	1,500	50,000	0.15	0.3	1,500	50,000	0.05	0.1	1,800	30,000	
		7	0.12	0.3	1,300	30,000	0.12	0.3	1,300	30,000	0.04	0.06	1,200	30,000	
		8	0.08	0.15	1,200	30,000	0.08	0.15	1,200	30,000	0.04	0.06	1,000	30,000	
		9	0.06	0.1	1,000	30,000	0.06	0.1	1,000	30,000	0.03	0.05	820	25,000	
		10	0.05	0.08	800	30,000	0.05	0.08	800	30,000	0.03	0.05	750	25,000	
		12	0.02	0.04	600	20,000	0.02	0.04	600	20,000	0.01	0.03	600	20,000	
		1.2	2.4	0.3	0.45	3,400	30,000	0.3	0.45	3,400	30,000	0.1	0.3	2,500	30,000
4			0.28	0.45	3,000	30,000	0.28	0.45	3,000	30,000	0.1	0.2	2,500	30,000	
6	0.15		0.4	2,000	30,000	0.15	0.4	2,000	30,000	0.07	0.1	2,000	30,000		
8	0.12		0.3	1,300	30,000	0.12	0.3	1,300	30,000	0.05	0.1	1,600	30,000		
10	0.08		0.15	1,200	20,000	0.08	0.15	1,200	20,000	0.03	0.07	1,200	20,000		
12	0.05		0.08	800	20,000	0.05	0.08	800	20,000	0.02	0.05	860	20,000		
1.4	8	0.15	0.45	2,500	30,000	0.15	0.45	2,500	30,000	0.12	0.2	2,500	30,00		

## HARD STAR Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번:HALB230  
Model number:HALB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발(Kovar)					
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm				
2	1.5	8	0.15	0.4	2,400	30,000	0.15	0.4	2,400	30,000	0.1	0.2	2,500	25,000		
			0.12	0.3	1,800	30,000	0.12	0.3	1,800	30,000	0.1	0.1	2,500	25,000		
			0.1	0.2	1,200	24,000	0.1	0.2	1,200	24,000	0.05	0.1	1,800	20,000		
			0.1	0.15	1,200	24,000	0.1	0.15	1,200	24,000	0.05	0.07	1,200	20,000		
			0.07	0.12	800	18,000	0.07	0.12	800	18,000	0.03	0.05	720	18,000		
			0.15	0.45	3,000	24,000	0.15	0.45	3,000	24,000	0.1	0.2	2,500	25,000		
	1.6	8	0.1	0.25	1,800	24,000	0.1	0.25	1,800	24,000	0.07	0.1	1,800	20,000		
			0.08	0.15	650	18,000	0.08	0.15	650	18,000	0.03	0.05	720	16,000		
			2	3	0.45	0.7	4,000	30,000	0.45	0.7	4,000	30,000	0.2	0.5	3,000	25,000
					0.45	0.7	4,000	30,000	0.45	0.7	4,000	30,000	0.2	0.5	3,000	25,000
					0.38	0.7	3,000	30,000	0.38	0.7	3,000	30,000	0.2	0.5	2,500	25,000
					0.3	0.45	2,500	20,000	0.3	0.45	2,500	20,000	0.2	0.3	2,000	20,000
2	10	0.23	0.45	2,500	20,000	0.23	0.45	2,500	20,000	0.1	0.3	2,000	18,000			
			0.2	0.3	1,800	16,000	0.2	0.3	1,800	16,000	0.1	0.2	1,600	16,000		
			0.2	0.3	1,800	16,000	0.2	0.3	1,800	16,000	0.08	0.2	1,600	16,000		
			0.15	0.3	1,800	16,000	0.15	0.3	1,800	16,000	0.07	0.15	1,600	16,000		
	12	0.2	0.3	1,800	16,000	0.3	0.45	2,500	20,000	0.2	0.3	2,000	20,000			
			0.23	0.45	2,500	20,000	0.23	0.45	2,500	20,000	0.1	0.3	2,000	18,000		
			0.2	0.3	1,800	16,000	0.2	0.3	1,800	16,000	0.1	0.2	1,600	16,000		
			0.1	0.15	1,000	12,000	0.1	0.15	1,000	12,000	0.05	0.1	1,000	14,000		
2.5	6	0.5	0.8	4,000	20,000	0.5	0.8	4,000	20,000	0.3	0.4	2,800	20,000			
			0.3	0.8	3,000	20,000	0.3	0.8	3,000	20,000	0.25	0.3	2,600	20,000		
			0.3	0.8	3,000	20,000	0.3	0.8	3,000	20,000	0.2	0.3	2,500	20,000		
			0.25	0.45	2,500	20,000	0.25	0.45	2,500	20,000	0.1	0.2	2,000	18,000		
	10	0.15	0.3	1,800	16,000	0.15	0.3	1,800	16,000	0.07	0.15	1,500	16,000			
				0.5	1	4,000	20,000	0.5	1	4,000	20,000	0.2	0.8	3,000	20,000	
				0.45	0.8	4,000	20,000	0.45	0.8	4,000	20,000	0.2	0.8	3,000	20,000	
				0.45	0.8	4,000	20,000	0.45	0.8	4,000	20,000	0.2	0.6	2,500	20,000	
3	12	0.3	0.6	3,000	20,000	0.3	0.6	3,000	20,000	0.2	0.6	2,500	20,000			
			0.3	0.6	3,000	20,000	0.3	0.6	3,000	20,000	0.1	0.4	2,000	18,000		
			0.23	0.5	3,000	20,000	0.23	0.5	3,000	20,000	0.1	0.4	2,000	18,000		
			0.23	0.45	1,800	16,000	0.23	0.45	1,800	16,000	0.1	0.3	1,600	18,000		
	20	0.15	0.3	800	12,000	0.15	0.3	800	12,000	0.07	0.1	750	14,000			
				0.2	0.4	1,200	16,000	0.2	0.4	1,200	16,000	0.1	0.2	1,200	16,000	
				0.15	0.3	800	12,000	0.15	0.3	800	12,000	0.07	0.1	750	14,000	
				0.45	0.6	4,000	20,000	0.45	0.6	4,000	20,000	0.25	1	3,000	20,000	
3.5	15	0.45	0.6	4,000	20,000	0.45	0.6	4,000	20,000	0.25	1	3,000	20,000			
			0.3	0.45	2,400	18,000	0.3	0.45	2,400	18,000	0.18	0.6	2,500	18,000		
	25	0.25	0.42	2,000	18,000	0.25	0.42	2,000	18,000	0.12	0.35	1,800	16,000			
				0.23	0.4	1,600	12,000	0.23	0.4	1,600	12,000	0.1	0.25	1,500	14,000	
				0.15	0.3	1,200	12,000	0.15	0.3	1,200	12,000	0.08	0.2	1,200	13,000	
4	8	0.55	1.2	4,000	20,000	0.55	1.2	4,000	20,000	0.3	1.5	3,000	20,000			
			0.55	1.2	4,000	20,000	0.55	1.2	4,000	20,000	0.3	1.5	3,000	20,000		
			0.53	1	4,000	20,000	0.53	1	4,000	20,000	0.3	1.5	3,000	20,000		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량은, 장삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

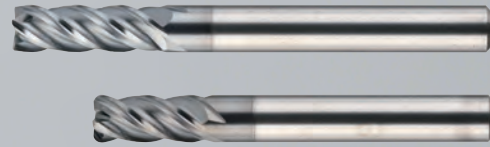
롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 코발(Kovar)					
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm				
2	4	14	0.45	1	4,000	20,000	0.45	1	4,000	20,000	0.3	1.5	3,000	20,000		
			0.38	0.8	3,500	20,000	0.38	0.8	3,500	20,000	0.3	1.5	3,000	20,000		
			0.3	0.5	3,300	20,000	0.3	0.5	3,300	20,000	0.2	1	2,400	16,000		
			0.23	0.45	2,600	16,000	0.23	0.45	2,600	16,000	0.2	0.8	1,600	16,000		
			0.2	0.4	2,600	16,000	0.2	0.4	2,600	16,000	0.1	0.3	1,600	14,000		
			0.18	0.3	1,800	14,000	0.18	0.3	1,800	14,000	0.1	0.2	1,200	14,000		
			5	15	0.55	1.5	4,000	20,000	0.55	1.5	4,000	20,000	0.3	1.5	3,000	18,000
					0.45	1	4,000	20,000	0.45	1	4,000	20,000	0.3	1.5	3,000	18,000
					0.38	0.9	3,000	16,000	0.38	0.9	3,000	16,000	0.3	1.2	3,000	15,000
					0.3	0.8	2,400	16,000	0.3	0.8	2,400	16,000	0.2	1	2,500	15,000
					0.23	0.45	1,200	12,000	0.23	0.45	1,200	12,000	0.2	0.8	2,000	12,000
					0.1	0.3	1,800	18,000	0.1	0.3	1,800	18,000	0.3	2	3,000	16,000
	6	10	0.75	2.3	4,000	18,000	0.75	2.3	4,000	18,000	0.3	2	3,000	16,000		
				0.75	2	4,000	18,000	0.75	2	4,000	18,000	0.3	2	3,000	16,000	
				0.75	1.8	4,000	18,000	0.75	1.8	4,000	18,000	0.3	2	3,000	16,000	
				0.6	1.5	4,000	12,000	0.6	1.5	4,000	12,000	0.3	1.5	3,000	16,000	
				0.53	1	3,000	12,000	0.53	1	3,000	12,000	0.2	1.5	3,000	14,000	
				0.53	0.8	2,500	12,000	0.53	0.8	2,500	12,000	0.2	1.2	2,400	13,000	
		50	0.3	0.6	1,500	8,000	0.3	0.6	1,500	8,000	0.1	0.6	1,200	8,200		
					0.3	0.6	1,500	8,000	0.3	0.6	1,500	8,000	0.1	0.6	1,200	8,200
					0.3	0.6	1,500	8,000	0.3	0.6	1,500	8,000	0.1	0.6	1,200	8,200
					0.3	0.6	1,500	8,000	0.3	0.6	1,500	8,000	0.1	0.6	1,200	8,200
					0.3	0.6	1,500	8,000	0.3	0.6	1,500	8,000	0.1	0.6	1,200	8,200
					0.3	0.6	1,500	8,000	0.3	0.6	1,500	8,000	0.1	0.6	1,200	8,200

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량은, 장삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

## 초경 엔드밀 Carbide End Mill



### 특징

- 당사 독자적인 스퍼터링 방식의 코팅기술을 사용한 코팅 Hard Star Type TI 코팅!
- 나노 레벨의 평활한 코팅으로 용착을 억제하고 수명 연장 실현!
- 내식, 내열성이 뛰어나, 인코빌을 비롯해 폭넓은 난삭재 가공에 최적!
- 표준품 외 특별 주문품도 단납기에 제공 가능!

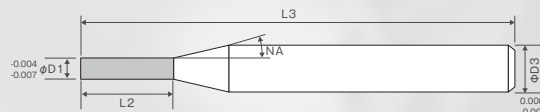
### Features

- Hard Star Type TI has original sputtering coating technology.
- Nano-level ultra-smooth coating suppresses welding and achieves a long life.
- Excellent corrosion resistance and heat resistance, ideal for processing a wide range of difficult-to-cut materials including Inconel.
- Non-standard custom-made products available.

## 초경 스퀘어 엔드밀 Carbide Square End Mill



■ 형번: HTIS499 Model number: HTIS499



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
HTIS499-0100-00200	1	2	15	4	50	4,000
HTIS499-0100-00300		3				4,160
HTIS499-0150-00300	1.5	3	15	4	50	4,800
HTIS499-0150-00450		4.5				5,120
HTIS499-0200-00400	2	4	15	4	50	5,040
HTIS499-0200-00600		6				5,360
HTIS499-0250-00500	2.5	5	15	4	50	5,040
HTIS499-0250-00750		7.5				5,440
HTIS499-0300-00600	3	6	15	4	50	5,040
HTIS499-0300-00900		9				5,360
HTIS499-0400-00800	4	8	15	6	50	5,280
HTIS499-0400-01200		12				5,600
HTIS499-0500-01000	5	10	15	6	50	5,600
HTIS499-0500-01500		15				6,000
HTIS499-0600-01200	6	12	—	6	50	5,840
HTIS499-0600-01800		18				6,080

CBN Series  
 Hard Star A Series  
 Hard Star TT Series  
 Hard Star TT Series  
 Hard Star TT Series  
 Ion Depo A Series  
 Ion Depo U Series  
 DLC Series  
 Non-Coat Series  
 Ion Depo R Series

HARD STAR Type TI 추천 절삭 조건표  
Recommended Milling Conditions

■형번:HTIS499  
Model number:HTIS499

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			내열 합금 Heat resistant alloy 인코넬 Inconel			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm		
4	1	2	1	0.05	150	12,000
		3	1	0.025	100	11,000
	1.5	3	1.5	0.07	200	9,000
		4.5	1.5	0.035	150	8,000
	2	4	2	0.1	200	6,500
		6	2	0.05	150	6,000
	2.5	5	2.5	0.12	250	5,500
		7.5	2.5	0.6	200	5,000
	3	6	3	0.15	250	3,400
		9	3	0.075	200	3,200
	4	8	4	0.2	250	3,000
		12	4	0.1	200	2,700
	5	10	5	0.25	300	2,500
		15	5	0.12	250	2,200
	6	12	6	0.3	300	2,000
		18	6	0.15	250	1,800

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량(날장, 날수)을 늘리는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 절삭액, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 길지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
Hard Star TT Series  
Ion Depo A Series  
Ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series

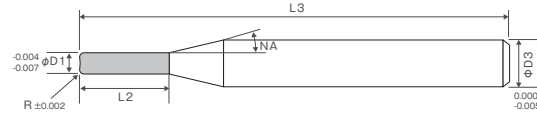
# HARD STAR Type TI Series

## 초경 래디우스 엔드밀 Carbide Radius End Mill

■형번:HTIR499 Model number:HTIR499



Hard TI
super MG
날 수 4
벨트스각 40°/42°
목각 15°
Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size) : mm

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	날장 (L2) Length of Cut	목각 (NA) Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
HTIR499-0300-0300-00800	3	0.3	8	15	4	50	5,520
HTIR499-0300-0500-00800		0.5	8	15	4	50	5,520
HTIR499-0400-0300-01100	4	0.3	11	15	6	50	6,000
HTIR499-0400-0500-01100		0.5	11	15	6	50	6,000
HTIR499-0400-1000-01100		1	11	15	6	50	6,000
HTIR499-0500-0300-01300	5	0.3	13	15	6	50	6,240
HTIR499-0500-0500-01300		0.5	13	15	6	50	6,240
HTIR499-0500-1000-01300		1	13	15	6	50	6,480
HTIR499-0600-0500-01300	6	0.5	13	—	6	50	6,240
HTIR499-0600-1000-01300		1	13	—	6	50	6,480
HTIR499-0800-0500-01900	8	0.5	19	—	8	70	10,800
HTIR499-0800-1000-01900		1	19	—	8	70	10,800
HTIR499-1000-0500-02200	10	0.5	22	—	10	80	12,560
HTIR499-1000-1000-02200		1	22	—	10	80	12,560
HTIR499-1000-2000-02200		2	22	—	10	80	12,560
HTIR499-1000-3000-02200		3	22	—	10	80	12,560
HTIR499-1200-0500-02600	12	0.5	26	—	12	110	16,560
HTIR499-1200-1000-02600		1	26	—	12	110	16,560
HTIR499-1200-2000-02600		2	26	—	12	110	16,560

# HARD STAR Type TI Series

## HARD STAR Type TI 추천 절삭 조건표 Recommended Milling Conditions

■형번:HTIR499  
Model number:HTIR499

### 래디우스 엔드밀 Radius End Mill

피삭재 Work Material			내열 합금 Heat resistant alloy 인코넬 Inconel			
날 수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>
4	3	8	4.5	0.15	250	3,600
	4	11	6	0.2	250	3,100
	5	13	7.5	0.25	300	2,600
	6	13	9	0.3	300	2,100
	8	19	12	0.4	300	1,700
	10	22	15	0.5	250	1,300
	12	26	18	0.6	200	900

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 절삭 가공을 통하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●라 p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.  
●오일 미스트 Coolant, 또는 불수용성 절삭액을 사용하십시오. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 절삭 가공을 통하는 경우의 최대치입니다. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정하십시오. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.







HARD STAR Type TT 추천 절삭 조건표  
Recommended Milling Conditions

■형번:HTTS499  
Model number:HTTS499

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			스테인리스강 Stainless Steel SUS304				티타늄 합금 Titanium alloy			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm		
4	1	2	1	0.2	600	18,000	1	0.2	600	16,800
		3	1	0.1	500	16,000	1	0.1	500	14,900
	1.5	3	1.5	0.3	700	12,500	1.5	0.3	700	11,700
		4.5	1.5	0.15	550	11,000	1.5	0.15	550	10,300
	2	4	2	0.4	850	10,000	2	0.4	850	9,300
		6	2	0.2	650	8,500	2	0.2	650	7,900
	2.5	5	2.5	5	1,000	8,200	2.5	5	1,000	7,600
		7.5	2.5	0.25	750	7,100	2.5	0.25	750	6,600
	3	6	3	0.6	1,100	7,200	3	0.6	1,100	6,700
		9	3	0.3	800	6,000	3	0.3	800	5,600
	4	8	4	0.8	1,200	6,400	4	0.8	1,200	6,000
		12	4	0.4	920	5,400	4	0.4	920	5,000
	5	10	5	1	1,200	5,600	5	1	1,200	5,200
		15	5	0.5	1,000	5,000	5	0.5	1,000	4,700
	6	12	6	1.2	1,200	5,000	6	1.2	1,200	4,600
		18	6	0.6	1,000	4,500	6	0.6	1,000	4,200

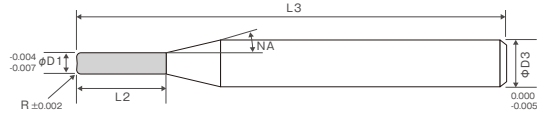
●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량, 절삭 방향, 절삭 방향은 절삭 방향을 고려하여 설정합니다. Depth of Cut shows the maximum value for finishing.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
Ion Depo A Series  
Ion Depo U Series  
DLC Series  
Non-Coat Series  
Ion Depo R Series

# HARD STAR Type TT Series

초경 래디우스 엔드밀 Carbide Radius End Mill

■형번:HTTR499 Model number:HTTR499



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	날장 (L2) Length of Cut	목각 (NA) <sup>o</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
HTTR499-0300-0300-00800	3	0.3	8	15	4	50	5,520
HTTR499-0300-0500-00800		0.5	8	15	4	50	5,520
HTTR499-0400-0300-01100	4	0.3	11	15	6	50	6,000
HTTR499-0400-0500-01100		0.5	11	15	6	50	6,000
HTTR499-0400-1000-01100		1	11	15	6	50	6,000
HTTR499-0500-0300-01300	5	0.3	13	15	6	50	6,240
HTTR499-0500-0500-01300		0.5	13	15	6	50	6,240
HTTR499-0500-1000-01300		1	13	15	6	50	6,240
HTTR499-0600-0500-01300	6	0.5	13	—	6	50	6,480
HTTR499-0600-1000-01300		1	13	—	6	50	6,480
HTTR499-0800-0500-01900	8	0.5	19	—	8	70	10,800
HTTR499-0800-1000-01900		1	19	—	8	70	10,800
HTTR499-1000-0500-02200	10	0.5	22	—	10	80	12,560
HTTR499-1000-1000-02200		1	22	—	10	80	12,560
HTTR499-1000-2000-02200		2	22	—	10	80	12,560
HTTR499-1000-3000-02200		3	22	—	10	80	12,560
HTTR499-1200-0500-02600	12	0.5	26	—	12	110	16,560
HTTR499-1200-1000-02600		1	26	—	12	110	16,560
HTTR499-1200-2000-02600		2	26	—	12	110	16,560

# HARD STAR Type TT Series

HARD STAR Type TT 추천 절삭 조건표  
Recommended Milling Conditions

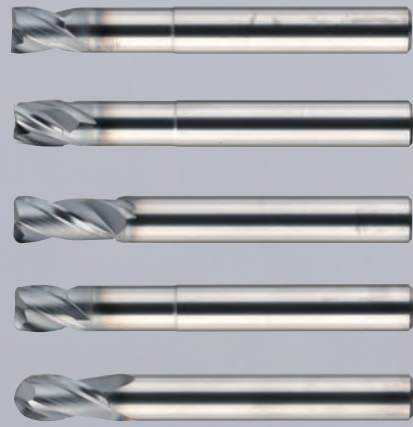
■형번:HTTR499  
Model number:HTTR499

래디우스 엔드밀 Radius End Mill

피삭재 Work Material	스테인리스강 Stainless Steel SUS304						티타늄 합금 Titanium alloy				
	날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
				∅p mm	∅e mm			∅p mm	∅e mm		
4	3	8	4.5	0.6	750	6,000	4.5	0.6	750	5,600	
	4	11	6	0.8	800	5,200	6	0.8	800	4,800	
	5	13	7.5	1	900	4,600	7.5	1	900	4,200	
	6	13	9	1.2	1000	4,200	9	1.2	1000	3,800	
	8	19	12	1.6	850	3,600	12	1.6	850	3,200	
	10	22	15	2	600	3,000	15	2	600	2,600	
	12	26	18	2.4	500	2,500	18	2.4	500	2,100	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●라 p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
●오일 미스트 분사, 또는 물수용성 절삭액 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

## 초경 엔드밀 Carbide End Mill



### 특징

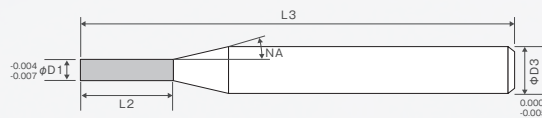
- 이온 플레이팅 방식의 코팅 ion Depo Type A는 조질강이나 탄소강, 동 재질 등 다양한 피삭재에 대응 가능!
- 내마모에 뛰어난 오리지널 코팅으로 긴 수명화를 실현!
- 당사 독자적인 재연마, 재코팅 기술에 의해 성능 노화를 억제하여 한층 더 원가 절감에 공헌!
- 표준품 외 특별 주문품도 단납기에 제공 가능!

### Features

- ion Depo Type A coating for various work materials, heat-treated steel, carbon steel, and copper.
- Achieves long life with excellent wear resistance.
- TOWA re-polishing and re-coating technology enhances cutting tool life and reduces overall tooling cost.
- Non-standard custom-made products available.

## 초경 스퀘어 엔드밀 Carbide Square End Mill

■ 형번: IAS230 Model number: IAS230



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAS230-0010-00015	0.1	0.15	15	4	50	5,760
IAS230-0015-00020	0.15	0.2	15	4	50	6,000
IAS230-0020-00040	0.2	0.4	15	4	50	3,600
IAS230-0025-00050	0.25	0.5	15	4	50	8,480
IAS230-0030-00030	0.3	0.3	15	4	50	3,120
IAS230-0030-00060		0.6	15	4	50	3,120
IAS230-0035-00070	0.35	0.7	15	4	50	7,360
IAS230-0040-00060	0.4	0.6	15	4	50	3,440
IAS230-0040-00080		0.8	15	4	50	3,440
IAS230-0045-00090	0.45	0.9	15	4	50	7,360
IAS230-0050-00080	0.5	0.8	15	4	50	1,760
IAS230-0050-00125		1.25	15	4	50	1,760
IAS230-0050-00200		2	15	4	50	3,840
IAS230-0055-00130	0.55	1.3	15	4	50	5,760
IAS230-0060-00100	0.6	1	15	4	50	2,720
IAS230-0060-00150		1.5	15	4	50	2,720
IAS230-0060-00240		2.4	15	4	50	3,840
IAS230-0065-00150	0.65	1.5	15	4	50	5,760
IAS230-0070-00180	0.7	1.8	15	4	50	2,960
IAS230-0075-00180	0.75	1.8	15	4	50	5,760
IAS230-0080-00120	0.8	1.2	15	4	50	1,760
IAS230-0080-00200		2	15	4	50	1,760
IAS230-0080-00320		3.2	15	4	50	3,840
IAS230-0085-00200	0.85	2	15	4	50	5,760
IAS230-0090-00200	0.9	2	15	4	50	2,960
IAS230-0095-00200	0.95	2	15	4	50	5,760
IAS230-0100-00150	1	1.5	15	4	50	1,520
IAS230-0100-00250		2.5	15	4	50	1,520
IAS230-0100-00400		4	15	4	50	3,440
IAS230-0105-00250	1.05	2.5	15	4	50	5,760
IAS230-0110-00250	1.1	2.5	15	4	50	4,800
IAS230-0115-00250	1.15	2.5	15	4	50	5,760
IAS230-0120-00300	1.2	3	15	4	50	1,760
IAS230-0125-00300	1.25	3	15	4	50	5,760
IAS230-0130-00300	1.3	3	15	4	50	4,800
IAS230-0135-00300	1.35	3	15	4	50	5,760
IAS230-0140-00350	1.4	3.5	15	4	50	4,800
IAS230-0145-00350	1.45	3.5	15	4	50	5,760
IAS230-0150-00200	1.5	2	15	4	50	1,520
IAS230-0150-00400		4	15	4	50	1,520
IAS230-0150-00600		6	15	4	50	3,440
IAS230-0155-00400	1.55	4	15	4	50	5,760
IAS230-0160-00400	1.6	4	15	4	50	4,800
IAS230-0165-00400	1.65	4	15	4	50	5,760
IAS230-0170-00450	1.7	4.5	15	4	50	4,800

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series

# ion Depo Type A Series

# ion Depo Type A Series

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAS230-0175-00450	1.75	4.5	15	4	50	5,760
IAS230-0180-00450	1.8	4.5	15	4	50	1,760
IAS230-0185-00450	1.85	4.5	15	4	50	5,760
IAS230-0190-00500	1.9	5	15	4	50	4,800
IAS230-0195-00500	1.95	5	15	4	50	5,760
IAS230-0200-00300	2	3	15	4	50	1,520
IAS230-0200-00500		5	15	4	50	1,520
IAS230-0200-00800		8	15	4	50	3,440
IAS230-0205-00500	2.05	5	15	4	50	5,760
IAS230-0210-00550	2.1	5.5	15	4	50	4,800
IAS230-0215-00550	2.15	5.5	15	4	50	5,760
IAS230-0220-00550	2.2	5.5	15	4	50	4,800
IAS230-0225-00550	2.25	5.5	15	4	50	5,760
IAS230-0230-00600	2.3	6	15	4	50	4,800
IAS230-0235-00600	2.35	6	15	4	50	5,760
IAS230-0240-00600	2.4	6	15	4	50	4,800
IAS230-0245-00600	2.45	6	15	4	50	5,760
IAS230-0250-00700	2.5	7	15	4	50	1,520
IAS230-0250-01000		10	15	4	50	3,440
IAS230-0255-00700	2.55	7	15	4	50	5,760
IAS230-0260-00700	2.6	7	15	4	50	4,800
IAS230-0265-00700	2.65	7	15	4	50	5,760
IAS230-0270-00700	2.7	7	15	4	50	4,800
IAS230-0275-00700	2.75	7	15	4	50	5,760
IAS230-0280-00700	2.8	7	15	4	50	4,800
IAS230-0285-00800	2.85	8	15	4	50	5,760
IAS230-0290-00800	2.9	8	15	4	50	4,800
IAS230-0295-00800	2.95	8	15	4	50	5,760
IAS230-0300-00500	3	5	15	4	50	2,000
IAS230-0300-00800		8	15	4	50	2,000
IAS230-0300-01200		12	15	4	50	4,400
IAS230-0310-00800	3.1	8	15	6	50	5,600
IAS230-0320-00800	3.2	8	15	6	50	5,600
IAS230-0330-00900	3.3	9	15	6	50	5,600
IAS230-0340-00900	3.4	9	15	6	50	5,600
IAS230-0350-00900	3.5	9	15	6	50	3,600
IAS230-0360-00900	3.6	9	15	6	50	5,600
IAS230-0370-01000	3.7	10	15	6	50	5,600
IAS230-0380-01000	3.8	10	15	6	50	5,600
IAS230-0390-01000	3.9	10	15	6	50	5,600
IAS230-0400-00600	4	6	15	6	50	2,240
IAS230-0400-01000		10	15	6	50	2,240
IAS230-0400-01600		16	15	6	50	4,720
IAS230-0410-01100	4.1	11	15	6	50	6,000
IAS230-0420-01100	4.2	11	15	6	50	6,000

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAS230-0430-01100	4.3	11	15	6	50	6,000
IAS230-0440-01100	4.4	11	15	6	50	6,000
IAS230-0450-01200	4.5	12	15	6	50	4,160
IAS230-0460-01200	4.6	12	15	6	50	6,000
IAS230-0470-01200	4.7	12	15	6	50	6,000
IAS230-0480-01200	4.8	12	15	6	50	6,000
IAS230-0490-01300	4.9	13	15	6	50	6,000
IAS230-0500-00800	5	8	15	6	50	2,400
IAS230-0500-01300		13	15	6	50	2,400
IAS230-0500-02000		20	15	6	60	5,360
IAS230-0510-01300	5.1	13	15	6	50	6,400
IAS230-0520-01300	5.2	13	15	6	50	6,400
IAS230-0530-01400	5.3	14	15	6	50	6,400
IAS230-0540-01400	5.4	14	15	6	50	6,400
IAS230-0550-01400	5.5	14	15	6	50	4,160
IAS230-0560-01400	5.6	14	15	6	50	6,400
IAS230-0570-01500	5.7	15	15	6	50	6,400
IAS230-0580-01500	5.8	15	15	6	50	6,400
IAS230-0590-01500	5.9	15	15	6	50	6,400
IAS230-0600-01000	6	10	—	6	50	2,640
IAS230-0600-01500		15	—	6	50	2,640
IAS230-0600-02400		24	—	6	60	5,440
IAS230-0650-01700	6.5	17	15	8	70	9,200
IAS230-0650-02000		20	15	8	70	9,200
IAS230-0700-01800	7	18	15	8	70	8,560
IAS230-0750-02000	7.5	20	15	8	70	10,240
IAS230-0800-02000	8	20	—	8	70	5,600
IAS230-0800-03200		32	—	8	80	10,800
IAS230-0850-02300	8.5	23	15	10	80	12,320
IAS230-0900-02300	9	23	15	10	80	11,280
IAS230-0950-02500	9.5	25	15	10	80	13,440
IAS230-1000-02500	10	25	—	10	80	6,560
IAS230-1000-04000		40	—	10	90	12,240
IAS230-1050-02800	10.5	28	15	12	110	17,120
IAS230-1100-02800	11	28	15	12	110	17,120
IAS230-1150-03000	11.5	30	15	12	110	10,800
IAS230-1200-03000	12	30	—	12	110	10,800
IAS230-1200-04800		48	—	12	120	20,480
IAS230-1400-02800	14	28	—	14	110	20,560
IAS230-1600-04800	16	48	—	16	140	22,640
IAS230-1800-05400	18	54	—	18	140	35,600
IAS230-2000-06000	20	60	—	20	150	38,560

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IAS230  
Model number:IAS230

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61					
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			ap mm	ae mm			ap mm	ae mm			ap mm	ae mm			ap mm	ae mm				
2	0.1	0.15	0.005	0.005	25	50,000	0.005	0.005	25	50,000	0.005	0.005	20	50,000	0.005	0.005	15	50,000		
			0.01	0.01	25	50,000	0.008	0.008	25	50,000	0.008	0.008	20	50,000	0.008	0.008	15	50,000		
			0.2	0.4	0.01	0.01	40	50,000	0.01	0.01	40	50,000	0.01	0.01	30	50,000	0.01	0.01	25	50,000
					0.01	0.01	40	50,000	0.01	0.01	40	50,000	0.01	0.01	30	50,000	0.01	0.01	25	50,000
			0.25	0.5	0.01	0.01	40	50,000	0.01	0.01	40	50,000	0.01	0.01	30	50,000	0.01	0.01	25	50,000
					0.01	0.01	40	50,000	0.01	0.01	40	50,000	0.01	0.01	30	50,000	0.01	0.01	25	50,000
			0.3	0.3	0.15	0.02	100	50,000	0.15	0.02	100	50,000	0.15	0.02	85	50,000	0.15	0.02	90	50,000
					0.15	0.02	100	50,000	0.15	0.02	100	50,000	0.15	0.02	85	50,000	0.15	0.02	90	50,000
			0.35	0.7	0.18	0.02	150	50,000	0.18	0.02	150	50,000	0.18	0.02	85	50,000	0.18	0.02	90	50,000
					0.18	0.02	150	50,000	0.18	0.02	150	50,000	0.18	0.02	85	50,000	0.18	0.02	90	50,000
			0.4	0.6	0.20	0.02	150	50,000	0.20	0.02	150	50,000	0.20	0.02	110	40,000	0.20	0.02	130	48,000
					0.20	0.02	150	50,000	0.20	0.02	150	50,000	0.20	0.02	110	40,000	0.20	0.02	130	48,000
			0.45	0.9	0.23	0.02	150	50,000	0.23	0.02	150	50,000	0.23	0.02	110	40,000	0.23	0.02	130	48,000
					0.23	0.02	150	50,000	0.23	0.02	150	50,000	0.23	0.02	110	40,000	0.23	0.02	130	48,000
			0.5	0.8	0.25	0.03	170	42,000	0.25	0.03	170	42,000	0.25	0.03	110	32,000	0.25	0.03	130	39,000
					0.25	0.03	170	42,000	0.25	0.03	170	42,000	0.25	0.03	110	32,000	0.25	0.03	130	39,000
					0.25	0.03	170	42,000	0.25	0.03	170	42,000	0.25	0.03	110	32,000	0.25	0.03	130	39,000
			0.55	1.3	0.55	0.03	180	42,000	0.55	0.03	180	42,000	0.55	0.03	110	32,000	0.55	0.03	130	39,000
					0.55	0.03	180	42,000	0.55	0.03	180	42,000	0.55	0.03	110	32,000	0.55	0.03	130	39,000
			0.6	1.5	0.60	0.03	180	42,000	0.60	0.03	180	42,000	0.60	0.03	110	32,000	0.60	0.03	130	39,000
0.60	0.03	180			42,000	0.60	0.03	180	42,000	0.60	0.03	110	32,000	0.60	0.03	130	39,000			
0.65	1.5	0.65	0.03	180	42,000	0.65	0.03	180	42,000	0.65	0.03	110	32,000	0.65	0.03	130	39,000			
		0.65	0.03	180	42,000	0.65	0.03	180	42,000	0.65	0.03	110	32,000	0.65	0.03	130	39,000			
0.7	1.8	0.70	0.04	180	42,000	0.70	0.04	180	42,000	0.70	0.04	110	32,000	0.70	0.04	130	39,000			
		0.70	0.04	180	42,000	0.70	0.04	180	42,000	0.70	0.04	110	32,000	0.70	0.04	130	39,000			
0.8	1.2	0.80	0.04	210	26,000	0.80	0.04	210	26,000	0.80	0.04	130	20,000	0.80	0.04	150	24,000			
		0.80	0.04	210	26,000	0.80	0.04	210	26,000	0.80	0.04	130	20,000	0.80	0.04	150	24,000			
		0.80	0.04	210	26,000	0.80	0.04	210	26,000	0.80	0.04	130	20,000	0.80	0.04	150	24,000			
0.85	2	0.85	0.04	210	26,000	0.85	0.04	210	26,000	0.85	0.04	130	20,000	0.85	0.04	150	24,000			
		0.85	0.04	210	26,000	0.85	0.04	210	26,000	0.85	0.04	130	20,000	0.85	0.04	150	24,000			
0.9	2	0.90	0.05	210	26,000	0.90	0.05	210	26,000	0.90	0.05	130	20,000	0.90	0.05	150	24,000			
		0.90	0.05	210	26,000	0.90	0.05	210	26,000	0.90	0.05	130	20,000	0.90	0.05	150	24,000			
0.95	2	0.95	0.05	210	26,000	0.95	0.05	210	26,000	0.95	0.05	130	20,000	0.95	0.05	150	24,000			
		0.95	0.05	210	26,000	0.95	0.05	210	26,000	0.95	0.05	130	20,000	0.95	0.05	150	24,000			
1	1.5	1.00	0.07	210	26,000	1.00	0.07	210	26,000	1.00	0.07	130	16,000	1.00	0.07	150	20,000			
		1.00	0.07	210	26,000	1.00	0.07	210	26,000	1.00	0.07	130	16,000	1.00	0.07	150	20,000			
		1.00	0.07	210	26,000	1.00	0.07	210	26,000	1.00	0.07	130	16,000	1.00	0.07	150	20,000			
1.05	2.5	1.05	0.07	210	26,000	1.05	0.07	210	26,000	1.05	0.07	130	16,000	1.05	0.07	150	20,000			
		1.05	0.07	210	26,000	1.05	0.07	210	26,000	1.05	0.07	130	16,000	1.05	0.07	150	20,000			
1.1	2.5	1.10	0.08	210	26,000	1.10	0.08	210	26,000	1.10	0.08	130	16,000	1.10	0.08	150	20,000			
		1.10	0.08	210	26,000	1.10	0.08	210	26,000	1.10	0.08	130	16,000	1.10	0.08	150	20,000			
1.15	2.5	1.15	0.08	210	26,000	1.15	0.08	210	26,000	1.15	0.08	130	16,000	1.15	0.08	150	20,000			
		1.15	0.08	210	26,000	1.15	0.08	210	26,000	1.15	0.08	130	16,000	1.15	0.08	150	20,000			
1.2	3	1.20	0.08	210	26,000	1.20	0.08	210	26,000	1.20	0.08	130	16,000	1.20	0.08	150	20,000			
		1.20	0.08	210	26,000	1.20	0.08	210	26,000	1.20	0.08	130	16,000	1.20	0.08	150	20,000			
1.25	3	1.25	0.09	210	26,000	1.25	0.09	210	26,000	1.25	0.09	130	16,000	1.25	0.09	150	20,000			
		1.25	0.09	210	26,000	1.25	0.09	210	26,000	1.25	0.09	130	16,000	1.25	0.09	150	20,000			
1.3	3	1.30	0.09	210	26,000	1.30	0.09	210	26,000	1.30	0.09	130	16,000	1.30	0.09	150	20,000			
		1.30	0.09	210	26,000	1.30	0.09	210	26,000	1.30	0.09	130	16,000	1.30	0.09	150	20,000			
1.35	3	1.35	0.09	210	26,000	1.35	0.09	210	26,000	1.35	0.09	130	16,000	1.35	0.09	150	20,000			
		1.35	0.09	210	26,000	1.35	0.09	210	26,000	1.35	0.09	130	16,000	1.35	0.09	150	20,000			
1.4	3.5	1.40	0.10	210	26,000	1.40	0.10	210	26,000	1.40	0.10	130	16,000	1.40	0.10	150	20,000			
		1.40	0.10	210	26,000	1.40	0.10	210	26,000	1.40	0.10	130	16,000	1.40	0.10	150	20,000			
1.45	3.5	1.45	0.10	210	26,000	1.45	0.10	210	26,000	1.45	0.10	130	16,000	1.45	0.10	150	20,000			
		1.45	0.10	210	26,000	1.45	0.10	210	26,000	1.45	0.10	130	16,000	1.45	0.10	150	20,000			
1.5	2	1.50	0.11	210	14,000	1.50	0.11	210	14,000	1.50	0.11	130	11,000	1.50	0.11	150	13,000			
		1.50	0.11	210	14,000	1.50	0.11	210	14,000	1.50	0.11	130	11,000	1.50	0.11	150	13,000			
		1.50	0.11	210	14,000	1.50	0.11	210	14,000	1.50	0.11	130	11,000	1.50	0.11	150	13,000			
1.55	4	1.55	0.11	210	14,000	1.55	0.11	210	14,000	1.55	0.11	130	11,000	1.55	0.11	150	13,000			
		1.55	0.11	210	14,000	1.55	0.11	210	14,000	1.55	0.11	130	11,000	1.55	0.11	150	13,000			

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량(날, 절삭)은 절삭가공의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●ap, ae 방향, ae는 반경 방향. ap=Axial Depth of Cut ae=Radial Depth of Cut.  
 ●오일 미스트 쿨런트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61					
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			ap mm	ae mm			ap mm	ae mm			ap mm	ae mm			ap mm	ae mm				
2	1.6	4	1.60	0.11	210	14,000	1.60	0.11	210	14,000	1.60	0.11	130	11,000	1.60	0.11	150	13,000		
			1.65	0.12	210	14,000	1.65	0.12	210	14,000	1.65	0.12	130	11,000	1.65	0.12	150	13,000		
			1.7	4.5	1.70	0.12	210	14,000	1.70	0.12	210	14,000	1.70	0.12	130	11,000	1.70	0.12	150	13,000
					1.75	0.12	210	14,000	1.75	0.12	210	14,000	1.75	0.12	130	11,000	1.75	0.12	150	13,000
			1.8	4.5	1.80	0.13	210	14,000	1.80	0.13	210	14,000	1.80	0.13	130	11,000	1.80	0.13	150	13,000
					1.85	0.13	210	14,000	1.85	0.13	210	14,000	1.85	0.13	130	11,000	1.85	0.13	150	13,000
			1.9	5	1.90	0.13	210	14,000	1.90	0.13	210	14,000	1.90	0.13	130	11,000	1.90	0.13	150	13,000
					1.95	0.14	210	1												



# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IAS230  
Model number:IAS230

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	3.9	10	3.90	0.39	280	7,000	3.90	0.39	280	7,000	3.90	0.39	170	5,300	3.90	0.39	190	6,500
		6	4.00	0.40	310	5,200	4.00	0.40	310	5,200	4.00	0.40	170	4,000	4.00	0.40	190	4,900
	4	10	4.00	0.40	310	5,200	4.00	0.40	310	5,200	4.00	0.40	170	4,000	4.00	0.40	190	4,900
		16	4.00	0.40	310	5,200	4.00	0.40	310	5,200	4.00	0.40	170	4,000	4.00	0.40	190	4,900
	4.1	11	4.10	0.41	310	5,200	4.10	0.41	310	5,200	4.10	0.41	170	4,000	4.10	0.41	190	4,900
	4.2	11	4.20	0.42	310	5,200	4.20	0.42	310	5,200	4.20	0.42	170	4,000	4.20	0.42	190	4,900
	4.3	11	4.30	0.43	310	5,200	4.30	0.43	310	5,200	4.30	0.43	170	4,000	4.30	0.43	190	4,900
	4.4	11	4.40	0.44	310	5,200	4.40	0.44	310	5,200	4.40	0.44	170	4,000	4.40	0.44	190	4,900
	4.5	12	4.50	0.45	310	5,200	4.50	0.45	310	5,200	4.50	0.45	170	4,000	4.50	0.45	190	4,900
	4.6	12	4.60	0.46	310	5,200	4.60	0.46	310	5,200	4.60	0.46	170	4,000	4.60	0.46	190	4,900
	4.7	12	4.70	0.47	310	5,200	4.70	0.47	310	5,200	4.70	0.47	170	4,000	4.70	0.47	190	4,900
	4.8	12	4.80	0.48	310	5,200	4.80	0.48	310	5,200	4.80	0.48	170	4,000	4.80	0.48	190	4,900
	4.9	13	4.90	0.49	310	5,200	4.90	0.49	310	5,200	4.90	0.49	170	4,000	4.90	0.49	190	4,900
	5	8	5.00	0.50	330	4,100	5.00	0.50	330	4,100	5.00	0.50	210	3,200	5.00	0.50	230	3,800
		13	5.00	0.50	330	4,100	5.00	0.50	330	4,100	5.00	0.50	210	3,200	5.00	0.50	230	3,800
		20	5.00	0.50	330	4,100	5.00	0.50	330	4,100	5.00	0.50	210	3,200	5.00	0.50	230	3,800
	5.1	13	5.10	0.51	330	4,100	5.10	0.51	330	4,100	5.10	0.51	210	3,200	5.10	0.51	230	3,800
	5.2	13	5.20	0.52	330	4,100	5.20	0.52	330	4,100	5.20	0.52	210	3,200	5.20	0.52	230	3,800
	5.3	14	5.30	0.53	330	4,100	5.30	0.53	330	4,100	5.30	0.53	210	3,200	5.30	0.53	230	3,800
	5.4	14	5.40	0.54	330	4,100	5.40	0.54	330	4,100	5.40	0.54	210	3,200	5.40	0.54	230	3,800
5.5	14	5.50	0.55	330	4,100	5.50	0.55	330	4,100	5.50	0.55	210	3,200	5.50	0.55	230	3,800	
5.6	14	5.60	0.56	330	4,100	5.60	0.56	330	4,100	5.60	0.56	210	3,200	5.60	0.56	230	3,800	
5.7	15	5.70	0.57	330	4,100	5.70	0.57	330	4,100	5.70	0.57	210	3,200	5.70	0.57	230	3,800	
5.8	15	5.80	0.58	330	4,100	5.80	0.58	330	4,100	5.80	0.58	210	3,200	5.80	0.58	230	3,800	
5.9	15	5.90	0.59	330	4,100	5.90	0.59	330	4,100	5.90	0.59	210	3,200	5.90	0.59	230	3,800	
6	10	6.00	0.60	340	3,400	6.00	0.60	340	3,400	6.00	0.60	240	2,700	6.00	0.60	260	3,200	
	15	6.00	0.60	340	3,400	6.00	0.60	340	3,400	6.00	0.60	240	2,700	6.00	0.60	260	3,200	
	24	6.00	0.60	300	3,400	6.00	0.60	300	3,400	6.00	0.60	240	2,700	6.00	0.60	260	3,200	
6.5	20	6.50	0.98	340	3,400	6.50	0.98	340	3,400	6.50	0.98	240	2,700	6.50	0.98	260	3,200	
	17	6.50	0.98	340	3,400	6.50	0.98	340	3,400	6.50	0.98	240	2,700	6.50	0.98	260	3,200	
7	18	7.00	1.05	340	3,400	7.00	1.05	340	3,400	7.00	1.05	240	2,700	7.00	1.05	260	3,200	
7.5	20	7.50	1.13	340	3,400	7.50	1.13	340	3,400	7.50	1.13	240	2,700	7.50	1.13	260	3,200	
8	20	8.00	1.20	310	2,600	8.00	1.20	310	2,600	8.00	1.20	220	2,000	8.00	1.20	240	2,400	
	32	8.00	1.20	300	2,600	8.00	1.20	300	2,600	8.00	1.20	220	2,000	8.00	1.20	240	2,400	
8.5	23	8.50	1.28	310	2,600	8.50	1.28	310	2,600	8.50	1.28	220	2,000	8.50	1.28	240	2,400	
9	23	9.00	1.35	310	2,600	9.00	1.35	310	2,600	9.00	1.35	220	2,000	9.00	1.35	240	2,400	
9.5	25	9.50	1.43	310	2,600	9.50	1.43	310	2,600	9.50	1.43	220	2,000	9.50	1.43	240	2,400	
10	25	10.00	1.50	290	2,100	10.00	1.50	290	2,100	10.00	1.50	210	1,600	10.00	1.50	230	1,900	
	40	10.00	1.50	250	1,900	10.00	1.50	250	1,900	10.00	1.50	200	1,400	10.00	1.50	200	1,700	
10.5	28	10.50	1.58	290	2,100	10.50	1.58	290	2,100	10.50	1.58	210	1,600	10.50	1.58	230	1,700	
11	28	16.50	1.65	290	2,100	16.50	1.65	290	2,100	16.50	1.65	210	1,600	16.50	1.65	230	1,700	
11.5	30	17.25	1.73	290	2,100	17.25	1.73	290	2,100	17.25	1.73	210	1,600	17.25	1.73	230	1,700	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입량만, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 분사, 또는 분수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	12	30	18.00	1.80	270	1,700	18.00	1.80	270	1,700	18.00	1.80	200	1,300	18.00	1.80	250	1,600
		48	18.00	1.80	230	1,600	18.00	1.80	230	1,600	18.00	1.80	180	1,200	18.00	1.80	200	1,400
	14	28	21.00	2.10	270	1,500	21.00	2.10	270	1,500	21.00	2.10	220	1,300	21.00	2.10	250	1,400
	16	48	24.00	2.40	230	1,300	24.00	2.40	230	1,300	24.00	2.40	180	1,100	24.00	2.40	200	1,200
	18	54	27.00	2.70	250	1,200	27.00	2.70	250	1,200	27.00	2.70	200	1,000	27.00	2.70	200	1,100
	20	60	30.00	3.00	200	1,000	30.00	3.00	200	1,000	30.00	3.00	150	800	30.00	3.00	180	900

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 ●절입량만, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 분사, 또는 분수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IAS230  
Model number:IAS230

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)					
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm
2	0.1	0.15	0.005	0.005	15	50,000	0.005	0.005	15	50,000	0.005	0.005	20	50,000	0.1	0.02	60	50,000		
			0.008	0.008	15	50,000	0.008	0.008	15	50,000	0.008	0.008	20	50,000	0.15	0.03	60	50,000		
			0.2	0.4	0.01	0.01	20	48,000	0.01	0.01	25	50,000	0.01	0.01	30	50,000	0.2	0.04	90	50,000
					0.01	0.01	20	48,000	0.01	0.01	25	50,000	0.01	0.01	30	50,000	0.25	0.05	90	50,000
			0.3	0.3	0.02	0.02	20	32,000	0.15	0.02	90	50,000	0.15	0.02	85	50,000	0.3	0.06	150	50,000
					0.02	0.02	20	32,000	0.15	0.02	90	50,000	0.15	0.02	85	50,000	0.3	0.06	150	50,000
			0.35	0.7	0.02	0.02	20	32,000	0.18	0.02	90	50,000	0.18	0.02	85	50,000	0.35	0.07	150	50,000
					0.02	0.02	20	32,000	0.18	0.02	90	50,000	0.18	0.02	85	50,000	0.35	0.07	150	50,000
			0.4	0.6	0.40	0.01	50	24,000	0.20	0.02	130	48,000	0.20	0.02	110	40,000	0.4	0.08	200	50,000
					0.40	0.01	50	24,000	0.20	0.02	130	48,000	0.20	0.02	110	40,000	0.4	0.08	200	50,000
			0.45	0.9	0.45	0.01	50	24,000	0.23	0.02	130	48,000	0.23	0.02	110	40,000	0.45	0.09	200	50,000
					0.45	0.01	50	24,000	0.23	0.02	130	48,000	0.23	0.02	110	40,000	0.45	0.09	200	50,000
			0.5	0.8	0.50	0.01	60	20,000	0.25	0.03	130	39,000	0.25	0.03	110	32,000	0.5	0.1	220	45,000
					0.50	0.01	60	20,000	0.25	0.03	130	39,000	0.25	0.03	110	32,000	0.5	0.1	220	45,000
			0.55	1.25	0.50	0.01	60	20,000	0.50	0.03	130	39,000	0.50	0.03	110	32,000	0.5	0.1	220	45,000
					0.50	0.01	60	20,000	0.50	0.03	130	39,000	0.50	0.03	110	32,000	0.5	0.1	220	45,000
			0.6	1.3	0.55	0.01	60	20,000	0.55	0.03	130	39,000	0.55	0.03	110	32,000	0.55	0.11	220	45,000
					0.55	0.01	60	20,000	0.55	0.03	130	39,000	0.55	0.03	110	32,000	0.55	0.11	220	45,000
			0.65	1	0.60	0.01	60	20,000	0.60	0.03	130	39,000	0.60	0.03	110	32,000	0.6	0.12	220	45,000
					0.60	0.01	60	20,000	0.60	0.03	130	39,000	0.60	0.03	110	32,000	0.6	0.12	220	45,000
			0.7	1.5	0.60	0.01	60	20,000	0.60	0.03	130	39,000	0.60	0.03	110	32,000	0.6	0.12	220	45,000
					0.60	0.01	60	20,000	0.60	0.03	130	39,000	0.60	0.03	110	32,000	0.6	0.12	220	45,000
			0.75	1.8	0.70	0.01	60	20,000	0.70	0.04	130	39,000	0.70	0.04	110	32,000	0.7	0.14	220	45,000
					0.70	0.01	60	20,000	0.70	0.04	130	39,000	0.70	0.04	110	32,000	0.7	0.14	220	45,000
0.8	1.2	0.80	0.02	70	12,000	0.80	0.04	150	24,000	0.80	0.04	130	20,000	0.8	0.16	250	28,000			
		0.80	0.02	70	12,000	0.80	0.04	150	24,000	0.80	0.04	130	20,000	0.8	0.16	250	28,000			
0.85	2	0.80	0.02	70	12,000	0.80	0.04	150	24,000	0.80	0.04	130	20,000	0.8	0.16	250	28,000			
		0.80	0.02	70	12,000	0.80	0.04	150	24,000	0.80	0.04	130	20,000	0.8	0.16	250	28,000			
0.9	2	0.85	0.02	70	12,000	0.85	0.04	150	24,000	0.85	0.04	130	20,000	0.85	0.17	250	28,000			
		0.85	0.02	70	12,000	0.85	0.04	150	24,000	0.85	0.04	130	20,000	0.85	0.17	250	28,000			
0.95	2	0.90	0.02	70	12,000	0.90	0.05	150	24,000	0.90	0.05	130	20,000	0.9	0.18	250	28,000			
		0.90	0.02	70	12,000	0.90	0.05	150	24,000	0.90	0.05	130	20,000	0.9	0.18	250	28,000			
1	2	0.95	0.02	70	12,000	0.95	0.05	150	24,000	0.95	0.05	130	20,000	0.95	0.19	250	28,000			
		0.95	0.02	70	12,000	0.95	0.05	150	24,000	0.95	0.05	130	20,000	0.95	0.19	250	28,000			
1.05	1.5	1.00	0.02	75	9,500	1.00	0.07	150	20,000	1.00	0.07	130	16,000	1	0.2	270	23,000			
		1.00	0.02	75	9,500	1.00	0.07	150	20,000	1.00	0.07	130	16,000	1	0.2	270	23,000			
1.1	2.5	1.00	0.02	75	9,500	1.00	0.07	150	20,000	1.00	0.07	130	16,000	1	0.2	270	23,000			
		1.00	0.02	75	9,500	1.00	0.07	150	20,000	1.00	0.07	130	16,000	1	0.2	270	23,000			
1.15	3	1.05	0.02	75	9,500	1.05	0.07	150	20,000	1.05	0.07	130	16,000	1.05	0.21	270	23,000			
		1.05	0.02	75	9,500	1.05	0.07	150	20,000	1.05	0.07	130	16,000	1.05	0.21	270	23,000			
1.2	3	1.10	0.02	75	9,500	1.10	0.08	150	20,000	1.10	0.08	130	16,000	1.1	0.22	270	23,000			
		1.10	0.02	75	9,500	1.10	0.08	150	20,000	1.10	0.08	130	16,000	1.1	0.22	270	23,000			
1.25	3	1.15	0.02	75	9,500	1.15	0.08	150	20,000	1.15	0.08	130	16,000	1.15	0.23	270	23,000			
		1.15	0.02	75	9,500	1.15	0.08	150	20,000	1.15	0.08	130	16,000	1.15	0.23	270	23,000			
1.3	3	1.20	0.02	75	9,500	1.20	0.08	150	20,000	1.20	0.08	130	16,000	1.2	0.24	270	23,000			
		1.20	0.02	75	9,500	1.20	0.08	150	20,000	1.20	0.08	130	16,000	1.2	0.24	270	23,000			
1.35	3	1.25	0.03	75	9,500	1.25	0.09	150	20,000	1.25	0.09	130	16,000	1.25	0.25	270	23,000			
		1.25	0.03	75	9,500	1.25	0.09	150	20,000	1.25	0.09	130	16,000	1.25	0.25	270	23,000			
1.4	3	1.30	0.03	75	9,500	1.30	0.09	150	20,000	1.30	0.09	130	16,000	1.3	0.26	270	23,000			
		1.30	0.03	75	9,500	1.30	0.09	150	20,000	1.30	0.09	130	16,000	1.3	0.26	270	23,000			
1.45	3	1.35	0.03	75	9,500	1.35	0.09	150	20,000	1.35	0.09	130	16,000	1.35	0.27	270	23,000			
		1.35	0.03	75	9,500	1.35	0.09	150	20,000	1.35	0.09	130	16,000	1.35	0.27	270	23,000			
1.5	3.5	1.40	0.03	75	9,500	1.40	0.10	150	20,000	1.40	0.10	130	16,000	1.4	0.28	270	23,000			
		1.40	0.03	75	9,500	1.40	0.10	150	20,000	1.40	0.10	130	16,000	1.4	0.28	270	23,000			
1.55	2	1.45	0.03	75	9,500	1.45	0.10	150	20,000	1.45	0.10	130	16,000	1.45	0.29	270	23,000			
		1.45	0.03	75	9,500	1.45	0.10	150	20,000	1.45	0.10	130	16,000	1.45	0.29	270	23,000			
1.55	4	1.50	0.03	75	6,400	1.50	0.11	150	13,000	1.50	0.11	130	11,000	1.5	0.3	300	23,000			
		1.50	0.03	75	6,400	1.50	0.11	150	13,000	1.50	0.11	130	11,000	1.5	0.3	300	23,000			
1.55	4	1.50	0.03	75	6,400	1.50	0.11	150	13,000	1.50	0.11	130	11,000	1.5	0.3	300	23,000			
		1.50	0.03	75	6,400	1.50	0.11	150	13,000	1.50	0.11	130	11,000	1.5	0.3	300	23,000			

공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●공구 폭 방향, ∅e 안경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●공구 폭 방향, ∅e 안경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 폭 방향, ∅e 안경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●공구 폭 방향, ∅e 안경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)					
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm
2	1.6	4	1.60	0.03	75	6,400	1.60	0.11	150	13,000	1.60	0.11	130	11,000	1.6	0.32	300	23,000		
			1.65	0.03	75	6,400	1.65	0.12	150	13,000	1.65	0.12	130	11,000	1.65	0.33	300	23,000		
			1.7	4.5	1.70	0.03	75	6,400	1.70	0.12	150	13,000	1.70	0.12	130	11,000	1.7	0.34	300	23,000
					1.75	0.04	75	6,400	1.75	0.12	150	13,000	1.75	0.12	130	11,000	1.75	0.35	300	23,000
			1.8	4.5	1.80	0.04	75	6,400	1.80	0.13	150	13,000	1.80	0.13	130	11,000	1.8	0.36	300	23,000
					1.85	0.04	75	6,400	1.85	0.13	150	13,000	1.85	0.13	130	11,000	1.85	0.37	300	23,000
			1.9	5	1.90	0.04	75	6,400	1.90</											

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IAS230  
Model number: IAS230

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	3.9	10	3.90	0.08	80	3,200	3.90	0.39	190	6,500	3.90	0.39	170	5,300	3.9	0.78	370	7,500
		6	4.00	0.08	95	2,400	4.00	0.40	190	4,900	4.00	0.40	170	4,000	4	0.8	390	5,600
	4	10	4.00	0.08	95	2,400	4.00	0.40	190	4,900	4.00	0.40	170	4,000	4	0.8	390	5,600
		16	4.00	0.08	95	2,400	4.00	0.40	190	4,900	4.00	0.40	170	4,000	4	0.8	390	5,600
	4.1	11	4.10	0.08	95	2,400	4.10	0.41	190	4,900	4.10	0.41	170	4,000	4.1	0.82	390	5,600
	4.2	11	4.20	0.08	95	2,400	4.20	0.42	190	4,900	4.20	0.42	170	4,000	4.2	0.84	390	5,600
	4.3	11	4.30	0.09	95	2,400	4.30	0.43	190	4,900	4.30	0.43	170	4,000	4.3	0.86	390	5,600
	4.4	11	4.40	0.09	95	2,400	4.40	0.44	190	4,900	4.40	0.44	170	4,000	4.4	0.88	390	5,600
	4.5	12	4.50	0.09	95	2,400	4.50	0.45	190	4,900	4.50	0.45	170	4,000	4.5	0.9	390	5,600
	4.6	12	4.60	0.09	95	2,400	4.60	0.46	190	4,900	4.60	0.46	170	4,000	4.6	0.92	390	5,600
	4.7	12	4.70	0.09	95	2,400	4.70	0.47	190	4,900	4.70	0.47	170	4,000	4.7	0.94	390	5,600
	4.8	12	4.80	0.10	95	2,400	4.80	0.48	190	4,900	4.80	0.48	170	4,000	4.8	0.96	390	5,600
	4.9	13	4.90	0.10	95	2,400	4.90	0.49	190	4,900	4.90	0.49	170	4,000	4.9	0.98	390	5,600
	5	8	5.00	0.10	95	1,900	5.00	0.50	230	3,800	5.00	0.50	210	3,200	5	1	410	4,500
		13	5.00	0.10	95	1,900	5.00	0.50	230	3,800	5.00	0.50	210	3,200	5	1	410	4,500
		20	5.00	0.10	95	1,900	5.00	0.50	230	3,800	5.00	0.50	210	3,200	5	1	410	4,500
	5.1	13	5.10	0.10	95	1,900	5.10	0.51	230	3,800	5.10	0.51	210	3,200	5.1	1.02	410	4,500
	5.2	13	5.20	0.10	95	1,900	5.20	0.52	230	3,800	5.20	0.52	210	3,200	5.2	1.04	410	4,500
	5.3	14	5.30	0.11	95	1,900	5.30	0.53	230	3,800	5.30	0.53	210	3,200	5.3	1.06	410	4,500
	5.4	14	5.40	0.11	95	1,900	5.40	0.54	230	3,800	5.40	0.54	210	3,200	5.4	1.08	410	4,500
5.5	14	5.50	0.11	95	1,900	5.50	0.55	230	3,800	5.50	0.55	210	3,200	5.5	1.1	410	4,500	
5.6	14	5.60	0.11	95	1,900	5.60	0.56	230	3,800	5.60	0.56	210	3,200	5.6	1.12	410	4,500	
5.7	15	5.70	0.11	95	1,900	5.70	0.57	230	3,800	5.70	0.57	210	3,200	5.7	1.14	410	4,500	
5.8	15	5.80	0.12	95	1,900	5.80	0.58	230	3,800	5.80	0.58	210	3,200	5.8	1.16	410	4,500	
5.9	15	5.90	0.12	95	1,900	5.90	0.59	230	3,800	5.90	0.59	210	3,200	5.9	1.18	410	4,500	
6	10	6.00	0.12	100	1,600	6.00	0.60	260	3,200	6.00	0.60	240	2,700	6	1.2	410	3,700	
	15	6.00	0.12	100	1,600	6.00	0.60	260	3,200	6.00	0.60	240	2,700	6	1.2	410	3,700	
	24	6.00	0.12	100	1,600	6.00	0.60	260	3,200	6.00	0.60	240	2,700	6	1.2	410	3,700	
6.5	20	6.50	0.13	100	1,600	6.50	0.98	260	3,200	6.50	0.98	240	2,700	6.5	1.3	410	3,700	
	17	6.50	0.13	100	1,600	6.50	0.98	260	3,200	6.50	0.98	240	2,700	6.5	1.3	410	3,700	
7	18	7.00	0.14	100	1,600	7.00	1.05	260	3,200	7.00	1.05	240	2,700	7	1.4	410	3,700	
7.5	20	7.50	0.15	100	1,600	7.50	1.13	260	3,200	7.50	1.13	240	2,700	7.5	1.5	410	3,700	
8	20	8.00	0.16	100	1,200	8.00	1.20	240	2,400	8.00	1.20	220	2,000	12	1.6	360	2,800	
	32	8.00	0.16	100	1,200	8.00	1.20	240	2,400	8.00	1.20	220	2,000	12	1.6	360	2,800	
8.5	23	8.50	0.17	100	1,200	8.50	1.28	240	2,400	8.50	1.28	220	2,000	12.75	1.7	360	2,800	
9	23	9.00	0.18	100	1,200	9.00	1.35	240	2,400	9.00	1.35	220	2,000	13.5	1.8	360	2,800	
9.5	25	9.50	0.19	100	1,200	9.50	1.43	240	2,400	9.50	1.43	220	2,000	14.25	1.9	360	2,800	
10	25	10.00	0.20	100	1,000	10.00	1.50	230	1,900	10.00	1.50	210	1,600	15	2	330	2,200	
	40	10.00	0.20	100	1,000	10.00	1.50	200	1,700	10.00	1.50	200	1,400	15	2	300	2,000	
10.5	28	10.50	0.21	100	1,000	10.50	1.58	230	1,700	10.50	1.58	210	1,600	15.75	2.1	330	2,200	
11	28	11.00	0.22	100	1,000	11.00	1.65	230	1,700	11.00	1.65	210	1,600	16.5	2.2	330	2,200	
11.5	30	11.50	0.23	100	1,000	11.50	1.73	230	1,700	11.50	1.73	210	1,600	17.25	2.3	330	2,200	

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 ●절입량은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●R p 축 방향, ∅e 안장 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●공구 미스트 플런저, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	12	30	12.00	0.24	100	800	18.00	1.80	250	1,600	18.00	1.80	200	1,400	18.00	1.80	180	1,200
		48	12.00	0.24	100	800	18.00	1.80	200	1,400	18.00	1.80	180	1,200	18	2.4	300	1,700
	14	28	14.00	0.28	100	700	21.00	2.10	250	1,400	21.00	2.10	220	1,300	21	2.8	300	1,800
		16	48	16.00	0.32	100	600	24.00	2.40	200	1,200	24.00	2.40	180	1,100	24	3.2	300
	18	54	18.00	0.36	100	500	27.00	2.70	200	1,100	27.00	2.70	200	1,000	27	3.6	250	1,600
		20	60	20.00	0.40	100	400	30.00	3.00	180	900	30.00	3.00	150	800	30	4	250

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 ●R p 축 방향, ∅e 안장 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●공구 미스트 플런저, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
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# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IAS230  
Model number:IAS230

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.1	0.15	0.1	0.02	60	50,000	0.1	0.02	60	50,000	0.005	0.005	15	50,000
			0.15	0.03	60	50,000	0.15	0.03	60	50,000	0.008	0.008	15	50,000
	0.2	0.4	0.2	0.04	90	50,000	0.2	0.04	90	50,000	0.01	0.01	20	48,000
			0.25	0.05	90	50,000	0.25	0.05	90	50,000	0.01	0.01	20	48,000
	0.3	0.3	0.3	0.06	150	50,000	0.3	0.06	150	50,000	0.02	0.02	20	32,000
			0.6	0.06	150	50,000	0.3	0.06	150	50,000	0.02	0.02	20	32,000
	0.35	0.7	0.35	0.07	150	50,000	0.35	0.07	150	50,000	0.02	0.02	20	32,000
			0.4	0.08	200	50,000	0.4	0.08	200	50,000	0.04	0.01	50	24,000
	0.4	0.8	0.4	0.08	200	50,000	0.4	0.08	200	50,000	0.04	0.01	50	24,000
			0.45	0.09	200	50,000	0.45	0.09	200	50,000	0.045	0.01	50	24,000
	0.5	0.8	0.5	0.1	220	45,000	0.5	0.1	220	45,000	0.50	0.01	60	20,000
			1.25	0.1	220	45,000	0.5	0.1	220	45,000	0.50	0.01	60	20,000
	0.55	1.3	0.55	0.11	220	45,000	0.55	0.11	220	45,000	0.55	0.01	60	20,000
			2	0.1	220	45,000	0.5	0.1	220	45,000	0.50	0.01	60	20,000
	0.6	1.5	0.6	0.12	220	45,000	0.6	0.12	220	45,000	0.60	0.01	60	20,000
			2.4	0.12	220	45,000	0.6	0.12	220	45,000	0.60	0.01	60	20,000
	0.65	1.5	0.65	0.13	220	45,000	0.65	0.13	220	45,000	0.65	0.01	60	20,000
			0.7	0.14	220	45,000	0.7	0.14	220	45,000	0.70	0.01	60	20,000
	0.75	1.8	0.75	0.15	220	45,000	0.75	0.15	220	45,000	0.75	0.02	60	20,000
			1.2	0.16	250	28,000	0.8	0.16	250	28,000	0.80	0.02	70	12,000
0.8	2	0.8	0.16	250	28,000	0.8	0.16	250	28,000	0.80	0.02	70	12,000	
		3.2	0.16	250	28,000	0.8	0.16	250	28,000	0.80	0.02	70	12,000	
0.85	2	0.85	0.17	250	28,000	0.85	0.17	250	28,000	0.85	0.02	70	12,000	
		0.9	0.18	250	28,000	0.9	0.18	250	28,000	0.90	0.02	70	12,000	
0.95	2	0.95	0.19	250	28,000	0.95	0.19	250	28,000	0.95	0.02	70	12,000	
		1.5	0.2	270	23,000	1	0.2	270	23,000	1.00	0.02	60	8,500	
1	2.5	1	0.2	270	23,000	1	0.2	270	23,000	1.00	0.02	60	8,500	
		4	0.2	270	23,000	1	0.2	270	23,000	1.00	0.02	60	8,500	
1.05	2.5	1.05	0.21	270	23,000	1.05	0.21	270	23,000	1.05	0.02	60	8,500	
		1.1	0.22	270	23,000	1.1	0.22	270	23,000	1.10	0.02	60	8,500	
1.15	2.5	1.15	0.23	270	23,000	1.15	0.23	270	23,000	1.15	0.02	60	8,500	
		1.2	0.24	270	23,000	1.2	0.24	270	23,000	1.20	0.02	60	8,500	
1.25	3	1.25	0.25	270	23,000	1.25	0.25	270	23,000	1.25	0.03	60	8,500	
		1.3	0.26	270	23,000	1.3	0.26	270	23,000	1.30	0.03	60	8,500	
1.35	3	1.35	0.27	270	23,000	1.35	0.27	270	23,000	1.35	0.03	60	8,500	
		1.4	0.28	270	23,000	1.4	0.28	270	23,000	1.40	0.03	60	8,500	
1.45	3.5	1.45	0.29	270	23,000	1.45	0.29	270	23,000	1.45	0.03	60	8,500	
		2	0.3	300	23,000	1.5	0.3	300	23,000	1.50	0.03	60	6,000	
1.5	4	1.5	0.3	300	23,000	1.5	0.3	300	23,000	1.50	0.03	60	6,000	
		6	0.3	300	23,000	1.5	0.3	300	23,000	1.50	0.03	60	6,000	
1.55	4	1.55	0.31	300	23,000	1.55	0.31	300	23,000	1.55	0.03	60	6,000	

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스퀘어 엔드밀 Square End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	1.6	4	1.6	0.32	300	23,000	1.6	0.32	300	23,000	1.60	0.03	60	6,000
			1.65	0.33	300	23,000	1.65	0.33	300	23,000	1.65	0.03	60	6,000
	1.7	4.5	1.7	0.34	300	23,000	1.7	0.34	300	23,000	1.70	0.03	60	6,000
			1.75	0.35	300	23,000	1.75	0.35	300	23,000	1.75	0.04	60	6,000
	1.8	4.5	1.8	0.36	300	23,000	1.8	0.36	300	23,000	1.80	0.04	60	6,000
			1.85	0.37	300	23,000	1.85	0.37	300	23,000	1.85	0.04	60	6,000
	1.9	5	1.9	0.38	300	23,000	1.9	0.38	300	23,000	1.90	0.04	60	6,000
			1.95	0.39	300	23,000	1.95	0.39	300	23,000	1.95	0.04	60	6,000
	2	3	2	0.4	330	12,000	2	0.4	330	12,000	2.00	0.04	60	3,200
			5	0.4	330	12,000	2	0.4	330	12,000	2.00	0.04	60	3,200
	2	8	2	0.4	330	12,000	2	0.4	330	12,000	2.00	0.04	60	3,200
			2.05	0.41	330	12,000	2.05	0.41	330	12,000	2.05	0.04	60	3,200
	2.1	5.5	2.1	0.42	330	12,000	2.1	0.42	330	12,000	2.10	0.04	60	3,200
			2.15	0.43	330	12,000	2.15	0.43	330	12,000	2.15	0.04	60	3,200
	2.2	5.5	2.2	0.44	330	12,000	2.2	0.44	330	12,000	2.20	0.04	60	3,200
			2.25	0.45	330	12,000	2.25	0.45	330	12,000	2.25	0.05	60	3,200
	2.3	6	2.3	0.46	330	12,000	2.3	0.46	330	12,000	2.30	0.05	60	3,200
			2.35	0.47	330	12,000	2.35	0.47	330	12,000	2.35	0.05	60	3,200
	2.4	6	2.4	0.48	330	12,000	2.4	0.48	330	12,000	2.40	0.05	60	3,200
			2.45	0.49	330	12,000	2.45	0.49	330	12,000	2.45	0.05	60	3,200
2.5	7	2.5	0.5	360	8,900	2.5	0.5	360	8,900	2.50	0.05	60	2,500	
		10	0.5	360	8,900	2.5	0.5	360	8,900	2.50	0.05	60	2,500	
2.55	7	2.55	0.51	360	8,900	2.55	0.51	360	8,900	2.55	0.05	60	2,500	
		2.6	0.52	360	8,900	2.6	0.52	360	8,900	2.60	0.05	60	2,500	
2.65	7	2.65	0.53	360	8,900	2.65	0.53	360	8,900	2.65	0.05	60	2,500	
		2.7	0.54	360	8,900	2.7	0.54	360	8,900	2.70	0.05	60	2,500	
2.75	7	2.75	0.55	360	8,900	2.75	0.55	360	8,900	2.75	0.06	60	2,500	
		2.8	0.56	360	8,900	2.8	0.56	360	8,900	2.80	0.06	60	2,500	
2.85	8	2.85	0.57	360	8,900	2.85	0.57	360	8,900	2.85	0.06	60	2,500	
		2.9	0.58	360	8,900	2.9	0.58	360	8,900	2.90	0.06	60	2,500	
2.95	8	2.95	0.59	360	8,900	2.95	0.59	360	8,900	2.95	0.06	60	2,500	
		3	0.6	370	7,500	3	0.6	370	7,500	3.00	0.06	70	2,200	
3	8	3	0.6	370	7,500	3	0.6	370	7,500	3.00	0.06	70	2,200	
		12	0.6	370	7,500	3	0.6	370	7,500	3.00	0.06	70	2,200	
3.1	8	3.1	0.62	370	7,500	3.1	0.62	370	7,500	3.10	0.06	70	2,200	
		3.2	0.64	370	7,500	3.2	0.64	370	7,500	3.20	0.06	70	2,200	
3.3	9	3.3	0.66	370	7,500	3.3	0.66	370	7,500	3.30	0.07	70	2,200	
		3.4	0.68	370	7,500	3.4	0.68	370	7,500	3.40	0.07	70	2,200	
3.5	9	3.5	0.7	370	7,500	3.5	0.7	370	7,500	3.50	0.07	70	2,200	
		3.6	0.72	370	7,500	3.6	0.72	370	7,500	3.60	0.07	70	2,200	
3.7	10	3.7	0.74	370	7,500	3.7	0.74	370	7,500	3.70	0.07	70	2,200	
		3.8	0.76	370	7,500	3.8	0.76	370	7,500	3.80	0.08	70	2,200	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 쿨런트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IAS230  
Model number:IAS230

## 스퀘어 엔드밀 Square End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	3.9	10	3.9	0.78	370	7,500	3.9	0.78	370	7,500	3.90	0.08	70	2,200
		6	4	0.8	390	5,600	4	0.8	390	5,600	4.00	0.08	80	1,600
	4	10	4	0.8	390	5,600	4	0.8	390	5,600	4.00	0.08	80	1,600
		16	4	0.8	390	5,600	4	0.8	390	5,600	4.00	0.08	80	1,600
	4.1	11	4.1	0.82	390	5,600	4.1	0.82	390	5,600	4.10	0.08	80	1,600
	4.2	11	4.2	0.84	390	5,600	4.2	0.84	390	5,600	4.20	0.08	80	1,600
	4.3	11	4.3	0.86	390	5,600	4.3	0.86	390	5,600	4.30	0.09	80	1,600
	4.4	11	4.4	0.88	390	5,600	4.4	0.88	390	5,600	4.40	0.09	80	1,600
	4.5	12	4.5	0.9	390	5,600	4.5	0.9	390	5,600	4.50	0.09	80	1,600
	4.6	12	4.6	0.92	390	5,600	4.6	0.92	390	5,600	4.60	0.09	80	1,600
	4.7	12	4.7	0.94	390	5,600	4.7	0.94	390	5,600	4.70	0.09	80	1,600
	4.8	12	4.8	0.96	390	5,600	4.8	0.96	390	5,600	4.80	0.10	80	1,600
	4.9	13	4.9	0.98	390	5,600	4.9	0.98	390	5,600	4.90	0.10	80	1,600
	5	8	5	1	410	4,500	5	1	410	4,500	5.00	0.10	80	1,300
		13	5	1	410	4,500	5	1	410	4,500	5.00	0.10	80	1,300
		20	5	1	410	4,500	5	1	410	4,500	5.00	0.10	80	1,300
	5.1	13	5.1	1.02	410	4,500	5.1	1.02	410	4,500	5.10	0.10	80	1,300
	5.2	13	5.2	1.04	410	4,500	5.2	1.04	410	4,500	5.20	0.10	80	1,300
	5.3	14	5.3	1.06	410	4,500	5.3	1.06	410	4,500	5.30	0.11	80	1,300
	5.4	14	5.4	1.08	410	4,500	5.4	1.08	410	4,500	5.40	0.11	80	1,300
5.5	14	5.5	1.1	410	4,500	5.5	1.1	410	4,500	5.50	0.11	80	1,300	
5.6	14	5.6	1.12	410	4,500	5.6	1.12	410	4,500	5.60	0.11	80	1,300	
5.7	15	5.7	1.14	410	4,500	5.7	1.14	410	4,500	5.70	0.11	80	1,300	
5.8	15	5.8	1.16	410	4,500	5.8	1.16	410	4,500	5.80	0.12	80	1,300	
5.9	15	5.9	1.18	410	4,500	5.9	1.18	410	4,500	5.90	0.12	80	1,200	
6	10	6	1.2	410	3,700	6	1.2	410	3,700	6.00	0.12	80	1,200	
	15	6	1.2	410	3,700	6	1.2	410	3,700	6.00	0.12	80	1,200	
	24	6	1.2	410	3,700	6	1.2	410	3,700	6.00	0.12	80	1,200	
6.5	20	6.5	1.3	410	3,700	6.5	1.3	410	3,700	6.50	0.13	80	1,200	
	17	6.5	1.3	410	3,700	6.5	1.3	410	3,700	6.50	0.13	80	1,200	
7	18	7	1.4	410	3,700	7	1.4	410	3,700	7.00	0.14	80	1,200	
7.5	20	7.5	1.5	410	3,700	7.5	1.5	410	3,700	7.50	0.15	80	1,200	
8	20	12	1.6	360	2,800	12	1.6	360	2,800	8.00	0.16	80	1,000	
	32	12	1.6	360	2,800	12	1.6	360	2,800	8.00	0.16	80	1,000	
8.5	23	12.75	1.7	360	2,800	12.75	1.7	360	2,800	8.50	0.17	80	1,000	
9	23	13.5	1.8	360	2,800	13.5	1.8	360	2,800	9.00	0.18	80	1,000	
9.5	25	14.25	1.9	360	2,800	14.25	1.9	360	2,800	9.50	0.19	80	1,000	
	25	15	2	330	2,200	15	2	330	2,200	10.00	0.20	80	900	
10	40	15	2	300	2,000	15	2	300	2,000	10.00	0.20	80	900	
	28	15.75	2.1	330	2,200	15.75	2.1	330	2,200	10.50	0.21	80	900	
11	28	16.5	2.2	330	2,200	16.5	2.2	330	2,200	11.00	0.22	80	900	
11.5	30	17.25	2.3	330	2,200	17.25	2.3	330	2,200	11.50	0.23	80	900	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 콜린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

## 스퀘어 엔드밀 Square End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	12	30	18	2.4	320	1,900	18	2.4	320	1,900	12.00	0.24	80	800
		48	18	2.4	300	1,700	18	2.4	300	1,700	12.00	0.24	80	800
	14	28	21	2.8	300	1,800	21	2.8	300	1,800	14.00	0.28	100	700
	16	48	24	3.2	300	1,700	24	3.2	300	1,700	16.00	0.32	100	600
	18	54	27	3.6	250	1,600	27	3.6	250	1,600	18.00	0.36	100	500
	20	60	30	4	250	1,500	30	4	250	1,500	20.00	0.40	100	400

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 콜린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

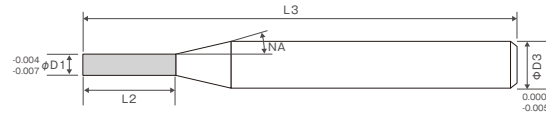
# ion Depo Type A Series

# ion Depo Type A Series

초경 스퀘어 엔드밀 Carbide Square End Mill

■형번:IAS430 Model number:IAS430

ion A super MG 날수 4 헬릭스각 30° 목각 15° Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) <sup>o</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAS430-0100-00250	1	2.5	15	4	50	3,920
IAS430-0100-00400		4	15	4	50	6,800
IAS430-0150-00400	1.5	4	15	4	50	3,920
IAS430-0150-00600		6	15	4	50	6,800
IAS430-0200-00500	2	5	15	4	50	2,400
IAS430-0200-00800		8	15	4	50	4,800
IAS430-0250-00700	2.5	7	15	4	50	2,400
IAS430-0250-01000		10	15	4	50	4,800
IAS430-0300-00800	3	8	15	4	50	2,480
IAS430-0300-01200		12	15	4	50	5,040
IAS430-0350-00900	3.5	9	15	6	50	5,200
IAS430-0400-01000	4	10	15	6	50	2,800
IAS430-0400-01600		16	15	6	50	5,360
IAS430-0450-01200	4.5	12	15	6	50	5,600
IAS430-0500-01300	5	13	15	6	50	2,880
IAS430-0500-02000		20	15	6	60	5,520
IAS430-0550-01400	5.5	14	15	6	50	6,000
IAS430-0600-01500	6	15	—	6	50	3,040
IAS430-0600-02400		24	—	6	60	5,840
IAS430-0650-01700	6.5	17	15	8	70	10,240
IAS430-0700-01800	7	18	15	8	70	8,560
IAS430-0750-01900	7.5	19	15	8	70	10,800
IAS430-0800-02000	8	20	—	8	70	6,160
IAS430-0800-03200		32	—	8	80	11,920
IAS430-0850-02200	8.5	22	15	10	80	13,440
IAS430-0900-02300	9	23	15	10	80	13,440
IAS430-0950-02400	9.5	24	15	10	80	15,520
IAS430-1000-02500	10	25	—	10	80	8,240
IAS430-1000-04000		40	—	10	90	14,640
IAS430-1200-03000	12	30	—	12	110	11,280

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) <sup>o</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAS430-1200-04800	12	48	—	12	120	22,000
IAS430-1400-02600	14	26	—	14	110	11,760
IAS430-1600-03200	16	32	—	16	120	18,080
IAS430-1800-03200	18	32	—	18	120	21,040
IAS430-2000-03800	20	38	—	20	130	26,400



# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IAS430  
Model number: IAS430

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			ap mm	ae mm			mm/min	min <sup>-1</sup>			ap mm	ae mm			mm/min	min <sup>-1</sup>		
4	1	2.5	1.50	0.05	330	21,000	1.50	0.05	330	21,000	1.50	0.05	150	15,000	1.50	0.05	210	19,500
		4	1.50	0.05	300	21,000	1.50	0.05	300	21,000	1.50	0.05	150	15,000	1.50	0.05	210	19,500
	1.5	4	2.25	0.08	330	21,000	2.25	0.08	330	21,000	2.25	0.08	150	15,000	2.25	0.08	210	19,500
		6	2.25	0.08	300	21,000	2.25	0.08	300	21,000	2.25	0.08	150	15,000	2.25	0.08	210	19,500
	2	5	3.00	0.10	330	11,000	3.00	0.10	330	11,000	3.00	0.10	160	7,500	3.00	0.10	270	9,600
		8	3.00	0.10	300	11,000	3.00	0.10	300	11,000	3.00	0.10	160	7,500	3.00	0.10	270	9,600
	2.5	7	3.75	0.13	330	11,000	3.75	0.13	330	11,000	3.75	0.13	160	7,500	3.75	0.13	270	9,600
		10	3.75	0.13	300	11,000	3.75	0.13	300	11,000	3.75	0.13	160	7,500	3.75	0.13	270	9,600
	3	8	4.50	0.30	450	7,000	4.50	0.30	450	7,000	4.50	0.30	180	5,000	4.50	0.30	320	6,500
		12	4.50	0.30	400	7,000	4.50	0.30	400	7,000	4.50	0.30	180	5,000	4.50	0.30	320	6,500
	3.5	9	5.25	0.35	450	7,000	5.25	0.35	450	7,000	5.25	0.35	180	5,000	5.25	0.35	320	6,500
	4	10	6.00	0.40	500	5,200	6.00	0.40	500	5,200	6.00	0.40	180	3,600	6.00	0.40	380	5,000
		16	6.00	0.40	500	5,200	6.00	0.40	500	5,200	6.00	0.40	180	3,600	6.00	0.40	380	5,000
	4.5	12	6.75	0.45	500	5,200	6.75	0.45	500	5,200	6.75	0.45	180	3,600	6.75	0.45	380	5,000
	5	13	7.50	0.50	520	4,200	7.50	0.50	520	4,200	7.50	0.50	200	3,000	7.50	0.50	380	4,000
		20	7.50	0.50	520	4,200	7.50	0.50	520	4,200	7.50	0.50	200	3,000	7.50	0.50	380	4,000
	5.5	14	8.25	0.55	520	4,200	8.25	0.55	520	4,200	8.25	0.55	200	3,000	8.25	0.55	380	4,000
	6	15	9.00	0.60	540	3,500	9.00	0.60	540	3,500	9.00	0.60	200	2,500	9.00	0.60	380	3,200
		24	9.00	0.60	540	3,500	9.00	0.60	540	3,500	9.00	0.60	200	2,500	9.00	0.60	380	3,200
	6.5	17	9.75	0.65	540	3,500	9.75	0.65	540	3,500	9.75	0.65	200	2,500	9.75	0.65	380	3,200
7	18	10.50	1.05	530	3,000	10.50	1.05	530	3,000	10.50	1.05	200	2,000	10.50	1.05	380	2,700	
7.5	19	11.25	1.13	530	3,000	11.25	1.13	530	3,000	11.25	1.13	200	2,000	11.25	1.13	380	2,700	
8	20	12.00	1.20	520	2,700	12.00	1.20	520	2,700	12.00	1.20	200	1,800	12.00	1.20	380	2,400	
	32	12.00	1.20	520	2,700	12.00	1.20	520	2,700	12.00	1.20	200	1,800	12.00	1.20	380	2,400	
8.5	22	12.75	1.28	520	2,700	12.75	1.28	520	2,700	12.75	1.28	200	1,800	12.75	1.28	380	2,400	
9	23	13.50	1.35	480	2,300	13.50	1.35	480	2,300	13.50	1.35	200	1,600	13.50	1.35	380	2,100	
9.5	24	14.25	1.43	480	2,300	14.25	1.43	480	2,300	14.25	1.43	200	1,600	14.25	1.43	380	2,100	
10	25	15.00	1.50	470	2,100	15.00	1.50	470	2,100	15.00	1.50	200	1,500	15.00	1.50	380	1,900	
	40	15.00	1.50	470	2,000	15.00	1.50	470	2,000	15.00	1.50	200	1,400	15.00	1.50	380	1,800	
12	30	18.00	1.80	440	1,700	18.00	1.80	440	1,700	18.00	1.80	200	1,200	18.00	1.80	380	1,600	
	48	18.00	1.80	400	1,600	18.00	1.80	400	1,600	18.00	1.80	180	1,200	18.00	1.80	350	1,500	
14	26	21.00	2.10	430	1,500	21.00	2.10	430	1,500	21.00	2.10	180	1,000	21.00	2.10	350	1,400	
16	32	24.00	2.40	420	1,300	24.00	2.40	420	1,300	24.00	2.40	160	900	24.00	2.40	330	1,200	
18	32	27.00	2.70	400	1,200	27.00	2.70	400	1,200	27.00	2.70	160	800	27.00	2.70	330	1,100	
20	38	30.00	3.00	350	1,000	30.00	3.00	350	1,000	30.00	3.00	150	700	30.00	3.00	300	900	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입량은, 장삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●ap, ae 방향, ae 반경 방향. ap=Axial Depth of Cut ae=Radial Depth of Cut.  
 ●오일 미스트 콜린트, 또는 물용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			ap mm	ae mm			mm/min	min <sup>-1</sup>			ap mm	ae mm			mm/min	min <sup>-1</sup>		
4	1	2.5	1.50	0.05	160	9,600	1.50	0.05	210	19,500	1.50	0.05	150	15,000	1.50	0.05	410	22,500
		4	1.50	0.05	160	9,600	1.50	0.05	210	19,500	1.50	0.05	150	15,000	1.50	0.05	410	22,500
	1.5	4	2.25	0.08	160	9,600	2.25	0.08	210	19,500	2.25	0.08	150	15,000	2.25	0.08	450	15,000
		6	2.25	0.08	160	9,600	2.25	0.08	210	19,500	2.25	0.08	150	15,000	2.25	0.08	450	15,000
	2	5	3.00	0.10	180	5,000	3.00	0.10	270	9,600	3.00	0.10	160	7,500	3.00	0.10	500	12,000
		8	3.00	0.10	180	5,000	3.00	0.10	270	9,600	3.00	0.10	160	7,500	3.00	0.10	500	12,000
	2.5	7	3.75	0.13	180	5,000	3.75	0.13	270	9,600	3.75	0.13	160	7,500	3.75	0.13	540	9,000
		10	3.75	0.13	180	5,000	3.75	0.13	270	9,600	3.75	0.13	160	7,500	3.75	0.13	540	9,000
	3	8	4.50	0.30	210	3,200	4.50	0.30	320	6,500	4.50	0.30	180	5,000	4.50	0.30	550	7,500
		12	4.50	0.30	210	3,200	4.50	0.30	320	6,500	4.50	0.30	180	5,000	4.50	0.30	550	7,500
	3.5	9	5.25	0.35	210	3,200	5.25	0.35	320	6,500	5.25	0.35	180	5,000	5.25	0.35	570	6,500
	4	10	6.00	0.40	230	2,400	6.00	0.40	380	5,000	6.00	0.40	180	3,600	6.00	0.40	650	6,500
		16	6.00	0.40	230	2,400	6.00	0.40	380	5,000	6.00	0.40	180	3,600	6.00	0.40	650	6,500
	4.5	12	6.75	0.45	230	2,400	6.75	0.45	380	5,000	6.75	0.45	180	3,600	6.75	0.45	680	5,600
	5	13	7.50	0.50	250	2,000	7.50	0.50	380	4,000	7.50	0.50	200	3,000	7.50	0.50	700	5,000
		20	7.50	0.50	250	2,000	7.50	0.50	380	4,000	7.50	0.50	200	3,000	7.50	0.50	700	5,000
	5.5	14	8.25	0.55	250	2,000	8.25	0.55	380	4,000	8.25	0.55	200	3,000	8.25	0.55	700	4,500
	6	15	9.00	0.60	250	1,600	9.00	0.60	380	3,200	9.00	0.60	200	2,500	9.00	0.60	700	4,100
		24	9.00	0.60	250	1,600	9.00	0.60	380	3,200	9.00	0.60	200	2,500	9.00	0.60	700	4,100
	6.5	17	9.75	0.65	250	1,600	9.75	0.65	380	3,200	9.75	0.65	200	2,500	9.75	0.65	700	4,100
7	18	10.50	1.05	250	1,500	10.50	1.05	380	2,700	10.50	1.05	200	2,000	10.50	1.05	700	4,100	
7.5	19	11.25	1.13	250	1,500	11.25	1.13	380	2,700	11.25	1.13	200	2,000	11.25	1.13	700	3,700	
8	20	12.00	1.20	250	1,200	12.00	1.20	380	2,400	12.00	1.20	200	1,800	12.00	1.20	700	2,800	
	32	12.00	1.20	250	1,200	12.00	1.20	380	2,400	12.00	1.20	200	1,800	12.00	1.20	700	2,800	
8.5	22	12.75	1.28	250	1,200	12.75	1											



## ion Depo Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번:IAS430  
Model number:IAS430

### 스퀘어 엔드밀 Square End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
4	1	2.5	1.50	0.05	410	22,500	1.50	0.05	410	22,500	1.00	0.05	100	6,500
		4	1.50	0.05	410	22,500	1.50	0.05	410	22,500	1.00	0.05	100	6,500
	1.5	4	2.25	0.08	450	15,000	2.25	0.08	450	15,000	1.50	0.08	100	6,500
		6	2.25	0.08	450	15,000	2.25	0.08	450	15,000	1.50	0.08	100	6,500
	2	5	3.00	0.10	500	12,000	3.00	0.10	500	12,000	2.00	0.10	100	3,200
		8	3.00	0.10	500	12,000	3.00	0.10	500	12,000	2.00	0.10	100	3,200
	2.5	7	3.75	0.13	540	9,000	3.75	0.13	540	9,000	3.75	0.13	100	2,500
		10	3.75	0.13	540	9,000	3.75	0.13	540	9,000	3.75	0.13	100	2,500
	3	8	4.50	0.30	550	7,500	4.50	0.30	550	7,500	4.50	0.30	130	2,100
		12	4.50	0.30	550	7,500	4.50	0.30	550	7,500	4.50	0.30	130	2,100
	3.5	9	5.25	0.35	570	6,500	5.25	0.35	570	6,500	5.25	0.35	130	2,100
	4	10	6.00	0.40	650	6,500	6.00	0.40	650	6,500	6.00	0.40	130	1,600
		16	6.00	0.40	650	5,600	6.00	0.40	650	5,600	6.00	0.40	130	1,600
	4.5	12	6.75	0.45	680	5,600	6.75	0.45	680	5,600	6.75	0.45	130	1,600
	5	13	7.50	0.50	700	5,000	7.50	0.50	700	5,000	7.50	0.50	150	1,300
		20	7.50	0.50	700	5,000	7.50	0.50	700	5,000	7.50	0.50	150	1,300
	5.5	14	8.25	0.55	700	4,500	8.25	0.55	700	4,500	8.25	0.55	150	1,300
	6	15	9.00	0.60	700	4,100	9.00	0.60	700	4,100	9.00	0.60	150	1,100
		24	9.00	0.60	700	4,100	9.00	0.60	700	4,100	9.00	0.60	150	1,100
	6.5	17	9.75	0.65	700	4,100	9.75	0.65	700	4,100	9.75	0.65	150	1,100
7	18	10.50	1.05	700	4,100	10.50	1.05	700	4,100	10.50	1.05	150	1,100	
7.5	19	11.25	1.13	700	3,700	11.25	1.13	700	3,700	11.25	1.13	150	1,100	
8	20	12.00	1.20	700	2,800	12.00	1.20	700	2,800	12.00	1.20	150	800	
	32	12.00	1.20	700	2,800	12.00	1.20	700	2,800	12.00	1.20	150	800	
8.5	22	12.75	1.28	700	2,800	12.75	1.28	700	2,800	12.75	1.28	150	800	
9	23	13.50	1.35	700	2,800	13.50	1.35	700	2,800	13.50	1.35	150	800	
9.5	24	14.25	1.43	700	2,800	14.25	1.43	700	2,800	14.25	1.43	150	800	
10	25	15.00	1.50	620	2,200	15.00	1.50	620	2,200	15.00	1.50	150	600	
	40	15.00	1.50	550	2,000	15.00	1.50	550	2,000	15.00	1.50	120	500	
12	30	18.00	1.80	540	1,900	18.00	1.80	540	1,900	18.00	1.80	150	500	
	48	18.00	1.80	500	1,800	18.00	1.80	500	1,800	18.00	1.80	120	400	
14	26	21.00	2.10	400	1,800	21.00	2.10	400	1,800	21.00	2.10	130	500	
16	32	24.00	2.40	350	1,600	24.00	2.40	350	1,600	24.00	2.40	130	400	
18	32	27.00	2.70	350	1,400	27.00	2.70	350	1,400	27.00	2.70	130	400	
20	38	30.00	3.00	300	1,200	30.00	3.00	300	1,200	30.00	3.00	120	300	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

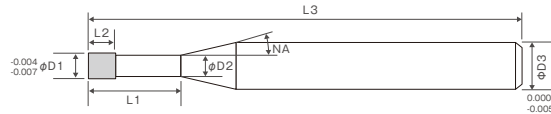
CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series

# ion Depo Type A Series

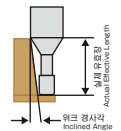
초경 롱 넥 스퀘어 엔드밀  
Carbide Long Neck Square End Mill

■형번:IALS230 Model number:IALS230

ion A super MG 날수 2 벨리스각 30° 목각 15° Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

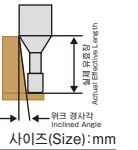


사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
IALS230-0010-0030	0.1	0.3	0.15	0.08	15	4	50	7,440	0.35	0.36	0.37	0.39	0.42
IALS230-0010-0050		0.5	0.15	0.08	15	4	50	8,160	0.56	0.57	0.60	0.62	0.67
IALS230-0010-0100		1	0.15	0.08	15	4	50	10,160	1.07	1.11	1.15	1.19	1.29
IALS230-0015-0030	0.15	0.3	0.2	0.13	15	4	50	6,960	0.35	0.36	0.37	0.39	0.42
IALS230-0015-0050		0.5	0.2	0.13	15	4	50	7,600	0.56	0.57	0.60	0.62	0.67
IALS230-0020-0050	0.2	0.5	0.3	0.18	15	4	50	4,880	0.56	0.57	0.60	0.62	0.67
IALS230-0020-0075		0.75	0.3	0.18	15	4	50	4,880	0.81	0.84	0.87	0.91	0.98
IALS230-0020-0100		1	0.3	0.18	15	4	50	5,280	1.07	1.11	1.15	1.19	1.29
IALS230-0030-0080	0.3	0.8	0.3	0.27	15	4	50	4,320	0.88	0.92	0.95	0.98	1.06
IALS230-0030-0100		1	0.4	0.27	15	4	50	4,320	1.09	1.13	1.17	1.21	1.31
IALS230-0030-0150-00030		1.5	0.3	0.27	15	4	50	4,320	1.61	1.66	1.72	1.79	1.93
IALS230-0030-0150-00040	0.3	1.5	0.4	0.27	15	4	50	4,320	1.61	1.66	1.72	1.79	1.93
IALS230-0030-0200		2	0.4	0.27	15	4	50	5,280	2.13	2.20	2.28	2.36	2.56
IALS230-0030-0250		2.5	0.4	0.27	15	4	50	5,520	2.64	2.73	2.83	2.94	3.18
IALS230-0030-0300	3	0.4	0.27	15	4	50	5,520	3.16	3.27	3.39	3.51	3.80	
IALS230-0040-0100	0.4	1	0.6	0.37	15	4	50	3,120	1.09	1.13	1.17	1.21	1.31
IALS230-0040-0120		1.2	0.4	0.37	15	4	50	3,120	1.30	1.34	1.39	1.44	1.56
IALS230-0040-0150		1.5	0.6	0.37	15	4	50	3,120	1.61	1.66	1.72	1.79	1.93
IALS230-0040-0200	0.4	2	0.6	0.37	15	4	50	3,120	2.13	2.20	2.28	2.36	2.56
IALS230-0040-0250-00040		2.5	0.4	0.37	15	4	50	3,120	2.64	2.73	2.83	2.94	3.18
IALS230-0040-0250-00060		2.5	0.6	0.37	15	4	50	3,120	2.64	2.73	2.83	2.94	3.18
IALS230-0040-0300	3	0.6	0.37	15	4	50	3,120	3.16	3.27	3.39	3.51	3.80	
IALS230-0050-0100	0.5	1	0.7	0.47	15	4	50	2,240	1.09	1.13	1.17	1.21	1.31
IALS230-0050-0150-00050		1.5	0.5	0.47	15	4	50	2,240	1.61	1.66	1.72	1.79	1.93
IALS230-0050-0150-00070		1.5	0.7	0.47	15	4	50	2,240	1.61	1.66	1.72	1.79	1.93
IALS230-0050-0200	0.5	2	0.7	0.47	15	4	50	2,240	2.13	2.20	2.28	2.36	2.56
IALS230-0050-0250		2.5	0.7	0.47	15	4	50	2,240	2.64	2.73	2.83	2.94	3.18
IALS230-0050-0300-00050		3	0.5	0.47	15	4	50	2,240	3.16	3.27	3.39	3.51	3.80
IALS230-0050-0300-00070	3	0.7	0.47	15	4	50	2,240	3.16	3.27	3.39	3.51	3.80	
IALS230-0050-0350	3.5	0.7	0.47	15	4	50	2,240	3.68	3.80	3.94	4.09	4.42	

# ion Depo Type A Series



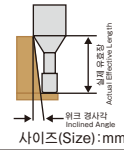
사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
IALS230-0050-0400	0.5	4	0.7	0.47	15	4	50	2,240	4.19	4.34	4.50	4.66	5.04
IALS230-0060-0150	0.6	1.5	0.9	0.57	15	4	50	2,400	1.61	1.66	1.72	1.79	1.93
IALS230-0060-0180		1.8	0.6	0.57	15	4	50	2,400	1.92	1.99	2.06	2.13	2.31
IALS230-0060-0200		2	0.9	0.57	15	4	50	2,400	2.13	2.20	2.28	2.36	2.56
IALS230-0060-0300		3	0.9	0.57	15	4	50	2,400	3.16	3.27	3.39	3.51	3.80
IALS230-0060-0400		4	0.9	0.57	15	4	50	2,400	4.19	4.34	4.50	4.66	5.04
IALS230-0060-0500		5	0.6	0.57	15	4	50	2,400	5.23	5.41	5.60	5.81	6.29
IALS230-0060-0600		6	0.9	0.57	15	4	50	2,400	6.26	6.48	6.71	6.96	7.53
IALS230-0070-0200	0.7	2	1	0.67	15	4	50	2,720	2.13	2.20	2.28	2.36	2.56
IALS230-0070-0400		4	1	0.67	15	4	50	2,720	4.19	4.34	4.50	4.66	5.04
IALS230-0070-0600		6	1	0.67	15	4	50	2,720	6.26	6.48	6.71	6.96	7.53
IALS230-0080-0220	0.8	2.2	0.8	0.77	15	4	50	2,640	2.33	2.41	2.50	2.59	2.80
IALS230-0080-0300		3	1.2	0.77	15	4	50	2,640	3.16	3.27	3.39	3.51	3.80
IALS230-0080-0400		4	1.2	0.77	15	4	50	2,640	4.19	4.34	4.50	4.66	5.04
IALS230-0080-0500	0.8	5	0.8	0.77	15	4	50	2,640	5.23	5.41	5.60	5.81	6.29
IALS230-0080-0600		6	1.2	0.77	15	4	50	2,640	6.26	6.48	6.71	6.96	7.53
IALS230-0080-0800		8	1.2	0.77	15	4	50	2,640	8.33	8.62	8.93	9.26	10.01
IALS230-0090-0400	0.9	4	1.4	0.87	15	4	50	3,040	4.19	4.34	4.50	4.66	5.04
IALS230-0090-0600		6	1.4	0.87	15	4	50	3,040	6.26	6.48	6.71	6.96	7.53
IALS230-0090-0800		8	1.4	0.87	15	4	50	3,040	8.33	8.62	8.93	9.26	10.01
IALS230-0100-0200	1	2	1.5	0.95	15	4	50	2,400	2.16	2.24	2.32	2.41	2.60
IALS230-0100-0300		3	0.8	0.95	15	4	50	2,400	3.20	3.31	3.43	3.56	3.85
IALS230-0100-0400		4	1.5	0.95	15	4	50	2,400	4.23	4.38	4.54	4.71	5.09
IALS230-0100-0600		6	0.8	0.95	15	4	50	2,400	6.30	6.52	6.75	7.01	7.57
IALS230-0100-0700		7	1.5	0.95	15	4	50	2,400	7.33	7.59	7.86	8.16	8.82
IALS230-0100-0800		8	1.5	0.95	15	4	50	2,400	8.37	8.66	8.97	9.31	10.06
IALS230-0100-0900		9	1.5	0.95	15	4	50	2,400	9.40	9.73	10.08	10.46	11.30
IALS230-0100-1000		10	0.8	0.95	15	4	50	2,400	10.43	10.80	11.19	11.61	12.55
IALS230-0100-1200		12	1.5	0.95	15	4	50	2,400	12.50	12.94	13.40	13.91	15.03
IALS230-0120-0400		1.2	4	1.8	1.15	15	4	50	2,560	4.23	4.38	4.54	4.71
IALS230-0120-0600	6		1.8	1.15	15	4	50	2,560	6.30	6.52	6.75	7.01	7.57
IALS230-0120-0800	8		1.8	1.15	15	4	50	2,560	8.37	8.66	8.97	9.31	10.06
IALS230-0120-1000	1.2	10	1.8	1.15	15	4	50	2,560	10.43	10.80	11.19	11.61	12.55
IALS230-0120-1200		12	1.8	1.15	15	4	50	2,560	12.50	12.94	13.40	13.91	15.03
IALS230-0140-0600		1.4	6	2.1	1.35	15	4	50	2,640	6.30	6.52	6.75	7.01
IALS230-0140-0800	8		2.1	1.35	15	4	50	2,640	8.37	8.66	8.97	9.31	10.06
IALS230-0140-1000	10		2.1	1.35	15	4	50	2,640	10.43	10.80	11.19	11.61	12.55
IALS230-0140-1200	1.4	12	2.1	1.35	15	4	50	2,640	12.50	12.94	13.40	13.91	15.03
IALS230-0140-1400		14	2.1	1.35	15	4	50	2,640	14.57	15.08	15.62	16.21	17.52
IALS230-0140-1600		16	2.1	1.35	15	4	50	3,040	16.64	17.21	17.84	18.50	20.01
IALS230-0150-0300	1.5	3	1.1	1.45	15	4	50	2,560	3.20	3.31	3.43	3.56	3.85
IALS230-0150-0400		4	2.3	1.45	15	4	50	2,560	4.23	4.38	4.54	4.71	5.09
IALS230-0150-0600		6	1.1	1.45	15	4	50	2,560	6.30	6.52	6.75	7.01	7.57
IALS230-0150-0800		8	2.3	1.45	15	4	50	2,560	8.37	8.66	8.97	9.31	10.06
IALS230-0150-1000	10	1.1	1.45	15	4	50	2,560	10.43	10.80	11.19	11.61	12.55	

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series

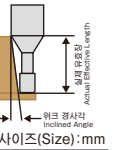
# ion Depo Type A Series



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코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부지)경 (D2) Neck Diameter	목각 (NA) <sup>*</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
IALS230-0150-1200	1.5	12	2.3	1.45	15	4	50	2,560	12.50	12.94	13.40	13.91	15.03
IALS230-0150-1400		14	2.3	1.45	15	4	50	2,640	14.57	15.08	15.62	16.21	17.52
IALS230-0150-1600		16	2.3	1.45	15	4	50	2,640	16.64	17.21	17.84	18.50	20.01
IALS230-0160-0600	1.6	6	2.4	1.55	15	4	50	2,640	6.30	6.52	6.75	7.01	7.57
IALS230-0160-0800		8	2.4	1.55	15	4	50	2,640	8.37	8.66	8.97	9.31	10.06
IALS230-0160-1000		10	2.4	1.55	15	4	50	2,640	10.43	10.80	11.19	11.61	12.55
IALS230-0160-1200		12	2.4	1.55	15	4	50	2,640	12.50	12.94	13.40	13.91	15.03
IALS230-0160-1400	1.8	14	2.4	1.55	15	4	50	2,640	14.57	15.08	15.62	16.21	17.52
IALS230-0160-1600		16	2.4	1.55	15	4	50	2,640	16.64	17.21	17.84	18.50	20.01
IALS230-0180-0600		6	2.7	1.75	15	4	50	2,640	6.30	6.52	6.75	7.01	7.57
IALS230-0180-0800		8	2.7	1.75	15	4	50	2,640	8.37	8.66	8.97	9.31	10.06
IALS230-0180-1000	2	10	2.7	1.75	15	4	50	2,640	10.43	10.80	11.19	11.61	12.55
IALS230-0180-1200		12	2.7	1.75	15	4	50	2,640	12.50	12.94	13.40	13.91	15.03
IALS230-0180-1400		14	2.7	1.75	15	4	50	2,640	14.57	15.08	15.62	16.21	17.52
IALS230-0180-1600		16	2.7	1.75	15	4	50	2,640	16.64	17.21	17.84	18.50	20.01
IALS230-0200-0400	2	4	3	1.94	15	4	50	2,560	4.25	4.40	4.56	4.73	5.11
IALS230-0200-0600		6	1.5	1.94	15	4	50	2,560	6.32	6.54	6.77	7.03	7.60
IALS230-0200-0800		8	3	1.94	15	4	50	2,560	8.39	8.68	8.99	9.33	10.08
IALS230-0200-1000		10	1.5	1.94	15	4	50	2,560	10.45	10.82	11.21	11.63	12.57
IALS230-0200-1200		12	3	1.94	15	4	50	2,560	12.52	12.96	13.42	13.93	15.06
IALS230-0200-1400		14	3	1.94	15	4	50	2,560	14.59	15.10	15.64	16.23	17.54
IALS230-0200-1500		15	1.5	1.94	15	4	50	2,560	15.62	16.17	16.75	17.38	18.79
IALS230-0200-1600		16	3	1.94	15	4	50	2,560	16.65	17.23	17.86	18.53	FREE
IALS230-0200-1800		18	3	1.94	15	4	50	2,560	18.72	19.37	20.07	20.83	FREE
IALS230-0200-2000		20	1.5	1.94	15	4	50	2,560	20.79	21.51	22.29	23.13	FREE
IALS230-0250-0800	2.5	8	3.7	2.44	15	4	50	2,640	8.39	8.68	8.99	9.33	10.08
IALS230-0250-1000		10	3.7	2.44	15	4	50	2,640	10.45	10.82	11.21	11.63	12.57
IALS230-0250-1200		12	3.7	2.44	15	4	50	2,640	12.52	12.96	13.42	13.93	FREE
IALS230-0250-1400		14	3.7	2.44	15	4	50	2,640	14.59	15.10	15.64	16.23	FREE
IALS230-0250-1600		16	3.7	2.44	15	4	50	2,640	16.65	17.23	17.86	18.53	FREE
IALS230-0250-1800		18	3.7	2.44	15	4	50	2,640	18.72	19.37	20.07	20.83	FREE
IALS230-0250-2000	20	3.7	2.44	15	4	50	2,640	20.79	21.51	22.29	FREE	FREE	
IALS230-0300-0800	3	8	4.5	2.85	15	4	50	3,440	8.56	8.86	9.18	9.52	FREE
IALS230-0300-1000		10	2.5	2.85	15	4	50	3,440	10.63	11.00	11.39	11.82	FREE
IALS230-0300-1200		12	4.5	2.85	15	4	50	3,440	12.69	13.14	13.61	14.12	FREE
IALS230-0300-1400		14	4.5	2.85	15	4	50	3,440	14.76	15.27	15.83	FREE	FREE
IALS230-0300-1500		15	2.5	2.85	15	4	50	3,440	15.79	16.34	16.93	FREE	FREE
IALS230-0300-1600		16	4.5	2.85	15	4	50	3,440	16.83	17.41	18.04	FREE	FREE
IALS230-0300-1800		18	4.5	2.85	15	4	50	3,440	18.90	19.55	FREE	FREE	FREE
IALS230-0300-2000		20	2.5	2.85	15	4	50	3,440	20.96	21.69	FREE	FREE	FREE
IALS230-0300-2500		25	4.5	2.85	15	4	60	3,440	26.13	27.04	FREE	FREE	FREE
IALS230-0300-3000		30	4.5	2.85	15	4	60	4,080	31.30	FREE	FREE	FREE	FREE
IALS230-0400-1000	4	10	3	3.8	15	6	50	3,920	10.72	11.10	11.50	11.93	12.89
IALS230-0400-1200		12	6	3.8	15	6	50	3,920	12.79	13.24	13.71	14.23	15.38
IALS230-0400-1500		15	3	3.8	15	6	50	3,920	15.89	16.44	17.04	17.68	FREE

# ion Depo Type A Series



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코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부지)경 (D2) Neck Diameter	목각 (NA) <sup>*</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
IALS230-0400-1600	4	16	6	3.8	15	6	50	3,920	16.92	17.51	18.15	18.83	FREE
IALS230-0400-2000		20	3	3.8	15	6	50	3,920	21.06	21.79	22.58	23.43	FREE
IALS230-0400-2500		25	6	3.8	15	6	60	3,920	26.23	27.14	28.12	FREE	FREE
IALS230-0400-3000		30	6	3.8	15	6	60	3,920	31.40	32.49	33.66	FREE	FREE
IALS230-0400-3500		35	6	3.8	15	6	70	3,920	36.56	37.84	FREE	FREE	FREE
IALS230-0500-1500	5	15	3.5	4.8	15	6	50	4,960	15.89	16.44	17.04	FREE	FREE
IALS230-0500-1600		16	7.5	4.8	15	6	50	4,960	16.92	17.51	18.15	FREE	FREE
IALS230-0500-2000		20	3.5	4.8	15	6	50	4,960	21.06	21.79	FREE	FREE	FREE
IALS230-0500-2500		25	7.5	4.8	15	6	60	4,960	26.23	27.14	FREE	FREE	FREE
IALS230-0500-3000		30	7.5	4.8	15	6	60	4,960	31.40	FREE	FREE	FREE	FREE
IALS230-0500-3500	35	7.5	4.8	15	6	70	4,960	36.56	FREE	FREE	FREE	FREE	
IALS230-0500-4000	40	7.5	4.8	15	6	70	4,960	41.73	FREE	FREE	FREE	FREE	
IALS230-0600-1500	6	15	6	5.8	15	6	50	2,640	FREE	FREE	FREE	FREE	FREE
IALS230-0600-2000		20	6	5.8	15	6	50	2,640	FREE	FREE	FREE	FREE	FREE
IALS230-0600-3000		30	6	5.8	15	6	60	2,640	FREE	FREE	FREE	FREE	FREE
IALS230-0600-4000		40	9	5.8	15	6	70	6,160	FREE	FREE	FREE	FREE	FREE
IALS230-0600-5000		50	9	5.8	15	6	80	7,840	FREE	FREE	FREE	FREE	FREE
IALS230-0600-6000	60	9	5.8	15	6	90	10,000	FREE	FREE	FREE	FREE	FREE	

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALS230  
Model number:IALS230

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			ap mm	ae mm			mm/min	min <sup>-1</sup>			ap mm	ae mm			mm/min	min <sup>-1</sup>			ap mm
2	0.1	0.3	0.005	0.06	150	40,000	0.005	0.06	150	40,000	0.004	0.06	120	40,000	0.005	0.06	150	40,000	
		0.5	0.004	0.06	100	40,000	0.004	0.06	100	40,000	0.003	0.06	75	40,000	0.004	0.06	100	40,000	
		1	0.002	0.06	40	40,000	0.002	0.06	40	40,000	0.002	0.06	30	40,000	0.002	0.06	40	40,000	
		0.15	0.3	0.005	0.09	200	40,000	0.005	0.09	200	40,000	0.004	0.09	150	40,000	0.005	0.09	200	40,000
			0.5	0.005	0.09	150	40,000	0.005	0.09	150	40,000	0.004	0.09	120	40,000	0.005	0.09	150	40,000
		0.2	0.5	0.01	0.12	330	40,000	0.01	0.12	330	40,000	0.007	0.12	250	40,000	0.01	0.12	330	40,000
	0.75		0.008	0.12	280	40,000	0.008	0.12	280	40,000	0.006	0.12	220	40,000	0.008	0.12	280	40,000	
	1		0.007	0.12	250	40,000	0.007	0.12	250	40,000	0.005	0.12	180	40,000	0.007	0.12	250	40,000	
	0.3	0.8	0.02	0.18	400	40,000	0.02	0.18	400	40,000	0.015	0.18	260	35,000	0.02	0.18	400	40,000	
		1	0.02	0.18	400	40,000	0.02	0.18	400	40,000	0.015	0.18	260	35,000	0.02	0.18	400	40,000	
		1.5	0.015	0.18	350	40,000	0.015	0.18	350	40,000	0.01	0.18	230	35,000	0.015	0.18	350	40,000	
		2	0.01	0.18	300	35,000	0.01	0.18	300	35,000	0.007	0.18	180	30,000	0.01	0.18	300	35,000	
		2.5	0.007	0.18	250	30,000	0.007	0.18	250	30,000	0.005	0.18	160	25,000	0.007	0.18	250	30,000	
		3	0.005	0.18	200	30,000	0.005	0.18	200	30,000	0.004	0.18	130	25,000	0.005	0.18	200	30,000	
	0.4	1	0.025	0.24	500	35,000	0.025	0.24	500	35,000	0.018	0.24	330	30,000	0.025	0.24	500	35,000	
		1.2	0.02	0.24	450	35,000	0.02	0.24	450	35,000	0.014	0.24	280	30,000	0.02	0.24	450	35,000	
		1.5	0.02	0.24	450	35,000	0.02	0.24	450	35,000	0.014	0.24	280	30,000	0.02	0.24	450	35,000	
		2	0.02	0.24	400	35,000	0.02	0.24	400	35,000	0.014	0.24	260	30,000	0.02	0.24	400	35,000	
		2.5	0.015	0.24	350	30,000	0.015	0.24	350	30,000	0.01	0.24	230	25,000	0.015	0.24	350	30,000	
		3	0.015	0.24	300	30,000	0.015	0.24	300	30,000	0.01	0.24	190	25,000	0.015	0.24	300	30,000	
	0.5	1	0.03	0.3	550	30,000	0.03	0.3	550	30,000	0.022	0.3	350	25,000	0.03	0.3	550	30,000	
		1.5	0.028	0.3	520	30,000	0.028	0.3	520	30,000	0.02	0.3	330	25,000	0.028	0.3	520	30,000	
		2	0.025	0.3	500	30,000	0.025	0.3	500	30,000	0.018	0.3	320	25,000	0.025	0.3	500	30,000	
		2.5	0.023	0.3	470	30,000	0.023	0.3	470	30,000	0.016	0.3	290	25,000	0.023	0.3	470	30,000	
3		0.02	0.3	450	30,000	0.02	0.3	450	30,000	0.014	0.3	280	25,000	0.02	0.3	450	30,000		
3.5		0.018	0.3	420	30,000	0.018	0.3	420	30,000	0.012	0.3	250	22,000	0.018	0.3	420	30,000		
0.6	4	0.015	0.3	350	25,000	0.015	0.3	350	25,000	0.01	0.3	230	22,000	0.015	0.3	350	25,000		
	1.5	0.035	0.36	600	30,000	0.035	0.36	600	30,000	0.025	0.36	400	25,000	0.035	0.36	600	30,000		
	1.8	0.035	0.36	600	30,000	0.035	0.36	600	30,000	0.025	0.36	380	25,000	0.035	0.36	600	30,000		
	2	0.035	0.36	600	30,000	0.035	0.36	600	30,000	0.025	0.36	380	25,000	0.035	0.36	600	30,000		
	3	0.03	0.36	550	30,000	0.03	0.36	550	30,000	0.02	0.36	350	25,000	0.03	0.36	550	30,000		
	4	0.025	0.36	450	25,000	0.025	0.36	450	25,000	0.018	0.36	300	22,000	0.025	0.36	450	25,000		
0.7	5	0.02	0.36	400	25,000	0.02	0.36	400	25,000	0.014	0.36	240	20,000	0.02	0.36	400	25,000		
	6	0.015	0.36	300	20,000	0.015	0.36	300	20,000	0.01	0.36	200	18,000	0.015	0.36	300	20,000		
	2	0.04	0.42	650	30,000	0.04	0.42	650	30,000	0.03	0.42	400	25,000	0.04	0.42	650	30,000		
	4	0.03	0.42	500	25,000	0.03	0.42	500	25,000	0.02	0.42	330	22,000	0.03	0.42	500	25,000		
	6	0.02	0.42	350	20,000	0.02	0.42	350	20,000	0.015	0.42	240	18,000	0.02	0.42	350	20,000		
	0.8	2.2	0.05	0.48	700	25,000	0.05	0.48	700	25,000	0.03	0.48	500	22,000	0.05	0.48	700	25,000	
3		0.05	0.48	700	25,000	0.05	0.48	700	25,000	0.03	0.48	500	22,000	0.05	0.48	700	25,000		
4		0.045	0.48	600	25,000	0.045	0.48	600	25,000	0.03	0.48	400	22,000	0.045	0.48	600	25,000		
5		0.035	0.48	500	22,000	0.035	0.48	500	22,000	0.025	0.48	350	20,000	0.035	0.48	500	22,000		
6		0.03	0.48	450	20,000	0.03	0.48	450	20,000	0.02	0.48	300	18,000	0.03	0.48	450	20,000		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량은, 절삭 가공을 할 때는 절입 깊이를 최대한 낮추어주세요. Depth of Cut shows the maximum value for finishing.  
●ap, ae 방향, ae 방향. ap=Axial Depth of Cut ae=Radial Depth of Cut.  
●공구 홀더에 확실하게 고정하고, 진동을 억제해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●절입량은, 절삭 가공을 할 때는 절입 깊이를 최대한 낮추어주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일할 만큼 조절해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			ap mm	ae mm			mm/min	min <sup>-1</sup>			ap mm	ae mm			mm/min	min <sup>-1</sup>		
2	0.8	8	0.02	0.48	350	18,000	0.02	0.48	350	18,000	0.015	0.48	240	15,000	0.02	0.48	350	18,000
		4	0.05	0.54	900	25,000	0.05	0.54	900	25,000	0.035	0.54	600	22,000	0.05	0.54	900	25,000
	0.9	6	0.04	0.54	600	20,000	0.04	0.54	600	20,000	0.03	0.54	400	18,000	0.04	0.54	600	20,000
		8	0.03	0.54	500	18,000	0.03	0.54	500	18,000	0.02	0.54	330	16,000	0.03	0.54	500	18,000
	1	2	0.07	0.6	1,500	25,000	0.07	0.6	1,500	25,000	0.06	0.6	1,000	22,000	0.07	0.6	1,500	25,000
		3	0.06	0.6	1,200	25,000	0.06	0.6	1,200	25,000	0.05	0.6	800	22,000	0.06	0.6	1,200	25,000
		4	0.055	0.6	1,100	25,000	0.055	0.6	1,100	25,000	0.045	0.6	700	22,000	0.055	0.6	1,100	25,000
		6	0.045	0.6	800	20,000	0.045	0.6	800	20,000	0.035	0.6	500	18,000	0.045	0.6	800	20,000
		7	0.04	0.6	800	20,000	0.04	0.6	800	20,000	0.03	0.6	500	18,000	0.04	0.6	800	20,000
		8	0.035	0.6	700	18,000	0.035	0.6	700	18,000	0.025	0.6	400	15,000	0.035	0.6	700	18,000
	1.2	9	0.03	0.6	700	18,000	0.03	0.6	700	18,000	0.02	0.6	400	15,000	0.03	0.6	700	18,000
		10	0.025	0.6	600	16,000	0.025	0.6	600	16,000	0.018	0.6	350	14,000	0.025	0.6	600	16,000
		12	0.02	0.6	500	14,000	0.02	0.6	500	14,000	0.014	0.6	300	12,000	0.02	0.6	500	14,000
		4	0.06	0.72	1,200	23,000	0.06	0.72	1,200	23,000	0.05	0.72	800	20,000	0.06	0.72	1,200	23,000
		6	0.05	0.72	900	20,000	0.05	0.72	900	20,000	0.04	0.72	600	18,000	0.05	0.72	900	20,000
		8	0.04	0.72	800	18,000	0.04	0.72	800	18,000	0.03	0.72	500	15,000	0.04	0.72	800	18,000
	1.4	10	0.03	0.72	700	16,000	0.03	0.72	700	16,000	0.02	0.72	450	14,000	0.03	0.72	700	16,000
		12	0.025	0.72	600	14,000	0.025	0.72	600	14,000	0.018	0.72	350	12,000	0.025	0.72	600	14,000
		6	0.07	0.84	1,200	20,000	0.07	0.84	1,200	20,000	0.06	0.84	720	16,000	0.07	0.84	1,200	20,000
		8	0.06	0.84	1,000	18,000	0.06	0.84	1,000	18,000	0.05	0.84	580	14,000	0.06	0.84	1,000	18,000
		10	0.05	0.84	850	16,000	0.05	0.84	850	16,000	0.04	0.84	520	13,000	0.05	0.84	850	16,000
		12	0.04	0.84	700	14,000	0.04	0.84	700	14,000	0.03	0.84	450	12,000	0.04	0.84	700	14,000
	1.5	14	0.035	0.84	600	13,000	0.035	0.84	600	13,000	0.025	0.84	350	11,000	0.035	0.84	600	13,000
		16	0.025	0.84	500	12,000	0.025	0.84	500	12,000	0.018	0.84	300	10,000	0.025	0.84	500	12,000
3		0.09	0.9	1,400	22,000	0.09	0											

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALS230  
Model number:IALS230

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	1.8	14	0.06	1.08	650	13,000	0.06	1.08	650	13,000	0.05	1.08	420	11,000	0.06	1.08	650	13,000
		16	0.05	1.08	550	12,000	0.05	1.08	550	12,000	0.04	1.08	350	10,000	0.05	1.08	550	12,000
	2	4	0.13	1.2	1,500	16,000	0.13	1.2	1,500	16,000	0.12	1.2	900	13,000	0.13	1.2	1,500	16,000
		6	0.12	1.2	1,400	16,000	0.12	1.2	1,400	16,000	0.1	1.2	850	13,000	0.12	1.2	1,400	16,000
		8	0.11	1.2	1,300	16,000	0.11	1.2	1,300	16,000	0.09	1.2	800	13,000	0.11	1.2	1,300	16,000
		10	0.1	1.2	1,200	16,000	0.1	1.2	1,200	16,000	0.08	1.2	750	13,000	0.1	1.2	1,200	16,000
		12	0.09	1.2	1,000	14,000	0.09	1.2	1,000	14,000	0.07	1.2	650	12,000	0.09	1.2	1,000	14,000
		14	0.08	1.2	900	13,000	0.08	1.2	900	13,000	0.06	1.2	570	11,000	0.08	1.2	900	13,000
		15	0.07	1.2	800	12,000	0.07	1.2	800	12,000	0.06	1.2	570	11,000	0.07	1.2	800	12,000
		16	0.07	1.2	800	12,000	0.07	1.2	800	12,000	0.05	1.2	500	10,000	0.07	1.2	800	12,000
	2.5	18	0.06	1.2	700	11,000	0.06	1.2	700	11,000	0.04	1.2	430	9,000	0.06	1.2	700	11,000
		20	0.05	1.2	600	10,000	0.05	1.2	600	10,000	0.035	1.2	360	8,000	0.05	1.2	600	10,000
		8	0.15	1.5	1,400	13,000	0.15	1.5	1,400	13,000	0.12	1.5	900	11,000	0.15	1.5	1,400	13,000
		10	0.14	1.5	1,300	13,000	0.14	1.5	1,300	13,000	0.11	1.5	800	11,000	0.14	1.5	1,300	13,000
	3	12	0.13	1.5	1,200	13,000	0.13	1.5	1,200	13,000	0.1	1.5	750	11,000	0.13	1.5	1,200	13,000
		14	0.12	1.5	1,000	12,000	0.12	1.5	1,000	12,000	0.09	1.5	650	10,000	0.12	1.5	1,000	12,000
		16	0.1	1.5	900	11,000	0.1	1.5	900	11,000	0.07	1.5	550	9,000	0.1	1.5	900	11,000
		18	0.09	1.5	800	10,000	0.09	1.5	800	10,000	0.06	1.5	480	8,000	0.09	1.5	800	10,000
		20	0.08	1.5	700	9,000	0.08	1.5	700	9,000	0.05	1.5	400	7,000	0.08	1.5	700	9,000
		8	0.2	1.8	1,500	11,000	0.2	1.8	1,500	11,000	0.16	1.8	1,000	9,000	0.2	1.8	1,500	11,000
10		0.18	1.8	1,400	11,000	0.18	1.8	1,400	11,000	0.14	1.8	900	9,000	0.18	1.8	1,400	11,000	
12		0.16	1.8	1,300	11,000	0.16	1.8	1,300	11,000	0.12	1.8	800	9,000	0.16	1.8	1,300	11,000	
4	14	0.14	1.8	1,200	11,000	0.14	1.8	1,200	11,000	0.1	1.8	700	9,000	0.14	1.8	1,200	11,000	
	15	0.12	1.8	1,000	10,000	0.12	1.8	1,000	10,000	0.1	1.8	700	9,000	0.12	1.8	1,000	10,000	
	16	0.12	1.8	1,000	10,000	0.12	1.8	1,000	10,000	0.09	1.8	600	8,000	0.12	1.8	1,000	10,000	
	18	0.11	1.8	900	10,000	0.11	1.8	900	10,000	0.08	1.8	550	8,000	0.11	1.8	900	10,000	
	20	0.1	1.8	800	9,000	0.1	1.8	800	9,000	0.07	1.8	450	7,000	0.1	1.8	800	9,000	
	25	0.08	1.8	700	8,000	0.08	1.8	700	8,000	0.06	1.8	380	6,000	0.08	1.8	700	8,000	
	30	0.06	1.8	600	7,000	0.06	1.8	600	7,000	0.045	1.8	300	5,000	0.06	1.8	600	7,000	
	10	0.3	2.4	1,500	8,000	0.3	2.4	1,500	8,000	0.25	2.4	850	6,000	0.3	2.4	1,500	8,000	
5	12	0.3	2.4	1,500	8,000	0.3	2.4	1,500	8,000	0.25	2.4	850	6,000	0.3	2.4	1,500	8,000	
	15	0.25	2.4	1,400	8,000	0.25	2.4	1,400	8,000	0.2	2.4	800	6,000	0.25	2.4	1,400	8,000	
	16	0.25	2.4	1,400	8,000	0.25	2.4	1,400	8,000	0.2	2.4	800	6,000	0.25	2.4	1,400	8,000	
	20	0.2	2.4	1,300	8,000	0.2	2.4	1,300	8,000	0.15	2.4	730	6,000	0.2	2.4	1,300	8,000	
	25	0.15	2.4	1,100	7,000	0.15	2.4	1,100	7,000	0.1	2.4	600	5,000	0.15	2.4	1,100	7,000	
	30	0.12	2.4	1,000	7,000	0.12	2.4	1,000	7,000	0.08	2.4	540	5,000	0.12	2.4	1,000	7,000	
	35	0.1	2.4	800	6,000	0.1	2.4	800	6,000	0.07	2.4	450	4,500	0.1	2.4	800	6,000	
	15	0.35	3	1,400	6,000	0.35	3	1,400	6,000	0.3	3	800	4,500	0.35	3	1,400	6,000	
5	16	0.35	3	1,400	6,000	0.35	3	1,400	6,000	0.3	3	800	4,500	0.35	3	1,400	6,000	
	20	0.3	3	1,300	6,000	0.3	3	1,300	6,000	0.25	3	730	4,500	0.3	3	1,300	6,000	
	25	0.25	3	1,200	6,000	0.25	3	1,200	6,000	0.2	3	680	4,500	0.25	3	1,200	6,000	
	30	0.2	3	900	5,000	0.2	3	900	5,000	0.15	3	540	4,000	0.2	3	900	5,000	

●공구는 홀더에 확실하게 고정되고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입량은, 장식 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●공구 미스트 플런저, 또는 분수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	5	35	0.15	3	800	5,000	0.15	3	800	5,000	0.1	3	420	3,500	0.15	3	800	5,000
		40	0.1	3	600	4,000	0.1	3	600	4,000	0.07	3	340	3,000	0.1	3	600	4,000
	6	15	0.45	3.6	1,500	5,500	0.45	3.6	1,500	5,500	0.38	3.6	700	3,800	0.45	3.6	1,500	5,500
		20	0.4	3.6	1,200	5,000	0.4	3.6	1,200	5,000	0.35	3.6	630	3,500	0.4	3.6	1,200	5,000
		30	0.35	3.6	900	4,000	0.35	3.6	900	4,000	0.3	3.6	500	3,000	0.35	3.6	900	4,000
		40	0.25	3.6	650	3,500	0.25	3.6	650	3,500	0.2	3.6	380	2,700	0.25	3.6	650	3,500
		50	0.15	3.6	500	3,000	0.15	3.6	500	3,000	0.1	3.6	280	2,200	0.15	3.6	500	3,000
		60	0.05	3.6	400	2,700	0.05	3.6	400	2,700	0.04	3.6	220	2,000	0.05	3.6	400	2,700

●공구는 홀더에 확실하게 고정되고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입량은, 장식 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●공구 미스트 플런저, 또는 분수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALS230  
Model number:IALS230

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material		고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			궤 mm	궤 mm			궤 mm	궤 mm			궤 mm	궤 mm			궤 mm	궤 mm		
2	0.1	0.3	0.004	0.06	70	40,000	0.005	0.06	150	40,000	0.004	0.06	120	40,000	0.006	0.06	150	40,000
		0.5	0.003	0.06	25	40,000	0.004	0.06	100	40,000	0.003	0.06	75	40,000	0.005	0.06	100	40,000
		1	0.002	0.06	20	40,000	0.002	0.06	40	40,000	0.002	0.06	30	40,000	0.002	0.06	40	40,000
	0.15	0.3	0.004	0.09	100	40,000	0.005	0.09	200	40,000	0.004	0.09	150	40,000	0.008	0.09	200	40,000
		0.5	0.004	0.09	70	40,000	0.005	0.09	150	40,000	0.004	0.09	120	40,000	0.008	0.09	150	40,000
	0.2	0.5	0.007	0.12	200	40,000	0.01	0.12	330	40,000	0.007	0.12	250	40,000	0.012	0.12	330	40,000
		0.75	0.006	0.12	170	40,000	0.008	0.12	280	40,000	0.006	0.12	220	40,000	0.01	0.12	280	40,000
		1	0.005	0.12	130	40,000	0.007	0.12	250	40,000	0.005	0.12	180	40,000	0.008	0.12	250	40,000
	0.3	0.8	0.015	0.18	210	35,000	0.02	0.18	400	40,000	0.015	0.18	260	35,000	0.024	0.18	400	40,000
		1	0.015	0.18	210	35,000	0.02	0.18	400	40,000	0.015	0.18	260	35,000	0.024	0.18	400	40,000
		1.5	0.01	0.18	180	35,000	0.015	0.18	350	40,000	0.01	0.18	230	35,000	0.018	0.18	350	40,000
		2	0.007	0.18	130	30,000	0.01	0.18	300	35,000	0.007	0.18	180	30,000	0.012	0.18	320	40,000
		2.5	0.005	0.18	110	25,000	0.007	0.18	250	30,000	0.005	0.18	160	25,000	0.008	0.18	280	35,000
		3	0.004	0.18	80	25,000	0.005	0.18	200	30,000	0.004	0.18	130	25,000	0.006	0.18	250	35,000
	0.4	1	0.018	0.24	280	30,000	0.025	0.24	500	35,000	0.018	0.24	330	30,000	0.03	0.24	600	40,000
		1.2	0.014	0.24	230	30,000	0.02	0.24	450	35,000	0.014	0.24	280	30,000	0.026	0.24	500	40,000
		1.5	0.014	0.24	230	30,000	0.02	0.24	450	35,000	0.014	0.24	280	30,000	0.026	0.24	500	40,000
		2	0.014	0.24	210	30,000	0.02	0.24	400	35,000	0.014	0.24	260	30,000	0.024	0.24	450	40,000
		2.5	0.01	0.24	180	25,000	0.015	0.24	350	30,000	0.01	0.24	230	25,000	0.02	0.24	400	40,000
		3	0.01	0.24	140	25,000	0.015	0.24	300	30,000	0.01	0.24	190	25,000	0.018	0.24	350	35,000
	0.5	1	0.022	0.3	300	25,000	0.03	0.3	550	30,000	0.022	0.3	350	25,000	0.036	0.3	650	35,000
		1.5	0.02	0.3	280	25,000	0.028	0.3	520	30,000	0.02	0.3	330	25,000	0.033	0.3	630	35,000
		2	0.018	0.3	270	25,000	0.025	0.3	500	30,000	0.018	0.3	320	25,000	0.03	0.3	600	35,000
		2.5	0.016	0.3	240	25,000	0.023	0.3	470	30,000	0.016	0.3	290	25,000	0.027	0.3	580	35,000
3		0.014	0.3	230	25,000	0.02	0.3	450	30,000	0.014	0.3	280	25,000	0.024	0.3	550	35,000	
3.5		0.012	0.3	200	22,000	0.018	0.3	420	30,000	0.012	0.3	250	22,000	0.021	0.3	500	30,000	
0.6	4	0.01	0.3	180	22,000	0.015	0.3	350	25,000	0.01	0.3	230	22,000	0.018	0.3	420	30,000	
	1.5	0.025	0.36	350	25,000	0.035	0.36	600	30,000	0.025	0.36	400	25,000	0.04	0.36	700	35,000	
	1.8	0.025	0.36	330	25,000	0.035	0.36	600	30,000	0.025	0.36	380	25,000	0.04	0.36	700	35,000	
	2	0.025	0.36	330	25,000	0.035	0.36	600	30,000	0.025	0.36	380	25,000	0.04	0.36	700	35,000	
	3	0.02	0.36	300	25,000	0.03	0.36	550	30,000	0.02	0.36	350	25,000	0.035	0.36	650	35,000	
	4	0.018	0.36	250	22,000	0.025	0.36	450	25,000	0.018	0.36	300	22,000	0.03	0.36	550	30,000	
0.7	5	0.014	0.36	190	20,000	0.02	0.36	400	25,000	0.014	0.36	240	20,000	0.024	0.36	480	30,000	
	6	0.01	0.36	150	18,000	0.015	0.36	300	20,000	0.01	0.36	200	18,000	0.018	0.36	380	25,000	
	2	0.03	0.42	350	25,000	0.04	0.42	650	30,000	0.03	0.42	400	25,000	0.05	0.42	750	35,000	
	4	0.02	0.42	280	22,000	0.03	0.42	500	25,000	0.02	0.42	330	22,000	0.04	0.42	600	30,000	
	6	0.015	0.42	190	18,000	0.02	0.42	350	20,000	0.015	0.42	240	18,000	0.03	0.42	450	25,000	
	0.8	2.2	0.03	0.48	450	22,000	0.05	0.48	700	25,000	0.03	0.48	500	22,000	0.06	0.48	850	35,000
3		0.03	0.48	450	22,000	0.05	0.48	700	25,000	0.03	0.48	500	22,000	0.06	0.48	850	35,000	
4		0.03	0.48	350	22,000	0.045	0.48	600	25,000	0.03	0.48	400	22,000	0.055	0.48	720	30,000	
5		0.025	0.48	300	20,000	0.035	0.48	500	22,000	0.025	0.48	350	20,000	0.05	0.48	650	30,000	
6		0.02	0.48	250	18,000	0.03	0.48	450	20,000	0.02	0.48	300	18,000	0.04	0.48	560	25,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 장삭 가를 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●궤 p 축 방향, 궤 e 반경 방향. 궤 p=Axial Depth of Cut 궤 e=Radial Depth of Cut.  
●오일 미스트 분사, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일할 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material		고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			궤 mm	궤 mm			궤 mm	궤 mm			궤 mm	궤 mm			궤 mm	궤 mm		
2	0.8	8	0.015	0.48	190	15,000	0.02	0.48	350	18,000	0.015	0.48	240	15,000	0.025	0.48	430	22,000
		4	0.035	0.54	550	22,000	0.05	0.54	900	25,000	0.035	0.54	600	22,000	0.06	0.54	1,000	30,000
	0.9	6	0.03	0.54	350	18,000	0.04	0.54	600	20,000	0.03	0.54	400	18,000	0.05	0.54	750	25,000
		8	0.02	0.54	280	16,000	0.03	0.54	500	18,000	0.02	0.54	330	16,000	0.04	0.54	620	22,000
	1	2	0.06	0.6	950	22,000	0.07	0.6	1,500	25,000	0.06	0.6	1,000	22,000	0.08	0.6	1,800	30,000
		3	0.05	0.6	750	22,000	0.06	0.6	1,200	25,000	0.05	0.6	800	22,000	0.07	0.6	1,500	30,000
		4	0.045	0.6	650	22,000	0.055	0.6	1,100	25,000	0.045	0.6	700	22,000	0.065	0.6	1,300	30,000
		6	0.035	0.6	450	18,000	0.045	0.6	800	20,000	0.035	0.6	500	18,000	0.055	0.6	1,000	25,000
		7	0.03	0.6	450	18,000	0.04	0.6	800	20,000	0.03	0.6	500	18,000	0.05	0.6	1,000	25,000
		8	0.025	0.6	350	15,000	0.035	0.6	700	18,000	0.025	0.6	400	15,000	0.045	0.6	850	22,000
	1.2	9	0.02	0.6	350	15,000	0.03	0.6	700	18,000	0.02	0.6	400	15,000	0.04	0.6	850	22,000
		10	0.018	0.6	300	14,000	0.025	0.6	600	16,000	0.018	0.6	350	14,000	0.03	0.6	750	20,000
		12	0.014	0.6	250	12,000	0.02	0.6	500	14,000	0.014	0.6	300	12,000	0.025	0.6	650	18,000
		4	0.05	0.72	750	20,000	0.06	0.72	1,200	23,000	0.05	0.72	800	20,000	0.07	0.72	1,400	27,000
		6	0.04	0.72	550	18,000	0.05	0.72	900	20,000	0.04	0.72	600	18,000	0.06	0.72	1,200	25,000
		8	0.03	0.72	450	15,000	0.04	0.72	800	18,000	0.03	0.72	500	15,000	0.05	0.72	1,000	22,000
	1.4	10	0.02	0.72	400	14,000	0.03	0.72	700	16,000	0.02	0.72	450	14,000	0.04	0.72	850	20,000
		12	0.018	0.72	300	12,000	0.025	0.72	600	14,000	0.018							



# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALS230  
Model number:IALS230

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	1.8	14	0.05	1.08	370	11,000	0.06	1.08	650	13,000	0.05	1.08	420	11,000	0.07	1.08	800	16,000
			0.04	1.08	300	10,000	0.05	1.08	550	12,000	0.04	1.08	350	10,000	0.06	1.08	700	15,000
	2	4	0.12	1.2	850	13,000	0.13	1.2	1,500	16,000	0.12	1.2	900	13,000	0.15	1.2	1,850	20,000
			0.1	1.2	800	13,000	0.12	1.2	1,400	16,000	0.1	1.2	850	13,000	0.14	1.2	1,750	20,000
			0.09	1.2	750	13,000	0.11	1.2	1,300	16,000	0.09	1.2	800	13,000	0.13	1.2	1,650	20,000
			0.08	1.2	700	13,000	0.1	1.2	1,200	16,000	0.08	1.2	750	13,000	0.12	1.2	1,500	20,000
			0.07	1.2	600	12,000	0.09	1.2	1,000	14,000	0.07	1.2	650	12,000	0.11	1.2	1,200	17,000
			0.06	1.2	520	11,000	0.08	1.2	900	13,000	0.06	1.2	570	11,000	0.1	1.2	1,100	16,000
			0.06	1.2	520	11,000	0.07	1.2	800	12,000	0.06	1.2	570	11,000	0.085	1.2	1,000	15,000
			0.05	1.2	450	10,000	0.07	1.2	800	12,000	0.05	1.2	500	10,000	0.085	1.2	1,000	15,000
			0.04	1.2	380	9,000	0.06	1.2	700	11,000	0.04	1.2	430	9,000	0.07	1.2	800	13,000
			0.035	1.2	310	8,000	0.05	1.2	600	10,000	0.035	1.2	360	8,000	0.06	1.2	720	12,000
	2.5	8	0.12	1.5	850	11,000	0.15	1.5	1,400	13,000	0.12	1.5	900	11,000	0.18	1.5	1,700	16,000
			0.11	1.5	750	11,000	0.14	1.5	1,300	13,000	0.11	1.5	800	11,000	0.17	1.5	1,600	16,000
			0.1	1.5	700	11,000	0.13	1.5	1,200	13,000	0.1	1.5	750	11,000	0.16	1.5	1,500	16,000
			0.09	1.5	600	10,000	0.12	1.5	1,000	12,000	0.09	1.5	650	10,000	0.15	1.5	1,200	14,000
			0.07	1.5	500	9,000	0.1	1.5	900	11,000	0.07	1.5	550	9,000	0.12	1.5	1,100	13,000
			0.06	1.5	430	8,000	0.09	1.5	800	10,000	0.06	1.5	480	8,000	0.11	1.5	950	12,000
	3	10	0.05	1.5	350	7,000	0.08	1.5	700	9,000	0.05	1.5	400	7,000	0.1	1.5	850	11,000
			0.16	1.8	950	9,000	0.2	1.8	1,500	11,000	0.16	1.8	1,000	9,000	0.24	1.8	1,800	13,000
0.14			1.8	850	9,000	0.18	1.8	1,400	11,000	0.14	1.8	900	9,000	0.22	1.8	1,700	13,000	
0.12			1.8	750	9,000	0.16	1.8	1,300	11,000	0.12	1.8	800	9,000	0.2	1.8	1,600	13,000	
0.1			1.8	650	9,000	0.14	1.8	1,200	11,000	0.1	1.8	700	9,000	0.17	1.8	1,400	13,000	
0.1			1.8	650	9,000	0.12	1.8	1,000	10,000	0.1	1.8	700	9,000	0.15	1.8	1,200	12,000	
0.09			1.8	550	8,000	0.12	1.8	1,000	10,000	0.09	1.8	600	8,000	0.15	1.8	1,200	12,000	
0.08			1.8	500	8,000	0.11	1.8	900	10,000	0.08	1.8	550	8,000	0.13	1.8	1,100	12,000	
0.07			1.8	400	7,000	0.1	1.8	800	9,000	0.07	1.8	450	7,000	0.12	1.8	1,000	11,000	
0.06			1.8	330	6,000	0.08	1.8	700	8,000	0.06	1.8	380	6,000	0.1	1.8	900	10,000	
4	12	0.045	1.8	250	5,000	0.06	1.8	600	7,000	0.045	1.8	300	5,000	0.07	1.8	730	8,500	
		0.25	2.4	800	6,000	0.3	2.4	1,500	8,000	0.25	2.4	850	6,000	0.36	2.4	1,900	10,000	
		0.25	2.4	800	6,000	0.3	2.4	1,500	8,000	0.25	2.4	850	6,000	0.36	2.4	1,900	10,000	
		0.2	2.4	750	6,000	0.25	2.4	1,400	8,000	0.2	2.4	800	6,000	0.3	2.4	1,800	10,000	
		0.2	2.4	750	6,000	0.25	2.4	1,400	8,000	0.2	2.4	800	6,000	0.3	2.4	1,800	10,000	
		0.15	2.4	680	6,000	0.2	2.4	1,300	8,000	0.15	2.4	730	6,000	0.24	2.4	1,600	10,000	
		0.1	2.4	550	5,000	0.15	2.4	1,100	7,000	0.1	2.4	600	5,000	0.18	2.4	1,300	8,500	
		0.08	2.4	490	5,000	0.12	2.4	1,000	7,000	0.08	2.4	540	5,000	0.15	2.4	1,200	8,500	
		0.07	2.4	400	4,500	0.1	2.4	800	6,000	0.07	2.4	450	4,500	0.12	2.4	1,000	7,200	
		5	15	0.3	3	750	4,500	0.35	3	1,400	6,000	0.3	3	800	4,500	0.42	3	1,700
0.3	3			750	4,500	0.35	3	1,400	6,000	0.3	3	800	4,500	0.42	3	1,700	7,200	
0.25	3			680	4,500	0.3	3	1,300	6,000	0.25	3	730	4,500	0.36	3	1,600	7,200	
0.2	3			630	4,500	0.25	3	1,200	6,000	0.2	3	680	4,500	0.3	3	1,500	7,200	
0.15	3			490	4,500	0.2	3	900	6,000	0.15	3	540	4,500	0.24	3	1,100	6,000	
0.15	3			490	4,000	0.2	3	900	5,000	0.15	3	540	4,000	0.24	3	1,100	6,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●오일 미스트 분사, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●절입량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut. ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	5	35	0.1	3	370	3,500	0.15	3	800	5,000	0.1	3	420	3,500	0.18	3	1,000	6,000
			0.07	3	290	3,000	0.1	3	600	4,000	0.07	3	340	3,000	0.12	3	720	4,800
	6	15	0.38	3.6	650	3,800	0.45	3.6	1,500	5,500	0.38	3.6	700	3,800	0.5	3.6	1,700	6,500
			0.35	3.6	580	3,500	0.4	3.6	1,200	5,000	0.35	3.6	630	3,500	0.48	3.6	1,500	6,000
			0.3	3.6	450	3,000	0.35	3.6	900	4,000	0.3	3.6	500	3,000	0.42	3.6	1,100	4,800
			0.2	3.6	330	2,700	0.25	3.6	650	3,500	0.2	3.6	380	2,700	0.3	3.6	780	4,200
			0.1	3.6	230	2,200	0.15	3.6	500	3,000	0.1	3.6	280	2,200	0.18	3.6	600	3,600
			0.04	3.6	170	2,000	0.05	3.6	400	2,700	0.04	3.6	220	2,000	0.06	3.6	480	3,200

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●오일 미스트 분사, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●절입량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut. ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALS230  
Model number:IALS230

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material		알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			궤 mm	궤 mm			궤 mm	궤 mm			궤 mm	궤 mm		
2	0.1	0.3	0.006	0.06	150	40,000	0.006	0.06	150	40,000	0.004	0.06	70	40,000
		0.5	0.005	0.06	100	40,000	0.005	0.06	100	40,000	0.003	0.06	25	40,000
		1	0.002	0.06	40	40,000	0.002	0.06	40	40,000	0.002	0.06	20	40,000
	0.15	0.3	0.008	0.09	200	40,000	0.008	0.09	200	40,000	0.004	0.09	100	40,000
		0.5	0.008	0.09	150	40,000	0.008	0.09	150	40,000	0.004	0.09	70	40,000
	0.2	0.5	0.012	0.12	330	40,000	0.012	0.12	330	40,000	0.007	0.12	200	40,000
		0.75	0.01	0.12	280	40,000	0.01	0.12	280	40,000	0.006	0.12	170	40,000
		1	0.008	0.12	250	40,000	0.008	0.12	250	40,000	0.005	0.12	130	40,000
	0.3	0.8	0.024	0.18	400	40,000	0.024	0.18	400	40,000	0.015	0.18	210	35,000
		1	0.024	0.18	400	40,000	0.024	0.18	400	40,000	0.015	0.18	210	35,000
		1.5	0.018	0.18	350	40,000	0.018	0.18	350	40,000	0.01	0.18	180	35,000
		2	0.012	0.18	320	40,000	0.012	0.18	320	40,000	0.007	0.18	130	30,000
		2.5	0.008	0.18	280	35,000	0.008	0.18	280	35,000	0.005	0.18	110	25,000
		3	0.006	0.18	250	35,000	0.006	0.18	250	35,000	0.004	0.18	80	25,000
	0.4	1	0.03	0.24	600	40,000	0.03	0.24	600	40,000	0.018	0.24	280	30,000
		1.2	0.026	0.24	500	40,000	0.026	0.24	500	40,000	0.014	0.24	230	30,000
		1.5	0.026	0.24	500	40,000	0.026	0.24	500	40,000	0.014	0.24	230	30,000
		2	0.024	0.24	450	40,000	0.024	0.24	450	40,000	0.014	0.24	210	30,000
		2.5	0.02	0.24	400	40,000	0.02	0.24	400	40,000	0.01	0.24	180	25,000
		3	0.018	0.24	350	35,000	0.018	0.24	350	35,000	0.01	0.24	140	25,000
	0.5	1	0.036	0.3	650	35,000	0.036	0.3	650	35,000	0.022	0.3	300	25,000
		1.5	0.033	0.3	630	35,000	0.033	0.3	630	35,000	0.02	0.3	280	25,000
		2	0.03	0.3	600	35,000	0.03	0.3	600	35,000	0.018	0.3	270	25,000
		2.5	0.027	0.3	580	35,000	0.027	0.3	580	35,000	0.016	0.3	240	25,000
3		0.024	0.3	550	35,000	0.024	0.3	550	35,000	0.014	0.3	230	25,000	
3.5		0.021	0.3	500	30,000	0.021	0.3	500	30,000	0.012	0.3	200	22,000	
0.6	4	0.018	0.3	420	30,000	0.018	0.3	420	30,000	0.01	0.3	180	22,000	
	1.5	0.04	0.36	700	35,000	0.04	0.36	700	35,000	0.025	0.36	350	25,000	
	1.8	0.04	0.36	700	35,000	0.04	0.36	700	35,000	0.025	0.36	330	25,000	
	2	0.04	0.36	700	35,000	0.04	0.36	700	35,000	0.025	0.36	330	25,000	
	3	0.035	0.36	650	35,000	0.035	0.36	650	35,000	0.02	0.36	300	25,000	
	4	0.03	0.36	550	30,000	0.03	0.36	550	30,000	0.018	0.36	250	22,000	
0.7	5	0.024	0.36	480	30,000	0.024	0.36	480	30,000	0.014	0.36	190	20,000	
	6	0.018	0.36	380	25,000	0.018	0.36	380	25,000	0.01	0.36	150	18,000	
	2	0.05	0.42	750	35,000	0.05	0.42	750	35,000	0.03	0.42	350	25,000	
	4	0.04	0.42	600	30,000	0.04	0.42	600	30,000	0.02	0.42	280	22,000	
	6	0.03	0.42	450	25,000	0.03	0.42	450	25,000	0.015	0.42	190	18,000	
	2.2	0.06	0.48	850	35,000	0.06	0.48	850	35,000	0.03	0.48	450	22,000	
0.8	3	0.06	0.48	850	35,000	0.06	0.48	850	35,000	0.03	0.48	450	22,000	
	4	0.055	0.48	720	30,000	0.055	0.48	720	30,000	0.03	0.48	350	22,000	
	5	0.05	0.48	650	30,000	0.05	0.48	650	30,000	0.025	0.48	300	20,000	
	6	0.04	0.48	560	25,000	0.04	0.48	560	25,000	0.02	0.48	250	18,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 절삭 가공을 할 때는 절삭 가공의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●궤 p 축 방향, 궤 e 방향. 궤 p=Axial Depth of Cut 궤 e=Radial Depth of Cut.  
●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●절삭량은, 절삭 가공을 할 때는 절삭 가공의 최대치입니다. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material		알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			궤 mm	궤 mm			궤 mm	궤 mm			궤 mm	궤 mm		
2	0.8	8	0.025	0.48	430	22,000	0.025	0.48	430	22,000	0.015	0.48	190	15,000
		4	0.06	0.54	1,000	30,000	0.06	0.54	1,000	30,000	0.035	0.54	550	22,000
	0.9	6	0.05	0.54	750	25,000	0.05	0.54	750	25,000	0.03	0.54	350	18,000
		8	0.04	0.54	620	22,000	0.04	0.54	620	22,000	0.02	0.54	280	16,000
	1	2	0.08	0.6	1,800	30,000	0.08	0.6	1,800	30,000	0.06	0.6	950	22,000
		3	0.07	0.6	1,500	30,000	0.07	0.6	1,500	30,000	0.05	0.6	750	22,000
		4	0.065	0.6	1,300	30,000	0.065	0.6	1,300	30,000	0.045	0.6	650	22,000
		6	0.055	0.6	1,000	25,000	0.055	0.6	1,000	25,000	0.035	0.6	450	18,000
		7	0.05	0.6	1,000	25,000	0.05	0.6	1,000	25,000	0.03	0.6	450	18,000
		8	0.045	0.6	850	22,000	0.045	0.6	850	22,000	0.025	0.6	350	15,000
	1.2	9	0.04	0.6	850	22,000	0.04	0.6	850	22,000	0.02	0.6	350	15,000
		10	0.03	0.6	750	20,000	0.03	0.6	750	20,000	0.018	0.6	300	14,000
		12	0.025	0.6	650	18,000	0.025	0.6	650	18,000	0.014	0.6	250	12,000
		4	0.07	0.72	1,400	27,000	0.07	0.72	1,400	27,000	0.05	0.72	750	20,000
		6	0.06	0.72	1,200	25,000	0.06	0.72	1,200	25,000	0.04	0.72	550	18,000
		8	0.05	0.72	1,000	22,000	0.05	0.72	1,000	22,000	0.03	0.72	450	15,000
	1.4	10	0.04	0.72	850	20,000	0.04	0.72	850	20,000	0.02	0.72	400	14,000
		12	0.03	0.72	700	17,000	0.03	0.72	700	17,000	0.018	0.72	300	12,000
		6	0.08	0.84	1,500	24,000	0.08	0.84	1,500	24,000	0.06	0.84	670	16,000
		8	0.07	0.84	1,300	22,000	0.07	0.84	1,300	22,000	0.05	0.84	530	14,000
		10	0.06	0.84	1,100	20,000	0.06	0.84	1,100	20,000	0.04	0.84	470	13,000
		12	0.05	0.84	850	17,000	0.05	0.84	850	17,000	0.03	0.84	400	12,000
	1.5	14	0.04	0.84	700	15,000	0.04	0.84	700	15,000	0.025	0.84	300	11,000
		16	0.03	0.84	550	13,000	0.03	0.84	550	13,000	0.018	0.84	250	10,000
3		0.1	0.9	1,700	26,000	0.1	0.9	1,700	26,000	0.08	0.9	810	18,000	
4		0.1	0.9	1,700	26,000	0.1	0.9	1,700	26,000	0.08	0.9	810	18,000	
6		0.09	0.9	1,500	24,000	0.09	0.9	1,500	24,000	0.07	0.9	670	16,000	
8		0.08	0.9	1,300	22,000	0.08	0.9	1,300	22,000	0.06	0.9	530	14,000	
1.6	10	0.07	0.9	1,100	20,000	0.07	0.9	1,100	20,000	0.05	0.9	470	13,000	
	12	0.06	0.9	850	17,000	0.06	0.9	850	17,000	0.04	0.9	400	12,000	
	14	0.05	0.9	750	16,000	0.05	0.9	750	16,000	0.03	0.9	330	11,000	
	16	0.04	0.9	650	15,000	0.04	0.9	650	15,000	0.025	0.9	270	10,000	
	6	0.1	0.96	1,500	24,000	0.1	0.96	1,500	24,000	0.08	0.96	670	16,000	
	8	0.09	0.96	1,300	22,000	0.09	0.96	1,300	22,000	0.07	0.96	530	14,000	
1.8	10	0.08	0.96	1,100	20,000	0.08	0.96	1,100	20,000	0.06	0.96	470	13,000	
	12	0.07	0.96	900	18,000	0.07	0.96	900	1					

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALS230  
Model number:IALS230

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	1.8	14	0.07	1.08	800	16,000	0.07	1.08	800	16,000	0.05	1.08	370	11,000
			0.06	1.08	700	15,000	0.06	1.08	700	15,000	0.04	1.08	300	10,000
	2	4	0.15	1.2	1,850	20,000	0.15	1.2	1,850	20,000	0.12	1.2	850	13,000
			0.14	1.2	1,750	20,000	0.14	1.2	1,750	20,000	0.1	1.2	800	13,000
			0.13	1.2	1,650	20,000	0.13	1.2	1,650	20,000	0.09	1.2	750	13,000
			0.12	1.2	1,500	20,000	0.12	1.2	1,500	20,000	0.08	1.2	700	13,000
			0.11	1.2	1,200	17,000	0.11	1.2	1,200	17,000	0.07	1.2	600	12,000
			0.1	1.2	1,100	16,000	0.1	1.2	1,100	16,000	0.06	1.2	520	11,000
			0.085	1.2	1,000	15,000	0.085	1.2	1,000	15,000	0.06	1.2	520	11,000
			0.085	1.2	1,000	15,000	0.085	1.2	1,000	15,000	0.05	1.2	450	10,000
	2.5	8	0.07	1.2	800	13,000	0.07	1.2	800	13,000	0.04	1.2	380	9,000
			0.06	1.2	720	12,000	0.06	1.2	720	12,000	0.035	1.2	310	8,000
			0.18	1.5	1,700	16,000	0.18	1.5	1,700	16,000	0.12	1.5	850	11,000
			0.17	1.5	1,600	16,000	0.17	1.5	1,600	16,000	0.11	1.5	750	11,000
			0.16	1.5	1,500	16,000	0.16	1.5	1,500	16,000	0.1	1.5	700	11,000
			0.15	1.5	1,200	14,000	0.15	1.5	1,200	14,000	0.09	1.5	600	10,000
			0.12	1.5	1,100	13,000	0.12	1.5	1,100	13,000	0.07	1.5	500	9,000
			0.11	1.5	950	12,000	0.11	1.5	950	12,000	0.06	1.5	430	8,000
	3	8	0.1	1.5	850	11,000	0.1	1.5	850	11,000	0.05	1.5	350	7,000
			0.24	1.8	1,800	13,000	0.24	1.8	1,800	13,000	0.16	1.8	950	9,000
0.22			1.8	1,700	13,000	0.22	1.8	1,700	13,000	0.14	1.8	850	9,000	
0.2			1.8	1,600	13,000	0.2	1.8	1,600	13,000	0.12	1.8	750	9,000	
0.17			1.8	1,400	13,000	0.17	1.8	1,400	13,000	0.1	1.8	650	9,000	
0.15			1.8	1,200	12,000	0.15	1.8	1,200	12,000	0.1	1.8	650	9,000	
0.15			1.8	1,200	12,000	0.15	1.8	1,200	12,000	0.09	1.8	550	8,000	
0.13			1.8	1,100	12,000	0.13	1.8	1,100	12,000	0.08	1.8	500	8,000	
0.12			1.8	1,000	11,000	0.12	1.8	1,000	11,000	0.07	1.8	400	7,000	
0.1			1.8	900	10,000	0.1	1.8	900	10,000	0.06	1.8	330	6,000	
4	10	0.07	1.8	730	8,500	0.07	1.8	730	8,500	0.045	1.8	250	5,000	
		0.36	2.4	1,900	10,000	0.36	2.4	1,900	10,000	0.25	2.4	800	6,000	
		0.36	2.4	1,900	10,000	0.36	2.4	1,900	10,000	0.25	2.4	800	6,000	
		0.3	2.4	1,800	10,000	0.3	2.4	1,800	10,000	0.2	2.4	750	6,000	
		0.3	2.4	1,800	10,000	0.3	2.4	1,800	10,000	0.2	2.4	750	6,000	
		0.24	2.4	1,600	10,000	0.24	2.4	1,600	10,000	0.15	2.4	680	6,000	
		0.18	2.4	1,300	8,500	0.18	2.4	1,300	8,500	0.1	2.4	550	5,000	
5	15	0.15	2.4	1,200	8,500	0.15	2.4	1,200	8,500	0.08	2.4	490	5,000	
		0.12	2.4	1,000	7,200	0.12	2.4	1,000	7,200	0.07	2.4	400	4,500	
		0.42	3	1,700	7,200	0.42	3	1,700	7,200	0.3	3	750	4,500	
		0.42	3	1,700	7,200	0.42	3	1,700	7,200	0.3	3	750	4,500	
		0.36	3	1,600	7,200	0.36	3	1,600	7,200	0.25	3	680	4,500	
5	20	0.3	3	1,500	7,200	0.3	3	1,500	7,200	0.2	3	630	4,500	
		0.3	3	1,500	7,200	0.3	3	1,500	7,200	0.2	3	630	4,500	
		0.24	3	1,100	6,000	0.24	3	1,100	6,000	0.15	3	490	4,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
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●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	5	35	0.18	3	1,000	6,000	0.18	3	1,000	6,000	0.1	3	370	3,500
			0.12	3	720	4,800	0.12	3	720	4,800	0.07	3	290	3,000
	6	15	0.5	3.6	1,700	6,500	0.5	3.6	1,700	6,500	0.38	3.6	650	3,800
			0.48	3.6	1,500	6,000	0.48	3.6	1,500	6,000	0.35	3.6	580	3,500
			0.42	3.6	1,100	4,800	0.42	3.6	1,100	4,800	0.3	3.6	450	3,000
			0.3	3.6	780	4,200	0.3	3.6	780	4,200	0.2	3.6	330	2,700
			0.18	3.6	600	3,600	0.18	3.6	600	3,600	0.1	3.6	230	2,200
			0.06	3.6	480	3,200	0.06	3.6	480	3,200	0.04	3.6	170	2,000

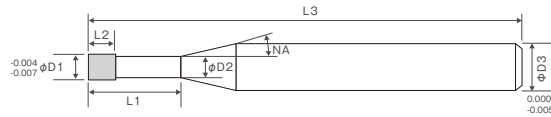
●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

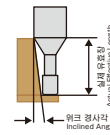
초경 롱 넥 스퀘어 엔드밀  
Carbide Long Neck Square End Mill

■형번:IALS430 Model number:IALS430

ion A super MG 날수 4 벨리스각 30° 목각 15° Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

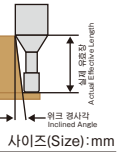


사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
IALS430-0100-0400	1	4	1.5	0.95	15	4	50	3,200	4.23	4.38	4.54	4.71	5.09
IALS430-0100-0600		6	0.8	0.95	15	4	50	3,200	6.30	6.52	6.75	7.01	7.57
IALS430-0100-0800		8	1.5	0.95	15	4	50	3,200	8.37	8.66	8.97	9.31	10.06
IALS430-0100-1000		10	0.8	0.95	15	4	50	3,200	10.43	10.80	11.19	11.61	12.55
IALS430-0100-1200		12	1.5	0.95	15	4	50	3,200	12.50	12.94	13.40	13.91	15.03
IALS430-0110-0600		1.1	6	1.7	1.05	15	4	50	5,600	6.30	6.52	6.75	7.01
IALS430-0110-1000	10		1.7	1.05	15	4	50	5,600	10.43	10.80	11.19	11.61	12.55
IALS430-0120-0600	1.2	6	1.8	1.15	15	4	50	3,200	6.30	6.52	6.75	7.01	7.57
IALS430-0120-0800		8	1.8	1.15	15	4	50	3,200	8.37	8.66	8.97	9.31	10.06
IALS430-0120-1000		10	1.8	1.15	15	4	50	3,200	10.43	10.80	11.19	11.61	12.55
IALS430-0120-1200	1.3	12	1.8	1.15	15	4	50	3,200	12.50	12.94	13.40	13.91	15.03
IALS430-0130-0600		6	1.9	1.25	15	4	50	5,600	6.30	6.52	6.75	7.01	7.57
IALS430-0130-1200		12	1.9	1.25	15	4	50	5,600	12.50	12.94	13.40	13.91	15.03
IALS430-0140-0600	1.4	6	2.1	1.35	15	4	50	3,200	6.30	6.52	6.75	7.01	7.57
IALS430-0140-0800		8	2.1	1.35	15	4	50	3,200	8.37	8.66	8.97	9.31	10.06
IALS430-0140-1000		10	2.1	1.35	15	4	50	3,200	10.43	10.80	11.19	11.61	12.55
IALS430-0140-1200		12	2.1	1.35	15	4	50	3,200	12.50	12.94	13.40	13.91	15.03
IALS430-0140-1400		14	2.1	1.35	15	4	50	3,200	14.57	15.08	15.62	16.21	17.52
IALS430-0140-1600	1.5	16	2.1	1.35	15	4	50	4,480	16.64	17.21	17.84	18.50	20.01
IALS430-0150-0300		3	1.1	1.45	15	4	50	3,200	3.20	3.31	3.43	3.56	3.85
IALS430-0150-0600		6	1.1	1.45	15	4	50	3,200	6.30	6.52	6.75	7.01	7.57
IALS430-0150-0800		8	2.3	1.45	15	4	50	3,200	8.37	8.66	8.97	9.31	10.06
IALS430-0150-1000		10	1.1	1.45	15	4	50	3,200	10.43	10.80	11.19	11.61	12.55
IALS430-0150-1200		12	2.3	1.45	15	4	50	3,200	12.50	12.94	13.40	13.91	15.03
IALS430-0150-1400	1.6	14	2.3	1.45	15	4	50	3,200	14.57	15.08	15.62	16.21	17.52
IALS430-0150-1600		16	2.3	1.45	15	4	50	3,200	16.64	17.21	17.84	18.50	20.01
IALS430-0160-0600		6	2.4	1.55	15	4	50	3,200	6.30	6.52	6.75	7.01	7.57
IALS430-0160-0800		8	2.4	1.55	15	4	50	3,200	8.37	8.66	8.97	9.31	10.06
IALS430-0160-1000		10	2.4	1.55	15	4	50	3,200	10.43	10.80	11.19	11.61	12.55
IALS430-0160-1200	12	2.4	1.55	15	4	50	3,200	12.50	12.94	13.40	13.91	15.03	

# ion Depo Type A Series

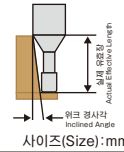


사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
IALS430-0160-1400	1.6	14	2.4	1.55	15	4	50	3,200	14.57	15.08	15.62	16.21	17.52
IALS430-0160-1600		16	2.4	1.55	15	4	50	3,200	16.64	17.21	17.84	18.50	20.01
IALS430-0170-0600	1.7	6	2.5	1.65	15	4	50	4,000	6.30	6.52	6.75	7.01	7.57
IALS430-0170-1400		14	2.5	1.65	15	4	50	4,000	14.57	15.08	15.62	16.21	17.52
IALS430-0180-0600	1.8	6	2.7	1.75	15	4	50	3,200	6.30	6.52	6.75	7.01	7.57
IALS430-0180-0800		8	2.7	1.75	15	4	50	3,200	8.37	8.66	8.97	9.31	10.06
IALS430-0180-1000		10	2.7	1.75	15	4	50	3,200	10.43	10.80	11.19	11.61	12.55
IALS430-0180-1200		12	2.7	1.75	15	4	50	3,200	12.50	12.94	13.40	13.91	15.03
IALS430-0180-1400		14	2.7	1.75	15	4	50	3,200	14.57	15.08	15.62	16.21	17.52
IALS430-0180-1600		16	2.7	1.75	15	4	50	3,200	16.64	17.21	17.84	18.50	20.01
IALS430-0190-0600	1.9	6	2.8	1.85	15	4	50	5,600	6.30	6.52	6.75	7.01	7.57
IALS430-0190-1600		16	2.8	1.85	15	4	50	5,600	16.64	17.21	17.84	18.50	20.01
IALS430-0200-0600	2	6	1.5	1.94	15	4	50	3,200	6.32	6.54	6.77	7.03	7.60
IALS430-0200-0800		8	3	1.94	15	4	50	3,200	8.39	8.68	8.99	9.33	10.08
IALS430-0200-1000		10	1.5	1.94	15	4	50	3,200	10.45	10.82	11.21	11.63	12.57
IALS430-0200-1200		12	3	1.94	15	4	50	3,200	12.52	12.96	13.42	13.93	15.06
IALS430-0200-1400		14	3	1.94	15	4	50	3,200	14.59	15.10	15.64	16.23	17.54
IALS430-0200-1500		15	1.5	1.94	15	4	50	3,200	15.62	16.17	16.75	17.38	18.79
IALS430-0200-1600		16	3	1.94	15	4	50	3,200	16.65	17.23	17.86	18.53	FREE
IALS430-0200-1800		18	3	1.94	15	4	50	3,200	18.72	19.37	20.07	20.83	FREE
IALS430-0200-2000	2.5	20	1.5	1.94	15	4	50	3,200	20.79	21.51	22.29	23.13	FREE
IALS430-0250-0800		8	3.7	2.44	15	4	50	3,200	8.39	8.68	8.99	9.33	10.08
IALS430-0250-1200		12	3.7	2.44	15	4	50	3,200	12.52	12.96	13.42	13.93	FREE
IALS430-0250-1600		16	3.7	2.44	15	4	50	3,200	16.65	17.23	17.86	18.53	FREE
IALS430-0250-2000	3	20	3.7	2.44	15	4	50	3,200	20.79	21.51	22.29	FREE	FREE
IALS430-0300-0800		8	4.5	2.85	15	4	50	4,480	8.56	8.86	9.18	9.52	FREE
IALS430-0300-1000		10	2.5	2.85	15	4	50	4,480	10.63	11.00	11.39	11.82	FREE
IALS430-0300-1200	3.5	12	4.5	2.85	15	4	50	4,480	12.69	13.14	13.61	14.12	FREE
IALS430-0300-1500		15	2.5	2.85	15	4	50	4,480	15.79	16.34	16.93	FREE	FREE
IALS430-0300-1600		16	4.5	2.85	15	4	50	4,480	16.83	17.41	18.04	FREE	FREE
IALS430-0300-2000		20	2.5	2.85	15	4	50	4,480	20.96	21.69	FREE	FREE	FREE
IALS430-0300-2500		25	4.5	2.85	15	4	60	4,480	26.13	27.04	FREE	FREE	FREE
IALS430-0300-3000	4	30	4.5	2.85	15	4	60	5,760	31.30	FREE	FREE	FREE	FREE
IALS430-0350-1500		15	5.5	3.35	15	6	50	5,040	15.79	16.34	16.93	17.57	18.99
IALS430-0350-2500		25	5.5	3.35	15	6	60	5,040	26.13	27.04	28.02	29.07	FREE
IALS430-0350-3500	4	35	5.5	3.35	15	6	70	6,400	36.47	37.74	39.10	FREE	FREE
IALS430-0400-1000		10	3	3.8	15	6	50	5,040	10.72	11.10	11.50	11.93	12.89
IALS430-0400-1200		12	6	3.8	15	6	50	5,040	12.79	13.24	13.71	14.23	15.38
IALS430-0400-1500		15	3	3.8	15	6	50	5,040	15.89	16.44	17.04	17.68	FREE
IALS430-0400-1600		16	6	3.8	15	6	50	5,040	16.92	17.51	18.15	18.83	FREE
IALS430-0400-2000		20	3	3.8	15	6	50	5,040	21.06	21.79	22.58	23.43	FREE
IALS430-0400-2500		25	6	3.8	15	6	60	5,040	26.23	27.14	28.12	FREE	FREE
IALS430-0400-3000		30	6	3.8	15	6	60	5,040	31.40	32.49	33.66	FREE	FREE
IALS430-0400-3500	5	35	6	3.8	15	6	70	5,040	36.56	37.84	FREE	FREE	FREE
IALS430-0500-1500		15	3.5	4.8	15	6	50	6,400	15.89	16.44	17.04	FREE	FREE

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series



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코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부지)경 (D2) Neck Diameter	목각 (NA) <sup>1)</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
IALS430-0500-1600	5	16	7.5	4.8	15	6	50	6,400	16.92	17.51	18.15	FREE	FREE
IALS430-0500-2000		20	3.5	4.8	15	6	50	6,400	21.06	21.79	FREE	FREE	FREE
IALS430-0500-2500		25	7.5	4.8	15	6	60	6,400	26.23	27.14	FREE	FREE	FREE
IALS430-0500-3500		35	7.5	4.8	15	6	70	6,400	36.56	FREE	FREE	FREE	FREE
IALS430-0600-2000	6	20	6	5.8	15	6	50	6,400	FREE	FREE	FREE	FREE	FREE
IALS430-0600-3000		30	6	5.8	15	6	60	6,400	FREE	FREE	FREE	FREE	FREE
IALS430-0600-4000		40	9	5.8	15	6	70	7,680	FREE	FREE	FREE	FREE	FREE
IALS430-0600-5000		50	9	5.8	15	6	80	9,680	FREE	FREE	FREE	FREE	FREE
IALS430-0800-3000	8	30	12	7.8	15	8	70	11,200	FREE	FREE	FREE	FREE	FREE
IALS430-0800-5000		50	12	7.8	15	8	90	13,920	FREE	FREE	FREE	FREE	FREE
IALS430-0800-6000		60	12	7.8	15	8	100	14,880	FREE	FREE	FREE	FREE	FREE
IALS430-1000-4000	10	40	15	9.8	15	10	90	12,080	FREE	FREE	FREE	FREE	FREE
IALS430-1000-6000		60	15	9.8	15	10	110	16,720	FREE	FREE	FREE	FREE	FREE
IALS430-1000-8000		80	15	9.8	15	10	130	18,640	FREE	FREE	FREE	FREE	FREE

## ion Depo Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번:IALS430  
Model number:IALS430

### 롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

날수 Number of Flutes	외경 Dia.	날장 Effective Length	주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61						
			Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed			
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>			
4		1	4	0.055	0.6	1,700	25,000	0.055	0.6	1,700	25,000	0.045	0.6	1,100	22,000	0.055	0.6	1,700	25,000		
			6	0.045	0.6	1,200	20,000	0.045	0.6	1,200	20,000	0.035	0.6	750	18,000	0.045	0.6	1,200	20,000		
			8	0.035	0.6	1,050	18,000	0.035	0.6	1,050	18,000	0.025	0.6	600	15,000	0.035	0.6	1,050	18,000		
			10	0.025	0.6	900	16,000	0.025	0.6	900	16,000	0.018	0.6	520	14,000	0.025	0.6	900	16,000		
			12	0.02	0.6	750	14,000	0.02	0.6	750	14,000	0.014	0.6	450	12,000	0.02	0.6	750	14,000		
			1.1	6	0.05	0.66	1,300	20,000	0.05	0.66	1,300	20,000	0.04	0.66	820	18,000	0.05	0.66	1,300	20,000	
				10	0.03	0.66	1,000	16,000	0.03	0.66	1,000	16,000	0.02	0.66	600	14,000	0.03	0.66	1,000	16,000	
				1.2	6	0.05	0.72	1,400	20,000	0.05	0.72	1,400	20,000	0.04	0.72	900	18,000	0.05	0.72	1,400	20,000
					8	0.04	0.72	1,200	18,000	0.04	0.72	1,200	18,000	0.03	0.72	750	15,000	0.04	0.72	1,200	18,000
			10	10	0.03	0.72	1,050	16,000	0.03	0.72	1,050	16,000	0.02	0.72	670	14,000	0.03	0.72	1,050	16,000	
				12	0.025	0.72	900	14,000	0.025	0.72	900	14,000	0.018	0.72	530	12,000	0.025	0.72	900	14,000	
			1.3	6	0.06	0.78	1,500	20,000	0.06	0.78	1,500	20,000	0.05	0.78	1,000	17,000	0.06	0.78	1,500	20,000	
		12		0.03	0.78	1,000	14,000	0.03	0.78	1,000	14,000	0.025	0.78	600	12,000	0.03	0.78	1,000	14,000		
		1.4	6	0.07	0.84	1,800	20,000	0.07	0.84	1,800	20,000	0.06	0.84	1,100	16,000	0.07	0.84	1,800	20,000		
			8	0.06	0.84	1,500	18,000	0.06	0.84	1,500	18,000	0.05	0.84	900	14,000	0.06	0.84	1,500	18,000		
			10	0.05	0.84	1,300	16,000	0.05	0.84	1,300	16,000	0.04	0.84	780	13,000	0.05	0.84	1,300	16,000		
			12	0.04	0.84	1,050	14,000	0.04	0.84	1,050	14,000	0.03	0.84	670	12,000	0.04	0.84	1,050	14,000		
			14	0.035	0.84	900	13,000	0.035	0.84	900	13,000	0.025	0.84	530	11,000	0.035	0.84	900	13,000		
			16	0.025	0.84	750	12,000	0.025	0.84	750	12,000	0.018	0.84	450	10,000	0.025	0.84	750	12,000		
		1.5	3	0.08	0.9	1,800	20,000	0.08	0.9	1,800	20,000	0.07	0.9	1,100	16,000	0.08	0.9	1,800	20,000		
			6	0.08	0.9	1,800	20,000	0.08	0.9	1,800	20,000	0.07	0.9	1,100	16,000	0.08	0.9	1,800	20,000		
			8	0.07	0.9	1,500	18,000	0.07	0.9	1,500	18,000	0.06	0.9	900	14,000	0.07	0.9	1,500	18,000		
			10	0.06	0.9	1,300	16,000	0.06	0.9	1,300	16,000	0.05	0.9	780	13,000	0.06	0.9	1,300	16,000		
			12	0.05	0.9	1,050	14,000	0.05	0.9	1,050	14,000	0.04	0.9	670	12,000	0.05	0.9	1,050	14,000		
			14	0.04	0.9	900	13,000	0.04	0.9	900	13,000	0.03	0.9	570	11,000	0.04	0.9	900	13,000		
		16	16	0.035	0.9	750	12,000	0.035	0.9	750	12,000	0.025	0.9	480	10,000	0.035	0.9	750	12,000		
			6	0.09	0.96	1,800	20,000	0.09	0.96	1,800	20,000	0.08	0.96	1,100	16,000	0.09	0.96	1,800	20,000		
		1.6	8	0.08	0.96	1,500	18,000	0.08	0.96	1,500	18,000	0.07	0.96	900	14,000	0.08	0.96	1,500	18,000		
			10	0.07	0.96	1,300	16,000	0.07	0.96	1,300	16,000	0.06	0.96	780	13,000	0.07	0.96	1,300	16,000		
			12	0.06	0.96	1,050	14,000	0.06	0.96	1,050	14,000	0.05	0.96	670	12,000	0.06	0.96	1,050	14,000		
			14	0.05	0.96	900	13,000	0.05	0.96	900	13,000	0.04	0.96	570	11,000	0.05	0.96	900	13,000		
			16	0.04	0.96	750	12,000	0.04	0.96	750	12,000	0.03	0.96	480	10,000	0.04	0.96	750	12,000		
		1.7	6	0.095	1.02	1,900	19,000	0.095	1.02	1,900	19,000	0.085	1.02	1,150	15,000	0.095	1.02	1,900	19,000		
			14	0.055	1.02	950	13,000	0.055	1.02	950	13,000	0.045	1.02	630	11,000	0.055	1.02	950	13,000		
		1.8	6	0.1	1.08	2,000	18,000	0.1	1.08	2,000	18,000	0.09	1.08	1,200	14,000	0.1	1.08	2,000	18,000		
			8	0.09	1.08	1,700	18,000	0.09	1.08	1,700	18,000	0.08	1.08	1,000	14,000	0.09	1.08	1,700	18,000		
			10	0.08	1.08	1,400	16,000	0.08	1.08	1,400	16,000	0.07	1.08	850	13,000	0.08	1.08	1,400	16,000		
			12	0.07	1.08	1,100	14,000	0.07	1.08	1,100	14,000	0.06	1.08	720	12,000	0.07	1.08	1,100	14,000		
			14	0.06	1.08	1,000	13,000	0.06	1.08	1,000	13,000	0.05	1.08	630	11,000	0.06	1.08	1,000	13,000		
			16	0.05	1.08	850	12,000	0.05	1.08	850	12,000	0.04	1.08	530	10,000	0.05	1.08	850	12,000		
		1.9	6	0.11	1.14	2,100	17,000	0.11	1.14	2,100	17,000	0.095	1.14	1,250	14,000	0.11	1.14	2,100	17,000		
			16	0.06	1.14	1,000	12,000	0.06	1.14	1,000	12,000	0.045	1.14	630	10,000	0.06	1.14	1,000	12,000		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량은, 절삭 가공을 할 때는 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●공구 미스트 클린트, 또는 물수분성 절삭유를 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALS430  
Model number:IALS430

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm
4	2	6	0.12	1.2	2,100	16,000	0.12	1.2	2,100	16,000	0.1	1.2	1,300	13,000	0.12	1.2	2,100	16,000	
		8	0.11	1.2	2,000	16,000	0.11	1.2	2,000	16,000	0.09	1.2	1,200	13,000	0.11	1.2	2,000	16,000	
		10	0.1	1.2	1,800	16,000	0.1	1.2	1,800	16,000	0.08	1.2	1,100	13,000	0.1	1.2	1,800	16,000	
		12	0.09	1.2	1,500	14,000	0.09	1.2	1,500	14,000	0.07	1.2	1,000	12,000	0.09	1.2	1,500	14,000	
		14	0.08	1.2	1,350	13,000	0.08	1.2	1,350	13,000	0.06	1.2	850	11,000	0.08	1.2	1,350	13,000	
		15	0.07	1.2	1,200	12,000	0.07	1.2	1,200	12,000	0.05	1.2	750	10,000	0.07	1.2	1,200	12,000	
		16	0.07	1.2	1,200	12,000	0.07	1.2	1,200	12,000	0.05	1.2	750	10,000	0.07	1.2	1,200	12,000	
		18	0.06	1.2	1,000	11,000	0.06	1.2	1,000	11,000	0.04	1.2	650	9,000	0.06	1.2	1,000	11,000	
		20	0.05	1.2	900	10,000	0.05	1.2	900	10,000	0.04	1.2	550	8,000	0.05	1.2	900	10,000	
		2.5	8	0.15	1.5	2,100	13,000	0.15	1.5	2,100	13,000	0.12	1.5	1,400	11,000	0.15	1.5	2,100	13,000
			12	0.13	1.5	1,800	13,000	0.13	1.5	1,800	13,000	0.1	1.5	1,100	11,000	0.13	1.5	1,800	13,000
			16	0.1	1.5	1,400	11,000	0.1	1.5	1,400	11,000	0.07	1.5	850	9,000	0.1	1.5	1,400	11,000
	20		0.08	1.5	1,100	9,000	0.08	1.5	1,100	9,000	0.05	1.5	600	7,000	0.08	1.5	1,100	9,000	
	3	8	0.2	1.8	2,300	11,000	0.2	1.8	2,300	11,000	0.16	1.8	1,500	9,000	0.2	1.8	2,300	11,000	
		10	0.16	1.8	2,000	11,000	0.16	1.8	2,000	11,000	0.12	1.8	1,200	9,000	0.16	1.8	2,000	11,000	
		12	0.16	1.8	2,000	11,000	0.16	1.8	2,000	11,000	0.12	1.8	1,200	9,000	0.16	1.8	2,000	11,000	
		15	0.12	1.8	1,500	10,000	0.12	1.8	1,500	10,000	0.09	1.8	900	8,000	0.12	1.8	1,500	10,000	
		16	0.12	1.8	1,500	10,000	0.12	1.8	1,500	10,000	0.09	1.8	900	8,000	0.12	1.8	1,500	10,000	
		20	0.1	1.8	1,200	9,000	0.1	1.8	1,200	9,000	0.07	1.8	680	7,000	0.1	1.8	1,200	9,000	
		25	0.08	1.8	1,050	8,000	0.08	1.8	1,050	8,000	0.06	1.8	570	6,000	0.08	1.8	1,050	8,000	
	3.5	15	0.18	2.1	2,000	9,000	0.18	2.1	2,000	9,000	0.15	2.1	1,200	7,000	0.18	2.1	2,000	9,000	
		25	0.12	2.1	1,500	7,500	0.12	2.1	1,500	7,500	0.08	2.1	850	6,000	0.12	2.1	1,500	7,500	
		35	0.07	2.1	1,000	6,000	0.07	2.1	1,000	6,000	0.05	2.1	520	4,500	0.07	2.1	1,000	6,000	
	4	10	0.3	2.4	2,200	8,000	0.3	2.4	2,200	8,000	0.25	2.4	1,300	6,000	0.3	2.4	2,200	8,000	
		12	0.3	2.4	2,200	8,000	0.3	2.4	2,200	8,000	0.25	2.4	1,300	6,000	0.3	2.4	2,200	8,000	
		15	0.25	2.4	2,100	8,000	0.25	2.4	2,100	8,000	0.2	2.4	1,200	6,000	0.25	2.4	2,100	8,000	
		16	0.25	2.4	2,100	8,000	0.25	2.4	2,100	8,000	0.2	2.4	1,200	6,000	0.25	2.4	2,100	8,000	
		20	0.2	2.4	2,000	8,000	0.2	2.4	2,000	8,000	0.15	2.4	1,100	6,000	0.2	2.4	2,000	8,000	
		25	0.15	2.4	1,700	7,000	0.15	2.4	1,700	7,000	0.1	2.4	900	5,000	0.15	2.4	1,700	7,000	
		30	0.12	2.4	1,500	7,000	0.12	2.4	1,500	7,000	0.08	2.4	800	5,000	0.12	2.4	1,500	7,000	
	5	15	0.35	3	2,100	6,000	0.35	3	2,100	6,000	0.3	3	1,200	4,500	0.35	3	2,100	6,000	
		16	0.35	3	2,100	6,000	0.35	3	2,100	6,000	0.3	3	1,200	4,500	0.35	3	2,100	6,000	
		20	0.25	3	1,800	6,000	0.25	3	1,800	6,000	0.2	3	1,000	4,500	0.25	3	1,800	6,000	
		25	0.25	3	1,800	6,000	0.25	3	1,800	6,000	0.2	3	1,000	4,500	0.25	3	1,800	6,000	
		35	0.15	3	1,200	5,000	0.15	3	1,200	5,000	0.1	3	630	3,500	0.15	3	1,200	5,000	
	6	20	0.4	3.6	1,800	5,000	0.4	3.6	1,800	5,000	0.35	3.6	1,000	3,500	0.4	3.6	1,800	5,000	
		30	0.35	3.6	1,400	4,000	0.35	3.6	1,400	4,000	0.3	3.6	750	3,000	0.35	3.6	1,400	4,000	
		40	0.25	3.6	1,000	3,500	0.25	3.6	1,000	3,500	0.2	3.6	570	2,700	0.25	3.6	1,000	3,500	
		50	0.15	3.6	750	3,000	0.15	3.6	750	3,000	0.1	3.6	420	2,200	0.15	3.6	750	3,000	
	8	30	0.6	4.8	1,400	3,800	0.6	4.8	1,400	3,800	0.45	4.8	900	2,800	0.6	4.8	1,400	3,800	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량(∅p, ∅e)은 절삭 가공을 할 때는 절삭 가공의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p : 축 방향, ∅e : 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 분사, 또는 분수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 절삭 가공의 최대치입니다. Length of tool overhang must be as short as possible.  
●RPM & FEED는 절삭량에 비례하여 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
4	8	50	0.4	4.8	820	2,800	0.4	4.8	820	2,800	0.3	4.8	600	2,100	0.4	4.8	820	2,800
		60	0.3	4.8	680	2,400	0.3	4.8	680	2,400	0.2	4.8	450	1,800	0.3	4.8	680	2,400
	10	40	0.8	6	1,200	3,000	0.8	6	1,200	3,000	0.55	6	750	2,200	0.8	6	1,200	3,000
		60	0.6	6	750	2,200	0.6	6	750	2,200	0.45	6	520	1,600	0.6	6	750	2,200
		80	0.4	6	520	1,800	0.4	6	520	1,800	0.3	6	360	1,300	0.4	6	520	1,800

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●절삭량(∅p, ∅e)은 절삭 가공을 할 때는 절삭 가공의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p : 축 방향, ∅e : 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 분사, 또는 분수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 절삭 가공의 최대치입니다. Length of tool overhang must be as short as possible.  
●RPM & FEED는 절삭량에 비례하여 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALS430  
Model number:IALS430

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material		고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐(Copper Tungsten)				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			궤 mm	궤 mm			mm/min	min <sup>-1</sup>			궤 mm	궤 mm			mm/min	min <sup>-1</sup>		
4	1	4	0.045	0.6	950	22,000	0.055	0.6	1,700	25,000	0.045	0.6	1,100	22,000	0.055	0.6	1,700	25,000
		6	0.035	0.6	600	18,000	0.045	0.6	1,200	20,000	0.035	0.6	750	18,000	0.045	0.6	1,200	20,000
		8	0.025	0.6	450	15,000	0.035	0.6	1,050	18,000	0.025	0.6	600	15,000	0.035	0.6	1,050	18,000
		10	0.018	0.6	370	14,000	0.025	0.6	900	16,000	0.018	0.6	520	14,000	0.025	0.6	900	16,000
		12	0.014	0.6	300	12,000	0.02	0.6	750	14,000	0.014	0.6	450	12,000	0.02	0.6	750	14,000
	1.1	6	0.04	0.66	670	18,000	0.05	0.66	1,300	20,000	0.04	0.66	820	18,000	0.05	0.66	1,300	20,000
		10	0.02	0.66	450	14,000	0.03	0.66	1,000	16,000	0.02	0.66	600	14,000	0.03	0.66	1,000	16,000
	1.2	6	0.04	0.72	750	18,000	0.05	0.72	1,400	20,000	0.04	0.72	900	18,000	0.05	0.72	1,400	20,000
		8	0.03	0.72	600	15,000	0.04	0.72	1,200	18,000	0.03	0.72	750	15,000	0.04	0.72	1,200	18,000
		10	0.02	0.72	520	14,000	0.03	0.72	1,050	16,000	0.02	0.72	670	14,000	0.03	0.72	1,050	16,000
	1.3	6	0.05	0.78	850	17,000	0.06	0.78	1,500	20,000	0.05	0.78	1,000	17,000	0.06	0.78	1,500	20,000
		12	0.025	0.78	450	12,000	0.03	0.78	1,000	14,000	0.025	0.78	600	12,000	0.03	0.78	1,000	14,000
	1.4	6	0.06	0.84	950	16,000	0.07	0.84	1,800	20,000	0.06	0.84	1,100	16,000	0.07	0.84	1,800	20,000
		8	0.05	0.84	750	14,000	0.06	0.84	1,500	18,000	0.05	0.84	900	14,000	0.06	0.84	1,500	18,000
		10	0.04	0.84	630	13,000	0.05	0.84	1,300	16,000	0.04	0.84	780	13,000	0.05	0.84	1,300	16,000
		12	0.03	0.84	520	12,000	0.04	0.84	1,050	14,000	0.03	0.84	670	12,000	0.04	0.84	1,050	14,000
		14	0.025	0.84	380	11,000	0.035	0.84	900	13,000	0.025	0.84	530	11,000	0.035	0.84	900	13,000
	1.5	6	0.07	0.9	950	16,000	0.08	0.9	1,800	20,000	0.07	0.9	1,100	16,000	0.08	0.9	1,800	20,000
8		0.06	0.9	750	14,000	0.07	0.9	1,500	18,000	0.06	0.9	900	14,000	0.07	0.9	1,500	18,000	
10		0.05	0.9	630	13,000	0.06	0.9	1,300	16,000	0.05	0.9	780	13,000	0.06	0.9	1,300	16,000	
12		0.04	0.9	520	12,000	0.05	0.9	1,050	14,000	0.04	0.9	670	12,000	0.05	0.9	1,050	14,000	
14		0.03	0.9	420	11,000	0.04	0.9	900	13,000	0.03	0.9	570	11,000	0.04	0.9	900	13,000	
1.6	6	0.08	0.96	950	16,000	0.09	0.96	1,800	20,000	0.08	0.96	1,100	16,000	0.09	0.96	1,800	20,000	
	8	0.07	0.96	750	14,000	0.08	0.96	1,500	18,000	0.07	0.96	900	14,000	0.08	0.96	1,500	18,000	
	10	0.06	0.96	630	13,000	0.07	0.96	1,300	16,000	0.06	0.96	780	13,000	0.07	0.96	1,300	16,000	
	12	0.05	0.96	520	12,000	0.06	0.96	1,050	14,000	0.05	0.96	670	12,000	0.06	0.96	1,050	14,000	
	14	0.04	0.96	420	11,000	0.05	0.96	900	13,000	0.04	0.96	570	11,000	0.05	0.96	900	13,000	
1.7	6	0.085	1.02	1,000	15,000	0.095	1.02	1,900	19,000	0.085	1.02	1,150	15,000	0.095	1.02	1,900	19,000	
	14	0.045	1.02	480	11,000	0.055	1.02	950	13,000	0.045	1.02	630	11,000	0.055	1.02	950	13,000	
	6	0.09	1.08	1,050	14,000	0.1	1.08	2,000	18,000	0.09	1.08	1,200	14,000	0.1	1.08	2,000	18,000	
	8	0.08	1.08	850	14,000	0.09	1.08	1,700	18,000	0.08	1.08	1,000	14,000	0.09	1.08	1,700	18,000	
	10	0.07	1.08	700	13,000	0.08	1.08	1,400	16,000	0.07	1.08	850	13,000	0.08	1.08	1,400	16,000	
1.8	12	0.06	1.08	570	12,000	0.07	1.08	1,100	14,000	0.06	1.08	720	12,000	0.07	1.08	1,100	14,000	
	14	0.05	1.08	480	11,000	0.06	1.08	1,000	13,000	0.05	1.08	630	11,000	0.06	1.08	1,000	13,000	
	16	0.04	1.08	380	10,000	0.05	1.08	850	12,000	0.04	1.08	530	10,000	0.05	1.08	850	12,000	
	6	0.095	1.14	1,100	14,000	0.11	1.14	2,100	17,000	0.095	1.14	1,250	14,000	0.11	1.14	2,100	17,000	
	16	0.045	1.14	480	10,000	0.06	1.14	1,000	12,000	0.045	1.14	630	10,000	0.06	1.14	1,000	12,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 장삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●궤 p 축 방향, 궤 e 반경 방향. 궤 p=Axial Depth of Cut 궤 e=Radial Depth of Cut.  
●오일 미스트 콜런트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material		고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐(Copper Tungsten)				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			궤 mm	궤 mm			mm/min	min <sup>-1</sup>			궤 mm	궤 mm			mm/min	min <sup>-1</sup>		
4	2	6	0.1	1.2	1,150	13,000	0.12	1.2	2,100	16,000	0.1	1.2	1,300	13,000	0.12	1.2	2,100	16,000
		8	0.09	1.2	1,050	13,000	0.11	1.2	2,000	16,000	0.09	1.2	1,200	13,000	0.11	1.2	2,000	16,000
		10	0.08	1.2	950	13,000	0.1	1.2	1,800	16,000	0.08	1.2	1,100	13,000	0.1	1.2	1,800	16,000
		12	0.07	1.2	850	12,000	0.09	1.2	1,500	14,000	0.07	1.2	1,000	12,000	0.09	1.2	1,500	14,000
		14	0.06	1.2	700	11,000	0.08	1.2	1,350	13,000	0.06	1.2	850	11,000	0.08	1.2	1,350	13,000
	2.5	6	0.12	1.5	1,250	11,000	0.15	1.5	2,100	13,000	0.12	1.5	1,400	11,000	0.15	1.5	2,100	13,000
		12	0.1	1.5	950	11,000	0.13	1.5	1,800	13,000	0.1	1.5	1,100	11,000	0.13	1.5	1,800	13,000
		16	0.07	1.5	700	9,000	0.1	1.5	1,400	11,000	0.07	1.5	850	9,000	0.1	1.5	1,400	11,000
		20	0.05	1.5	450	7,000	0.08	1.5	1,100	9,000	0.05	1.5	600	7,000	0.08	1.5	1,100	9,000
	3	8	0.16	1.8	1,350	9,000	0.2	1.8	2,300	11,000	0.16	1.8	1,500	9,000	0.2	1.8	2,300	11,000
		10	0.12	1.8	1,050	9,000	0.16	1.8	2,000	11,000	0.12	1.8	1,200	9,000	0.16	1.8	2,000	11,000
		12	0.12	1.8	1,050	9,000	0.16	1.8	2,000	11,000	0.12	1.8	1,200	9,000	0.16	1.8	2,000	11,000
		15	0.09	1.8	750	8,000	0.12	1.8	1,500	10,000	0.09	1.8	900	8,000	0.12	1.8	1,500	10,000
		16	0.09	1.8	750	8,000	0.12	1.8	1,500	10,000	0.09	1.8	900	8,000	0.12	1.8	1,500	10,000
	3.5	20	0.07	1.8	530	7,000	0.1	1.8	1,200	9,000	0.07	1.8	680	7,000	0.1	1.8	1,200	9,000
		25	0.06	1.8	420	6,000	0.08	1.8	1,050	8,000	0.06	1.8	570	6,000	0.08	1.8	1,050	8,000
		30	0.045	1.8	300	5,000	0.06	1.8	900	7,000	0.045	1.8	450	5,000	0.06	1.8	900	7,000
		15	0.15	2.1	1,050	7,000	0.18	2.1	2,000	9,000	0.15	2.1	1,200	7,000	0.18	2.1	2,000	9,000
25		0.08	2.1	700	6,000	0.12	2.1	1,500	7,500	0.08	2.1	850	6,000	0.12	2.1	1,500	7,500	
4	35	0.05	2.1	370	4,500	0.07	2.1	1,000	6,000	0.05	2.1	520	4,500	0.07	2.1	1,000	6,000	
	10	0.25	2.4	1,150	6,000	0.3	2.4	2,200	8,000	0.25	2.4	1,300	6,000	0.3	2.4	2,200	8,000	
	12	0.25	2.4	1,150	6,000	0.3	2.4	2,200	8,000	0.25	2.4	1,300	6,000	0.3	2.4	2,200	8,000	
	15	0.2	2.4	1,050	6,000	0.25	2.4	2,100	8,000	0.2	2.4	1,200	6,000	0.25	2.4	2,100	8,000	
	16	0.2	2.4	1,050	6,000	0.25	2.4	2,100	8,000	0.2	2.4	1,200	6,000	0.25	2.4	2,100	8,000	
5	20	0.15	2.4	950	6,000	0.2	2.4	2,000	8,000	0.15	2.4	1,100	6,000	0.2	2.4	2,000	8,000	
	25	0.1	2.4	750	5,000	0.15	2.4	1,700	7,000	0.1	2.4	900	5,000	0.15	2.4	1,700	7,000	
	30	0.08	2.4	650	5,000	0.12	2.4	1,500	7,000	0.08	2.4	800	5,000	0.12	2.4	1,500	7,000	
	35	0.07	2.4	520	4,500	0.1	2.4	1,200	6,000	0.07	2.4	670	4,500	0.1	2.4	1,200	6,000	
	15	0.3	3	1,050	4,500	0.35	3	2,100	6,000	0.3	3	1,200	4,500	0.				

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALS430  
Model number:IALS430

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐(Copper Tungsten)							
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed		Spindle Speed		Depth of Cut		Feed		Spindle Speed		Depth of Cut		Feed		Spindle Speed			
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>				
4	8	50	0.3	4.8	450	2,100	0.4	4.8	820	2,800	0.3	4.8	600	2,100	0.4	4.8	820	2,800				
		60	0.2	4.8	300	1,800	0.3	4.8	680	2,400	0.2	4.8	450	1,800	0.3	4.8	680	2,400				
	10	40	0.55	6	600	2,200	0.8	6	1,200	3,000	0.55	6	750	2,200	0.8	6	1,200	3,000				
		60	0.45	6	370	1,600	0.6	6	750	2,200	0.45	6	520	1,600	0.6	6	750	2,200				
		80	0.3	6	210	1,300	0.4	6	520	1,800	0.3	6	360	1,300	0.4	6	520	1,800				

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 ●절입량은, 장삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.  
 ●오일 미스트 Coolant, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)											
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed		Spindle Speed		Depth of Cut		Feed		Spindle Speed		Depth of Cut		Feed		Spindle Speed			
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>				
4	1	4	0.055	0.6	1,700	25,000	0.055	0.6	1,700	25,000	0.045	0.6	950	22,000								
			6	0.045	0.6	1,200	20,000	0.045	0.6	1,200	20,000	0.035	0.6	600	18,000							
			8	0.035	0.6	1,050	18,000	0.035	0.6	1,050	18,000	0.025	0.6	450	15,000							
			10	0.025	0.6	900	16,000	0.025	0.6	900	16,000	0.018	0.6	370	14,000							
		12	0.02	0.6	750	14,000	0.02	0.6	750	14,000	0.014	0.6	300	12,000								
			1.1	6	0.05	0.66	1,300	20,000	0.05	0.66	1,300	20,000	0.04	0.66	670	18,000						
				10	0.03	0.66	1,000	16,000	0.03	0.66	1,000	16,000	0.02	0.66	450	14,000						
				1.2	6	0.05	0.72	1,400	20,000	0.05	0.72	1,400	20,000	0.04	0.72	750	18,000					
		8			0.04	0.72	1,200	18,000	0.04	0.72	1,200	18,000	0.03	0.72	600	15,000						
		10	0.03		0.72	1,050	16,000	0.03	0.72	1,050	16,000	0.02	0.72	520	14,000							
		12	0.025		0.72	900	14,000	0.025	0.72	900	14,000	0.018	0.72	380	12,000							
		1.3	6	0.06	0.78	1,500	20,000	0.06	0.78	1,500	20,000	0.05	0.78	850	17,000							
	12		0.03	0.78	1,000	14,000	0.03	0.78	1,000	14,000	0.025	0.78	450	12,000								
	1.4		6	0.07	0.84	1,800	20,000	0.07	0.84	1,800	20,000	0.06	0.84	950	16,000							
			8	0.06	0.84	1,500	18,000	0.06	0.84	1,500	18,000	0.05	0.84	750	14,000							
		10	0.05	0.84	1,300	16,000	0.05	0.84	1,300	16,000	0.04	0.84	630	13,000								
		12	0.04	0.84	1,050	14,000	0.04	0.84	1,050	14,000	0.03	0.84	520	12,000								
	14	0.035	0.84	900	13,000	0.035	0.84	900	13,000	0.025	0.84	380	11,000									
		16	0.025	0.84	750	12,000	0.025	0.84	750	12,000	0.018	0.84	300	10,000								
		1.5	3	0.08	0.9	1,800	20,000	0.08	0.9	1,800	20,000	0.07	0.9	950	16,000							
			6	0.08	0.9	1,800	20,000	0.08	0.9	1,800	20,000	0.07	0.9	950	16,000							
	8		0.07	0.9	1,500	18,000	0.07	0.9	1,500	18,000	0.06	0.9	750	14,000								
	10		0.06	0.9	1,300	16,000	0.06	0.9	1,300	16,000	0.05	0.9	630	13,000								
	12	0.05	0.9	1,050	14,000	0.05	0.9	1,050	14,000	0.04	0.9	520	12,000									
		14	0.04	0.9	900	13,000	0.04	0.9	900	13,000	0.03	0.9	420	11,000								
		16	0.035	0.9	750	12,000	0.035	0.9	750	12,000	0.025	0.9	330	10,000								
		1.6	6	0.09	0.96	1,800	20,000	0.09	0.96	1,800	20,000	0.08	0.96	950	16,000							
	8		0.08	0.96	1,500	18,000	0.08	0.96	1,500	18,000	0.07	0.96	750	14,000								
	10		0.07	0.96	1,300	16,000	0.07	0.96	1,300	16,000	0.06	0.96	630	13,000								
	12		0.06	0.96	1,050	14,000	0.06	0.96	1,050	14,000	0.05	0.96	520	12,000								
	14	0.05	0.96	900	13,000	0.05	0.96	900	13,000	0.04	0.96	420	11,000									
		16	0.04	0.96	750	12,000	0.04	0.96	750	12,000	0.03	0.96	330	10,000								
		1.7	6	0.095	1.02	1,900	19,000	0.095	1.02	1,900	19,000	0.085	1.02	1,000	15,000							
			14	0.055	1.02	950	13,000	0.055	1.02	950	13,000	0.045	1.02	480	11,000							
	1.8		6	0.1	1.08	2,000	18,000	0.1	1.08	2,000	18,000	0.09	1.08	1,050	14,000							
			8	0.09	1.08	1,700	18,000	0.09	1.08	1,700	18,000	0.08	1.08	850	14,000							
		10	0.08	1.08	1,400	16,000	0.08	1.08	1,400	16,000	0.07	1.08	700	13,000								
		12	0.07	1.08	1,100	14,000	0.07	1.08	1,100	14,000	0.06	1.08	570	12,000								
	14	0.06	1.08	1,000	13,000	0.06	1.08	1,000	13,000	0.05	1.08	480	11,000									
		16	0.05	1.08	850	12,000	0.05	1.08	850	12,000	0.04	1.08	380	10,000								
		1.9	6	0.11	1.14	2,100	17,000	0.11	1.14	2,100	17,000	0.095	1.14	1,100	14,000							
			16	0.06	1.14	1,000	12,000	0.06	1.14	1,000	12,000	0.045	1.14	480	10,000							

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입량은, 장삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.  
 ●오일 미스트 Coolant, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALS430  
Model number:IALS430

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm		
4	2	6	0.12	1.2	2,100	16,000	0.12	1.2	2,100	16,000	0.1	1.2	1,150	13,000
		8	0.11	1.2	2,000	16,000	0.11	1.2	2,000	16,000	0.09	1.2	1,050	13,000
		10	0.1	1.2	1,800	16,000	0.1	1.2	1,800	16,000	0.08	1.2	950	13,000
		12	0.09	1.2	1,500	14,000	0.09	1.2	1,500	14,000	0.07	1.2	850	12,000
		14	0.08	1.2	1,350	13,000	0.08	1.2	1,350	13,000	0.06	1.2	700	11,000
		15	0.07	1.2	1,200	12,000	0.07	1.2	1,200	12,000	0.05	1.2	600	10,000
		16	0.07	1.2	1,200	12,000	0.07	1.2	1,200	12,000	0.05	1.2	600	10,000
		18	0.06	1.2	1,000	11,000	0.06	1.2	1,000	11,000	0.04	1.2	500	9,000
		20	0.05	1.2	900	10,000	0.05	1.2	900	10,000	0.035	1.2	400	8,000
		25	8	0.15	1.5	2,100	13,000	0.15	1.5	2,100	13,000	0.12	1.5	1,250
	12	12	0.13	1.5	1,800	13,000	0.13	1.5	1,800	13,000	0.1	1.5	950	11,000
	16	16	0.1	1.5	1,400	11,000	0.1	1.5	1,400	11,000	0.07	1.5	700	9,000
	20	20	0.08	1.5	1,100	9,000	0.08	1.5	1,100	9,000	0.05	1.5	450	7,000
	8	8	0.2	1.8	2,300	11,000	0.2	1.8	2,300	11,000	0.16	1.8	1,350	9,000
	10	10	0.16	1.8	2,000	11,000	0.16	1.8	2,000	11,000	0.12	1.8	1,050	9,000
	12	12	0.16	1.8	2,000	11,000	0.16	1.8	2,000	11,000	0.12	1.8	1,050	9,000
	15	15	0.12	1.8	1,500	10,000	0.12	1.8	1,500	10,000	0.09	1.8	750	8,000
	16	16	0.12	1.8	1,500	10,000	0.12	1.8	1,500	10,000	0.09	1.8	750	8,000
	20	20	0.1	1.8	1,200	9,000	0.1	1.8	1,200	9,000	0.07	1.8	530	7,000
	25	25	0.08	1.8	1,050	8,000	0.08	1.8	1,050	8,000	0.06	1.8	420	6,000
	30	30	0.06	1.8	900	7,000	0.06	1.8	900	7,000	0.045	1.8	300	5,000
	15	3.5	0.18	2.1	2,000	9,000	0.18	2.1	2,000	9,000	0.15	2.1	1,050	7,000
	25	25	0.12	2.1	1,500	7,500	0.12	2.1	1,500	7,500	0.08	2.1	700	6,000
	35	35	0.07	2.1	1,000	6,000	0.07	2.1	1,000	6,000	0.05	2.1	370	4,500
	10	4	0.3	2.4	2,200	8,000	0.3	2.4	2,200	8,000	0.25	2.4	1,150	6,000
	12	12	0.3	2.4	2,200	8,000	0.3	2.4	2,200	8,000	0.25	2.4	1,150	6,000
	15	15	0.25	2.4	2,100	8,000	0.25	2.4	2,100	8,000	0.2	2.4	1,050	6,000
	16	16	0.25	2.4	2,100	8,000	0.25	2.4	2,100	8,000	0.2	2.4	1,050	6,000
	20	20	0.2	2.4	2,000	8,000	0.2	2.4	2,000	8,000	0.15	2.4	950	6,000
	25	25	0.15	2.4	1,700	7,000	0.15	2.4	1,700	7,000	0.1	2.4	750	5,000
	30	30	0.12	2.4	1,500	7,000	0.12	2.4	1,500	7,000	0.08	2.4	650	5,000
	35	35	0.1	2.4	1,200	6,000	0.1	2.4	1,200	6,000	0.07	2.4	520	4,500
	15	5	0.35	3	2,100	6,000	0.35	3	2,100	6,000	0.3	3	1,050	4,500
	16	16	0.35	3	2,100	6,000	0.35	3	2,100	6,000	0.3	3	1,050	4,500
	20	20	0.25	3	1,800	6,000	0.25	3	1,800	6,000	0.2	3	850	4,500
	25	25	0.25	3	1,800	6,000	0.25	3	1,800	6,000	0.2	3	850	4,500
	35	35	0.15	3	1,200	5,000	0.15	3	1,200	5,000	0.1	3	480	3,500
	20	6	0.4	3.6	1,800	5,000	0.4	3.6	1,800	5,000	0.35	3.6	850	3,500
	30	30	0.35	3.6	1,400	4,000	0.35	3.6	1,400	4,000	0.3	3.6	600	3,000
	40	40	0.25	3.6	1,000	3,500	0.25	3.6	1,000	3,500	0.2	3.6	420	2,700
50	50	0.15	3.6	750	3,000	0.15	3.6	750	3,000	0.1	3.6	270	2,200	
8	8	0.6	4.8	1,400	3,800	0.6	4.8	1,400	3,800	0.45	4.8	750	2,800	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 콜린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm		
4	8	50	0.4	4.8	820	2,800	0.4	4.8	820	2,800	0.3	4.8	450	2,100
		60	0.3	4.8	680	2,400	0.3	4.8	680	2,400	0.2	4.8	300	1,800
	10	40	0.8	6	1,200	3,000	0.8	6	1,200	3,000	0.55	6	600	2,200
		60	0.6	6	750	2,200	0.6	6	750	2,200	0.45	6	370	1,600
		80	0.4	6	520	1,800	0.4	6	520	1,800	0.3	6	210	1,300

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●절삭량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 콜린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

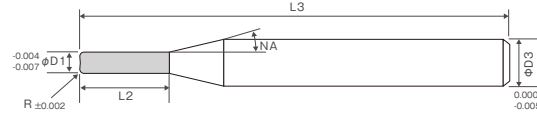
# ion Depo Type A Series

# ion Depo Type A Series

초경 래디우스 엔드밀 Carbide Radius End Mill

■형번: IAR230 Model number: IAR230

ion A super MG 날수 2 벨릭스각 30° 목각 15° Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	날장 (L2) Length of Cut	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAR230-0100-0100-00200	1	0.1	2	15	4	50	5,600
IAR230-0100-0200-00200		0.2	2	15	4	50	5,600
IAR230-0100-0300-00200		0.3	2	15	4	50	5,600
IAR230-0150-0100-00300	1.5	0.1	3	15	4	50	5,600
IAR230-0150-0200-00300		0.2	3	15	4	50	5,600
IAR230-0150-0300-00300		0.3	3	15	4	50	5,600
IAR230-0200-0100-00400	2	0.1	4	15	4	50	5,600
IAR230-0200-0200-00400		0.2	4	15	4	50	5,600
IAR230-0200-0300-00400		0.3	4	15	4	50	5,600
IAR230-0200-0500-00400		0.5	4	15	4	50	5,600
IAR230-0250-0100-00500	2.5	0.1	5	15	4	50	5,600
IAR230-0250-0200-00500		0.2	5	15	4	50	5,600
IAR230-0250-0300-00500		0.3	5	15	4	50	6,160
IAR230-0250-0500-00500		0.5	5	15	4	50	6,160
IAR230-0300-0100-00600	3	0.1	6	15	4	50	6,880
IAR230-0300-0200-00600		0.2	6	15	4	50	6,880
IAR230-0300-0300-00600		0.3	6	15	4	50	6,880
IAR230-0300-0500-00600		0.5	6	15	4	50	6,880
IAR230-0300-1000-00600	4	1	6	15	4	50	7,520
IAR230-0400-0100-00800		0.1	8	15	6	50	6,960
IAR230-0400-0200-00800		0.2	8	15	6	50	6,960
IAR230-0400-0300-00800		0.3	8	15	6	50	6,960
IAR230-0400-0500-00800	5	0.5	8	15	6	50	6,960
IAR230-0400-1000-00800		1	8	15	6	50	7,600
IAR230-0500-0100-01000		0.1	10	15	6	50	7,040
IAR230-0500-0200-01000		0.2	10	15	6	50	7,040
IAR230-0500-0300-01000	5	0.3	10	15	6	50	7,040
IAR230-0500-0500-01000		0.5	10	15	6	50	7,040
IAR230-0500-1000-01000		1	10	15	6	50	7,680
IAR230-0500-1500-01000		1.5	10	15	6	50	8,000

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	날장 (L2) Length of Cut	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAR230-0600-0100-01200	6	0.1	12	—	6	50	13,920
IAR230-0600-0200-01200		0.2	12	—	6	50	13,920
IAR230-0600-0300-01200		0.3	12	—	6	50	13,920
IAR230-0600-0500-01200		0.5	12	—	6	50	13,920
IAR230-0600-1000-01200		1	12	—	6	50	14,880
IAR230-0600-1500-01200		1.5	12	—	6	50	14,880
IAR230-0600-2000-01200		2	12	—	6	50	14,880



# ion Depo Type A Series

# ion Depo Type A Series

## ion Depo Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번: IAR230  
Model number: IAR230

### 래디우스 엔드밀 Radius End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	1	2	1.5	0.1	200	25,500	1.5	0.1	200	25,500	1.5	0.1	80	12,800	1.5	0.1	200	25,500
	1.5	3	2.25	0.15	340	17,100	2.25	0.15	340	17,100	2.25	0.15	90	8,500	2.25	0.15	340	17,100
	2	4	3	0.2	400	12,800	3	0.2	400	12,800	3	0.2	110	6,400	3	0.2	400	12,800
	2.5	5	3.75	0.25	400	10,200	3.75	0.25	400	10,200	3.75	0.25	110	5,100	3.75	0.25	400	10,200
	3	6	4.5	0.3	450	8,500	4.5	0.3	450	8,500	4.5	0.3	120	4,300	4.5	0.3	450	8,500
	4	8	6	0.4	450	6,400	6	0.4	450	6,400	6	0.4	120	3,200	6	0.4	450	6,400
	5	10	7.5	0.5	600	5,100	7.5	0.5	600	5,100	7.5	0.5	150	2,600	7.5	0.5	600	5,100
	6	12	9	0.6	600	4,300	9	0.6	600	4,300	9	0.6	150	2,200	9	0.6	600	4,300

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### 래디우스 엔드밀 Radius End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm		
2	1	2	1.5	0.1	200	25,500	1.5	0.1	200	25,500	1	0.02	60	6,400
	1.5	3	2.25	0.15	340	17,100	2.25	0.15	340	17,100	1.5	0.03	70	4,200
	2	4	3	0.2	400	12,800	3	0.2	400	12,800	2	0.04	80	3,200
	2.5	5	3.75	0.25	400	10,200	3.75	0.25	400	10,200	2.5	0.05	80	2,500
	3	6	4.5	0.3	450	8,500	4.5	0.3	450	8,500	3	0.06	100	2,100
	4	8	6	0.4	450	6,400	6	0.4	450	6,400	4	0.08	100	1,600
	5	10	7.5	0.5	600	5,100	7.5	0.5	600	5,100	5	0.1	120	1,300
	6	12	9	0.6	600	4,300	9	0.6	600	4,300	6	0.12	130	1,100

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### 래디우스 엔드밀 Radius End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐(Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	1	2	1	0.02	60	6,400	1.5	0.1	200	25,500	1.5	0.1	80	12,800	1.5	0.1	200	25,500
	1.5	3	1.5	0.03	70	4,200	2.25	0.15	340	17,100	2.25	0.15	90	8,500	2.25	0.15	340	17,100
	2	4	2	0.04	80	3,200	3	0.2	400	12,800	3	0.2	110	6,400	3	0.2	400	12,800
	2.5	5	2.5	0.05	80	2,500	3.75	0.25	400	10,200	3.75	0.25	110	5,100	3.75	0.25	400	10,200
	3	6	3	0.06	100	2,100	4.5	0.3	450	8,500	4.5	0.3	120	4,300	4.5	0.3	450	8,500
	4	8	4	0.08	100	1,600	6	0.4	450	6,400	6	0.4	120	3,200	6	0.4	450	6,400
	5	10	5	0.1	120	1,300	7.5	0.5	600	5,100	7.5	0.5	150	2,600	7.5	0.5	600	5,100
	6	12	6	0.12	130	1,100	9	0.6	600	4,300	9	0.6	150	2,200	9	0.6	600	4,300

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 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 클린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

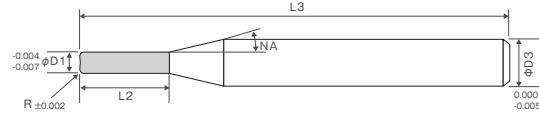
# ion Depo Type A Series

# ion Depo Type A Series

초경 래디우스 엔드밀 Carbide Radius End Mill

■형번: IAR430 Model number: IAR430

ion A super MG 날수 4 벨릭스각 30° 목각 15° Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	날장 (L2) Length of Cut	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAR430-0100-0100-00200	1	0.1	2	15	4	50	9,520
IAR430-0100-0200-00200		0.2	2	15	4	50	9,520
IAR430-0100-0300-00200		0.3	2	15	4	50	9,520
IAR430-0150-0100-00300	1.5	0.1	3	15	4	50	9,520
IAR430-0150-0200-00300		0.2	3	15	4	50	9,520
IAR430-0150-0300-00300		0.3	3	15	4	50	9,520
IAR430-0150-0500-00300	2	0.5	3	15	4	50	9,520
IAR430-0200-0100-00400		0.1	4	15	4	50	9,520
IAR430-0200-0200-00400		0.2	4	15	4	50	9,520
IAR430-0200-0300-00400	3	0.3	4	15	4	50	9,520
IAR430-0200-0500-00400		0.5	4	15	4	50	9,520
IAR430-0300-0100-00600		3	0.1	6	15	4	50
IAR430-0300-0200-00600	0.2		6	15	4	50	11,760
IAR430-0300-0300-00600	0.3		6	15	4	50	11,760
IAR430-0300-0500-00600	4	0.5	6	15	4	50	11,760
IAR430-0300-1000-00600		1	6	15	4	50	12,800
IAR430-0400-0100-00800		4	0.1	8	15	6	50
IAR430-0400-0200-00800	0.2		8	15	6	50	11,840
IAR430-0400-0300-00800	0.3		8	15	6	50	11,840
IAR430-0400-0500-00800	5	0.5	8	15	6	50	11,840
IAR430-0400-1000-00800		1	8	15	6	50	12,960
IAR430-0500-0100-01000		5	0.1	10	15	6	50
IAR430-0500-0200-01000	0.2		10	15	6	50	12,000
IAR430-0500-0300-01000	0.3		10	15	6	50	12,000
IAR430-0500-0500-01000	6	0.5	10	15	6	50	12,000
IAR430-0500-1000-01000		1	10	15	6	50	13,120
IAR430-0500-1500-01000		1.5	10	15	6	50	13,600
IAR430-0600-0100-01200	6	0.1	12	—	6	50	11,600
IAR430-0600-0200-01200		0.2	12	—	6	50	11,600
IAR430-0600-0300-01200		0.3	12	—	6	50	11,600

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	날장 (L2) Length of Cut	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAR430-0600-0500-01200	6	0.5	12	—	6	50	11,600
IAR430-0600-1000-01200		1	12	—	6	50	12,400
IAR430-0600-1500-01200		1.5	12	—	6	50	12,400
IAR430-0800-0100-01600	8	0.1	16	—	8	70	16,720
IAR430-0800-0200-01600		0.2	16	—	8	70	16,720
IAR430-0800-0500-01600		0.5	16	—	8	70	16,720
IAR430-0800-1000-01600		1	16	—	8	70	16,720
IAR430-0800-1500-01600		1.5	16	—	8	70	17,600
IAR430-0800-2000-01600		2	16	—	8	70	17,600
IAR430-0800-2500-01600		2.5	16	—	8	70	18,640
IAR430-0800-3000-01600		3	16	—	8	70	18,640
IAR430-1000-0100-02000		10	0.1	20	—	10	80
IAR430-1000-0200-02000	0.2		20	—	10	80	17,600
IAR430-1000-0300-02000	0.3		20	—	10	80	17,600
IAR430-1000-0500-02000	0.5		20	—	10	80	17,600
IAR430-1000-1000-02000	1		20	—	10	80	17,600
IAR430-1000-1500-02000	1.5		20	—	10	80	18,640
IAR430-1000-2000-02000	2		20	—	10	80	18,640
IAR430-1000-2500-02000	2.5		20	—	10	80	20,480
IAR430-1000-3000-02000	3		20	—	10	80	20,480
IAR430-1200-0100-02400	12		0.1	24	—	12	110
IAR430-1200-0200-02400		0.2	24	—	12	110	27,840
IAR430-1200-0300-02400		0.3	24	—	12	110	27,840
IAR430-1200-0500-02400		0.5	24	—	12	110	27,840
IAR430-1200-1000-02400		1	24	—	12	110	27,840
IAR430-1200-1500-02400		1.5	24	—	12	110	28,800
IAR430-1200-2000-02400		2	24	—	12	110	28,800
IAR430-1200-2500-02400		2.5	24	—	12	110	29,680
IAR430-1200-3000-02400		3	24	—	12	110	29,680
IAR430-1600-1000-04000	16	1	40	—	16	130	32,160
IAR430-1600-2000-04000		2	40	—	16	130	32,160
IAR430-1600-3000-04000		3	40	—	16	130	32,160
IAR430-2000-1000-05000	20	1	50	—	20	140	45,920
IAR430-2000-2000-05000		2	50	—	20	140	45,920
IAR430-2000-3000-05000		3	50	—	20	140	45,920

# ion Depo Type A Series

# ion Depo Type A Series

## ion Depo Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번: IAR430  
Model number: IAR430

### 래디우스 엔드밀 Radius End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
4	1	2	1.5	0.1	300	25,500	1.5	0.1	300	25,500	1.5	0.1	120	12,800	1.5	0.1	220	19,100
	1.5	3	2.25	0.15	510	17,100	2.25	0.15	510	17,100	2.25	0.15	130	8,500	2.25	0.15	370	12,700
	2	4	3	0.2	600	12,800	3	0.2	600	12,800	3	0.2	160	6,400	3	0.2	430	9,500
	3	6	4.5	0.3	670	8,500	4.5	0.3	670	8,500	4.5	0.3	180	4,300	4.5	0.3	500	6,400
	4	8	6	0.4	760	6,400	6	0.4	760	6,400	6	0.4	200	3,200	6	0.4	570	4,800
	5	10	7.5	0.5	760	5,100	7.5	0.5	760	5,100	7.5	0.5	260	2,600	7.5	0.5	570	3,800
	6	12	9	0.6	760	4,200	9	0.6	760	4,200	9	0.6	260	2,200	9	0.6	570	3,200
	8	16	12	0.8	780	3,200	12	0.8	780	3,200	12	0.8	380	1,600	12	0.8	580	2,400
	10	20	15	1	780	2,600	15	1	780	2,600	15	1	380	1,300	15	1	580	1,900
	12	24	18	1.2	780	2,100	18	1.2	780	2,100	18	1.2	380	1,100	18	1.2	580	1,600
	16	40	24	1.6	600	1,500	24	1.6	600	1,500	24	1.6	300	800	24	1.6	450	1,200
	20	50	30	1.5	500	1,000	30	1.5	500	1,000	30	1.5	300	400	30	1.5	400	700

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 인장 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.

●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
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### 래디우스 엔드밀 Radius End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm		
4	1	2	1.5	0.1	300	25,500	1.5	0.1	300	25,500	1	0.05	60	6,400
	1.5	3	2.25	0.15	510	17,100	2.25	0.15	510	17,100	1.5	0.075	65	4,300
	2	4	3	0.2	600	12,800	3	0.2	600	12,800	2	0.1	80	3,200
	3	6	4.5	0.3	670	8,500	4.5	0.3	670	8,500	3	0.15	90	2,200
	4	8	6	0.4	760	6,400	6	0.4	760	6,400	4	0.2	90	1,600
	5	10	7.5	0.5	760	5,100	7.5	0.5	760	5,100	5	0.25	120	1,300
	6	12	9	0.6	760	4,200	9	0.6	760	4,200	6	0.3	120	1,200
	8	16	12	0.8	780	3,200	12	0.8	780	3,200	8	0.4	160	800
	10	20	15	1	780	2,600	15	1	780	2,600	10	0.5	160	650
	12	24	18	1.2	780	2,100	18	1.2	780	2,100	12	0.6	160	530
	16	40	24	1.6	600	1,500	24	1.6	600	1,500	16	0.8	150	450
	20	50	30	1.5	500	1,000	30	1.5	500	1,000	20	0.5	150	350

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●절삭방향, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 인장 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.

●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
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### 래디우스 엔드밀 Radius End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
4	1	2	1	0.05	60	6,400	1.5	0.1	220	19,100	1.5	0.1	120	12,800	1.5	0.1	300	25,500
	1.5	3	1.5	0.075	65	4,300	2.25	0.15	370	12,700	2.25	0.15	130	8,500	2.25	0.15	510	17,100
	2	4	2	0.1	80	3,200	3	0.2	430	9,500	3	0.2	160	6,400	3	0.2	600	12,800
	3	6	3	0.15	90	2,200	4.5	0.3	500	6,400	4.5	0.3	180	4,300	4.5	0.3	670	8,500
	4	8	4	0.2	90	1,600	6	0.4	570	4,800	6	0.4	200	3,200	6	0.4	760	6,400
	5	10	5	0.25	120	1,300	7.5	0.5	570	3,800	7.5	0.5	260	2,600	7.5	0.5	760	5,100
	6	12	6	0.3	120	1,200	9	0.6	570	3,200	9	0.6	260	2,200	9	0.6	760	4,200
	8	16	8	0.4	160	800	12	0.8	580	2,400	12	0.8	380	1,600	12	0.8	780	3,200
	10	20	10	0.5	160	650	15	1	580	1,900	15	1	380	1,300	15	1	780	2,600
	12	24	12	0.6	160	530	18	1.2	580	1,600	18	1.2	380	1,100	18	1.2	780	2,100
	16	40	16	0.8	150	450	24	1.6	450	1,200	24	1.6	300	800	24	1.6	600	1,500
	20	50	20	0.5	150	350	30	1.5	400	700	30	1.5	300	400	30	1.5	500	1,000

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
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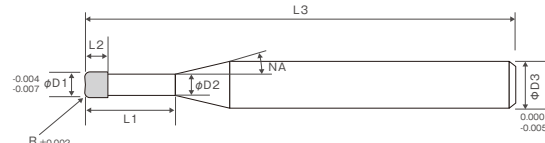
●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
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# ion Depo Type A Series

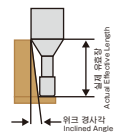
초경 롱 넥 래디우스 엔드밀  
Carbide Long Neck Radius End Mill

■형번:IALR230 Model number:IALR230

ion A super MG 날수 2 벨릭스각 30° 목각 15° Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

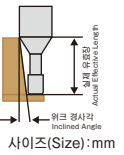


사이즈(Size):mm

●재연가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IALR230-0020-0050-0050	0.2	0.05	0.5	0.15	0.18	15	4	50	7,200	0.55	0.57	0.59	0.61	0.66
IALR230-0020-0050-0100		0.05	1	0.15	0.18	15	4	50	7,200	1.07	1.11	1.14	1.19	1.28
IALR230-0020-0050-0200		0.05	2	0.15	0.18	15	4	50	7,200	2.10	2.18	2.25	2.34	2.52
IALR230-0030-0050-0080	0.3	0.05	0.8	0.3	0.27	15	4	50	6,960	0.88	0.91	0.94	0.98	1.05
IALR230-0030-0050-0100		0.05	1	0.25	0.27	15	4	50	6,960	1.09	1.13	1.17	1.21	1.30
IALR230-0030-0050-0150-00025		0.05	1.5	0.25	0.27	15	4	50	6,960	1.61	1.66	1.72	1.78	1.92
IALR230-0030-0050-0150-00030		0.05	1.5	0.3	0.27	15	4	50	6,960	1.61	1.66	1.72	1.78	1.92
IALR230-0030-0050-0200		0.05	2	0.25	0.27	15	4	50	6,960	2.12	2.20	2.27	2.36	2.54
IALR230-0030-0050-0250		0.05	2.5	0.25	0.27	15	4	50	7,680	2.64	2.73	2.83	2.93	3.17
IALR230-0030-0050-0300	0.4	0.05	3	0.25	0.27	15	4	50	7,680	3.16	3.27	3.38	3.51	3.79
IALR230-0040-0050-0100		0.05	1	0.3	0.37	15	4	50	4,640	1.09	1.13	1.17	1.21	1.30
IALR230-0040-0050-0120		0.05	1.2	0.4	0.37	15	4	50	4,640	1.30	1.34	1.39	1.44	1.55
IALR230-0040-0050-0150		0.05	1.5	0.3	0.37	15	4	50	4,640	1.61	1.66	1.72	1.78	1.92
IALR230-0040-0050-0200		0.05	2	0.3	0.37	15	4	50	4,640	2.12	2.20	2.27	2.36	2.54
IALR230-0040-0050-0250		0.05	2.5	0.4	0.37	15	4	50	4,640	2.64	2.73	2.83	2.93	3.17
IALR230-0040-0050-0300		0.05	3	0.3	0.37	15	4	50	4,640	3.16	3.27	3.38	3.51	3.79
IALR230-0040-0100-0100		0.1	1	0.3	0.37	15	4	50	4,640	1.09	1.12	1.16	1.20	1.29
IALR230-0040-0100-0120		0.1	1.2	0.4	0.37	15	4	50	4,640	1.29	1.34	1.38	1.43	1.54
IALR230-0040-0100-0150		0.1	1.5	0.3	0.37	15	4	50	4,640	1.61	1.66	1.71	1.77	1.91
IALR230-0040-0100-0200		0.1	2	0.3	0.37	15	4	50	4,640	2.12	2.19	2.27	2.35	2.53
IALR230-0040-0100-0250		0.1	2.5	0.4	0.37	15	4	50	4,640	2.64	2.73	2.82	2.92	3.15
IALR230-0040-0100-0300	0.1	3	0.3	0.37	15	4	50	4,640	3.16	3.26	3.38	3.50	3.78	
IALR230-0050-0050-0100	0.5	0.05	1	0.4	0.47	15	4	50	3,760	1.09	1.13	1.17	1.21	1.30
IALR230-0050-0050-0150		0.05	1.5	0.5	0.47	15	4	50	3,760	1.61	1.66	1.72	1.78	1.92
IALR230-0050-0050-0200		0.05	2	0.4	0.47	15	4	50	3,760	2.12	2.20	2.27	2.36	2.54
IALR230-0050-0050-0300-00040		0.05	3	0.4	0.47	15	4	50	3,760	3.16	3.27	3.38	3.51	3.79
IALR230-0050-0050-0300-00050		0.05	3	0.5	0.47	15	4	50	3,760	3.16	3.27	3.38	3.51	3.79
IALR230-0050-0050-0400		0.05	4	0.4	0.47	15	4	50	3,760	4.19	4.34	4.49	4.66	5.03
IALR230-0050-0100-0100		0.1	1	0.4	0.47	15	4	50	3,760	1.09	1.12	1.16	1.20	1.29
IALR230-0050-0100-0150		0.1	1.5	0.5	0.47	15	4	50	3,760	1.61	1.66	1.71	1.77	1.91
IALR230-0050-0100-0200		0.1	2	0.4	0.47	15	4	50	3,760	2.12	2.19	2.27	2.35	2.53
IALR230-0050-0100-0250		0.1	2.5	0.5	0.47	15	4	50	3,760	2.64	2.73	2.82	2.92	3.15

# ion Depo Type A Series

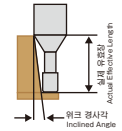


사이즈(Size):mm

●재연가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.						
										30'	1°	1°30'	2°	3°		
IALR230-0050-0100-0200	0.5	0.1	2	0.4	0.47	15	4	50	3,760	2.12	2.19	2.27	2.35	2.53		
IALR230-0050-0100-0300-00040		0.1	3	0.4	0.47	15	4	50	3,760	3.16	3.26	3.38	3.50	3.78		
IALR230-0050-0100-0300-00050		0.1	3	0.5	0.47	15	4	50	3,760	3.16	3.26	3.38	3.50	3.78		
IALR230-0050-0100-0400		0.1	4	0.4	0.47	15	4	50	3,760	4.19	4.33	4.48	4.65	5.02		
IALR230-0060-0050-0180	0.6	0.05	1.8	0.6	0.57	15	4	50	3,760	1.92	1.98	2.05	2.13	2.30		
IALR230-0060-0050-0200		0.05	2	0.5	0.57	15	4	50	3,760	2.12	2.20	2.27	2.36	2.54		
IALR230-0060-0050-0300		0.05	3	0.5	0.57	15	4	50	3,760	3.16	3.27	3.38	3.51	3.79		
IALR230-0060-0050-0400		0.05	4	0.5	0.57	15	4	50	3,760	4.19	4.34	4.49	4.66	5.03		
IALR230-0060-0050-0500		0.05	5	0.6	0.57	15	4	50	3,760	5.22	5.40	5.60	5.81	6.27		
IALR230-0060-0050-0600		0.05	6	0.5	0.57	15	4	50	3,760	6.26	6.47	6.71	6.96	7.52		
IALR230-0060-0100-0180		0.6	0.1	1.8	0.6	0.57	15	4	50	3,760	1.92	1.98	2.05	2.12	2.28	
IALR230-0060-0100-0200			0.1	2	0.5	0.57	15	4	50	3,760	2.12	2.19	2.27	2.35	2.53	
IALR230-0060-0100-0300			0.1	3	0.5	0.57	15	4	50	3,760	3.16	3.26	3.38	3.50	3.78	
IALR230-0060-0100-0400			0.1	4	0.5	0.57	15	4	50	3,760	4.19	4.33	4.48	4.65	5.02	
IALR230-0060-0100-0500			0.1	5	0.6	0.57	15	4	50	3,760	5.22	5.40	5.59	5.80	6.26	
IALR230-0060-0100-0600			0.1	6	0.5	0.57	15	4	50	3,760	6.26	6.47	6.70	6.95	7.51	
IALR230-0060-0200-0200			0.7	0.2	2	0.5	0.57	15	4	50	3,760	2.12	2.19	2.26	2.33	2.51
IALR230-0060-0200-0300				0.2	3	0.5	0.57	15	4	50	3,760	3.15	3.26	3.37	3.48	3.75
IALR230-0060-0200-0400		0.2		4	0.5	0.57	15	4	50	3,760	4.19	4.32	4.47	4.63	5.00	
IALR230-0060-0200-0600		0.2		6	0.5	0.57	15	4	50	3,760	6.25	6.46	6.69	6.93	7.48	
IALR230-0070-0050-0400	0.7	0.05		4	0.55	0.67	15	4	50	4,000	4.19	4.34	4.49	4.66	5.03	
IALR230-0070-0050-0600		0.05		6	0.55	0.67	15	4	50	4,000	6.26	6.47	6.71	6.96	7.52	
IALR230-0070-0100-0400		0.1		4	0.55	0.67	15	4	50	4,000	4.19	4.33	4.48	4.65	5.02	
IALR230-0070-0100-0600		0.1		6	0.55	0.67	15	4	50	4,000	6.26	6.47	6.70	6.95	7.51	
IALR230-0080-0050-0220		0.8		0.05	2.2	0.8	0.77	15	4	50	4,320	2.33	2.41	2.49	2.59	2.79
IALR230-0080-0050-0400				0.05	4	0.65	0.77	15	4	50	4,320	4.19	4.34	4.49	4.66	5.03
IALR230-0080-0050-0500	0.05			5	0.8	0.77	15	4	50	4,320	5.22	5.40	5.60	5.81	6.27	
IALR230-0080-0050-0600	0.05			6	0.65	0.77	15	4	50	4,320	6.26	6.47	6.71	6.96	7.52	
IALR230-0080-0050-0800	0.05			8	0.65	0.77	15	4	50	4,320	8.33	8.61	8.92	9.26	10.00	
IALR230-0080-0100-0220	0.8			0.1	2.2	0.8	0.77	15	4	50	4,320	2.33	2.41	2.49	2.58	2.78
IALR230-0080-0100-0400				0.1	4	0.65	0.77	15	4	50	4,320	4.19	4.33	4.48	4.65	5.02
IALR230-0080-0100-0500				0.1	5	0.8	0.77	15	4	50	4,320	5.22	5.40	5.59	5.80	6.26
IALR230-0080-0100-0600			0.1	6	0.65	0.77	15	4	50	4,320	6.26	6.47	6.70	6.95	7.51	
IALR230-0080-0100-0800			0.1	8	0.65	0.77	15	4	50	4,320	8.32	8.61	8.92	9.25	9.99	
IALR230-0080-0200-0220			0.9	0.2	2.2	0.8	0.77	15	4	50	4,320	2.33	2.40	2.48	2.56	2.76
IALR230-0080-0200-0400				0.2	4	0.65	0.77	15	4	50	4,320	4.19	4.32	4.47	4.63	5.00
IALR230-0080-0200-0500				0.2	5	0.8	0.77	15	4	50	4,320	5.22	5.39	5.58	5.78	6.24
IALR230-0080-0200-0600	0.2			6	0.65	0.77	15	4	50	4,320	6.25	6.46	6.69	6.93	7.48	
IALR230-0080-0200-0800	0.2			8	0.65	0.77	15	4	50	4,320	8.32	8.60	8.91	9.23	9.97	
IALR230-0090-0100-0400	0.9			0.1	4	0.7	0.87	15	4	50	4,800	4.19	4.33	4.48	4.65	5.02
IALR230-0090-0100-0800		0.1		8	0.7	0.87	15	4	50	4,800	8.32	8.61	8.92	9.25	9.99	
IALR230-0100-0050-0200		1		0.05	2	0.8	0.95	15	4	50	3,680	2.16	2.24	2.31	2.40	2.59
IALR230-0100-0050-0300			0.05	3	0.8	0.95	15	4	50	3,680	3.20	3.31	3.42	3.55	3.83	
IALR230-0100-0050-0400	0.05		4	0.8	0.95	15	4	50	3,680	4.23	4.38	4.53	4.70	5.08		
IALR230-0100-0050-0500	0.05		5	0.8	0.95	15	4	50	3,680	5.26	5.44	5.64	5.85	6.32		

# ion Depo Type A Series

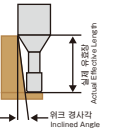


사이즈(Size):mm

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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IALR230-0100-0050-0600	1	0.05	6	0.8	0.95	15	4	50	4,000	6.30	6.51	6.75	7.00	7.56	
IALR230-0100-0050-0800		0.05	8	0.8	0.95	15	4	50	4,000	8.36	8.65	8.96	9.30	10.05	
IALR230-0100-0050-1000		0.05	10	0.8	0.95	15	4	50	4,000	10.43	10.79	11.18	11.60	12.54	
IALR230-0100-0050-1200		0.05	12	0.8	0.95	15	4	50	4,000	12.50	12.93	13.40	13.90	15.02	
IALR230-0100-0100-0200		0.1	2	0.8	0.95	15	4	50	3,680	2.16	2.23	2.31	2.39	2.58	
IALR230-0100-0100-0300		0.1	3	0.8	0.95	15	4	50	3,680	3.19	3.30	3.42	3.54	3.82	
IALR230-0100-0100-0400		0.1	4	0.8	0.95	15	4	50	3,680	4.23	4.37	4.53	4.69	5.07	
IALR230-0100-0100-0500		0.1	5	0.8	0.95	15	4	50	3,680	5.26	5.44	5.63	5.84	6.31	
IALR230-0100-0100-0600		0.1	6	0.8	0.95	15	4	50	4,000	6.30	6.51	6.74	6.99	7.55	
IALR230-0100-0100-0800		0.1	8	0.8	0.95	15	4	50	4,000	8.36	8.65	8.96	9.29	10.04	
IALR230-0100-0100-1000		0.1	10	0.8	0.95	15	4	50	4,000	10.43	10.79	11.18	11.59	12.52	
IALR230-0100-0100-1200		0.1	12	0.8	0.95	15	4	50	4,000	12.50	12.93	13.39	13.89	15.01	
IALR230-0100-0200-0200		0.2	2	0.8	0.95	15	4	50	3,680	2.16	2.23	2.30	2.38	2.56	
IALR230-0100-0200-0300		0.2	3	0.8	0.95	15	4	50	3,680	3.19	3.30	3.41	3.53	3.80	
IALR230-0100-0200-0400		0.2	4	0.8	0.95	15	4	50	3,680	4.22	4.36	4.52	4.68	5.04	
IALR230-0100-0200-0500		0.2	5	0.8	0.95	15	4	50	3,680	5.26	5.43	5.62	5.83	6.29	
IALR230-0100-0200-0600		0.2	6	0.8	0.95	15	4	50	4,000	6.29	6.50	6.73	6.98	7.53	
IALR230-0100-0200-0800		0.2	8	0.8	0.95	15	4	50	4,000	8.36	8.64	8.95	9.28	10.01	
IALR230-0100-0200-1000		0.2	10	0.8	0.95	15	4	50	4,000	10.43	10.78	11.17	11.58	12.50	
IALR230-0100-0200-1200		0.2	12	0.8	0.95	15	4	50	4,000	12.49	12.92	13.38	13.88	14.99	
IALR230-0100-0300-0200		0.3	2	0.8	0.95	15	4	50	3,680	2.15	2.22	2.29	2.36	2.53	
IALR230-0100-0300-0300		0.3	3	0.8	0.95	15	4	50	3,680	3.19	3.29	3.40	3.51	3.78	
IALR230-0100-0300-0400		0.3	4	0.8	0.95	15	4	50	3,680	4.22	4.36	4.50	4.66	5.02	
IALR230-0100-0300-0500		0.3	5	0.8	0.95	15	4	50	3,680	5.25	5.43	5.61	5.81	6.26	
IALR230-0100-0300-0600		0.3	6	0.8	0.95	15	4	50	4,000	6.29	6.50	6.72	6.96	7.51	
IALR230-0100-0300-0800		0.3	8	0.8	0.95	15	4	50	4,000	8.36	8.64	8.94	9.26	9.99	
IALR230-0100-0300-1000		0.3	10	0.8	0.95	15	4	50	4,000	10.42	10.78	11.15	11.56	12.48	
IALR230-0100-0300-1200		0.3	12	0.8	0.95	15	4	50	4,000	12.49	12.92	13.37	13.86	14.96	
IALR230-0120-0100-0500		1.2	0.1	5	1	1.15	15	4	50	4,960	5.26	5.44	5.63	5.84	6.31
IALR230-0120-0100-0600			0.1	6	1	1.15	15	4	50	4,080	6.30	6.51	6.74	6.99	7.55
IALR230-0120-0100-0800			0.1	8	1	1.15	15	4	50	4,080	8.36	8.65	8.96	9.29	10.04
IALR230-0120-0100-1000			0.1	10	1	1.15	15	4	50	4,080	10.43	10.79	11.18	11.59	12.52
IALR230-0120-0100-1200			0.1	12	1	1.15	15	4	50	4,080	12.50	12.93	13.39	13.89	15.01
IALR230-0120-0200-0500			0.2	5	1	1.15	15	4	50	4,960	5.26	5.43	5.62	5.83	6.29
IALR230-0120-0200-0600			0.2	6	1	1.15	15	4	50	4,080	6.29	6.50	6.73	6.98	7.53
IALR230-0120-0200-0800			0.2	8	1	1.15	15	4	50	4,080	8.36	8.64	8.95	9.28	10.01
IALR230-0120-0200-1000			0.2	10	1	1.15	15	4	50	4,080	10.43	10.78	11.17	11.58	12.50
IALR230-0120-0200-1200			0.2	12	1	1.15	15	4	50	4,080	12.49	12.92	13.38	13.88	14.99
IALR230-0120-0300-0500			0.3	5	1	1.15	15	4	50	4,960	5.25	5.43	5.61	5.81	6.26
IALR230-0120-0300-0600			0.3	6	1	1.15	15	4	50	4,080	6.29	6.50	6.72	6.96	7.51
IALR230-0120-0300-0800	0.3		8	1	1.15	15	4	50	4,080	8.36	8.64	8.94	9.26	9.99	
IALR230-0120-0300-1000	0.3		10	1	1.15	15	4	50	4,080	10.42	10.78	11.15	11.56	12.48	
IALR230-0120-0300-1200	0.3		12	1	1.15	15	4	50	4,080	12.49	12.92	13.37	13.86	14.96	
IALR230-0150-0100-0400	1.5		0.1	4	1.2	1.45	15	4	50	3,920	4.23	4.37	4.53	4.69	5.07
IALR230-0150-0100-0600			0.1	6	1.2	1.45	15	4	50	3,920	6.30	6.51	6.74	6.99	7.55

# ion Depo Type A Series



사이즈(Size):mm

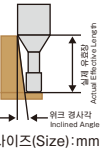
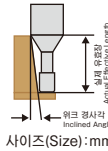
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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IALR230-0150-0100-0800	1.5	0.1	8	1.2	1.45	15	4	50	4,080	8.36	8.65	8.96	9.29	10.04
IALR230-0150-0100-1000		0.1	10	1.2	1.45	15	4	50	4,080	10.43	10.79	11.18	11.59	12.52
IALR230-0150-0100-1200		0.1	12	1.2	1.45	15	4	50	4,080	12.50	12.93	13.39	13.89	15.01
IALR230-0150-0100-1600		0.1	16	1.2	1.45	15	4	50	4,080	16.63	17.21	17.83	18.49	19.98
IALR230-0150-0200-0400		0.2	4	1.2	1.45	15	4	50	3,920	4.22	4.36	4.52	4.68	5.04
IALR230-0150-0200-0600		0.2	6	1.2	1.45	15	4	50	3,920	6.29	6.50	6.73	6.98	7.53
IALR230-0150-0200-0800		0.2	8	1.2	1.45	15	4	50	4,080	8.36	8.64	8.95	9.28	10.01
IALR230-0150-0200-1000		0.2	10	1.2	1.45	15	4	50	4,080	10.43	10.78	11.17	11.58	12.50
IALR230-0150-0200-1200		0.2	12	1.2	1.45	15	4	50	4,080	12.49	12.92	13.38	13.88	14.99
IALR230-0150-0200-1600		0.2	16	1.2	1.45	15	4	50	4,080	16.63	17.20	17.82	18.48	19.96
IALR230-0150-0300-0400		0.3	4	1.2	1.45	15	4	50	3,920	4.22	4.36	4.50	4.66	5.02
IALR230-0150-0300-0600		0.3	6	1.2	1.45	15	4	50	3,920	6.29	6.50	6.72	6.96	7.51
IALR230-0150-0300-0800		0.3	8	1.2	1.45	15	4	50	4,080	8.36	8.64	8.94	9.26	9.99
IALR230-0150-0300-1000		0.3	10	1.2	1.45	15	4	50	4,080	10.42	10.78	11.15	11.56	12.48
IALR230-0150-0300-1200		0.3	12	1.2	1.45	15	4	50	4,080	12.49	12.92	13.37	13.86	14.96
IALR230-0150-0300-1600		0.3	16	1.2	1.45	15	4	50	4,080	16.63	17.19	17.80	18.46	19.94
IALR230-0150-0500-0400		0.5	4	1.2	1.45	15	4	50	3,920	4.21	4.34	4.48	4.63	4.97
IALR230-0150-0500-0600		0.5	6	1.2	1.45	15	4	50	3,920	6.28	6.48	6.70	6.93	7.46
IALR230-0150-0500-0800		0.5	8	1.2	1.45	15	4	50	4,080	8.35	8.62	8.92	9.23	9.95
IALR230-0150-0500-1000		0.5	10	1.2	1.45	15	4	50	4,080	10.42	10.76	11.13	11.53	12.43
IALR230-0150-0500-1200		0.5	12	1.2	1.45	15	4	50	4,080	12.48	12.90	13.35	13.83	14.92
IALR230-0150-0500-1600		0.5	16	1.2	1.45	15	4	50	4,080	16.62	17.18	17.78	18.43	19.89
IALR230-0200-0100-0400		0.1	4	1.6	1.94	15	4	50	3,920	4.25	4.39	4.55	4.71	5.09
IALR230-0200-0100-0600		0.1	6	1.6	1.94	15	4	50	4,080	6.31	6.53	6.76	7.01	7.57
IALR230-0200-0100-0800		0.1	8	1.6	1.94	15	4	50	4,080	8.38	8.67	8.98	9.31	10.06
IALR230-0200-0100-1000		0.1	10	1.6	1.94	15	4	50	4,080	10.45	10.81	11.20	11.61	12.55
IALR230-0200-0100-1200		0.1	12	1.6	1.94	15	4	50	4,080	12.52	12.95	13.41	13.91	15.03
IALR230-0200-0100-1600		0.1	16	1.6	1.94	15	4	50	4,080	16.65	17.23	17.85	18.51	FREE
IALR230-0200-0100-2000		0.1	20	1.6	1.94	15	4	50	4,080	20.79	21.51	22.28	23.11	FREE
IALR230-0200-0200-0400		0.2	4	1.6	1.94	15	4	50	3,920	4.24	4.38	4.54	4.70	5.07
IALR230-0200-0200-0600		0.2	6	1.6	1.94	15	4	50	4,080	6.31	6.52	6.75	7.00	7.55
IALR230-0200-0200-0800		0.2	8	1.6	1.94	15	4	50	4,080	8.38	8.66	8.97	9.30	10.04
IALR230-0200-0200-1000		0.2	10	1.6	1.94	15	4	50	4,080	10.45	10.80	11.19	11.60	12.52
IALR230-0200-0200-1200		0.2	12	1.6	1.94	15	4	50	4,080	12.51	12.94	13.40	13.90	15.01
IALR230-0200-0200-1600		0.2	16	1.6	1.94	15	4	50	4,080	16.65	17.22	17.84	18.50	FREE
IALR230-0200-0200														



# ion Depo Type A Series

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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IALR230-0200-0500-0800	2	0.5	8	1.6	1.94	15	4	50	4,080	8.37	8.64	8.94	9.25	9.97	
IALR230-0200-0500-1000		0.5	10	1.6	1.94	15	4	50	4,080	10.44	10.78	11.15	11.55	12.46	
IALR230-0200-0500-1200		0.5	12	1.6	1.94	15	4	50	4,080	12.50	12.92	13.37	13.85	14.94	
IALR230-0200-0500-1600		0.5	16	1.6	1.94	15	4	50	4,080	16.64	17.20	17.80	18.45	FREE	
IALR230-0200-0500-2000		0.5	20	1.6	1.94	15	4	50	4,080	20.77	21.48	22.24	23.05	FREE	
IALR230-0250-0100-1000	2.5	0.1	10	2	2.44	15	4	50	4,320	10.45	10.81	11.20	11.61	12.55	
IALR230-0250-0100-2000		0.1	20	2	2.44	15	4	50	4,400	20.79	21.51	22.28	FREE	FREE	
IALR230-0250-0200-1000		0.2	10	2	2.44	15	4	50	4,320	10.45	10.80	11.19	11.60	12.52	
IALR230-0250-0200-2000		0.2	20	2	2.44	15	4	50	4,400	20.78	21.50	22.27	FREE	FREE	
IALR230-0250-0300-1000		0.3	10	2	2.44	15	4	50	4,320	10.44	10.80	11.18	11.58	12.50	
IALR230-0250-0300-2000		0.3	20	2	2.44	15	4	50	4,400	20.78	21.49	22.26	FREE	FREE	
IALR230-0250-0500-1000		0.5	10	2	2.44	15	4	50	4,320	10.44	10.78	11.15	11.55	12.46	
IALR230-0250-0500-2000		0.5	20	2	2.44	15	4	50	4,400	20.77	21.48	22.24	FREE	FREE	
IALR230-0300-0100-1200		3	0.1	12	4.5	2.85	15	4	50	6,880	12.69	13.13	13.60	14.11	FREE
IALR230-0300-0100-1800			0.1	18	4.5	2.85	15	4	50	7,040	18.89	19.55	FREE	FREE	FREE
IALR230-0300-0100-2400	0.1		24	4.5	2.85	15	4	60	7,280	25.09	25.96	FREE	FREE	FREE	
IALR230-0300-0100-3000	0.1		30	4.5	2.85	15	4	60	7,600	31.30	FREE	FREE	FREE	FREE	
IALR230-0300-0200-1200	0.2		12	4.5	2.85	15	4	50	6,880	12.69	13.12	13.59	14.09	FREE	
IALR230-0300-0200-1800	0.2		18	4.5	2.85	15	4	50	7,040	18.89	19.54	FREE	FREE	FREE	
IALR230-0300-0200-2400	0.2		24	4.5	2.85	15	4	60	7,280	25.09	25.96	FREE	FREE	FREE	
IALR230-0300-0200-3000	0.2		30	4.5	2.85	15	4	60	7,600	31.29	FREE	FREE	FREE	FREE	
IALR230-0300-0300-1200	0.3		12	4.5	2.85	15	4	50	6,880	12.68	13.11	13.58	14.08	FREE	
IALR230-0300-0300-1800	0.3		18	4.5	2.85	15	4	50	7,040	18.89	19.53	FREE	FREE	FREE	
IALR230-0300-0300-2400	0.3		24	4.5	2.85	15	4	60	7,280	25.09	25.95	FREE	FREE	FREE	
IALR230-0300-0300-3000	0.3		30	4.5	2.85	15	4	60	7,600	31.29	FREE	FREE	FREE	FREE	
IALR230-0300-0500-1200	0.5		12	4.5	2.85	15	4	50	6,880	12.68	13.10	13.56	14.05	FREE	
IALR230-0300-0500-1800	0.5		18	4.5	2.85	15	4	50	7,040	18.88	19.52	FREE	FREE	FREE	
IALR230-0300-0500-2400	0.5		24	4.5	2.85	15	4	60	7,280	25.08	25.94	FREE	FREE	FREE	
IALR230-0300-0500-3000	0.5	30	4.5	2.85	15	4	60	7,600	31.28	FREE	FREE	FREE	FREE		
IALR230-0300-1000-1200	1	12	4.5	2.85	15	4	50	6,880	12.66	13.07	13.50	13.97	FREE		
IALR230-0300-1000-1800	1	18	4.5	2.85	15	4	50	7,040	18.86	19.48	FREE	FREE	FREE		
IALR230-0300-1000-2400	1	24	4.5	2.85	15	4	60	7,280	25.06	25.90	FREE	FREE	FREE		
IALR230-0300-1000-3000	1	30	4.5	2.85	15	4	60	7,600	31.27	FREE	FREE	FREE	FREE		
IALR230-0400-0100-1600	4	0.1	16	6	3.8	15	6	50	6,880	16.92	17.51	18.14	18.81	FREE	
IALR230-0400-0100-2400		0.1	24	6	3.8	15	6	60	6,880	25.19	26.06	27.00	28.01	FREE	
IALR230-0400-0100-3200		0.1	32	6	3.8	15	6	70	6,880	33.46	34.62	35.87	FREE	FREE	
IALR230-0400-0200-1600		0.2	16	6	3.8	15	6	50	6,880	16.92	17.50	18.13	18.80	FREE	
IALR230-0400-0200-2400		0.2	24	6	3.8	15	6	60	6,880	25.19	26.06	26.99	28.00	FREE	
IALR230-0400-0200-3200		0.2	32	6	3.8	15	6	70	6,880	33.46	34.62	35.86	FREE	FREE	
IALR230-0400-0300-1600		0.3	16	6	3.8	15	6	50	6,880	16.91	17.49	18.11	18.78	FREE	
IALR230-0400-0300-2400		0.3	24	6	3.8	15	6	60	6,880	25.18	26.05	26.98	27.98	FREE	
IALR230-0400-0300-3200		0.3	32	6	3.8	15	6	70	6,880	33.45	34.61	35.85	FREE	FREE	
IALR230-0400-0500-1600		0.5	16	6	3.8	15	6	50	6,880	16.91	17.48	18.09	18.75	FREE	
IALR230-0400-0500-2400		0.5	24	6	3.8	15	6	60	6,880	25.18	26.04	26.96	27.95	FREE	
IALR230-0400-0500-3200		0.5	32	6	3.8	15	6	70	6,880	33.45	34.59	35.83	FREE	FREE	

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IALR230-0400-1000-1600	4	1	16	6	3.8	15	6	50	6,880	16.89	17.45	18.04	18.68	FREE
IALR230-0400-1000-2400		1	24	6	3.8	15	6	60	6,880	25.16	26.00	26.91	27.88	FREE
IALR230-0400-1000-3200		1	32	6	3.8	15	6	70	6,880	33.43	34.56	35.77	FREE	FREE
IALR230-0500-0100-2000	5	0.1	20	7.5	4.8	15	6	50	8,720	21.06	21.79	FREE	FREE	FREE
IALR230-0500-0100-4000		0.1	40	7.5	4.8	15	6	70	10,960	41.73	FREE	FREE	FREE	FREE
IALR230-0500-0200-1500		0.2	15	3.5	4.8	15	6	50	8,720	15.88	16.43	17.02	FREE	FREE
IALR230-0500-0200-2000-00350		0.2	20	3.5	4.8	15	6	50	8,720	21.05	21.78	FREE	FREE	FREE
IALR230-0500-0200-2000-00750		0.2	20	7.5	4.8	15	6	50	8,720	21.05	21.78	FREE	FREE	FREE
IALR230-0500-0200-4000		0.2	40	7.5	4.8	15	6	70	10,960	41.73	FREE	FREE	FREE	FREE
IALR230-0500-0300-1500		0.3	15	3.5	4.8	15	6	50	8,720	15.88	16.42	17.01	FREE	FREE
IALR230-0500-0300-2000-00350		0.3	20	3.5	4.8	15	6	50	8,720	21.05	21.77	FREE	FREE	FREE
IALR230-0500-0300-2000-00750		0.3	20	7.5	4.8	15	6	50	8,720	21.05	21.77	FREE	FREE	FREE
IALR230-0500-0300-4000		0.3	40	7.5	4.8	15	6	70	10,960	41.72	FREE	FREE	FREE	FREE
IALR230-0500-0500-2000		0.5	20	7.5	4.8	15	6	50	8,720	21.04	21.76	FREE	FREE	FREE
IALR230-0500-0500-4000		0.5	40	7.5	4.8	15	6	70	10,960	41.72	FREE	FREE	FREE	FREE
IALR230-0500-1000-2000		1	20	7.5	4.8	15	6	50	8,720	21.03	21.72	FREE	FREE	FREE
IALR230-0500-1000-4000		1	40	7.5	4.8	15	6	70	10,960	41.70	FREE	FREE	FREE	FREE
IALR230-0600-0100-2400		6	0.1	24	9	5.8	15	6	60	8,720	FREE	FREE	FREE	FREE
IALR230-0600-0100-4800	0.1		48	9	5.8	15	6	80	13,680	FREE	FREE	FREE	FREE	FREE
IALR230-0600-0200-2400	0.2		24	9	5.8	15	6	60	8,720	FREE	FREE	FREE	FREE	FREE
IALR230-0600-0200-4800	0.2		48	9	5.8	15	6	80	13,680	FREE	FREE	FREE	FREE	FREE
IALR230-0600-0300-2400	0.3		24	9	5.8	15	6	60	8,720	FREE	FREE	FREE	FREE	FREE
IALR230-0600-0300-4800	0.3		48	9	5.8	15	6	80	13,680	FREE	FREE	FREE	FREE	FREE
IALR230-0600-0500-2400	0.5		24	9	5.8	15	6	60	8,720	FREE	FREE	FREE	FREE	FREE
IALR230-0600-0500-4800	0.5		48	9	5.8	15	6	80	13,680	FREE	FREE	FREE	FREE	FREE
IALR230-0600-1000-2400	1		24	9	5.8	15	6	60	8,720	FREE	FREE	FREE	FREE	FREE
IALR230-0600-1000-4800	1	48	9	5.8	15	6	80	13,680	FREE	FREE	FREE	FREE	FREE	

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALR230  
Model number:IALR230

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	0.2	0.5	0.01	0.05	200	30,000	0.01	0.05	200	30,000	0.01	0.05	200	30,000	0.003	0.04	150	30,000
		1	0.007	0.05	150	30,000	0.007	0.05	150	30,000	0.007	0.05	150	30,000	0.003	0.04	100	30,000
		2	0.005	0.05	100	30,000	0.005	0.05	100	30,000	0.005	0.05	100	30,000	0.002	0.04	80	30,000
	0.3	0.8	0.02	0.1	200	30,000	0.02	0.1	200	30,000	0.02	0.1	200	30,000	0.003	0.08	180	30,000
		1	0.02	0.1	200	30,000	0.02	0.1	200	30,000	0.02	0.1	200	30,000	0.003	0.08	180	30,000
		1.5	0.015	0.1	180	30,000	0.015	0.1	180	30,000	0.015	0.1	180	30,000	0.003	0.08	130	30,000
		2	0.01	0.1	150	30,000	0.01	0.1	150	30,000	0.01	0.1	150	30,000	0.003	0.08	100	30,000
	0.4	1	0.025	0.12	350	30,000	0.025	0.12	350	30,000	0.025	0.12	350	30,000	0.005	0.1	300	30,000
		1.2	0.025	0.12	350	30,000	0.025	0.12	350	30,000	0.025	0.12	350	30,000	0.005	0.1	300	30,000
		1.5	0.022	0.12	300	30,000	0.022	0.12	300	30,000	0.022	0.12	300	30,000	0.005	0.1	270	30,000
		2	0.02	0.12	250	30,000	0.02	0.12	250	30,000	0.02	0.12	250	30,000	0.005	0.1	180	25,000
	0.5	2.5	0.02	0.12	250	30,000	0.02	0.12	250	30,000	0.02	0.12	250	30,000	0.005	0.1	180	25,000
		3	0.015	0.12	220	30,000	0.015	0.12	220	30,000	0.015	0.12	220	30,000	0.004	0.1	150	25,000
		1	0.03	0.14	500	30,000	0.03	0.14	500	30,000	0.03	0.14	500	30,000	0.01	0.12	400	25,000
		1.5	0.03	0.14	500	30,000	0.03	0.14	500	30,000	0.03	0.14	500	30,000	0.01	0.12	400	25,000
	0.6	2	0.025	0.14	400	30,000	0.025	0.14	400	30,000	0.025	0.14	400	30,000	0.01	0.12	300	25,000
		3	0.02	0.14	340	30,000	0.02	0.14	340	30,000	0.02	0.14	340	30,000	0.008	0.12	250	25,000
		4	0.015	0.14	280	25,000	0.015	0.14	280	25,000	0.015	0.14	280	25,000	0.005	0.12	180	20,000
		1.8	0.035	0.16	600	30,000	0.035	0.16	600	30,000	0.035	0.16	600	30,000	0.02	0.13	400	25,000
	0.7	2	0.035	0.16	600	30,000	0.035	0.16	600	30,000	0.035	0.16	600	30,000	0.02	0.13	400	25,000
3		0.03	0.16	500	30,000	0.03	0.16	500	30,000	0.03	0.16	500	30,000	0.015	0.13	350	25,000	
4		0.025	0.16	400	25,000	0.025	0.16	400	25,000	0.025	0.16	400	25,000	0.015	0.13	250	20,000	
5		0.015	0.16	250	20,000	0.015	0.16	250	20,000	0.015	0.16	250	20,000	0.008	0.13	150	16,000	
0.8	6	0.015	0.16	250	20,000	0.015	0.16	250	20,000	0.015	0.16	250	20,000	0.008	0.13	150	16,000	
	4	0.03	0.2	600	25,000	0.03	0.2	600	25,000	0.03	0.2	600	25,000	0.02	0.16	400	20,000	
	6	0.02	0.2	450	20,000	0.02	0.2	450	20,000	0.02	0.2	450	20,000	0.01	0.16	250	16,000	
	2.2	0.045	0.25	1,000	25,000	0.045	0.25	1,000	25,000	0.045	0.25	1,000	25,000	0.025	0.2	600	20,000	
0.9	4	0.045	0.25	1,000	25,000	0.045	0.25	1,000	25,000	0.045	0.25	1,000	25,000	0.025	0.2	600	20,000	
	5	0.03	0.25	700	20,000	0.03	0.25	700	20,000	0.03	0.25	700	20,000	0.02	0.2	400	16,000	
	6	0.03	0.25	700	20,000	0.03	0.25	700	20,000	0.03	0.25	700	20,000	0.02	0.2	400	16,000	
	8	0.02	0.25	400	18,000	0.02	0.25	400	18,000	0.02	0.25	400	18,000	0.01	0.2	250	14,000	
1	4	0.05	0.3	1,100	25,000	0.05	0.3	1,100	25,000	0.05	0.3	1,100	25,000	0.03	0.24	700	20,000	
	8	0.03	0.3	500	18,000	0.03	0.3	500	18,000	0.03	0.3	500	18,000	0.01	0.24	350	14,000	
	2	0.065	0.35	1,600	25,000	0.065	0.35	1,600	25,000	0.065	0.35	1,600	25,000	0.05	0.28	900	20,000	
	3	0.06	0.35	1,500	25,000	0.06	0.35	1,500	25,000	0.06	0.35	1,500	25,000	0.05	0.28	850	20,000	
	4	0.055	0.35	1,400	25,000	0.055	0.35	1,400	25,000	0.055	0.35	1,400	25,000	0.04	0.28	800	20,000	
	5	0.05	0.35	1,200	22,000	0.05	0.35	1,200	22,000	0.05	0.35	1,200	22,000	0.03	0.28	700	18,000	
	6	0.045	0.35	1,000	20,000	0.045	0.35	1,000	20,000	0.045	0.35	1,000	20,000	0.02	0.28	600	16,000	
1	8	0.035	0.35	700	18,000	0.035	0.35	700	18,000	0.035	0.35	700	18,000	0.02	0.28	450	14,000	
	10	0.025	0.35	600	16,000	0.025	0.35	600	16,000	0.025	0.35	600	16,000	0.01	0.28	350	13,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●공구 흔들림은 필요 이상으로 하지 않아주세요. Length of tool overhang must be as short as possible. ●공구 폭 방향, ∅e 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut. ●공구 절삭 방향, ∅e 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut. ●공구 절삭 방향, ∅e 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut. ●공구 흔들림은 필요 이상으로 하지 않아주세요. Length of tool overhang must be as short as possible. ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	1	12	0.02	0.35	350	14,000	0.02	0.35	350	14,000	0.02	0.35	350	14,000	0.008	0.28	250	12,000
		5	0.055	0.4	1,500	22,000	0.055	0.4	1,500	22,000	0.055	0.4	1,500	22,000	0.03	0.32	850	18,000
		6	0.05	0.4	1,300	20,000	0.05	0.4	1,300	20,000	0.05	0.4	1,300	20,000	0.03	0.32	750	17,000
	1.2	8	0.04	0.4	1,100	18,000	0.04	0.4	1,100	18,000	0.04	0.4	1,100	18,000	0.025	0.32	600	15,000
		10	0.03	0.4	900	16,000	0.03	0.4	900	16,000	0.03	0.4	900	16,000	0.02	0.32	500	13,000
		12	0.025	0.4	700	14,000	0.025	0.4	700	14,000	0.025	0.4	700	14,000	0.015	0.32	400	11,000
		4	0.09	0.45	1,600	22,000	0.09	0.45	1,600	22,000	0.09	0.45	1,600	22,000	0.05	0.36	1,000	18,000
	1.5	6	0.08	0.45	1,400	20,000	0.08	0.45	1,400	20,000	0.08	0.45	1,400	20,000	0.045	0.36	850	16,000
		8	0.07	0.45	1,200	18,000	0.07	0.45	1,200	18,000	0.07	0.45	1,200	18,000	0.04	0.36	700	15,000
		10	0.06	0.45	1,000	16,000	0.06	0.45	1,000	16,000	0.06	0.45	1,000	16,000	0.035	0.36	550	13,000
		12	0.05	0.45	800	14,000	0.05	0.45	800	14,000	0.05	0.45	800	14,000	0.03	0.36	450	11,000
	2	16	0.035	0.45	600	12,000	0.035	0.45	600	12,000	0.035	0.45	600	12,000	0.018	0.36	350	10,000
		4	0.13	0.5	2,200	16,000	0.13	0.5	2,200	16,000	0.13	0.5	2,200	16,000	0.06	0.4	1,000	14,000
		6	0.12	0.5	2,100	16,000	0.12	0.5	2,100	16,000	0.12	0.5	2,100	16,000	0.055	0.4	900	14,000
		8	0.11	0.5	2,000	16,000	0.11	0.5	2,000	16,000	0.11	0.5	2,000	16,000	0.05	0.4	800	13,000
	2.5	10	0.1	0.5	1,800	16,000	0.1	0.5	1,800	16,000	0.1	0.5	1,800	16,000	0.045	0.4	750	13,000
		12	0.09	0.5	1,500	14,000	0.09	0.5	1,500	14,000	0.09	0.5	1,500	14,000	0.04	0.4	600	11,000
		16	0.07	0.5	1,200	12,000	0.07	0.5	1,200	12,000	0.07	0.5	1,200	12,000	0.03	0.4	500	10,000
		20	0.07	0.5	1,000	12,000	0.07	0.5	1,000	12,000	0.07	0.5	1,000	12,000	0.03	0.4		

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALR230  
Model number:IALR230

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			궤 mm	궤 mm			mm/min	min <sup>-1</sup>			궤 mm	궤 mm			mm/min	min <sup>-1</sup>		
2	0.2	0.5	0.003	0.04	150	30,000	0.003	0.04	150	30,000	0.003	0.04	150	30,000	0.012	0.05	250	30,000
		1	0.003	0.04	100	30,000	0.003	0.04	100	30,000	0.003	0.04	100	30,000	0.008	0.05	200	30,000
		2	0.002	0.04	80	30,000	0.002	0.04	80	30,000	0.002	0.04	80	30,000	0.006	0.05	135	30,000
	0.3	0.8	0.003	0.08	180	30,000	0.003	0.08	180	30,000	0.003	0.08	180	30,000	0.024	0.1	300	30,000
		1	0.003	0.08	180	30,000	0.003	0.08	180	30,000	0.003	0.08	180	30,000	0.024	0.1	300	30,000
		1.5	0.003	0.08	130	30,000	0.003	0.08	130	30,000	0.003	0.08	130	30,000	0.018	0.1	260	30,000
		2	0.003	0.08	100	30,000	0.003	0.08	100	30,000	0.003	0.08	100	30,000	0.012	0.1	250	30,000
	0.4	2.5	0.002	0.08	80	25,000	0.002	0.08	80	25,000	0.002	0.08	80	25,000	0.008	0.1	240	30,000
		3	0.002	0.08	50	25,000	0.002	0.08	50	25,000	0.002	0.08	50	25,000	0.006	0.1	220	30,000
		1	0.005	0.1	300	30,000	0.005	0.1	300	30,000	0.005	0.1	300	30,000	0.03	0.12	450	30,000
		1.2	0.005	0.1	300	30,000	0.005	0.1	300	30,000	0.005	0.1	300	30,000	0.03	0.12	450	30,000
	0.5	1.5	0.005	0.1	270	30,000	0.005	0.1	270	30,000	0.005	0.1	270	30,000	0.027	0.12	400	30,000
		2	0.005	0.1	180	25,000	0.005	0.1	180	25,000	0.005	0.1	180	25,000	0.024	0.12	360	30,000
		2.5	0.005	0.1	180	25,000	0.005	0.1	180	25,000	0.005	0.1	180	25,000	0.024	0.12	360	30,000
		3	0.004	0.1	150	25,000	0.004	0.1	150	25,000	0.004	0.1	150	25,000	0.018	0.12	300	30,000
	0.6	1	0.01	0.12	400	25,000	0.01	0.12	400	25,000	0.01	0.12	400	25,000	0.036	0.14	650	30,000
		1.5	0.01	0.12	400	25,000	0.01	0.12	400	25,000	0.01	0.12	400	25,000	0.036	0.14	650	30,000
		2	0.01	0.12	300	25,000	0.01	0.12	300	25,000	0.01	0.12	300	25,000	0.03	0.14	600	30,000
		3	0.008	0.12	250	25,000	0.008	0.12	250	25,000	0.008	0.12	250	25,000	0.024	0.14	480	30,000
	0.7	4	0.005	0.12	180	20,000	0.005	0.12	180	20,000	0.005	0.12	180	20,000	0.018	0.14	430	30,000
		1.8	0.02	0.13	400	25,000	0.02	0.13	400	25,000	0.02	0.13	400	25,000	0.04	0.16	800	30,000
		2	0.02	0.13	400	25,000	0.02	0.13	400	25,000	0.02	0.13	400	25,000	0.04	0.16	800	30,000
		3	0.015	0.13	350	25,000	0.015	0.13	350	25,000	0.015	0.13	350	25,000	0.035	0.16	750	30,000
	0.8	4	0.015	0.13	250	20,000	0.015	0.13	250	20,000	0.015	0.13	250	20,000	0.03	0.16	650	30,000
		5	0.008	0.13	150	16,000	0.008	0.13	150	16,000	0.008	0.13	150	16,000	0.018	0.16	400	25,000
		6	0.008	0.13	150	16,000	0.008	0.13	150	16,000	0.008	0.13	150	16,000	0.018	0.16	400	25,000
		4	0.02	0.16	400	20,000	0.02	0.16	400	20,000	0.02	0.16	400	20,000	0.04	0.2	1,000	30,000
	0.9	6	0.01	0.16	250	16,000	0.01	0.16	250	16,000	0.01	0.16	250	16,000	0.025	0.2	700	25,000
		2.2	0.025	0.2	600	20,000	0.025	0.2	600	20,000	0.025	0.2	600	20,000	0.055	0.25	1,400	30,000
		4	0.025	0.2	600	20,000	0.025	0.2	600	20,000	0.025	0.2	600	20,000	0.055	0.25	1,400	30,000
		5	0.02	0.2	400	16,000	0.02	0.2	400	16,000	0.02	0.2	400	16,000	0.04	0.25	1,000	25,000
	1	6	0.02	0.2	400	16,000	0.02	0.2	400	16,000	0.02	0.2	400	16,000	0.04	0.25	1,000	25,000
		8	0.01	0.2	250	14,000	0.01	0.2	250	14,000	0.01	0.2	250	14,000	0.025	0.25	600	22,000
		4	0.03	0.24	700	20,000	0.03	0.24	700	20,000	0.03	0.24	700	20,000	0.06	0.3	1,500	30,000
		8	0.01	0.24	350	14,000	0.01	0.24	350	14,000	0.01	0.24	350	14,000	0.04	0.3	800	22,000
	1	2	0.05	0.28	900	20,000	0.05	0.28	900	20,000	0.05	0.28	900	20,000	0.08	0.35	2,200	30,000
		3	0.05	0.28	850	20,000	0.05	0.28	850	20,000	0.05	0.28	850	20,000	0.07	0.35	2,100	30,000
		4	0.04	0.28	800	20,000	0.04	0.28	800	20,000	0.04	0.28	800	20,000	0.065	0.35	2,000	30,000
		5	0.03	0.28	700	18,000	0.03	0.28	700	18,000	0.03	0.28	700	18,000	0.06	0.35	1,700	27,000
		6	0.02	0.28	600	16,000	0.02	0.28	600	16,000	0.02	0.28	600	16,000	0.055	0.35	1,500	25,000
8		0.02	0.28	450	14,000	0.02	0.28	450	14,000	0.02	0.28	450	14,000	0.045	0.35	1,000	22,000	
1	10	0.01	0.28	350	13,000	0.01	0.28	350	13,000	0.01	0.28	350	13,000	0.03	0.35	800	20,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●궤 p 축 방향, 궤 e 반경 방향. 궤 p=Axial Depth of Cut 궤 e=Radial Depth of Cut. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			궤 mm	궤 mm			mm/min	min <sup>-1</sup>			궤 mm	궤 mm			mm/min	min <sup>-1</sup>		
2	1	12	0.008	0.28	250	12,000	0.008	0.28	250	12,000	0.008	0.28	250	12,000	0.008	0.28	250	12,000
		5	0.03	0.32	850	18,000	0.03	0.32	850	18,000	0.03	0.32	850	18,000	0.065	0.4	2,200	26,000
		6	0.03	0.32	750	17,000	0.03	0.32	750	17,000	0.03	0.32	750	17,000	0.06	0.4	2,000	25,000
	1.2	8	0.025	0.32	600	15,000	0.025	0.32	600	15,000	0.025	0.32	600	15,000	0.05	0.4	1,600	22,000
		10	0.02	0.32	500	13,000	0.02	0.32	500	13,000	0.02	0.32	500	13,000	0.04	0.4	1,400	20,000
		12	0.015	0.32	400	11,000	0.015	0.32	400	11,000	0.015	0.32	400	11,000	0.03	0.4	1,000	17,000
		4	0.05	0.36	1,000	18,000	0.05	0.36	1,000	18,000	0.05	0.36	1,000	18,000	0.1	0.45	2,300	26,000
	1.5	6	0.045	0.36	850	16,000	0.045	0.36	850	16,000	0.045	0.36	850	16,000	0.09	0.45	2,000	24,000
		8	0.04	0.36	700	15,000	0.04	0.36	700	15,000	0.04	0.36	700	15,000	0.08	0.45	1,800	22,000
		10	0.035	0.36	550	13,000	0.035	0.36	550	13,000	0.035	0.36	550	13,000	0.07	0.45	1,500	20,000
		12	0.03	0.36	450	11,000	0.03	0.36	450	11,000	0.03	0.36	450	11,000	0.06	0.45	1,200	17,000
	2	16	0.018	0.36	350	10,000	0.018	0.36	350	10,000	0.018	0.36	350	10,000	0.04	0.45	900	15,000
		4	0.06	0.4	1,000	14,000	0.06	0.4	1,000	14,000	0.06	0.4	1,000	14,000	0.15	0.5	3,000	20,000
		6	0.055	0.4	900	14,000	0.055	0.4	900	14,000	0.055	0.4	900	14,000	0.14	0.5	2,800	20,000
		8	0.05	0.4	800	13,000	0.05	0.4	800	13,000	0.05	0.4	800	13,000	0.13	0.5	2,600	20,000
	2.5	10	0.045	0.4	750	13,000	0.045	0.4	750	13,000	0.045	0.4	750	13,000	0.12	0.5	2,300	20,000
		12	0.04	0.4	600	11,000	0.04	0.4	600	11,000	0.04	0.4	600	11,000	0.11	0.5	1,900	17,000
		16	0.03	0.4	500	10,000	0.03	0.4	500	10,000	0.03	0.4	500	10,000	0.085	0.5	1,600	15,000
		20	0.03	0.4	450	10,000	0.03	0.4	450	10,000	0.03	0.4	450	10,000	0.085	0.5	1,400	15,000
	3	10	0.07	0.65	900	11,000	0.07	0.65	900	11,000	0.07	0.65	900	11,000	0.17	0.8	3,000	16,000
		12	0.08	0.75	900	9,000	0.08	0.75	900	9,000	0.08	0.75	900	9,000	0.2	0.9	3,000	13,000
		18	0.07	0.75	700	8,000	0.07	0.75	700	8,000	0.07	0.75	700	8,000	0.14	0.9	2,400	12,000
		24	0.05	0.75	500	6,400	0.05	0.75	500	6,400	0.05	0.75	500	6,400	0.1	0.9	1,800	10,000
	4	30	0.03	0.75	400	5,600	0.03	0.75	400	5,600	0.03	0.75	400	5,600	0.07	0.9	1,300	8,500
		16	0.1	1	850	6,400	0.1	1										

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALR230  
Model number:IALR230

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.2	0.5	0.012	0.05	250	30,000	0.012	0.05	250	30,000	0.003	0.04	150	30,000
		1	0.008	0.05	200	30,000	0.008	0.05	200	30,000	0.003	0.04	100	30,000
		2	0.006	0.05	135	30,000	0.006	0.05	135	30,000	0.002	0.04	80	30,000
	0.3	0.8	0.024	0.1	300	30,000	0.024	0.1	300	30,000	0.003	0.08	180	30,000
		1	0.024	0.1	300	30,000	0.024	0.1	300	30,000	0.003	0.08	180	30,000
		1.5	0.018	0.1	260	30,000	0.018	0.1	260	30,000	0.003	0.08	130	30,000
		2	0.012	0.1	250	30,000	0.012	0.1	250	30,000	0.003	0.08	100	30,000
		2.5	0.008	0.1	240	30,000	0.008	0.1	240	30,000	0.002	0.08	80	25,000
		3	0.006	0.1	220	30,000	0.006	0.1	220	30,000	0.002	0.08	50	25,000
	0.4	1	0.03	0.12	450	30,000	0.03	0.12	450	30,000	0.005	0.1	300	30,000
		1.2	0.03	0.12	450	30,000	0.03	0.12	450	30,000	0.005	0.1	300	30,000
		1.5	0.027	0.12	400	30,000	0.027	0.12	400	30,000	0.005	0.1	270	30,000
		2	0.024	0.12	360	30,000	0.024	0.12	360	30,000	0.005	0.1	180	25,000
		2.5	0.024	0.12	360	30,000	0.024	0.12	360	30,000	0.005	0.1	180	25,000
	0.5	1	0.036	0.14	650	30,000	0.036	0.14	650	30,000	0.01	0.12	400	25,000
		1.5	0.036	0.14	650	30,000	0.036	0.14	650	30,000	0.01	0.12	400	25,000
		2	0.03	0.14	600	30,000	0.03	0.14	600	30,000	0.01	0.12	300	25,000
		3	0.024	0.14	480	30,000	0.024	0.14	480	30,000	0.008	0.12	250	25,000
	0.6	4	0.018	0.14	430	30,000	0.018	0.14	430	30,000	0.005	0.12	180	20,000
		1.8	0.04	0.16	800	30,000	0.04	0.16	800	30,000	0.02	0.13	400	25,000
		2	0.04	0.16	800	30,000	0.04	0.16	800	30,000	0.02	0.13	400	25,000
		3	0.035	0.16	750	30,000	0.035	0.16	750	30,000	0.015	0.13	350	25,000
		4	0.03	0.16	650	30,000	0.03	0.16	650	30,000	0.015	0.13	250	20,000
		5	0.018	0.16	400	25,000	0.018	0.16	400	25,000	0.008	0.13	150	16,000
		6	0.018	0.16	400	25,000	0.018	0.16	400	25,000	0.008	0.13	150	16,000
	0.7	4	0.04	0.2	1,000	30,000	0.04	0.2	1,000	30,000	0.02	0.16	400	20,000
		6	0.025	0.2	700	25,000	0.025	0.2	700	25,000	0.01	0.16	250	16,000
	0.8	2.2	0.055	0.25	1,400	30,000	0.055	0.25	1,400	30,000	0.025	0.2	600	20,000
		4	0.055	0.25	1,400	30,000	0.055	0.25	1,400	30,000	0.025	0.2	600	20,000
		5	0.04	0.25	1,000	25,000	0.04	0.25	1,000	25,000	0.02	0.2	400	16,000
6		0.04	0.25	1,000	25,000	0.04	0.25	1,000	25,000	0.02	0.2	400	16,000	
0.9	8	0.025	0.25	600	22,000	0.025	0.25	600	22,000	0.01	0.2	250	14,000	
	4	0.06	0.3	1,500	30,000	0.06	0.3	1,500	30,000	0.03	0.24	700	20,000	
1	8	0.04	0.3	800	22,000	0.04	0.3	800	22,000	0.01	0.24	350	14,000	
	2	0.08	0.35	2,200	30,000	0.08	0.35	2,200	30,000	0.05	0.28	900	20,000	
	3	0.07	0.35	2,100	30,000	0.07	0.35	2,100	30,000	0.05	0.28	850	20,000	
	4	0.065	0.35	2,000	30,000	0.065	0.35	2,000	30,000	0.04	0.28	800	20,000	
	5	0.06	0.35	1,700	27,000	0.06	0.35	1,700	27,000	0.03	0.28	700	18,000	
	6	0.055	0.35	1,500	25,000	0.055	0.35	1,500	25,000	0.02	0.28	600	16,000	
	8	0.045	0.35	1,000	22,000	0.045	0.35	1,000	22,000	0.02	0.28	450	14,000	
	10	0.03	0.35	800	20,000	0.03	0.35	800	20,000	0.01	0.28	350	13,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●공구 홀더는 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●절입량은, 청삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing. ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	1	12	0.025	0.35	600	18,000	0.025	0.35	600	18,000	0.008	0.28	250	12,000
		5	0.065	0.4	2,200	26,000	0.065	0.4	2,200	26,000	0.03	0.32	850	18,000
		6	0.06	0.4	2,000	25,000	0.06	0.4	2,000	25,000	0.03	0.32	750	17,000
	1.2	8	0.05	0.4	1,600	22,000	0.05	0.4	1,600	22,000	0.025	0.32	600	15,000
		10	0.04	0.4	1,400	20,000	0.04	0.4	1,400	20,000	0.02	0.32	500	13,000
		12	0.03	0.4	1,000	17,000	0.03	0.4	1,000	17,000	0.015	0.32	400	11,000
		4	0.1	0.45	2,300	26,000	0.1	0.45	2,300	26,000	0.05	0.36	1,000	18,000
	1.5	6	0.09	0.45	2,000	24,000	0.09	0.45	2,000	24,000	0.045	0.36	850	16,000
		8	0.08	0.45	1,800	22,000	0.08	0.45	1,800	22,000	0.04	0.36	700	15,000
		10	0.07	0.45	1,500	20,000	0.07	0.45	1,500	20,000	0.035	0.36	550	13,000
		12	0.06	0.45	1,200	17,000	0.06	0.45	1,200	17,000	0.03	0.36	450	11,000
	2	4	0.15	0.5	3,000	20,000	0.15	0.5	3,000	20,000	0.06	0.4	1,000	14,000
		6	0.14	0.5	2,800	20,000	0.14	0.5	2,800	20,000	0.055	0.4	900	14,000
		8	0.13	0.5	2,600	20,000	0.13	0.5	2,600	20,000	0.05	0.4	800	13,000
		10	0.12	0.5	2,300	20,000	0.12	0.5	2,300	20,000	0.045	0.4	750	13,000
	2.5	12	0.11	0.5	1,900	17,000	0.11	0.5	1,900	17,000	0.04	0.4	600	11,000
		16	0.085	0.5	1,600	15,000	0.085	0.5	1,600	15,000	0.03	0.4	500	10,000
		20	0.085	0.5	1,400	15,000	0.085	0.5	1,400	15,000	0.03	0.4	450	10,000
		10	0.17	0.8	3,000	16,000	0.17	0.8	3,000	16,000	0.07	0.65	900	11,000
	3	20	0.1	0.8	1,600	11,000	0.1	0.8	1,600	11,000	0.05	0.65	450	7,000
		12	0.2	0.9	3,000	13,000	0.2	0.9	3,000	13,000	0.08	0.75	900	9,000
		18	0.14	0.9	2,400	12,000	0.14	0.9	2,400	12,000	0.07	0.75	700	8,000
		24	0.1	0.9	1,800	10,000	0.1	0.9	1,800	10,000	0.05	0.75	500	6,400
	4	30	0.07	0.9	1,300	8,500	0.07	0.9	1,300	8,500	0.03	0.75	400	5,600
		16	0.3	1.2	3,200	10,000	0.3	1.2	3,200	10,000	0.1	1	850	6,400
		24	0.18	1.2	2,400	8,500	0.18	1.2	2,400	8,500	0.08	1	700	5,600
	5	32	0.14	1.2	1,800	8,000	0.14	1.2	1,800	8,000	0.04	1	500	4,800
		15	0.36	1.6	3,000	7,200	0.36	1.6	3,000	7,200	0.1	1.3	800	4,800
		20	0.36	1.6	3,000	7,200	0.36	1.6	3,000	7,200	0.1	1.3	800	4,800
	6	40	0.16	1.6	1,300	4,800	0.16	1.6	1,300	4,800	0.05	1.3	400	3,200
24		0.48	2.1	2,600	5,400	0.48	2.1	2,600	5,400	0.15	1.7	700	3,600	
		48	0.18	2.1	1,000	3,600	0.18	2.1	1,000	3,600	0.05	1.7	350	2,400

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●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

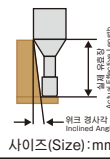
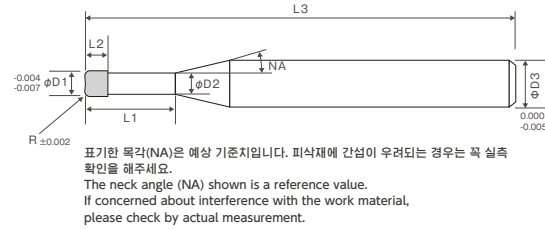


# ion Depo Type A Series

초경 롱 넥 래디우스 엔드밀  
Carbide Long Neck Radius End Mill

■형번:IALR430 Model number:IALR430

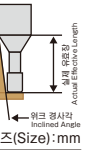
ion A super MG 날수 4 벨리스각 30° 목각 15° Shank 0/-0.005



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IALR430-0100-0050-0300	1	0.05	3	0.8	0.95	15	4	50	5,760	3.20	3.31	3.42	3.55	3.83	
IALR430-0100-0050-0400		0.05	4	0.8	0.95	15	4	50	5,760	4.23	4.38	4.53	4.70	5.08	
IALR430-0100-0050-0500		0.05	5	0.8	0.95	15	4	50	5,760	5.26	5.44	5.64	5.85	6.32	
IALR430-0100-0050-0600		0.05	6	0.8	0.95	15	4	50	5,760	6.30	6.51	6.75	7.00	7.56	
IALR430-0100-0050-0800		0.05	8	0.8	0.95	15	4	50	5,760	8.36	8.65	8.96	9.30	10.05	
IALR430-0100-0050-1000		0.05	10	0.8	0.95	15	4	50	5,760	10.43	10.79	11.18	11.60	12.54	
IALR430-0100-0050-1200		0.05	12	0.8	0.95	15	4	50	5,760	12.50	12.93	13.40	13.90	15.02	
IALR430-0100-0100-0300		0.1	3	0.8	0.95	15	4	50	5,760	3.19	3.30	3.42	3.54	3.82	
IALR430-0100-0100-0400		0.1	4	0.8	0.95	15	4	50	5,760	4.23	4.37	4.53	4.69	5.07	
IALR430-0100-0100-0500		0.1	5	0.8	0.95	15	4	50	5,760	5.26	5.44	5.63	5.84	6.31	
IALR430-0100-0100-0600		0.1	6	0.8	0.95	15	4	50	5,760	6.30	6.51	6.74	6.99	7.55	
IALR430-0100-0100-0800		0.1	8	0.8	0.95	15	4	50	5,760	8.36	8.65	8.96	9.29	10.04	
IALR430-0100-0100-1000		0.1	10	0.8	0.95	15	4	50	5,760	10.43	10.79	11.18	11.59	12.52	
IALR430-0100-0100-1200		0.1	12	0.8	0.95	15	4	50	5,760	12.50	12.93	13.39	13.89	15.01	
IALR430-0100-0200-0300		0.2	3	0.8	0.95	15	4	50	5,760	3.19	3.30	3.41	3.53	3.80	
IALR430-0100-0200-0400		0.2	4	0.8	0.95	15	4	50	5,760	4.22	4.36	4.52	4.68	5.04	
IALR430-0100-0200-0500		0.2	5	0.8	0.95	15	4	50	5,760	5.26	5.43	5.62	5.83	6.29	
IALR430-0100-0200-0600		0.2	6	0.8	0.95	15	4	50	5,760	6.29	6.50	6.73	6.98	7.53	
IALR430-0100-0200-0800		0.2	8	0.8	0.95	15	4	50	5,760	8.36	8.64	8.95	9.28	10.01	
IALR430-0100-0200-1000		0.2	10	0.8	0.95	15	4	50	5,760	10.43	10.78	11.17	11.58	12.50	
IALR430-0100-0200-1200	0.2	12	0.8	0.95	15	4	50	5,760	12.49	12.92	13.38	13.88	14.99		
IALR430-0100-0300-0300	1.2	0.3	3	0.8	0.95	15	4	50	5,760	3.19	3.29	3.40	3.51	3.78	
IALR430-0100-0300-0400		0.3	4	0.8	0.95	15	4	50	5,760	4.22	4.36	4.50	4.66	5.02	
IALR430-0100-0300-0500		0.3	5	0.8	0.95	15	4	50	5,760	5.25	5.43	5.61	5.81	6.26	
IALR430-0100-0300-0600		0.3	6	0.8	0.95	15	4	50	5,760	6.29	6.50	6.72	6.96	7.51	
IALR430-0100-0300-0800		0.3	8	0.8	0.95	15	4	50	5,760	8.36	8.64	8.94	9.26	9.99	
IALR430-0100-0300-1000		0.3	10	0.8	0.95	15	4	50	5,760	10.42	10.78	11.15	11.56	12.48	
IALR430-0100-0300-1200		0.3	12	0.8	0.95	15	4	50	5,760	12.49	12.92	13.37	13.86	14.96	
IALR430-0120-0100-0500		1.2	0.1	5	1	1.15	15	4	50	6,080	5.26	5.44	5.63	5.84	6.31
IALR430-0120-0100-1000			0.1	10	1	1.15	15	4	50	6,080	10.43	10.79	11.18	11.59	12.52

# ion Depo Type A Series



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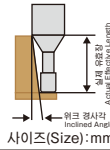
코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IALR430-0120-0100-1500	1.2	0.1	15	1	1.15	15	4	50	9,120	15.60	16.14	16.72	17.34	18.74	
IALR430-0120-0200-0500		0.2	5	1	1.15	15	4	50	6,080	5.26	5.43	5.62	5.83	6.29	
IALR430-0120-0200-1000		0.2	10	1	1.15	15	4	50	6,080	10.43	10.78	11.17	11.58	12.50	
IALR430-0120-0200-1500		0.2	15	1	1.15	15	4	50	9,120	15.59	16.13	16.71	17.33	18.72	
IALR430-0120-0300-0500		0.3	5	1	1.15	15	4	50	6,080	5.25	5.43	5.61	5.81	6.26	
IALR430-0120-0300-1000		0.3	10	1	1.15	15	4	50	6,080	10.42	10.78	11.15	11.56	12.48	
IALR430-0120-0300-1500		0.3	15	1	1.15	15	4	50	9,120	15.59	16.12	16.70	17.31	18.69	
IALR430-0150-0100-0300		1.5	0.1	3	1.1	1.45	15	4	50	6,080	3.19	3.30	3.42	3.54	3.82
IALR430-0150-0100-0600			0.1	6	1.1	1.45	15	4	50	6,080	6.30	6.51	6.74	6.99	7.55
IALR430-0150-0100-1000			0.1	10	1.1	1.45	15	4	50	6,080	10.43	10.79	11.18	11.59	12.52
IALR430-0150-0100-1200	0.1		12	1.2	1.45	15	4	50	6,080	12.50	12.93	13.39	13.89	15.01	
IALR430-0150-0100-1800	0.1		18	1.2	1.45	15	4	50	6,080	18.70	19.35	20.04	20.79	22.47	
IALR430-0150-0200-0300	0.2		3	1.1	1.45	15	4	50	6,080	3.19	3.30	3.41	3.53	3.80	
IALR430-0150-0200-0600	0.2		6	1.1	1.45	15	4	50	6,080	6.29	6.50	6.73	6.98	7.53	
IALR430-0150-0200-1000	0.2		10	1.1	1.45	15	4	50	6,080	10.43	10.78	11.17	11.58	12.50	
IALR430-0150-0200-1200	0.2		12	1.2	1.45	15	4	50	6,080	12.49	12.92	13.38	13.88	14.99	
IALR430-0150-0200-1800	0.2		18	1.2	1.45	15	4	50	6,080	18.70	19.34	20.03	20.78	22.45	
IALR430-0150-0300-0300	0.3		3	1.1	1.45	15	4	50	6,080	3.19	3.29	3.40	3.51	3.78	
IALR430-0150-0300-0600	0.3		6	1.1	1.45	15	4	50	6,080	6.29	6.50	6.72	6.96	7.51	
IALR430-0150-0300-1000	0.3		10	1.1	1.45	15	4	50	6,080	10.42	10.78	11.15	11.56	12.48	
IALR430-0150-0300-1200	0.3		12	1.2	1.45	15	4	50	6,080	12.49	12.92	13.37	13.86	14.96	
IALR430-0150-0300-1800	0.3		18	1.2	1.45	15	4	50	6,080	18.69	19.33	20.02	20.76	22.42	
IALR430-0150-0500-0600	0.5		6	1.2	1.45	15	4	50	6,080	6.28	6.48	6.70	6.93	7.46	
IALR430-0150-0500-1200	0.5		12	1.2	1.45	15	4	50	6,080	12.48	12.90	13.35	13.83	14.92	
IALR430-0150-0500-1800	0.5		18	1.2	1.45	15	4	50	6,080	18.69	19.32	20.00	20.73	22.38	
IALR430-0200-0100-0600	2	0.1	6	1.5	1.94	15	4	50	6,080	6.31	6.53	6.76	7.01	7.57	
IALR430-0200-0100-0800		0.1	8	1.6	1.94	15	4	50	6,080	8.38	8.67	8.98	9.31	10.06	
IALR430-0200-0100-1000		0.1	10	1.5	1.94	15	4	50	6,080	10.45	10.81	11.20	11.61	12.55	
IALR430-0200-0100-1200		0.1	12	1.6	1.94	15	4	50	6,080	12.52	12.95	13.41	13.91	15.03	
IALR430-0200-0100-1500		0.1	15	1.5	1.94	15	4	50	6,080	15.62	16.16	16.74	17.36	18.76	
IALR430-0200-0100-1600		0.1	16	1.6	1.94	15	4	50	6,080	16.65	17.23	17.85	18.51	FREE	
IALR430-0200-0100-2000		0.1	20	1.5	1.94	15	4	50	6,080	20.79	21.51	22.28	23.11	FREE	
IALR430-0200-0100-2400		0.1	24	1.6	1.94	15	4	60	6,080	24.92	25.79	26.71	27.71	FREE	
IALR430-0200-0200-0600		0.2	6	1.5	1.94	15	4	50	6,080	6.31	6.52	6.75	7.00	7.55	
IALR430-0200-0200-0800		0.2	8	1.6	1.94	15	4	50	6,080	8.38	8.66	8.97	9.30	10.04	
IALR430-0200-0200-1000		0.2	10	1.5	1.94	15	4	50	6,080	10.45	10.80	11.19	11.60	12.52	
IALR430-0200-0200-1200		0.2	12	1.6	1.94	15	4	50	6,080	12.51	12.94	13.40	13.90	15.01	
IALR430-0200-0200-1500		0.2	15	1.5	1.94	15	4	50	6,080	15.61	16.15	16.73	17.35	18.74	
IALR430-0200-0200-1600		0.2	16	1.6	1.94	15	4	50	6,080	16.65	17.22	17.84	18.50	FREE	
IALR430-0200-0200-2000		0.2	20	1.5	1.94	15	4	50	6,080	20.78	21.50	22.27	23.10	FREE	
IALR430-0200-0200-2400		0.2	24	1.6	1.94	15	4	60	6,080	24.92	25.78	26.70	27.70	FREE	
IALR430-0200-0300-0600		0.3	6	1.5	1.94	15	4	50	6,080	6.31	6.52	6.74	6.98	7.53	
IALR430-0200-0300-0800		0.3	8	1.6	1.94	15	4	50	6,080	8.37	8.66	8.96	9.28	10.02	
IALR430-0200-0300-1000		0.3	10	1.5	1.94	15	4	50	6,080	10.44	10.80	11.18	11.58	12.50	
IALR430-0200-0300-1200		0.3	12	1.6	1.94	15	4	50	6,080	12.51	12.94	13.39	13.88	14.99	

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series



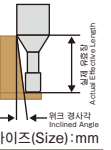
# ion Depo Type A Series

# ion Depo Type A Series



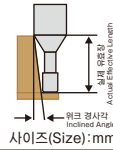
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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IALR430-0200-0300-1500	2	0.3	15	1.5	1.94	15	4	50	6,080	15.61	16.14	16.72	17.33	18.72	
IALR430-0200-0300-1600		0.3	16	1.6	1.94	15	4	50	6,080	16.64	17.21	17.83	18.48	FREE	
IALR430-0200-0300-2000		0.3	20	1.5	1.94	15	4	50	6,080	20.78	21.49	22.26	23.08	FREE	
IALR430-0200-0300-2400		0.3	24	1.6	1.94	15	4	60	6,080	24.91	25.77	26.69	27.68	FREE	
IALR430-0200-0500-0800		0.5	8	1.6	1.94	15	4	50	6,080	8.37	8.64	8.94	9.25	9.97	
IALR430-0200-0500-1200		0.5	12	1.6	1.94	15	4	50	6,080	12.50	12.92	13.37	13.85	14.94	
IALR430-0200-0500-1600		0.5	16	1.6	1.94	15	4	50	6,080	16.64	17.20	17.80	18.45	FREE	
IALR430-0200-0500-2400		0.5	24	1.6	1.94	15	4	60	6,080	24.91	25.76	26.67	27.65	FREE	
IALR430-0250-0100-1000	2.5	0.1	10	2	2.44	15	4	50	6,400	10.45	10.81	11.20	11.61	12.55	
IALR430-0250-0100-2000		0.1	20	2	2.44	15	4	50	6,400	20.79	21.51	22.28	FREE	FREE	
IALR430-0250-0200-1000		0.2	10	2	2.44	15	4	50	6,400	10.45	10.80	11.19	11.60	12.52	
IALR430-0250-0200-2000		0.2	20	2	2.44	15	4	50	6,400	20.78	21.50	22.27	FREE	FREE	
IALR430-0250-0300-1000		0.3	10	2	2.44	15	4	50	6,400	10.44	10.80	11.18	11.58	12.50	
IALR430-0250-0300-2000		0.3	20	2	2.44	15	4	50	6,400	20.78	21.49	22.26	FREE	FREE	
IALR430-0250-0500-1000		0.5	10	2	2.44	15	4	50	6,400	10.44	10.78	11.15	11.55	12.46	
IALR430-0250-0500-2000		0.5	20	2	2.44	15	4	50	6,400	20.77	21.48	22.24	FREE	FREE	
IALR430-0300-0100-1000		3	0.1	10	2.5	2.85	15	4	50	8,320	10.62	10.99	11.38	11.81	FREE
IALR430-0300-0100-1200			0.1	12	2.5	2.85	15	4	50	8,320	12.69	13.13	13.60	14.11	FREE
IALR430-0300-0100-1500			0.1	15	2.5	2.85	15	4	50	8,320	15.79	16.34	16.92	FREE	FREE
IALR430-0300-0100-1800			0.1	18	2.5	2.85	15	4	50	8,320	18.89	19.55	FREE	FREE	FREE
IALR430-0300-0100-2000	0.1		20	2.5	2.85	15	4	50	8,320	20.96	21.69	FREE	FREE	FREE	
IALR430-0300-0100-2400	0.1		24	2.5	2.85	15	4	60	8,800	25.09	25.96	FREE	FREE	FREE	
IALR430-0300-0100-3000	0.1		30	2.5	2.85	15	4	60	8,800	31.30	FREE	FREE	FREE	FREE	
IALR430-0300-0200-1000	0.2		10	2.5	2.85	15	4	50	8,320	10.62	10.98	11.37	11.79	FREE	
IALR430-0300-0200-1200	0.2		12	2.5	2.85	15	4	50	8,320	12.69	13.12	13.59	14.09	FREE	
IALR430-0300-0200-1500	0.2		15	2.5	2.85	15	4	50	8,320	15.79	16.33	16.91	FREE	FREE	
IALR430-0300-0200-1800	0.2		18	2.5	2.85	15	4	50	8,320	18.89	19.54	FREE	FREE	FREE	
IALR430-0300-0200-2000	0.2		20	2.5	2.85	15	4	50	8,320	20.96	21.68	FREE	FREE	FREE	
IALR430-0300-0200-2400	0.2		24	2.5	2.85	15	4	60	8,800	25.09	25.96	FREE	FREE	FREE	
IALR430-0300-0200-3000	0.2		30	2.5	2.85	15	4	60	8,800	31.29	FREE	FREE	FREE	FREE	
IALR430-0300-0300-1000	0.3		10	2.5	2.85	15	4	50	8,320	10.62	10.98	11.36	11.78	FREE	
IALR430-0300-0300-1200	0.3		12	2.5	2.85	15	4	50	8,320	12.68	13.11	13.58	14.08	FREE	
IALR430-0300-0300-1500	0.3		15	2.5	2.85	15	4	50	8,320	15.78	16.32	16.90	FREE	FREE	
IALR430-0300-0300-1800	0.3		18	2.5	2.85	15	4	50	8,320	18.89	19.53	FREE	FREE	FREE	
IALR430-0300-0300-2000	0.3	20	2.5	2.85	15	4	50	8,320	20.95	21.67	FREE	FREE	FREE		
IALR430-0300-0300-2400	0.3	24	2.5	2.85	15	4	60	8,800	25.09	25.95	FREE	FREE	FREE		
IALR430-0300-0300-3000	0.3	30	2.5	2.85	15	4	60	8,800	31.29	FREE	FREE	FREE	FREE		
IALR430-0300-0500-1200	0.5	12	2.5	2.85	15	4	50	8,320	12.68	13.10	13.56	14.05	FREE		
IALR430-0300-0500-1800	0.5	18	2.5	2.85	15	4	50	8,320	18.88	19.52	FREE	FREE	FREE		
IALR430-0300-0500-2400	0.5	24	2.5	2.85	15	4	60	8,800	25.08	25.94	FREE	FREE	FREE		
IALR430-0300-0500-3000	0.5	30	2.5	2.85	15	4	60	8,800	31.28	FREE	FREE	FREE	FREE		
IALR430-0300-1000-1200	1	12	2.5	2.85	15	4	50	8,320	12.66	13.07	13.50	13.97	FREE		
IALR430-0300-1000-1800	1	18	2.5	2.85	15	4	50	8,320	18.86	19.48	FREE	FREE	FREE		
IALR430-0300-1000-2400	1	24	2.5	2.85	15	4	60	8,800	25.06	25.90	FREE	FREE	FREE		
IALR430-0300-1000-3000	1	30	2.5	2.85	15	4	60	8,800	31.27	FREE	FREE	FREE	FREE		



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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IALR430-0400-0100-1000	4	0.1	10	3	3.8	15	6	50	8,320	10.72	11.09	11.49	11.91	12.87	
IALR430-0400-0100-1500		0.1	15	3	3.8	15	6	50	8,320	15.89	16.44	17.03	17.66	19.09	
IALR430-0400-0100-1600		0.1	16	3.2	3.8	15	6	50	8,320	16.92	17.51	18.14	18.81	FREE	
IALR430-0400-0100-2000		0.1	20	3	3.8	15	6	50	8,320	21.06	21.79	22.57	23.41	FREE	
IALR430-0400-0100-2400		0.1	24	3.2	3.8	15	6	60	8,320	25.19	26.06	27.00	28.01	FREE	
IALR430-0400-0100-3200		0.1	32	3.2	3.8	15	6	70	8,320	33.46	34.62	35.87	FREE	FREE	
IALR430-0400-0200-1000		0.2	10	3	3.8	15	6	50	8,320	10.72	11.08	11.48	11.90	12.85	
IALR430-0400-0200-1500		0.2	15	3	3.8	15	6	50	8,320	15.88	16.43	17.02	17.65	19.06	
IALR430-0400-0200-1600		0.2	16	3.2	3.8	15	6	50	8,320	16.92	17.50	18.13	18.80	FREE	
IALR430-0400-0200-2000		0.2	20	3	3.8	15	6	50	8,320	21.05	21.78	22.56	23.40	FREE	
IALR430-0400-0200-2400		0.2	24	3.2	3.8	15	6	60	8,320	25.19	26.06	26.99	28.00	FREE	
IALR430-0400-0200-3200		0.2	32	3.2	3.8	15	6	70	8,320	33.46	34.62	35.86	FREE	FREE	
IALR430-0400-0300-1000		0.3	10	3	3.8	15	6	50	8,320	10.71	11.08	11.46	11.88	12.83	
IALR430-0400-0300-1500		0.3	15	3	3.8	15	6	50	8,320	15.88	16.42	17.01	17.63	19.04	
IALR430-0400-0300-1600		0.3	16	3.2	3.8	15	6	50	8,320	16.91	17.49	18.11	18.78	FREE	
IALR430-0400-0300-2000		0.3	20	3	3.8	15	6	50	8,320	21.05	21.77	22.55	23.38	FREE	
IALR430-0400-0300-2400		0.3	24	3.2	3.8	15	6	60	8,320	25.18	26.05	26.98	27.98	FREE	
IALR430-0400-0300-3200		0.3	32	3.2	3.8	15	6	70	8,320	33.45	34.61	35.85	FREE	FREE	
IALR430-0400-0500-1600		0.5	16	3.2	3.8	15	6	50	8,320	16.91	17.48	18.09	18.75	FREE	
IALR430-0400-0500-2400		0.5	24	3.2	3.8	15	6	60	8,320	25.18	26.04	26.96	27.95	FREE	
IALR430-0400-0500-3200		0.5	32	3.2	3.8	15	6	70	8,320	33.45	34.59	35.83	FREE	FREE	
IALR430-0400-1000-1600		1	16	3.2	3.8	15	6	50	8,320	16.89	17.45	18.04	18.68	FREE	
IALR430-0400-1000-2400		1	24	3.2	3.8	15	6	60	8,320	25.16	26.00	26.91	27.88	FREE	
IALR430-0400-1000-3200		1	32	3.2	3.8	15	6	70	8,320	33.43	34.56	35.77	FREE	FREE	
IALR430-0500-0100-1500		5	0.1	15	3.5	4.8	15	6	50	10,400	15.89	16.44	17.03	FREE	FREE
IALR430-0500-0100-2000-00350			0.1	20	3.5	4.8	15	6	50	10,400	21.06	21.79	FREE	FREE	FREE
IALR430-0500-0100-2000-00400			0.1	20	4	4.8	15	6	50	10,400	21.06	21.79	FREE	FREE	FREE
IALR430-0500-0100-4000			0.1	40	4	4.8	15	6	70	13,280	41.73	FREE	FREE	FREE	FREE
IALR430-0500-0200-2000			0.2	20	4	4.8	15	6	50	10,400	21.05	21.78	FREE	FREE	FREE
IALR430-0500-0200-4000			0.2	40	4	4.8	15	6	70	13,280	41.73	FREE	FREE	FREE	FREE
IALR430-0500-0300-2000			0.3	20	4	4.8	15	6	50	10,400	21.05	21.77	FREE	FREE	FREE
IALR430-0500-0300-4000			0.3	40	4	4.8	15	6	70	13,280	41.72	FREE	FREE	FREE	FREE
IALR430-0500-0500-2000	0.5		20	4	4.8	15	6	50	10,400	21.04	21.76	FREE	FREE	FREE	
IALR430-0500-0500-4000	0.5		40	4	4.8	15	6	70	13,280	41.72	FREE	FREE	FREE	FREE	
IALR430-0500-1000-2000	1		20	4	4.8	15	6	50	10,400	21.03	21.72	FREE	FREE	FREE	
IALR430-0500-1000-4000	1		40	4	4.8	15	6	70	13,280	41.70	FREE	FREE	FREE	FREE	
IALR430-0600-0100-1500	6		0.1	15	6	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0100-2000			0.1	20	6	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0100-2400			0.1	24	5	5.8	15	6	60	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0100-3000			0.1	30	6	5.8	15	6	60	10					



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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>①</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IALR430-0600-0200-4800	6	0.2	48	5	5.8	15	6	80	16,480	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0300-1500		0.3	15	6	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0300-2000		0.3	20	6	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0300-2400		0.3	24	5	5.8	15	6	60	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0300-3000		0.3	30	6	5.8	15	6	60	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0300-4800		0.3	48	5	5.8	15	6	80	16,480	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0500-1500		0.5	15	6	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0500-2000		0.5	20	6	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0500-2400		0.5	24	5	5.8	15	6	60	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0500-3000		0.5	30	6	5.8	15	6	60	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-0500-4800		0.5	48	5	5.8	15	6	80	16,480	FREE	FREE	FREE	FREE	FREE
IALR430-0600-1000-2400		1	24	5	5.8	15	6	60	10,400	FREE	FREE	FREE	FREE	FREE
IALR430-0600-1000-4800		1	48	5	5.8	15	6	80	16,480	FREE	FREE	FREE	FREE	FREE

## ion Depo Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번:IALR430  
Model number:IALR430

### 롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

날수 Number of Flutes	외경 Dia.	날장 Effective Length	주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61				
			Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			①p mm	②e mm	mm/min	min <sup>-1</sup>	①p mm	②e mm	mm/min	min <sup>-1</sup>	①p mm	②e mm	mm/min	min <sup>-1</sup>	①p mm	②e mm	mm/min	min <sup>-1</sup>	
4	1.0	3	0.06	0.35	1,800	16,000	0.06	0.35	1,800	16,000	0.06	0.35	1,800	16,000	0.045	0.3	1,260	12,800	
		4	0.05	0.35	1,500	16,000	0.05	0.35	1,500	16,000	0.05	0.35	1,500	16,000	0.04	0.3	1,050	12,800	
		5	0.045	0.35	1,410	16,000	0.045	0.35	1,410	16,000	0.045	0.35	1,410	16,000	0.035	0.25	990	12,800	
		6	0.04	0.25	1,200	14,500	0.04	0.25	1,200	14,500	0.04	0.25	1,200	14,500	0.03	0.25	840	11,600	
		8	0.03	0.25	870	14,500	0.03	0.25	870	14,500	0.03	0.25	870	14,500	0.02	0.2	620	11,600	
		10	0.025	0.25	660	11,100	0.025	0.25	660	11,100	0.025	0.25	660	11,100	0.015	0.1	470	8,900	
		12	0.02	0.2	300	11,100	0.02	0.2	300	11,100	0.02	0.2	300	11,100	0.01	0.08	210	8,900	
		1.2	5	0.06	0.4	1,740	15,500	0.06	0.4	1,740	15,500	0.06	0.4	1,740	15,500	0.045	0.35	1,220	12,400
			10	0.04	0.35	1,290	12,000	0.04	0.35	1,290	12,000	0.04	0.35	1,290	12,000	0.03	0.25	900	9,600
			15	0.02	0.25	480	10,600	0.02	0.25	480	10,600	0.02	0.25	480	10,600	0.01	0.1	330	8,500
		1.5	3	0.08	0.53	1,910	14,000	0.08	0.53	1,910	14,000	0.08	0.53	1,910	14,000	0.05	0.4	1,340	11,200
			6	0.08	0.53	1,910	14,000	0.08	0.53	1,910	14,000	0.08	0.53	1,910	14,000	0.05	0.4	1,340	11,200
	10		0.06	0.42	1,250	11,500	0.06	0.42	1,250	11,500	0.06	0.42	1,250	11,500	0.04	0.3	870	9,000	
	12		0.06	0.42	1,250	11,500	0.06	0.42	1,250	11,500	0.06	0.42	1,250	11,500	0.04	0.3	870	9,000	
	2	18	0.02	0.3	560	8,500	0.02	0.3	560	8,500	0.02	0.3	560	8,500	0.01	0.15	390	6,800	
		6	0.08	0.6	2,150	11,100	0.08	0.6	2,150	11,100	0.08	0.6	2,150	11,100	0.05	0.5	1,500	8,800	
		8	0.08	0.6	2,150	11,100	0.08	0.6	2,150	11,100	0.08	0.6	2,150	11,100	0.05	0.5	1,500	8,800	
		10	0.065	0.6	1,800	11,100	0.065	0.6	1,800	11,100	0.065	0.6	1,800	11,100	0.045	0.5	1,260	8,800	
12		0.065	0.6	1,800	11,100	0.065	0.6	1,800	11,100	0.065	0.6	1,800	11,100	0.045	0.5	1,260	8,800		
15		0.05	0.5	1,500	9,600	0.05	0.5	1,500	9,600	0.05	0.5	1,500	9,600	0.04	0.35	1,050	7,700		
16		0.05	0.5	1,500	9,600	0.05	0.5	1,500	9,600	0.05	0.5	1,500	9,600	0.04	0.35	1,050	7,700		
2.5	20	0.03	0.45	900	9,600	0.03	0.45	900	9,600	0.03	0.45	900	9,600	0.015	0.25	630	7,700		
	24	0.02	0.4	740	6,400	0.02	0.4	740	6,400	0.02	0.4	740	6,400	0.01	0.2	510	5,100		
	10	0.1	0.85	2,280	9,200	0.1	0.85	2,280	9,200	0.1	0.85	2,280	9,200	0.07	0.7	1,590	7,400		
	20	0.08	0.6	1,580	8,300	0.08	0.6	1,580	8,300	0.08	0.6	1,580	8,300	0.05	0.4	1,110	6,600		
	10	0.12	0.9	2,400	8,000	0.12	0.9	2,400	8,000	0.12	0.9	2,400	8,000	0.08	0.8	1,680	6,400		
	12	0.12	0.9	2,400	8,000	0.12	0.9	2,400	8,000	0.12	0.9	2,400	8,000	0.08	0.8	1,680	6,400		
3	15	0.11	0.8	2,000	7,800	0.11	0.8	2,000	7,800	0.11	0.8	2,000	7,800	0.07	0.7	1,410	6,200		
	18	0.11	0.8	2,000	7,800	0.11	0.8	2,000	7,800	0.11	0.8	2,000	7,800	0.07	0.7	1,410	6,200		
	20	0.1	0.8	1,850	7,700	0.1	0.8	1,850	7,700	0.1	0.8	1,850	7,700	0.06	0.6	1,250	6,200		
	24	0.1	0.7	1,620	7,500	0.1	0.7	1,620	7,500	0.1	0.7	1,620	7,500	0.06	0.5	1,140	6,000		
	30	0.05	0.6	1,050	6,000	0.05	0.6	1,050	6,000	0.05	0.6	1,050	6,000	0.03	0.4	740	4,800		
	10	0.15	1.2	2,520	6,000	0.15	1.2	2,520	6,000	0.15	1.2	2,520	6,000	0.1	1	1,770	4,800		
4	15	0.15	1.2	2,520	6,000	0.15	1.2	2,520	6,000	0.15	1.2	2,520	6,000	0.1	1	1,770	4,800		
	16	0.15	1.2	2,520	6,000	0.15	1.2	2,520	6,000	0.15	1.2	2,520	6,000	0.1	1	1,770	4,800		
	20	0.12	1	2,030	5,400	0.12	1	2,030	5,400	0.12	1	2,030	5,400	0.085	0.8	1,430	4,300		
	24	0.12	1	2,030	5,400	0.12	1	2,030	5,400	0.12	1	2,030	5,400	0.085	0.8	1,430	4,300		
	32	0.08	0.9	1,350	4,800	0.08	0.9	1,350	4,800	0.08	0.9	1,350	4,800	0.04	0.7	950	3,800		
5	15	0.17	1.6	2,300	5,100	0.17	1.6	2,300	5,100	0.17	1.6	2,300	5,100	0.12	1.2	1,610	4,100		
	20	0.17	1.6	2,300	5,100	0.17	1.6	2,300	5,100	0.17	1.6	2,300	5,100	0.12	1.2	1,610	4,100		
	40	0.07	1.2	1,020	3,200	0.07	1.2	1,020	3,200	0.07	1.2	1,020	3,200	0.05	0.9	720	2,600		
6	15	0.23	2.1	2,100	3,700	0.23	2.1	2,100	3,700	0.23	2.1	2,100	3,700	0.15	1.5	1,470	3,000		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량은, 절삭 가공을 할하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●①p 축 방향, ②e 반경 방향. ①p=Axial Depth of Cut ②e=Radial Depth of Cut.  
 ●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일안 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALR430  
Model number:IALR430

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
4	6	20	0.22	2.1	2,100	3,700	0.22	2.1	2,100	3,700	0.22	2.1	2,100	3,700	0.13	1.5	1,470	3,000
		24	0.2	2.1	2,100	3,700	0.2	2.1	2,100	3,700	0.2	2.1	2,100	3,700	0.12	1.5	1,470	3,000
		30	0.09	1.5	950	2,600	0.09	1.5	950	2,600	0.09	1.5	950	2,600	0.05	1.2	660	2,100
		48	0.09	1.5	950	2,600	0.09	1.5	950	2,600	0.09	1.5	950	2,600	0.05	1.2	660	2,100

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭방향, 장삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.  
 ●오일 미스트 Coolant, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐(Copper Tungsten)				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm
4	1.0	3	0.045	0.3	1,260	12,800	0.045	0.3	1,260	12,800	0.045	0.3	1,260	12,800	0.045	0.3	1,260	12,800	
		4	0.04	0.3	1,050	12,800	0.04	0.3	1,050	12,800	0.04	0.3	1,050	12,800	0.15	0.23	1,500	16,000	
		5	0.035	0.25	990	12,800	0.035	0.25	990	12,800	0.035	0.25	990	12,800	0.13	0.23	1,410	16,000	
		6	0.03	0.25	840	11,600	0.03	0.25	840	11,600	0.03	0.25	840	11,600	0.12	0.2	1,200	14,500	
		8	0.02	0.2	620	11,600	0.02	0.2	620	11,600	0.02	0.2	620	11,600	0.09	0.2	870	14,500	
		10	0.015	0.1	470	8,900	0.015	0.1	470	8,900	0.015	0.1	470	8,900	0.075	0.15	660	11,100	
		12	0.01	0.08	210	8,900	0.01	0.08	210	8,900	0.01	0.08	210	8,900	0.06	0.15	300	11,100	
		1.2	5	0.045	0.35	1,220	12,400	0.045	0.35	1,220	12,400	0.045	0.35	1,220	12,400	0.18	0.28	1,740	15,500
		10	0.03	0.25	900	9,600	0.03	0.25	900	9,600	0.03	0.25	900	9,600	0.12	0.28	1,290	12,000	
		15	0.01	0.1	330	8,500	0.01	0.1	330	8,500	0.01	0.1	330	8,500	0.07	0.23	480	10,600	
		1.5	3	0.05	0.4	1,340	11,200	0.05	0.4	1,340	11,200	0.05	0.4	1,340	11,200	0.24	0.35	1,910	14,000
		6	0.05	0.4	1,340	11,200	0.05	0.4	1,340	11,200	0.05	0.4	1,340	11,200	0.24	0.35	1,910	14,000	
	10	0.04	0.3	870	9,000	0.04	0.3	870	9,000	0.04	0.3	870	9,000	0.18	0.3	1,250	11,500		
	12	0.04	0.3	870	9,000	0.04	0.3	870	9,000	0.04	0.3	870	9,000	0.18	0.3	1,250	11,500		
	18	0.01	0.15	390	6,800	0.01	0.15	390	6,800	0.01	0.15	390	6,800	0.08	0.25	560	8,500		
	2	6	0.05	0.5	1,500	8,800	0.05	0.5	1,500	8,800	0.05	0.5	1,500	8,800	0.24	0.45	2,150	11,100	
	8	0.05	0.5	1,500	8,800	0.05	0.5	1,500	8,800	0.05	0.5	1,500	8,800	0.24	0.45	2,150	11,100		
	10	0.045	0.5	1,260	8,800	0.045	0.5	1,260	8,800	0.045	0.5	1,260	8,800	0.2	0.43	1,800	11,100		
	12	0.045	0.5	1,260	8,800	0.045	0.5	1,260	8,800	0.045	0.5	1,260	8,800	0.2	0.43	1,800	11,100		
	15	0.04	0.35	1,050	7,700	0.04	0.35	1,050	7,700	0.04	0.35	1,050	7,700	0.15	0.39	1,500	9,600		
	16	0.04	0.35	1,050	7,700	0.04	0.35	1,050	7,700	0.04	0.35	1,050	7,700	0.15	0.39	1,500	9,600		
	20	0.015	0.25	630	7,700	0.015	0.25	630	7,700	0.015	0.25	630	7,700	0.12	0.35	900	9,600		
	24	0.01	0.2	510	5,100	0.01	0.2	510	5,100	0.01	0.2	510	5,100	0.1	0.3	740	6,400		
	2.5	10	0.07	0.7	1,590	7,400	0.07	0.7	1,590	7,400	0.07	0.7	1,590	7,400	0.3	0.5	2,280	9,200	
	20	0.05	0.4	1,110	6,600	0.05	0.4	1,110	6,600	0.05	0.4	1,110	6,600	0.24	0.43	1,580	8,300		
	3	10	0.08	0.8	1,680	6,400	0.08	0.8	1,680	6,400	0.08	0.8	1,680	6,400	0.36	0.55	2,400	8,000	
	12	0.08	0.8	1,680	6,400	0.08	0.8	1,680	6,400	0.08	0.8	1,680	6,400	0.36	0.55	2,400	8,000		
	15	0.07	0.7	1,410	6,200	0.07	0.7	1,410	6,200	0.07	0.7	1,410	6,200	0.33	0.5	2,010	7,800		
	18	0.07	0.7	1,410	6,200	0.07	0.7	1,410	6,200	0.07	0.7	1,410	6,200	0.33	0.5	2,010	7,800		
	20	0.06	0.6	1,250	6,200	0.06	0.6	1,250	6,200	0.06	0.6	1,250	6,200	0.3	0.5	1,850	7,700		
	24	0.06	0.5	1,140	6,000	0.06	0.5	1,140	6,000	0.06	0.5	1,140	6,000	0.3	0.45	1,620	7,500		
	30	0.03	0.4	740	4,800	0.03	0.4	740	4,800	0.03	0.4	740	4,800	0.15	0.4	1,050	6,000		
	4	10	0.1	1	1,770	4,800	0.1	1	1,770	4,800	0.1	1	1,770	4,800	0.45	0.75	2,520	6,000	
	15	0.1	1	1,770	4,800	0.1	1	1,770	4,800	0.1	1	1,770	4,800	0.45	0.75	2,520	6,000		
	16	0.1	1	1,770	4,800	0.1	1	1,770	4,800	0.1	1	1,770	4,800	0.45	0.75	2,520	6,000		
	20	0.085	0.8	1,430	4,300	0.085	0.8	1,430	4,300	0.085	0.8	1,430	4,300	0.39	0.7	2,030	5,400		
	24	0.085	0.8	1,430	4,300	0.085	0.8	1,430	4,300	0.085	0.8	1,430	4,300	0.39	0.7	2,030	5,400		
	32	0.04	0.7	950	3,800	0.04	0.7	950	3,800	0.04	0.7	950	3,800	0.25	0.6	1,350	4,800		
	5	15	0.12	1.2	1,610	4,100	0.12	1.2	1,610	4,100	0.12	1.2	1,610	4,100	0.52	1	2,300	5,100	
	20	0.12	1.2	1,610	4,100	0.12	1.2	1,610	4,100	0.12	1.2	1,610	4,100	0.52	1	2,300	5,100		
	40	0.05	0.9	720	2,600	0.05	0.9	720	2,600	0.05	0.9	720	2,600	0.25	0.8	1,020	3,200		
	6	15	0.15	1.5	1,470	3,000	0.15	1.5	1,470	3,000	0.15	1.5	1,470	3,000	0.65	1.2	2,100	3,700	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭방향, 장삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.  
 ●오일 미스트 Coolant, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALR430  
Model number:IALR430

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐(Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
4	6	20	0.13	1.5	1,470	3,000	0.13	1.5	1,470	3,000	0.13	1.5	1,470	3,000	0.62	1.2	2,100	3,700
		24	0.12	1.5	1,470	3,000	0.12	1.5	1,470	3,000	0.12	1.5	1,470	3,000	0.6	1.2	2,100	3,700
		30	0.05	1.2	660	2,100	0.05	1.2	660	2,100	0.05	1.2	660	2,100	0.32	0.9	950	2,600
		48	0.05	1.2	660	2,100	0.05	1.2	660	2,100	0.05	1.2	660	2,100	0.32	0.9	950	2,600

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 장삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm		
4	1.0	3	0.2	0.23	1,800	16,000	0.2	0.23	1,800	16,000	0.045	0.3	1,260	12,800
		4	0.15	0.23	1,500	16,000	0.15	0.23	1,500	16,000	0.04	0.3	1,050	12,800
		5	0.13	0.23	1,410	16,000	0.13	0.23	1,410	16,000	0.035	0.25	990	12,800
		6	0.12	0.2	1,200	14,500	0.12	0.2	1,200	14,500	0.03	0.25	840	11,600
		8	0.09	0.2	870	14,500	0.09	0.2	870	14,500	0.02	0.2	620	11,600
		10	0.075	0.15	660	11,100	0.075	0.15	660	11,100	0.015	0.1	470	8,900
		12	0.06	0.15	300	11,100	0.06	0.15	300	11,100	0.01	0.08	210	8,900
		5	0.18	0.28	1,740	15,500	0.18	0.28	1,740	15,500	0.045	0.35	1,220	12,400
		10	0.12	0.28	1,290	12,000	0.12	0.28	1,290	12,000	0.03	0.25	900	9,600
		15	0.07	0.23	480	10,600	0.07	0.23	480	10,600	0.01	0.1	330	8,500
		3	0.24	0.35	1,910	14,000	0.24	0.35	1,910	14,000	0.05	0.4	1,340	11,200
		6	0.24	0.35	1,910	14,000	0.24	0.35	1,910	14,000	0.05	0.4	1,340	11,200
	10	0.18	0.3	1,250	11,500	0.18	0.3	1,250	11,500	0.04	0.3	870	9,000	
	12	0.18	0.3	1,250	11,500	0.18	0.3	1,250	11,500	0.04	0.3	870	9,000	
	18	0.08	0.25	560	8,500	0.08	0.25	560	8,500	0.01	0.15	390	6,800	
	6	0.24	0.45	2,150	11,100	0.24	0.45	2,150	11,100	0.05	0.5	1,500	8,800	
	8	0.24	0.45	2,150	11,100	0.24	0.45	2,150	11,100	0.05	0.5	1,500	8,800	
	10	0.2	0.43	1,800	11,100	0.2	0.43	1,800	11,100	0.045	0.5	1,260	8,800	
	12	0.2	0.43	1,800	11,100	0.2	0.43	1,800	11,100	0.045	0.5	1,260	8,800	
	15	0.15	0.39	1,500	9,600	0.15	0.39	1,500	9,600	0.04	0.35	1,050	7,700	
	16	0.15	0.39	1,500	9,600	0.15	0.39	1,500	9,600	0.04	0.35	1,050	7,700	
	20	0.12	0.35	900	9,600	0.12	0.35	900	9,600	0.015	0.25	630	7,700	
	24	0.1	0.3	740	6,400	0.1	0.3	740	6,400	0.01	0.2	510	5,100	
	10	0.3	0.5	2,280	9,200	0.3	0.5	2,280	9,200	0.07	0.7	1,590	7,400	
	20	0.24	0.43	1,580	8,300	0.24	0.43	1,580	8,300	0.05	0.4	1,110	6,600	
	10	0.36	0.55	2,400	8,000	0.36	0.55	2,400	8,000	0.08	0.8	1,680	6,400	
	12	0.36	0.55	2,400	8,000	0.36	0.55	2,400	8,000	0.08	0.8	1,680	6,400	
	15	0.33	0.5	2,010	7,800	0.33	0.5	2,010	7,800	0.07	0.7	1,410	6,200	
	18	0.33	0.5	2,010	7,800	0.33	0.5	2,010	7,800	0.07	0.7	1,410	6,200	
	20	0.3	0.5	1,850	7,700	0.3	0.5	1,850	7,700	0.06	0.6	1,250	6,200	
	24	0.3	0.45	1,620	7,500	0.3	0.45	1,620	7,500	0.06	0.5	1,140	6,000	
	30	0.15	0.4	1,050	6,000	0.15	0.4	1,050	6,000	0.03	0.4	740	4,800	
	10	0.45	0.75	2,520	6,000	0.45	0.75	2,520	6,000	0.1	1	1,770	4,800	
	15	0.45	0.75	2,520	6,000	0.45	0.75	2,520	6,000	0.1	1	1,770	4,800	
	16	0.45	0.75	2,520	6,000	0.45	0.75	2,520	6,000	0.1	1	1,770	4,800	
	20	0.39	0.7	2,030	5,400	0.39	0.7	2,030	5,400	0.085	0.8	1,430	4,300	
	24	0.39	0.7	2,030	5,400	0.39	0.7	2,030	5,400	0.085	0.8	1,430	4,300	
	32	0.25	0.6	1,350	4,800	0.25	0.6	1,350	4,800	0.04	0.7	950	3,800	
	15	0.52	1	2,300	5,100	0.52	1	2,300	5,100	0.12	1.2	1,610	4,100	
	20	0.52	1	2,300	5,100	0.52	1	2,300	5,100	0.12	1.2	1,610	4,100	
	40	0.25	0.8	1,020	3,200	0.25	0.8	1,020	3,200	0.05	0.9	720	2,600	
	6	15	0.65	1.2	2,100	3,700	0.65	1.2	2,100	3,700	0.15	1.5	1,470	3,000

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 장삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

**ion Depo Type A 추천 절삭 조건표**  
Recommended Milling Conditions

**■형번:IALR430**  
Model number:IALR430

**롱 넥 래디우스 엔드밀 Long Neck Radius End Mill**

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
4	6	20	0.62	1.2	2,100	3,700	0.62	1.2	2,100	3,700	0.13	1.5	1,470	3,000
		24	0.6	1.2	2,100	3,700	0.6	1.2	2,100	3,700	0.12	1.5	1,470	3,000
		30	0.32	0.9	950	2,600	0.32	0.9	950	2,600	0.05	1.2	660	2,100
		48	0.32	0.9	950	2,600	0.32	0.9	950	2,600	0.05	1.2	660	2,100

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●돌입각은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.

●오일 미스트 분사, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 절삭 길이 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●SPM & FEED는 종일단 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



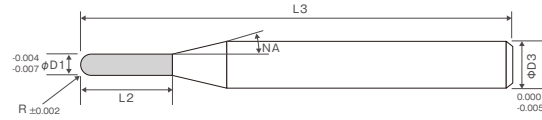
# ion Depo Type A Series

# ion Depo Type A Series

## 초경 볼 엔드밀 Carbide Ball End Mill

■형번: IAB230 Model number: IAB230

ion A super MG 날수 2 벨리스크라 30° 목각 15° Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	볼 반경 (R) Ball R	날장 (L2) Length of Cut	날경 (D1) Outside Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAB230-0010-0050-00010	0.05	0.1	0.1	15	4	50	8,080
IAB230-0015-0075-00015	0.075	0.15	0.15	15	4	50	7,520
IAB230-0020-0100-00020	0.1	0.2	0.2	15	4	50	5,680
IAB230-0030-0150-00030	0.15	0.3	0.3	15	4	50	4,640
IAB230-0040-0200-00060	0.2	0.6	0.4	15	4	50	3,120
IAB230-0050-0250-00080	0.25	0.8	0.5	15	4	50	2,880
IAB230-0060-0300-00090	0.3	0.9	0.6	15	4	50	2,800
IAB230-0060-0300-00100		1	0.6	15	4	50	2,800
IAB230-0070-0350-00110	0.35	1.1	0.7	15	4	50	6,240
IAB230-0080-0400-00120	0.4	1.2	0.8	15	4	50	2,800
IAB230-0090-0450-00140	0.45	1.4	0.9	15	4	50	6,240
IAB230-0100-0500-00150	0.5	1.5	1	15	4	50	2,560
IAB230-0110-0550-00170	0.55	1.7	1.1	15	4	50	6,240
IAB230-0120-0600-00180	0.6	1.8	1.2	15	4	50	3,600
IAB230-0130-0650-00200	0.65	2	1.3	15	4	50	6,240
IAB230-0140-0700-00210	0.7	2.1	1.4	15	4	50	3,600
IAB230-0150-0750-00200	0.75	2	1.5	15	4	50	3,120
IAB230-0150-0750-00230		2.3	1.5	15	4	50	3,120
IAB230-0160-0800-00240	0.8	2.4	1.6	15	4	50	3,600
IAB230-0170-0850-00260	0.85	2.6	1.7	15	4	50	6,240
IAB230-0180-0900-00270	0.9	2.7	1.8	15	4	50	6,240
IAB230-0190-0950-00290	0.95	2.9	1.9	15	4	50	6,240
IAB230-0200-1000-00300	1	3	2	15	4	50	2,320
IAB230-0210-1050-00320	1.05	3.2	2.1	15	4	50	6,240
IAB230-0220-1100-00330	1.1	3.3	2.2	15	4	50	6,240
IAB230-0230-1150-00350	1.15	3.5	2.3	15	4	50	6,240
IAB230-0240-1200-00360	1.2	3.6	2.4	15	4	50	6,240
IAB230-0250-1250-00380	1.25	3.8	2.5	15	4	50	4,000
IAB230-0260-1300-00390	1.3	3.9	2.6	15	4	50	6,240
IAB230-0270-1350-00410	1.35	4.1	2.7	15	4	50	6,240

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	볼 반경 (R) Ball R	날장 (L2) Length of Cut	날경 (D1) Outside Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAB230-0280-1400-00420	1.4	4.2	2.8	15	4	50	6,240
IAB230-0290-1450-00440	1.45	4.4	2.9	15	4	50	6,240
IAB230-0300-1500-00500	1.5	5	3	15	4	50	2,800
IAB230-0310-1550-00500	1.55	5	3.1	15	6	50	6,560
IAB230-0320-1600-00500	1.6	5	3.2	15	6	50	6,560
IAB230-0330-1650-00500	1.65	5	3.3	15	6	50	6,560
IAB230-0340-1700-00510	1.7	5.1	3.4	15	6	50	6,560
IAB230-0350-1750-00530	1.75	5.3	3.5	15	6	50	5,200
IAB230-0360-1800-00360	1.8	3.6	3.6	15	6	50	6,560
IAB230-0370-1850-00370	1.85	3.7	3.7	15	6	50	6,560
IAB230-0380-1900-00380	1.9	3.8	3.8	15	6	50	6,560
IAB230-0390-1950-00390	1.95	3.9	3.9	15	6	50	6,560
IAB230-0400-2000-00400	2	4	4	15	6	50	3,200
IAB230-0400-2000-00600		6	4	15	6	50	3,200
IAB230-0410-2050-00410	2.05	4.1	4.1	15	6	50	8,000
IAB230-0420-2100-00420	2.1	4.2	4.2	15	6	50	8,000
IAB230-0430-2150-00430	2.15	4.3	4.3	15	6	50	8,000
IAB230-0440-2200-00440	2.2	4.4	4.4	15	6	50	8,000
IAB230-0450-2250-00450	2.25	4.5	4.5	15	6	50	8,000
IAB230-0460-2300-00460	2.3	4.6	4.6	15	6	50	8,000
IAB230-0470-2350-00470	2.35	4.7	4.7	15	6	50	8,000
IAB230-0480-2400-00480	2.4	4.8	4.8	15	6	50	8,000
IAB230-0490-2450-00490	2.45	4.9	4.9	15	6	50	8,000
IAB230-0500-2500-00500	2.5	5	5	15	6	50	3,840
IAB230-0500-2500-00800		8	5	15	6	50	3,840
IAB230-0510-2550-00510	2.55	5.1	5.1	15	6	50	8,000
IAB230-0520-2600-00520	2.6	5.2	5.2	15	6	50	8,000
IAB230-0530-2650-00530	2.65	5.3	5.3	15	6	50	8,000
IAB230-0540-2700-00540	2.7	5.4	5.4	15	6	50	8,000
IAB230-0550-2750-00550	2.75	5.5	5.5	15	6	50	8,000
IAB230-0560-2800-00560	2.8	5.6	5.6	15	6	50	8,000
IAB230-0570-2850-00570	2.85	5.7	5.7	15	6	50	8,000
IAB230-0580-2900-00580	2.9	5.8	5.8	15	6	50	8,000
IAB230-0590-2950-00590	2.95	5.9	5.9	15	6	50	8,000
IAB230-0600-3000-00600	3	6	6	—	6	50	4,000
IAB230-0600-3000-01000		10	6	—	6	50	4,000
IAB230-0700-3500-00700	3.5	7	7	15	8	70	8,560
IAB230-0800-4000-01200	4	12	8	—	8	70	7,760
IAB230-0800-4000-01600		16	8	—	8	70	7,760
IAB230-0900-4500-01350	4.5	13.5	9	15	10	80	11,920
IAB230-1000-5000-01500	5	15	10	—	10	80	10,160
IAB230-1000-5000-02000		20	10	—	10	80	10,160
IAB230-1100-5500-01650	5.5	16.5	11	15	12	110	19,840
IAB230-1200-6000-02000	6	20	12	—	12	110	17,120
IAB230-1200-6000-02400		24	12	—	12	110	17,120

## ion Depo Type A 추천 절삭 조건표 Recommended Milling Conditions

■형번: IAB230  
Model number: IAB230

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	볼 반경 (R) Ball R	날장 (L2) Length of Cut	날경 (D1) Outside Diameter	목각 (NA) <sup>*</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IAB230-1400-7000-03000	7	30	14	—	14	110	36,160
IAB230-1600-8000-03000	8	30	16	—	16	140	42,720
IAB230-1800-9000-03400	9	34	18	—	18	140	64,400
IAB230-2000-10000-03800	10	38	20	—	20	160	66,320

## 볼 엔드밀 Ball End Mill

날수 Number of Flutes	외경 Dia.		주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
	날장 Length of cut	날경 Dia.	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm			mm/min	min <sup>-1</sup>			∂p mm	∂e mm			mm/min	min <sup>-1</sup>		
2	0.1	0.1	0.005	0.008	200	50,000	0.005	0.008	200	50,000	0.005	0.008	200	50,000	0.005	0.008	200	50,000
	0.15	0.15	0.008	0.015	200	50,000	0.008	0.015	200	50,000	0.008	0.015	200	50,000	0.008	0.015	200	50,000
	0.2	0.2	0.010	0.020	400	50,000	0.010	0.020	400	50,000	0.010	0.020	400	50,000	0.010	0.020	400	50,000
	0.3	0.3	0.015	0.030	400	50,000	0.015	0.030	400	50,000	0.015	0.030	400	50,000	0.015	0.030	400	50,000
	0.4	0.6	0.020	0.040	400	50,000	0.020	0.040	400	50,000	0.020	0.040	400	50,000	0.020	0.040	400	50,000
	0.5	0.8	0.025	0.050	400	50,000	0.025	0.050	400	50,000	0.025	0.050	400	50,000	0.025	0.050	400	50,000
	0.6	0.9	0.030	0.060	630	50,000	0.030	0.060	630	50,000	0.030	0.060	630	50,000	0.030	0.060	630	50,000
		1	0.030	0.060	630	50,000	0.030	0.060	630	50,000	0.030	0.060	630	50,000	0.030	0.060	630	50,000
	0.7	1.1	0.035	0.070	630	50,000	0.035	0.070	630	50,000	0.035	0.070	630	50,000	0.035	0.070	630	50,000
	0.8	1.2	0.040	0.080	1200	50,000	0.040	0.080	1200	50,000	0.040	0.080	1200	50,000	0.040	0.080	1200	50,000
	0.9	1.4	0.045	0.090	1200	50,000	0.045	0.090	1200	50,000	0.045	0.090	1200	50,000	0.045	0.090	1200	50,000
	1	1.5	0.050	0.100	1400	48,000	0.050	0.100	1400	48,000	0.050	0.100	1400	48,000	0.050	0.100	1400	48,000
	1.1	1.7	0.055	0.165	1400	48,000	0.055	0.165	1400	48,000	0.055	0.165	1400	48,000	0.055	0.165	1400	48,000
	1.2	1.8	0.060	0.180	1400	40,000	0.060	0.180	1400	40,000	0.060	0.180	1400	40,000	0.060	0.180	1400	40,000
	1.3	2	0.065	0.195	1400	40,000	0.065	0.195	1400	40,000	0.065	0.195	1400	40,000	0.065	0.195	1400	40,000
	1.4	2.1	0.070	0.210	1400	40,000	0.070	0.210	1400	40,000	0.070	0.210	1400	40,000	0.070	0.210	1400	40,000
	1.5	2	0.075	0.225	1400	40,000	0.075	0.225	1400	40,000	0.075	0.225	1400	40,000	0.075	0.225	1400	40,000
		2.3	0.075	0.225	1400	40,000	0.075	0.225	1400	40,000	0.075	0.225	1400	40,000	0.075	0.225	1400	40,000
	1.6	2.4	0.080	0.240	1200	30,000	0.080	0.240	1200	30,000	0.080	0.240	1200	30,000	0.080	0.240	1200	30,000
	1.7	2.6	0.085	0.255	1200	30,000	0.085	0.255	1200	30,000	0.085	0.255	1200	30,000	0.085	0.255	1200	30,000
	1.8	2.7	0.090	0.270	1200	30,000	0.090	0.270	1200	30,000	0.090	0.270	1200	30,000	0.090	0.270	1200	30,000
	1.9	2.9	0.095	0.285	1200	30,000	0.095	0.285	1200	30,000	0.095	0.285	1200	30,000	0.095	0.285	1200	30,000
	2	3	0.100	0.300	1100	24,000	0.100	0.300	1100	24,000	0.100	0.300	1100	24,000	0.100	0.300	1100	24,000
	2.1	3.2	0.105	0.315	1100	24,000	0.105	0.315	1100	24,000	0.105	0.315	1100	24,000	0.105	0.315	1100	24,000
	2.2	3.3	0.110	0.330	1100	24,000	0.110	0.330	1100	24,000	0.110	0.330	1100	24,000	0.110	0.330	1100	24,000
	2.3	3.5	0.115	0.345	1100	24,000	0.115	0.345	1100	24,000	0.115	0.345	1100	24,000	0.115	0.345	1100	24,000
	2.4	3.6	0.120	0.360	1100	24,000	0.120	0.360	1100	24,000	0.120	0.360	1100	24,000	0.120	0.360	1100	24,000
	2.5	3.8	0.125	0.375	1100	24,000	0.125	0.375	1100	24,000	0.125	0.375	1100	24,000	0.125	0.375	1100	24,000
	2.6	3.9	0.130	0.390	1100	24,000	0.130	0.390	1100	24,000	0.130	0.390	1100	24,000	0.130	0.390	1100	24,000
	2.7	4.1	0.135	0.405	1100	24,000	0.135	0.405	1100	24,000	0.135	0.405	1100	24,000	0.135	0.405	1100	24,000
	2.8	4.2	0.140	0.420	1100	24,000	0.140	0.420	1100	24,000	0.140	0.420	1100	24,000	0.140	0.420	1100	24,000
	2.9	4.4	0.145	0.435	1100	24,000	0.145	0.435	1100	24,000	0.145	0.435	1100	24,000	0.145	0.435	1100	24,000
	3	5	0.150	0.450	930	16,000	0.150	0.450	930	16,000	0.150	0.450	930	16,000	0.150	0.450	930	16,000
	3.1	5	0.155	0.465	930	16,000	0.155	0.465	930	16,000	0.155	0.465	930	16,000	0.155	0.465	930	16,000
	3.2	5	0.160	0.480	930	16,000	0.160	0.480	930	16,000	0.160	0.480	930	16,000	0.160	0.480	930	16,000
	3.3	5	0.165	0.495	930	16,000	0.165	0.495	930	16,000	0.165	0.495	930	16,000	0.165	0.495	930	16,000
	3.4	5.1	0.170	0.510	930	16,000	0.170	0.510	930	16,000	0.170	0.510	930	16,000	0.170	0.510	930	16,000
	3.5	5.3	0.175	0.525	930	16,000	0.175	0.525	930	16,000	0.175	0.525	930	16,000	0.175	0.525	930	16,000
	3.6	3.6	0.180	0.540	930	16,000	0.180	0.540	930	16,000	0.180	0.540	930	16,000	0.180	0.540	930	16,000
3.7	3.7	0.185	0.555	930	16,000	0.185	0.555	930	16,000	0.185	0.555	930	16,000	0.185	0.555	930	16,000	
3.8	3.8	0.190	0.570	930	16,000	0.190	0.570	930	16,000	0.190	0.570	930	16,000	0.190	0.570	930	16,000	
3.9	3.9	0.195	0.585	930	16,000	0.195	0.585	930	16,000	0.195	0.585	930	16,000	0.195	0.585	930	16,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 절삭 가공을 할 때는 절삭 깊이를 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∂p 축 방향, ∂e 반경 방향. ∂p=Axial Depth of Cut ∂e=Radial Depth of Cut.  
●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IAB230  
Model number: IAB230

볼 엔드밀 Ball End Mill

피삭재 Work Material	주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61									
	날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed		Spindle Speed		Depth of Cut		Feed		Spindle Speed		Depth of Cut		Feed		Spindle Speed		
				∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>			
2	4	4	0.200	0.600	930	12,000	0.200	0.600	930	12,000	0.200	0.600	930	12,000	0.200	0.600	930	12,000	0.200	0.600	930	12,000
		6	0.200	0.600	930	12,000	0.200	0.600	930	12,000	0.200	0.600	930	12,000	0.200	0.600	930	12,000	0.200	0.600	930	12,000
	4.1	4.1	0.205	0.615	930	12,000	0.205	0.615	930	12,000	0.205	0.615	930	12,000	0.205	0.615	930	12,000	0.205	0.615	930	12,000
		4.2	0.210	0.630	930	12,000	0.210	0.630	930	12,000	0.210	0.630	930	12,000	0.210	0.630	930	12,000	0.210	0.630	930	12,000
		4.3	0.215	0.645	930	12,000	0.215	0.645	930	12,000	0.215	0.645	930	12,000	0.215	0.645	930	12,000	0.215	0.645	930	12,000
		4.4	0.220	0.660	930	12,000	0.220	0.660	930	12,000	0.220	0.660	930	12,000	0.220	0.660	930	12,000	0.220	0.660	930	12,000
		4.5	0.225	0.675	930	12,000	0.225	0.675	930	12,000	0.225	0.675	930	12,000	0.225	0.675	930	12,000	0.225	0.675	930	12,000
		4.6	0.230	0.690	930	12,000	0.230	0.690	930	12,000	0.230	0.690	930	12,000	0.230	0.690	930	12,000	0.230	0.690	930	12,000
		4.7	0.235	0.705	930	12,000	0.235	0.705	930	12,000	0.235	0.705	930	12,000	0.235	0.705	930	12,000	0.235	0.705	930	12,000
		4.8	0.240	0.720	930	12,000	0.240	0.720	930	12,000	0.240	0.720	930	12,000	0.240	0.720	930	12,000	0.240	0.720	930	12,000
	4.9	0.245	0.735	930	12,000	0.245	0.735	930	12,000	0.245	0.735	930	12,000	0.245	0.735	930	12,000	0.245	0.735	930	12,000	
	5	5	0.250	0.750	930	9,600	0.250	0.750	930	9,600	0.250	0.750	930	9,600	0.250	0.750	930	9,600	0.250	0.750	930	9,600
		8	0.250	0.750	930	9,600	0.250	0.750	930	9,600	0.250	0.750	930	9,600	0.250	0.750	930	9,600	0.250	0.750	930	9,600
	5.1	5.1	0.255	0.765	930	9,600	0.255	0.765	930	9,600	0.255	0.765	930	9,600	0.255	0.765	930	9,600	0.255	0.765	930	9,600
		5.2	0.260	0.780	930	9,600	0.260	0.780	930	9,600	0.260	0.780	930	9,600	0.260	0.780	930	9,600	0.260	0.780	930	9,600
		5.3	0.265	0.795	930	9,600	0.265	0.795	930	9,600	0.265	0.795	930	9,600	0.265	0.795	930	9,600	0.265	0.795	930	9,600
		5.4	0.270	0.810	930	9,600	0.270	0.810	930	9,600	0.270	0.810	930	9,600	0.270	0.810	930	9,600	0.270	0.810	930	9,600
		5.5	0.275	0.825	930	9,600	0.275	0.825	930	9,600	0.275	0.825	930	9,600	0.275	0.825	930	9,600	0.275	0.825	930	9,600
		5.6	0.280	0.840	930	9,600	0.280	0.840	930	9,600	0.280	0.840	930	9,600	0.280	0.840	930	9,600	0.280	0.840	930	9,600
		5.7	0.285	0.855	930	9,600	0.285	0.855	930	9,600	0.285	0.855	930	9,600	0.285	0.855	930	9,600	0.285	0.855	930	9,600
5.8		0.290	0.870	930	9,600	0.290	0.870	930	9,600	0.290	0.870	930	9,600	0.290	0.870	930	9,600	0.290	0.870	930	9,600	
5.9	0.295	0.885	930	9,600	0.295	0.885	930	9,600	0.295	0.885	930	9,600	0.295	0.885	930	9,600	0.295	0.885	930	9,600		
6	6	0.300	0.900	930	8,000	0.300	0.900	930	8,000	0.300	0.900	930	8,000	0.300	0.900	930	8,000	0.300	0.900	930	8,000	
	10	0.300	0.900	930	8,000	0.300	0.900	930	8,000	0.300	0.900	930	8,000	0.300	0.900	930	8,000	0.300	0.900	930	8,000	
7	7	0.350	1.050	930	8,000	0.350	1.050	930	8,000	0.350	1.050	930	8,000	0.350	1.050	930	8,000	0.350	1.050	930	8,000	
	12	0.400	1.200	900	6,000	0.400	1.200	900	6,000	0.400	1.200	900	6,000	0.400	1.200	900	6,000	0.400	1.200	900	6,000	
8	16	0.400	1.200	900	6,000	0.400	1.200	900	6,000	0.400	1.200	900	6,000	0.400	1.200	900	6,000	0.400	1.200	900	6,000	
	9	0.450	1.350	900	6,000	0.450	1.350	900	6,000	0.450	1.350	900	6,000	0.450	1.350	900	6,000	0.450	1.350	900	6,000	
10	15	0.500	1.500	900	4,800	0.500	1.500	900	4,800	0.500	1.500	900	4,800	0.500	1.500	900	4,800	0.500	1.500	900	4,800	
	20	0.500	1.500	900	4,800	0.500	1.500	900	4,800	0.500	1.500	900	4,800	0.500	1.500	900	4,800	0.500	1.500	900	4,800	
11	16.5	0.550	1.650	900	4,800	0.550	1.650	900	4,800	0.550	1.650	900	4,800	0.550	1.650	900	4,800	0.550	1.650	900	4,800	
	12	0.600	1.800	900	4,000	0.600	1.800	900	4,000	0.600	1.800	900	4,000	0.600	1.800	900	4,000	0.600	1.800	900	4,000	
12	24	0.600	1.800	900	4,000	0.600	1.800	900	4,000	0.600	1.800	900	4,000	0.600	1.800	900	4,000	0.600	1.800	900	4,000	
	14	0.700	2.100	900	3,400	0.700	2.100	900	3,400	0.700	2.100	900	3,400	0.700	2.100	900	3,400	0.700	2.100	900	3,400	
16	30	0.800	2.400	900	3,000	0.800	2.400	900	3,000	0.800	2.400	900	3,000	0.800	2.400	900	3,000	0.800	2.400	900	3,000	
	18	0.900	2.700	900	2,650	0.900	2.700	900	2,650	0.900	2.700	900	2,650	0.900	2.700	900	2,650	0.900	2.700	900	2,650	
20	38	1.000	3.000	900	2,400	1.000	3.000	900	2,400	1.000	3.000	900	2,400	1.000	3.000	900	2,400	1.000	3.000	900	2,400	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

볼 엔드밀 Ball End Mill

피삭재 Work Material	고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐 (Copper Tungsten)									
	날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed		Spindle Speed		Depth of Cut		Feed		Spindle Speed		Depth of Cut		Feed		Spindle Speed		
				∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>			
2	0.1	0.1	0.003	0.008	100	50,000	0.005	0.008	200	50,000	0.005	0.008	200	50,000	0.005	0.008	200	50,000	0.005	0.008	250	50,000
		0.15	0.15	0.004	0.015	100	50,000	0.008	0.015	200	50,000	0.008	0.015	200	50,000	0.0075	0.015	250	50,000			
	0.2	0.2	0.005	0.020	200	50,000	0.010	0.020	400	50,000	0.010	0.020	400	50,000	0.01	0.020	600	50,000				
		0.3	0.008	0.030	200	50,000	0.015	0.030	400	50,000	0.015	0.030	400	50,000	0.015	0.030	600	50,000				
		0.4	0.010	0.040	500	50,000	0.020	0.040	400	50,000	0.020	0.040	400	50,000	0.02	0.040	600	50,000				
		0.5	0.013	0.050	500	50,000	0.025	0.050	400	50,000	0.025	0.050	400	50,000	0.025	0.050	600	50,000				
		0.6	0.9	0.015	0.060	800	48,000	0.030	0.060	630	50,000	0.030	0.060	630	50,000	0.03	0.060	750	50,000			
			1	0.015	0.060	800	48,000	0.030	0.060	630	50,000	0.030	0.060	630	50,000	0.03	0.060	750	50,000			
		0.7	1.1	0.018	0.070	800	48,000	0.035	0.070	630	50,000	0.035	0.070	630	50,000	0.035	0.070	750	50,000			
		0.8	1.2	0.020	0.080	800	36,000	0.040	0.080	1200	50,000	0.040	0.080	1200	50,000	0.04	0.080	1,000	50,000			
	0.9	1.4	0.023	0.090	800	36,000	0.045	0.090	1200	50,000	0.045	0.090	1200	50,000	0.045	0.090	1,000	48,000				
	1	1.5	0.025	0.100	800	30,000	0.050	0.100	1400	48,000	0.050											

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IAB230  
Model number: IAB230

## 볼 엔드밀 Ball End Mill

피삭재 Work Material	고속도강 High Speed Steels HAP5R/HAP72/ASP23						스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐(Copper Tungsten)				
	날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				∂p mm	∂e mm			mm/min	min <sup>-1</sup>			∂p mm	∂e mm			mm/min	min <sup>-1</sup>		
2	4	4	0.100	0.600	450	7,200	0.200	0.600	930	12,000	0.200	0.600	930	12,000	0.2	0.600	1,200	12,000	
		6	0.100	0.600	450	7,200	0.200	0.600	930	12,000	0.200	0.600	930	12,000	0.2	0.600	1,200	12,000	
	4.1	4.1	0.103	0.615	450	7,200	0.205	0.615	930	12,000	0.205	0.615	930	12,000	0.205	0.615	1,200	12,000	
	4.2	4.2	0.105	0.630	450	7,200	0.210	0.630	930	12,000	0.210	0.630	930	12,000	0.21	0.630	1,200	12,000	
	4.3	4.3	0.108	0.645	450	7,200	0.215	0.645	930	12,000	0.215	0.645	930	12,000	0.215	0.645	1,200	12,000	
	4.4	4.4	0.110	0.660	450	7,200	0.220	0.660	930	12,000	0.220	0.660	930	12,000	0.22	0.660	1,200	12,000	
	4.5	4.5	0.113	0.675	450	7,200	0.225	0.675	930	12,000	0.225	0.675	930	12,000	0.225	0.675	1,200	12,000	
	4.6	4.6	0.115	0.690	450	7,200	0.230	0.690	930	12,000	0.230	0.690	930	12,000	0.23	0.690	1,200	12,000	
	4.7	4.7	0.118	0.705	450	7,200	0.235	0.705	930	12,000	0.235	0.705	930	12,000	0.235	0.705	1,200	12,000	
	4.8	4.8	0.120	0.720	450	7,200	0.240	0.720	930	12,000	0.240	0.720	930	12,000	0.24	0.720	1,200	12,000	
	4.9	4.9	0.123	0.735	450	7,200	0.245	0.735	930	12,000	0.245	0.735	930	12,000	0.245	0.735	1,200	12,000	
	5	5	0.125	0.750	450	5,700	0.250	0.750	930	9,600	0.250	0.750	930	9,600	0.25	0.750	1,150	9,600	
		8	0.125	0.750	450	5,700	0.250	0.750	930	9,600	0.250	0.750	930	9,600	0.25	0.750	1,150	9,600	
	5.1	5.1	0.128	0.765	450	5,700	0.255	0.765	930	9,600	0.255	0.765	930	9,600	0.255	0.765	1,150	9,600	
	5.2	5.2	0.130	0.780	450	5,700	0.260	0.780	930	9,600	0.260	0.780	930	9,600	0.26	0.780	1,150	9,600	
	5.3	5.3	0.133	0.795	450	5,700	0.265	0.795	930	9,600	0.265	0.795	930	9,600	0.265	0.795	1,150	9,600	
	5.4	5.4	0.135	0.810	450	5,700	0.270	0.810	930	9,600	0.270	0.810	930	9,600	0.27	0.810	1,150	9,600	
	5.5	5.5	0.138	0.825	450	5,700	0.275	0.825	930	9,600	0.275	0.825	930	9,600	0.275	0.825	1,150	9,600	
	5.6	5.6	0.140	0.840	450	5,700	0.280	0.840	930	9,600	0.280	0.840	930	9,600	0.28	0.840	1,150	9,600	
	5.7	5.7	0.143	0.855	450	5,700	0.285	0.855	930	9,600	0.285	0.855	930	9,600	0.285	0.855	1,150	9,600	
5.8	5.8	0.145	0.870	450	5,700	0.290	0.870	930	9,600	0.290	0.870	930	9,600	0.29	0.870	1,150	9,600		
5.9	5.9	0.148	0.885	450	5,700	0.295	0.885	930	9,600	0.295	0.885	930	9,600	0.295	0.885	1,150	9,600		
6	6	0.150	0.900	450	4,800	0.300	0.900	930	8,000	0.300	0.900	930	8,000	0.3	0.900	1,050	8,000		
	10	0.150	0.900	450	4,800	0.300	0.900	930	8,000	0.300	0.900	930	8,000	0.3	0.900	1,050	8,000		
7	7	0.175	1.050	450	4,800	0.350	1.050	930	8,000	0.350	1.050	930	8,000	0.35	1.050	1,000	8,000		
8	12	0.200	1.200	450	3,600	0.400	1.200	900	6,000	0.400	1.200	900	6,000	0.4	1.200	1,000	6,000		
	16	0.200	1.200	450	3,600	0.400	1.200	900	6,000	0.400	1.200	900	6,000	0.4	1.200	1,000	6,000		
9	13.5	0.225	1.350	450	3,600	0.450	1.350	900	6,000	0.450	1.350	900	6,000	0.45	1.350	1,000	6,000		
10	15	0.250	1.500	450	2,900	0.500	1.500	900	4,800	0.500	1.500	900	4,800	0.5	1.500	1,000	4,800		
	20	0.250	1.500	450	2,900	0.500	1.500	900	4,800	0.500	1.500	900	4,800	0.5	1.500	1,000	4,800		
11	16.5	0.275	1.650	450	2,900	0.550	1.650	900	4,800	0.550	1.650	900	4,800	0.55	1.650	1,000	4,800		
12	20	0.300	1.800	450	2,400	0.600	1.800	900	4,000	0.600	1.800	900	4,000	0.6	1.800	1,000	4,000		
	24	0.300	1.800	450	2,400	0.600	1.800	900	4,000	0.600	1.800	900	4,000	0.6	1.800	1,000	4,000		
14	30	0.350	2.100	450	2,000	0.700	2.100	900	3,400	0.700	2.100	900	3,400	0.7	2.100	1,000	3,400		
16	30	0.400	2.400	450	1,800	0.800	2.400	900	3,000	0.800	2.400	900	3,000	0.8	2.400	1,000	3,000		
18	34	0.450	2.700	450	1,600	0.900	2.700	900	2,650	0.900	2.700	900	2,650	0.9	2.700	1,000	2,650		
20	38	0.500	3.000	450	1,450	1.000	3.000	900	2,400	1.000	3.000	900	2,400	1	3.000	1,000	2,400		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●절입량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing. ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.  
●∂p 축 방향, ∂e 반경 방향. ∂p=Axial Depth of Cut ∂e=Radial Depth of Cut.

## 볼 엔드밀 Ball End Mill

피삭재 Work Material	알루미늄 합금 Aluminum Alloy A5000번						알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)				
	날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				∂p mm	∂e mm			mm/min	min <sup>-1</sup>			∂p mm	∂e mm		
2	0.1	0.1	0.005	0.008	250	50,000	0.005	0.008	250	50,000	0.003	0.008	100	50,000	
		0.15	0.15	0.008	0.015	250	50,000	0.008	0.015	250	50,000	0.004	0.015	100	50,000
	0.2	0.2	0.010	0.020	500	50,000	0.010	0.020	500	50,000	0.005	0.020	200	50,000	
	0.3	0.3	0.015	0.030	500	50,000	0.015	0.030	500	50,000	0.008	0.030	200	50,000	
	0.4	0.6	0.020	0.040	600	50,000	0.020	0.040	600	50,000	0.010	0.040	500	50,000	
	0.5	0.8	0.025	0.050	600	50,000	0.025	0.050	600	50,000	0.013	0.050	500	50,000	
		0.6	0.9	0.030	0.060	750	50,000	0.030	0.060	750	50,000	0.015	0.060	800	48,000
	0.7	1	0.030	0.060	750	50,000	0.030	0.060	750	50,000	0.015	0.060	800	48,000	
		1.1	0.035	0.070	750	50,000	0.035	0.070	750	50,000	0.018	0.070	800	48,000	
	0.8	1.2	0.040	0.080	1,000	50,000	0.040	0.080	1,000	50,000	0.020	0.080	800	36,000	
	0.9	1.4	0.045	0.090	1,000	50,000	0.045	0.090	1,000	50,000	0.023	0.090	800	36,000	
	1	1.5	0.050	0.100	1,250	50,000	0.050	0.100	1,250	50,000	0.025	0.100	800	30,000	
	1.1	1.7	0.055	0.165	1,250	50,000	0.055	0.165	1,250	50,000	0.028	0.165	800	30,000	
	1.2	1.8	0.060	0.180	1,480	50,000	0.060	0.180	1,480	50,000	0.030	0.180	700	25,000	
	1.3	2	0.065	0.195	1,480	50,000	0.065	0.195	1,480	50,000	0.033	0.195	700	25,000	
	1.4	2.1	0.070	0.210	1,480	50,000	0.070	0.210	1,480	50,000	0.035	0.210	700	25,000	
	1.5	2	0.075	0.225	1,480	50,000	0.075	0.225	1,480	50,000	0.038	0.225	700	25,000	
		2.3	0.075	0.225	1,480	50,000	0.075	0.225	1,480	50,000	0.038	0.225	700	25,000	
	1.6	2.4	0.080	0.240	1,900	50,000	0.080	0.240	1,900	50,000	0.040	0.240	600	18,000	
	1.7	2.6	0.085	0.255	1,900	50,000	0.085	0.255	1,900	50,000	0.043	0.255	600	18,000	
	1.8	2.7	0.090	0.270	1,900	50,000	0.090	0.270	1,900	50,000	0.045	0.270	600	18,000	
	1.9	2.9	0.095	0.285	1,900	50,000	0.095	0.285	1,900	50,000	0.048	0.285	600	18,000	
	2	3	0.100	0.300	2,400	48,000	0.100	0.300	2,400	48,000	0.050	0.300	500	14,500	
	2.1	3.2	0.105	0.315	2,400	48,000	0.105	0.315	2,400	48,000	0.053	0.315	500	14,500	
	2.2	3.3	0												

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IAB230  
Model number: IAB230

볼 엔드밀 Ball End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	4	4	0.200	0.600	2,400	24,000	0.200	0.600	2,400	24,000	0.100	0.600	450	7,200
		6	0.200	0.600	2,400	24,000	0.200	0.600	2,400	24,000	0.100	0.600	450	7,200
	4.1	4.1	0.205	0.615	2,400	24,000	0.205	0.615	2,400	24,000	0.103	0.615	450	7,200
	4.2	4.2	0.210	0.630	2,400	24,000	0.210	0.630	2,400	24,000	0.105	0.630	450	7,200
	4.3	4.3	0.215	0.645	2,400	24,000	0.215	0.645	2,400	24,000	0.108	0.645	450	7,200
	4.4	4.4	0.220	0.660	2,400	24,000	0.220	0.660	2,400	24,000	0.110	0.660	450	7,200
	4.5	4.5	0.225	0.675	2,400	24,000	0.225	0.675	2,400	24,000	0.113	0.675	450	7,200
	4.6	4.6	0.230	0.690	2,400	24,000	0.230	0.690	2,400	24,000	0.115	0.690	450	7,200
	4.7	4.7	0.235	0.705	2,400	24,000	0.235	0.705	2,400	24,000	0.118	0.705	450	7,200
	4.8	4.8	0.240	0.720	2,400	24,000	0.240	0.720	2,400	24,000	0.120	0.720	450	7,200
	4.9	4.9	0.245	0.735	2,400	24,000	0.245	0.735	2,400	24,000	0.123	0.735	450	7,200
	5	5	0.250	0.750	2,400	19,000	0.250	0.750	2,400	19,000	0.125	0.750	450	5,700
		8	0.250	0.750	2,400	19,000	0.250	0.750	2,400	19,000	0.125	0.750	450	5,700
	5.1	5.1	0.255	0.765	2,400	19,000	0.255	0.765	2,400	19,000	0.128	0.765	450	5,700
	5.2	5.2	0.260	0.780	2,400	19,000	0.260	0.780	2,400	19,000	0.130	0.780	450	5,700
	5.3	5.3	0.265	0.795	2,400	19,000	0.265	0.795	2,400	19,000	0.133	0.795	450	5,700
	5.4	5.4	0.270	0.810	2,400	19,000	0.270	0.810	2,400	19,000	0.135	0.810	450	5,700
	5.5	5.5	0.275	0.825	2,400	19,000	0.275	0.825	2,400	19,000	0.138	0.825	450	5,700
	5.6	5.6	0.280	0.840	2,400	19,000	0.280	0.840	2,400	19,000	0.140	0.840	450	5,700
	5.7	5.7	0.285	0.855	2,400	19,000	0.285	0.855	2,400	19,000	0.143	0.855	450	5,700
5.8	5.8	0.290	0.870	2,400	19,000	0.290	0.870	2,400	19,000	0.145	0.870	450	5,700	
5.9	5.9	0.295	0.885	2,400	19,000	0.295	0.885	2,400	19,000	0.148	0.885	450	5,700	
6	6	0.300	0.900	2,400	16,000	0.300	0.900	2,400	16,000	0.150	0.900	450	4,800	
	10	0.300	0.900	2,400	16,000	0.300	0.900	2,400	16,000	0.150	0.900	450	4,800	
7	7	0.350	1.050	2,400	16,000	0.350	1.050	2,400	16,000	0.175	1.050	450	4,800	
8	12	0.400	1.200	2,400	12,000	0.400	1.200	2,400	12,000	0.200	1.200	450	3,600	
	16	0.400	1.200	2,400	12,000	0.400	1.200	2,400	12,000	0.200	1.200	450	3,600	
9	13.5	0.450	1.350	2,400	12,000	0.450	1.350	2,400	12,000	0.225	1.350	450	3,600	
10	15	0.500	1.500	2,300	9,600	0.500	1.500	2,300	9,600	0.250	1.500	450	2,900	
	20	0.500	1.500	2,300	9,600	0.500	1.500	2,300	9,600	0.250	1.500	450	2,900	
11	16.5	0.550	1.650	2,300	9,600	0.550	1.650	2,300	9,600	0.275	1.650	450	2,900	
12	20	0.600	1.800	2,100	8,000	0.600	1.800	2,100	8,000	0.300	1.800	450	2,400	
	24	0.600	1.800	2,100	8,000	0.600	1.800	2,100	8,000	0.300	1.800	450	2,400	
14	30	0.700	2.100	2,000	6,800	0.700	2.100	2,000	6,800	0.350	2.100	450	2,000	
16	30	0.800	2.400	2,000	6,000	0.800	2.400	2,000	6,000	0.400	2.400	450	1,800	
18	34	0.900	2.700	2,000	5,300	0.900	2.700	2,000	5,300	0.450	2.700	450	1,600	
20	38	1.000	3.000	2,000	4,800	1.000	3.000	2,000	4,800	0.500	3.000	450	1,450	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●공구 돌출은, 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

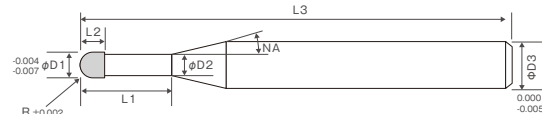


# ion Depo Type A Series

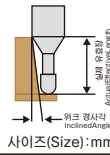
초경 롱 넥 볼 엔드밀  
Carbide Long Neck Ball End Mill

■형번:IALB230 Model number:IALB230

ion A super MG 날수 2 벨리스각 30° 목각 15° Shank 0/-0.005



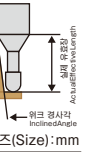
표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

코드 No. Code No.	볼 반경 (R) Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Outside Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IALB230-0010-0050-0030	0.05	0.3	0.07	0.1	0.08	15	4	50	8,160	0.35	0.36	0.37	0.38	0.41
IALB230-0010-0050-0050		0.5	0.07	0.1	0.08	15	4	50	8,800	0.55	0.57	0.59	0.61	0.66
IALB230-0015-0075-0030	0.075	0.3	0.1	0.15	0.13	15	4	50	9,440	0.35	0.36	0.37	0.38	0.40
IALB230-0015-0075-0050		0.5	0.1	0.15	0.13	15	4	50	10,000	0.55	0.57	0.59	0.61	0.65
IALB230-0015-0075-0100	1	0.1	0.15	0.13	15	4	50	10,400	1.07	1.10	1.14	1.18	1.27	
IALB230-0020-0100-0050	0.1	0.5	0.15	0.2	0.18	15	4	50	5,680	0.55	0.57	0.58	0.60	0.64
IALB230-0020-0100-0075		0.75	0.15	0.2	0.18	15	4	50	5,680	0.81	0.84	0.86	0.89	0.96
IALB230-0020-0100-0100	1	0.15	0.2	0.18	15	4	50	5,680	1.07	1.10	1.14	1.18	1.27	
IALB230-0030-0150-0050	0.15	0.5	0.2	0.3	0.27	15	4	50	5,600	0.57	0.58	0.60	0.62	0.66
IALB230-0030-0150-0060		0.6	0.2	0.3	0.27	15	4	50	5,600	0.67	0.69	0.71	0.73	0.78
IALB230-0030-0150-0075	0.75	0.2	0.3	0.27	15	4	50	5,600	0.83	0.85	0.88	0.90	0.97	
IALB230-0030-0150-0080	0.8	0.3	0.3	0.27	15	4	50	5,600	0.88	0.91	0.93	0.96	1.03	
IALB230-0030-0150-0100	1	0.2	0.3	0.27	15	4	50	5,600	1.09	1.12	1.15	1.19	1.28	
IALB230-0030-0150-0125	0.15	1.25	0.2	0.3	0.27	15	4	50	6,000	1.34	1.39	1.43	1.48	1.59
IALB230-0030-0150-0150-00020		1.5	0.2	0.3	0.27	15	4	50	6,000	1.60	1.65	1.71	1.77	1.90
IALB230-0030-0150-0150-00030	1.5	0.3	0.3	0.27	15	4	50	6,000	1.60	1.65	1.71	1.77	1.90	
IALB230-0030-0150-0175	1.75	0.2	0.3	0.27	15	4	50	6,000	1.86	1.92	1.99	2.05	2.21	
IALB230-0030-0150-0200	2	0.2	0.3	0.27	15	4	50	6,000	2.12	2.19	2.26	2.34	2.52	
IALB230-0030-0150-0225	2.25	0.2	0.3	0.27	15	4	50	6,160	2.38	2.46	2.54	2.63	2.83	
IALB230-0030-0150-0250	2.5	0.2	0.3	0.27	15	4	50	6,160	2.64	2.72	2.82	2.92	3.14	
IALB230-0030-0150-0275	2.75	0.2	0.3	0.27	15	4	50	6,160	2.90	2.99	3.09	3.20	3.45	
IALB230-0030-0150-0300	3	0.2	0.3	0.27	15	4	50	6,160	3.15	3.26	3.37	3.49	3.76	
IALB230-0040-0200-0050	0.2	0.5	0.3	0.4	0.37	15	4	50	3,840	0.57	0.58	0.59	0.61	0.64
IALB230-0040-0200-0075		0.75	0.3	0.4	0.37	15	4	50	3,840	0.83	0.85	0.87	0.90	0.96
IALB230-0040-0200-0100	1	0.3	0.4	0.37	15	4	50	3,840	1.08	1.12	1.15	1.18	1.27	
IALB230-0040-0200-0120	1.2	0.4	0.4	0.37	15	4	50	3,840	1.29	1.33	1.37	1.41	1.52	
IALB230-0040-0200-0150	1.5	0.3	0.4	0.37	15	4	50	3,920	1.60	1.65	1.70	1.76	1.89	
IALB230-0040-0200-0200	2	0.3	0.4	0.37	15	4	50	4,000	2.12	2.19	2.26	2.33	2.51	
IALB230-0040-0200-0250	2.5	0.4	0.4	0.37	15	4	50	4,160	2.64	2.72	2.81	2.91	3.13	
IALB230-0040-0200-0300	3	0.3	0.4	0.37	15	4	50	4,400	3.15	3.26	3.37	3.48	3.75	

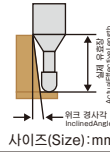
# ion Depo Type A Series



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코드 No. Code No.	볼 반경 (R) Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Outside Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IALB230-0050-0250-0100	0.25	1	0.35	0.5	0.47	15	4	50	3,840	1.08	1.11	1.14	1.18	1.26	
IALB230-0050-0250-0150		1.5	0.5	0.5	0.47	15	4	50	3,840	1.60	1.65	1.70	1.75	1.88	
IALB230-0050-0250-0200		2	0.35	0.5	0.47	15	4	50	3,840	2.12	2.18	2.25	2.33	2.50	
IALB230-0050-0250-0250		2.5	0.35	0.5	0.47	15	4	50	3,840	2.63	2.72	2.81	2.90	3.12	
IALB230-0050-0250-0300		3	0.5	0.5	0.47	15	4	50	3,840	3.15	3.25	3.36	3.48	3.74	
IALB230-0050-0250-0350		3.5	0.35	0.5	0.47	15	4	50	3,840	3.67	3.79	3.91	4.05	4.36	
IALB230-0050-0250-0400	4	0.35	0.5	0.47	15	4	50	3,840	4.18	4.32	4.47	4.63	4.98		
IALB230-0060-0300-0100	0.3	1	0.6	0.6	0.57	15	4	50	3,280	1.08	1.11	1.14	1.17	1.24	
IALB230-0060-0300-0150		1.5	0.6	0.6	0.57	15	4	50	2,960	1.60	1.64	1.69	1.74	1.87	
IALB230-0060-0300-0200		2	0.6	0.6	0.57	15	4	50	2,960	2.12	2.18	2.25	2.32	2.49	
IALB230-0060-0300-0220		2.2	0.8	0.6	0.57	15	4	50	3,040	2.32	2.39	2.47	2.55	2.74	
IALB230-0060-0300-0250		2.5	0.6	0.6	0.57	15	4	50	3,040	2.63	2.71	2.80	2.89	3.11	
IALB230-0060-0300-0300		3	0.6	0.6	0.57	15	4	50	3,040	3.15	3.25	3.35	3.47	3.73	
IALB230-0060-0300-0350	3.5	0.6	0.6	0.57	15	4	50	3,120	3.67	3.78	3.91	4.04	4.35		
IALB230-0060-0300-0400	4	0.6	0.6	0.57	15	4	50	3,120	4.18	4.32	4.46	4.62	4.97		
IALB230-0060-0300-0450	4.5	0.6	0.6	0.57	15	4	50	3,120	4.70	4.85	5.02	5.19	5.59		
IALB230-0060-0300-0500	5	0.6	0.6	0.57	15	4	50	3,120	5.22	5.39	5.57	5.77	6.22		
IALB230-0060-0300-0550	5.5	0.6	0.6	0.57	15	4	50	3,120	5.73	5.92	6.13	6.34	6.84		
IALB230-0060-0300-0600	6	0.6	0.6	0.57	15	4	50	3,120	6.25	6.46	6.68	6.92	7.46		
IALB230-0070-0350-0200	0.35	2	0.7	0.7	0.67	15	4	50	2,960	2.11	2.18	2.24	2.31	2.48	
IALB230-0070-0350-0400		4	0.7	0.7	0.67	15	4	50	3,120	4.18	4.31	4.46	4.61	4.96	
IALB230-0070-0350-0600	6	0.7	0.7	0.67	15	4	50	3,120	6.25	6.45	6.67	6.91	7.45		
IALB230-0080-0400-0200	0.4	2	0.6	0.8	0.77	15	4	50	2,960	2.11	2.17	2.24	2.31	2.46	
IALB230-0080-0400-0220		2.2	0.8	0.8	0.77	15	4	50	2,960	2.32	2.39	2.46	2.54	2.71	
IALB230-0080-0400-0300	3	0.8	0.8	0.77	15	4	50	3,120	3.15	3.24	3.34	3.46	3.71		
IALB230-0080-0400-0400	4	0.6	0.8	0.77	15	4	50	3,120	4.18	4.31	4.45	4.60	4.95		
IALB230-0080-0400-0500	5	0.8	0.8	0.77	15	4	50	3,120	5.21	5.38	5.56	5.75	6.19		
IALB230-0080-0400-0600	6	0.6	0.8	0.77	15	4	50	3,120	6.25	6.45	6.67	6.90	7.44		
IALB230-0080-0400-0700	7	0.6	0.8	0.77	15	4	50	3,120	7.28	7.52	7.78	8.05	8.68		
IALB230-0080-0400-0800	8	0.6	0.8	0.77	15	4	50	3,120	8.31	8.59	8.89	9.20	9.92		
IALB230-0090-0450-0200	0.45	2	0.65	0.9	0.87	15	4	50	2,960	2.11	2.17	2.23	2.30	2.45	
IALB230-0090-0450-0400		4	0.65	0.9	0.87	15	4	50	3,120	4.18	4.31	4.45	4.60	4.94	
IALB230-0090-0450-0600	6	0.65	0.9	0.87	15	4	50	3,120	6.24	6.45	6.66	6.90	7.42		
IALB230-0090-0450-0800	8	0.65	0.9	0.87	15	4	50	3,120	8.31	8.59	8.88	9.20	9.91		
IALB230-0100-0500-0200	0.5	2	0.75	1	0.95	15	4	50	2,480	2.15	2.20	2.27	2.33	2.49	
IALB230-0100-0500-0250		2.5	0.75	1	0.95	15	4	50	2,480	2.66	2.74	2.82	2.91	3.11	
IALB230-0100-0500-0300		3	0.8	1	0.95	15	4	50	2,480	3.18	3.27	3.37	3.48	3.73	
IALB230-0100-0500-0400		4	0.75	1	0.95	15	4	50	2,800	4.21	4.34	4.48	4.63	4.97	
IALB230-0100-0500-0600		6	0.8	1	0.95	15	4	50	3,040	6.28	6.48	6.70	6.93	7.46	
IALB230-0100-0500-0700		7	0.75	1	0.95	15	4	50	3,040	7.32	7.55	7.81	8.08	8.70	
IALB230-0100-0500-0800		8	0.75	1	0.95	15	4	50	3,040	8.35	8.62	8.92	9.23	9.95	
IALB230-0100-0500-0900		9	0.75	1	0.95	15	4	50	3,040	9.38	9.69	10.02	10.38	11.19	
IALB230-0100-0500-1000		10	0.8	1	0.95	15	4	50	3,040	10.42	10.76	11.13	11.53	12.43	
IALB230-0100-0500-1200		12	0.75	1	0.95	15	4	50	3,040	12.48	12.90	13.35	13.83	14.92	
IALB230-0120-0600-0240		0.6	2.4	0.9	1.2	1.15	15	4	50	3,760	2.56	2.63	2.70	2.78	2.96

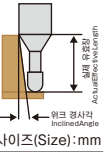
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코드 No. Code No.	볼 반경 Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Outside Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IALB230-0120-0600-0400	0.6	4	0.9	1.2	1.15	15	4	50	3,760	4.21	4.34	4.47	4.62	4.95
IALB230-0120-0600-0600		6	0.9	1.2	1.15	15	4	50	4,080	6.28	6.48	6.69	6.92	7.44
IALB230-0120-0600-0800		8	0.9	1.2	1.15	15	4	50	4,080	8.35	8.62	8.91	9.22	9.92
IALB230-0120-0600-1000		10	0.9	1.2	1.15	15	4	50	4,080	10.41	10.76	11.12	11.52	12.41
IALB230-0120-0600-1200		12	0.9	1.2	1.15	15	4	50	4,080	12.48	12.89	13.34	13.82	14.90
IALB230-0140-0700-0800	0.7	8	1	1.4	1.35	15	4	50	3,520	8.34	8.61	8.90	9.20	9.90
IALB230-0140-0700-1200		12	1	1.4	1.35	15	4	50	3,520	12.48	12.89	13.33	13.80	14.87
IALB230-0140-0700-1600		16	1	1.4	1.35	15	4	50	3,520	16.61	17.17	17.76	18.40	19.84
IALB230-0150-0750-0300	0.75	3	1.1	1.5	1.45	15	4	50	2,880	3.17	3.26	3.35	3.45	3.67
IALB230-0150-0750-0400		4	1.1	1.5	1.45	15	4	50	2,880	4.21	4.33	4.46	4.60	4.92
IALB230-0150-0750-0600		6	1.1	1.5	1.45	15	4	50	2,880	6.27	6.47	6.67	6.90	7.40
IALB230-0150-0750-0800		8	1.1	1.5	1.45	15	4	50	3,040	8.34	8.61	8.89	9.20	9.89
IALB230-0150-0750-1000		10	1.1	1.5	1.45	15	4	50	3,280	10.41	10.74	11.11	11.50	12.37
IALB230-0150-0750-1200	12	1.1	1.5	1.45	15	4	50	3,520	12.48	12.88	13.32	13.80	14.86	
IALB230-0150-0750-1400	14	1.1	1.5	1.45	15	4	50	3,520	14.54	15.02	15.54	16.09	17.35	
IALB230-0150-0750-1600	16	1.1	1.5	1.45	15	4	50	3,520	16.61	17.16	17.76	18.39	19.83	
IALB230-0160-0800-0400	0.8	4	1.2	1.6	1.55	15	4	50	4,000	4.20	4.32	4.45	4.59	4.90
IALB230-0160-0800-0800		8	1.2	1.6	1.55	15	4	50	4,080	8.34	8.60	8.88	9.19	9.88
IALB230-0160-0800-1200		12	1.2	1.6	1.55	15	4	50	4,080	12.47	12.88	13.32	13.79	14.85
IALB230-0160-0800-1600		16	1.2	1.6	1.55	15	4	50	4,080	16.61	17.16	17.75	18.39	19.82
IALB230-0180-0900-0800	0.9	8	1.3	1.8	1.75	15	4	50	3,520	8.34	8.60	8.87	9.17	9.85
IALB230-0180-0900-1200		12	1.3	1.8	1.75	15	4	50	3,520	12.47	12.87	13.31	13.77	14.83
IALB230-0180-0900-1600		16	1.3	1.8	1.75	15	4	50	3,520	16.60	17.15	17.74	18.37	19.80
IALB230-0200-1000-0300	1	3	1.5	2	1.94	15	4	50	2,480	3.18	3.26	3.34	3.43	3.64
IALB230-0200-1000-0400		4	1.5	2	1.94	15	4	50	2,480	4.22	4.33	4.45	4.58	4.88
IALB230-0200-1000-0600		6	1.5	2	1.94	15	4	50	2,800	6.28	6.47	6.67	6.88	7.37
IALB230-0200-1000-0800		8	1.5	2	1.94	15	4	50	3,040	8.35	8.61	8.88	9.18	9.85
IALB230-0200-1000-1000		10	1.5	2	1.94	15	4	50	3,040	10.42	10.75	11.10	11.48	12.34
IALB230-0200-1000-1200		12	1.5	2	1.94	15	4	50	3,040	12.49	12.89	13.32	13.78	14.83
IALB230-0200-1000-1300		13	1.5	2	1.94	15	4	50	3,040	13.52	13.96	14.43	14.93	16.07
IALB230-0200-1000-1400		14	1.5	2	1.94	15	4	50	3,040	14.55	15.03	15.53	16.08	17.31
IALB230-0200-1000-1500		15	1.5	2	1.94	15	4	50	3,040	15.59	16.10	16.64	17.23	18.56
IALB230-0200-1000-1600		16	1.5	2	1.94	15	4	50	3,040	16.62	17.17	17.75	18.38	19.80
IALB230-0200-1000-1800	18	1.5	2	1.94	15	4	50	3,040	18.69	19.30	19.97	20.68	FREE	
IALB230-0200-1000-2000	20	1.5	2	1.94	15	4	50	3,040	20.76	21.44	22.18	22.98	FREE	
IALB230-0250-1250-0600	1.25	6	2.3	2.5	2.44	15	4	50	3,280	6.28	6.45	6.64	6.84	7.31
IALB230-0250-1250-0800		8	2.3	2.5	2.44	15	4	50	3,360	8.34	8.59	8.86	9.14	9.80
IALB230-0250-1250-1000		10	2.3	2.5	2.44	15	4	50	3,440	10.41	10.73	11.07	11.44	12.28
IALB230-0250-1250-1500		15	2.3	2.5	2.44	15	4	50	4,080	15.58	16.08	16.62	17.19	FREE
IALB230-0250-1250-2000	20	2.3	2.5	2.44	15	4	50	4,800	20.75	21.43	22.16	FREE	FREE	
IALB230-0300-1500-0600	1.5	6	2.5	3	2.85	15	4	50	2,800	6.44	6.61	6.80	7.00	7.46
IALB230-0300-1500-0800		8	2.5	3	2.85	15	4	50	3,040	8.51	8.75	9.02	9.30	9.95
IALB230-0300-1500-1000		10	2.5	3	2.85	15	4	50	3,520	10.58	10.89	11.23	11.60	FREE
IALB230-0300-1500-1200		12	2.5	3	2.85	15	4	50	3,680	12.64	13.03	13.45	13.90	FREE
IALB230-0300-1500-1400		14	2.5	3	2.85	15	4	50	4,080	14.71	15.17	15.67	FREE	FREE

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코드 No. Code No.	볼 반경 Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Outside Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IALB230-0300-1500-1500	1.5	15	2.5	3	2.85	15	4	50	4,000	15.74	16.24	16.77	FREE	FREE	
IALB230-0300-1500-1600		16	2.5	3	2.85	15	4	50	4,080	16.78	17.31	17.88	FREE	FREE	
IALB230-0300-1500-2000		20	2.5	3	2.85	15	4	50	3,920	20.91	21.59	FREE	FREE	FREE	
IALB230-0300-1500-2500		25	2.5	3	2.85	15	4	60	3,920	26.08	26.94	FREE	FREE	FREE	
IALB230-0300-1500-3000		30	2.5	3	2.85	15	4	60	4,480	31.25	FREE	FREE	FREE	FREE	
IALB230-0350-1750-1000	1.75	10	2.8	3.5	3.35	15	6	50	4,480	10.57	10.88	11.21	11.56	12.38	
IALB230-0350-1750-1500		15	2.8	3.5	3.35	15	6	50	4,480	15.74	16.22	16.75	17.31	18.59	
IALB230-0350-1750-2000		20	2.8	3.5	3.35	15	6	50	4,800	20.90	21.57	22.29	23.06	24.81	
IALB230-0350-1750-2500		25	2.8	3.5	3.35	15	6	60	4,800	26.07	26.92	27.83	28.81	FREE	
IALB230-0350-1750-3000		30	2.8	3.5	3.35	15	6	60	5,120	31.24	32.27	33.37	34.56	FREE	
IALB230-0350-1750-3500	35	2.8	3.5	3.35	15	6	70	6,160	36.41	37.62	38.91	FREE	FREE		
IALB230-0400-2000-1000	2	10	3	4	3.8	15	6	50	3,120	10.66	10.96	11.28	11.63	12.43	
IALB230-0400-2000-1200		12	3	4	3.8	15	6	50	4,080	12.72	13.10	13.50	13.93	14.92	
IALB230-0400-2000-1400		14	3	4	3.8	15	6	50	4,080	14.79	15.24	15.72	16.23	17.41	
IALB230-0400-2000-1500		15	3	4	3.8	15	6	50	4,080	15.82	16.31	16.82	17.38	18.65	
IALB230-0400-2000-1600		16	3	4	3.8	15	6	50	4,080	16.86	17.38	17.93	18.53	19.89	
IALB230-0400-2000-2000		20	3	4	3.8	15	6	50	4,080	20.99	21.65	22.37	23.13	FREE	
IALB230-0400-2000-2500		25	3	4	3.8	15	6	60	4,080	26.16	27.00	27.91	28.88	FREE	
IALB230-0400-2000-3000		30	3	4	3.8	15	6	60	4,080	31.33	32.35	33.45	FREE	FREE	
IALB230-0400-2000-3500		35	3	4	3.8	15	6	70	4,720	36.50	37.70	38.99	FREE	FREE	
IALB230-0500-2500-1000		2.5	10	3.5	5	4.8	15	6	50	4,800	10.64	10.92	11.23	11.56	FREE
IALB230-0500-2500-1500	15		3.5	5	4.8	15	6	50	6,800	15.81	16.27	16.77	FREE	FREE	
IALB230-0500-2500-2000	20		3.5	5	4.8	15	6	50	6,800	20.98	21.62	FREE	FREE	FREE	
IALB230-0500-2500-2500	25		3.5	5	4.8	15	6	60	6,800	26.14	26.97	FREE	FREE	FREE	
IALB230-0500-2500-3000	30		3.5	5	4.8	15	6	60	7,280	31.31	FREE	FREE	FREE	FREE	
IALB230-0500-2500-3500	35		3.5	5	4.8	15	6	70	7,280	36.48	FREE	FREE	FREE	FREE	
IALB230-0500-2500-4000	40		3.5	5	4.8	15	6	70	9,200	41.65	FREE	FREE	FREE	FREE	
IALB230-0600-3000-1000	3		10	6	6	5.8	15	6	50	5,120	FREE	FREE	FREE	FREE	FREE
IALB230-0600-3000-1500			15	6	6	5.8	15	6	50	5,120	FREE	FREE	FREE	FREE	FREE
IALB230-0600-3000-2000			20	6	6	5.8	15	6	50	5,120	FREE	FREE	FREE	FREE	FREE
IALB230-0600-3000-2500		25	6	6	5.8	15	6	60	5,120	FREE	FREE	FREE	FREE	FREE	
IALB230-0600-3000-3000		30	6	6	5.8	15	6	60	5,280	FREE	FREE	FREE	FREE	FREE	
IALB230-0600-3000-3500		35	6	6	5.8	15	6	70	5,440	FREE	FREE	FREE	FREE	FREE	
IALB230-0600-3000-4000		40	6	6	5.8	15	6	70	5,760	FREE	FREE	FREE	FREE	FREE	
IALB230-0600-3000-4500		45	6	6	5.8	15	6	80	6,160	FREE	FREE	FREE	FREE	FREE	
IALB230-0600-3000-5000		50	6	6	5.8	15	6	80	6,240	FREE	FREE	FREE	FREE	FREE	

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALB230  
Model number:IALB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material		주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61						
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			ap mm	ae mm			mm/min	min <sup>-1</sup>			ap mm	ae mm			mm/min	min <sup>-1</sup>			ap mm	ae mm
2	0.1	0.3	0.005	0.005	80	50,000	0.005	0.005	80	50,000	0.005	0.005	80	50,000	0.003	0.003	60	50,000		
		0.5	0.003	0.003	70	50,000	0.003	0.003	70	50,000	0.003	0.003	70	50,000	0.003	0.003	40	50,000		
		0.15	0.3	0.005	0.015	150	50,000	0.005	0.015	150	50,000	0.005	0.015	150	50,000	0.003	0.005	120	50,000	
			0.5	0.004	0.007	150	50,000	0.004	0.007	150	50,000	0.004	0.007	150	50,000	0.003	0.005	120	50,000	
			1	0.003	0.005	100	50,000	0.003	0.005	100	50,000	0.003	0.005	100	50,000	0.002	0.003	70	50,000	
		0.2	0.5	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.01	0.01	210	50,000	
	0.75		0.007	0.01	250	50,000	0.007	0.01	250	50,000	0.007	0.01	250	50,000	0.005	0.01	210	50,000		
	0.3	0.5	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.01	0.015	210	50,000		
			0.6	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.01	0.015	210	50,000	
			0.75	0.008	0.015	250	50,000	0.008	0.015	250	50,000	0.008	0.015	250	50,000	0.007	0.01	210	50,000	
		0.8	1	0.007	0.01	250	50,000	0.007	0.01	250	50,000	0.007	0.01	250	50,000	0.005	0.01	210	50,000	
			1.25	0.005	0.01	250	50,000	0.005	0.01	250	50,000	0.005	0.01	250	50,000	0.005	0.005	210	50,000	
			1.5	0.005	0.01	200	50,000	0.005	0.01	200	50,000	0.005	0.01	200	50,000	0.005	0.005	170	50,000	
		0.4	1.75	0.005	0.01	200	50,000	0.005	0.01	200	50,000	0.005	0.01	200	50,000	0.005	0.005	170	50,000	
				2	0.003	0.01	150	50,000	0.003	0.01	150	50,000	0.003	0.01	150	50,000	0.003	0.005	120	50,000
				2.25	0.003	0.01	150	50,000	0.003	0.01	150	50,000	0.003	0.01	150	50,000	0.003	0.005	120	50,000
			2.5	0.003	0.007	150	50,000	0.003	0.007	150	50,000	0.003	0.007	150	50,000	0.003	0.003	120	50,000	
				2.75	0.003	0.007	150	50,000	0.003	0.007	150	50,000	0.003	0.007	150	50,000	0.003	0.003	120	50,000
				3	0.003	0.005	150	50,000	0.003	0.005	150	50,000	0.003	0.005	150	50,000	0.003	0.003	120	50,000
	0.5	0.5	0.02	0.05	800	50,000	0.02	0.05	800	50,000	0.02	0.05	800	50,000	0.02	0.03	650	50,000		
			0.75	0.02	0.05	800	50,000	0.02	0.05	800	50,000	0.02	0.05	800	50,000	0.02	0.03	650	50,000	
			1	0.02	0.05	800	50,000	0.02	0.05	800	50,000	0.02	0.05	800	50,000	0.02	0.03	650	50,000	
			1.2	0.02	0.05	800	50,000	0.02	0.05	800	50,000	0.02	0.05	800	50,000	0.02	0.03	650	50,000	
			1.5	0.02	0.03	700	50,000	0.02	0.03	700	50,000	0.02	0.03	700	50,000	0.01	0.02	600	50,000	
2		0.015	0.02	600	50,000	0.015	0.02	600	50,000	0.015	0.02	600	50,000	0.01	0.015	500	50,000			
		0.015	0.02	450	50,000	0.015	0.02	450	50,000	0.015	0.02	450	50,000	0.01	0.015	380	50,000			
		0.01	0.02	400	30,000	0.01	0.02	400	30,000	0.01	0.02	400	30,000	0.01	0.01	340	30,000			
		0.03	0.05	800	50,000	0.03	0.05	800	50,000	0.03	0.05	800	50,000	0.02	0.05	680	50,000			
		0.03	0.05	700	50,000	0.03	0.05	700	50,000	0.03	0.05	700	50,000	0.02	0.04	600	50,000			
0.6	2.5	0.02	0.04	600	50,000	0.02	0.04	600	50,000	0.02	0.04	600	50,000	0.02	0.03	510	50,000			
		0.015	0.04	600	50,000	0.015	0.04	600	50,000	0.015	0.04	600	50,000	0.01	0.03	510	50,000			
		0.015	0.035	500	50,000	0.015	0.035	500	50,000	0.015	0.035	500	50,000	0.01	0.025	420	50,000			
		0.015	0.03	400	50,000	0.015	0.03	400	50,000	0.015	0.03	400	50,000	0.01	0.02	340	50,000			
	3	0.012	0.02	400	50,000	0.012	0.02	400	50,000	0.012	0.02	400	50,000	0.005	0.01	340	50,000			
		1.0	0.05	0.1	1,200	50,000	0.05	0.1	1,200	50,000	0.05	0.1	1,200	50,000	0.05	0.07	1,000	50,000		
		1.5	0.05	0.1	1,200	50,000	0.05	0.1	1,200	50,000	0.05	0.1	1,200	50,000	0.05	0.07	1,000	50,000		
		2	0.05	0.1	1,200	50,000	0.05	0.1	1,200	50,000	0.05	0.1	1,200	50,000	0.04	0.07	1,000	50,000		
0.7	2.2	0.05	0.1	1,200	50,000	0.05	0.1	1,200	50,000	0.05	0.1	1,200	50,000	0.04	0.07	1,000	50,000			
		2.5	0.035	0.1	1,200	50,000	0.035	0.1	1,200	50,000	0.035	0.1	1,200	50,000	0.03	0.06	1,000	50,000		
	3	0.025	0.1	1,000	50,000	0.025	0.1	1,000	50,000	0.025	0.1	1,000	50,000	0.03	0.05	850	50,000			

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material		주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61					
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			ap mm	ae mm			mm/min	min <sup>-1</sup>			ap mm	ae mm			mm/min	min <sup>-1</sup>			ap mm
2	0.6	3.5	0.025	0.08	1,000	50,000	0.025	0.08	1,000	50,000	0.025	0.08	1,000	50,000	0.025	0.08	1,000	50,000	
		4.0	0.025	0.05	800	50,000	0.025	0.05	800	50,000	0.025	0.05	800	50,000	0.02	0.04	680	50,000	
		4.5	0.025	0.05	750	50,000	0.025	0.05	750	50,000	0.025	0.05	750	50,000	0.01	0.03	630	50,000	
		5	0.02	0.04	500	30,000	0.02	0.04	500	30,000	0.02	0.04	500	30,000	0.01	0.02	420	30,000	
		5.5	0.013	0.02	500	30,000	0.013	0.02	500	30,000	0.013	0.02	500	30,000	0.01	0.01	420	30,000	
		6	0.01	0.02	450	30,000	0.01	0.02	450	30,000	0.01	0.02	450	30,000	0.005	0.01	380	30,000	
		0.7	2	0.08	0.12	1,800	50,000	0.08	0.12	1,800	50,000	0.08	0.12	1,800	50,000	0.07	0.08	1,300	50,000
			4	0.05	0.11	1,300	50,000	0.05	0.11	1,300	50,000	0.05	0.11	1,300	50,000	0.03	0.06	1,100	50,000
			6	0.03	0.05	700	30,000	0.03	0.05	700	30,000	0.03	0.05	700	30,000	0.01	0.02	600	30,000
			8	0.03	0.05	700	30,000	0.03	0.05	700	30,000	0.03	0.05	700	30,000	0.02	0.03	600	30,000
		0.8	2.0	0.1	0.15	2,000	50,000	0.1	0.15	2,000	50,000	0.1	0.15	2,000	50,000	0.1	0.12	1,700	50,000
			2.2	0.1	0.15	2,000	50,000	0.1	0.15	2,000	50,000	0.1	0.15	2,000	50,000	0.1	0.12	1,700	50,000
	3.0		0.07	0.15	1,800	50,000	0.07	0.15	1,800	50,000	0.07	0.15	1,800	50,000	0.07	0.1	1,500	50,000	
	4		0.05	0.12	1,500	50,000	0.05	0.12	1,500	50,000	0.05	0.12	1,500	50,000	0.05	0.08	1,300	50,000	
	5		0.05	0.1	1,200	50,000	0.05	0.1	1,200	50,000	0.05	0.1	1,200	50,000	0.04	0.07	1,000	50,000	
	6		0.05	0.08	900	30,000	0.05	0.08	900	30,000	0.05	0.08	900	30,000	0.03	0.05	750	30,000	
	7		0.03	0.05	700	30,000	0.03	0.05	700	30,000	0.03	0.05	700	30,000	0.02	0.03	600	30,000	
	8		0.015	0.03	500	24,000	0.015	0.03	500	24,000	0.015	0.03	500	24,000	0.01	0.01	420	24,000	
	0.9	2	0.15	0.2	2,500	50,000	0.15	0.2	2,500	50,000	0.15	0.2	2,500	50,000	0.1	0.2	2,000	50,000	
		4	0.																

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALB230  
Model number:IALB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	1.5	6	0.15	0.3	3,000	30,000	0.15	0.3	3,000	30,000	0.15	0.3	3,000	30,000	0.12	0.2	2,500	30,000
		8.0	0.1	0.25	2,400	30,000	0.1	0.25	2,400	30,000	0.1	0.25	2,400	30,000	0.08	0.18	2,000	30,000
		10.0	0.08	0.2	1,800	30,000	0.08	0.2	1,800	30,000	0.08	0.2	1,800	30,000	0.06	0.12	1,500	30,000
		12	0.07	0.13	1,200	24,000	0.07	0.13	1,200	24,000	0.07	0.13	1,200	24,000	0.05	0.09	1,000	24,000
		14	0.06	0.1	1,200	24,000	0.06	0.1	1,200	24,000	0.06	0.1	1,200	24,000	0.04	0.07	1,000	24,000
		16	0.05	0.08	800	18,000	0.05	0.08	800	18,000	0.05	0.08	800	18,000	0.035	0.06	680	18,000
	1.6	4	0.2	0.3	4,000	24,000	0.2	0.3	4,000	24,000	0.2	0.3	4,000	24,000	0.17	0.25	3,400	24,000
		8	0.1	0.3	3,000	24,000	0.1	0.3	3,000	24,000	0.1	0.3	3,000	24,000	0.09	0.2	2,500	24,000
		12	0.07	0.15	1,800	24,000	0.07	0.15	1,800	24,000	0.07	0.15	1,800	24,000	0.06	0.12	1,500	24,000
		16	0.05	0.1	650	18,000	0.05	0.1	650	18,000	0.05	0.1	650	18,000	0.035	0.07	550	18,000
	1.8	8	0.15	0.3	2,500	20,000	0.15	0.3	2,500	20,000	0.15	0.3	2,500	20,000	0.12	0.2	2,100	20,000
		12.0	0.1	0.2	1,800	16,000	0.1	0.2	1,800	16,000	0.1	0.2	1,800	16,000	0.07	0.15	1,500	16,000
	2	3.0	0.3	0.5	4,000	30,000	0.3	0.5	4,000	30,000	0.3	0.5	4,000	30,000	0.2	0.5	3,400	30,000
			4	0.3	0.5	4,000	30,000	0.3	0.5	4,000	30,000	0.3	0.5	4,000	30,000	0.2	0.45	3,400
		6.0	0.25	0.5	3,000	30,000	0.25	0.5	3,000	30,000	0.25	0.5	3,000	30,000	0.2	0.4	2,500	30,000
			8	0.2	0.3	2,500	20,000	0.2	0.3	2,500	20,000	0.2	0.3	2,500	20,000	0.15	0.3	2,100
		10	0.15	0.3	2,500	20,000	0.15	0.3	2,500	20,000	0.15	0.3	2,500	20,000	0.1	0.2	2,100	20,000
			12.0	0.13	0.2	1,800	16,000	0.13	0.2	1,800	16,000	0.13	0.2	1,800	16,000	0.1	0.15	1,500
		13	0.12	0.2	1,800	16,000	0.12	0.2	1,800	16,000	0.12	0.2	1,800	16,000	0.08	0.13	1,500	16,000
			14	0.1	0.2	1,800	16,000	0.1	0.2	1,800	16,000	0.1	0.2	1,800	16,000	0.07	0.13	1,500
15		0.1	0.2	1,800	16,000	0.1	0.2	1,800	16,000	0.1	0.2	1,800	16,000	0.07	0.13	1,500	16,000	
		16	0.1	0.15	1,600	14,000	0.1	0.15	1,600	14,000	0.1	0.15	1,600	14,000	0.06	0.11	1,400	14,000
18		0.07	0.12	1,600	14,000	0.07	0.12	1,600	14,000	0.07	0.12	1,600	14,000	0.05	0.1	1,400	14,000	
		20	0.06	0.1	1,000	12,000	0.06	0.1	1,000	12,000	0.06	0.1	1,000	12,000	0.05	0.07	850	12,000
2.5		6	0.25	0.5	3,000	20,000	0.25	0.5	3,000	20,000	0.25	0.5	3,000	20,000	0.3	0.35	2,500	20,000
		8	0.2	0.5	3,000	20,000	0.2	0.5	3,000	20,000	0.2	0.5	3,000	20,000	0.25	0.35	2,500	20,000
	10	0.2	0.5	3,000	20,000	0.2	0.5	3,000	20,000	0.2	0.5	3,000	20,000	0.25	0.35	2,500	20,000	
	15	0.15	0.3	2,500	20,000	0.15	0.3	2,500	20,000	0.15	0.3	2,500	20,000	0.1	0.2	2,100	20,000	
	20	0.1	0.2	1,800	16,000	0.1	0.2	1,800	16,000	0.1	0.2	1,800	16,000	0.08	0.15	1,500	16,000	
3	6	0.35	0.6	4,000	20,000	0.35	0.6	4,000	20,000	0.35	0.6	4,000	20,000	0.25	0.5	3,400	20,000	
	8	0.3	0.5	4,000	20,000	0.3	0.5	4,000	20,000	0.3	0.5	4,000	20,000	0.2	0.5	3,400	20,000	
	10.0	0.3	0.5	4,000	20,000	0.3	0.5	4,000	20,000	0.3	0.5	4,000	20,000	0.2	0.45	3,400	20,000	
	12	0.2	0.4	3,000	20,000	0.2	0.4	3,000	20,000	0.2	0.4	3,000	20,000	0.2	0.4	2,500	20,000	
	14	0.2	0.4	3,000	20,000	0.2	0.4	3,000	20,000	0.2	0.4	3,000	20,000	0.15	0.35	2,500	20,000	
	15	0.15	0.4	3,000	20,000	0.15	0.4	3,000	20,000	0.15	0.4	3,000	20,000	0.13	0.35	2,500	20,000	
	16	0.15	0.35	3,000	20,000	0.15	0.35	3,000	20,000	0.15	0.35	3,000	20,000	0.13	0.35	2,500	20,000	
	20.0	0.15	0.3	1,800	16,000	0.15	0.3	1,800	16,000	0.15	0.3	1,800	16,000	0.1	0.2	1,500	16,000	
	25	0.13	0.27	1,200	16,000	0.13	0.27	1,200	16,000	0.13	0.27	1,200	16,000	0.1	0.16	1,000	16,000	
	30	0.1	0.2	800	12,000	0.1	0.2	800	12,000	0.1	0.2	800	12,000	0.07	0.12	680	12,000	
3.5	10	0.3	0.6	4,000	20,000	0.3	0.6	4,000	20,000	0.3	0.6	4,000	20,000	0.2	0.6	3,600	20,000	
	15	0.2	0.5	3,000	20,000	0.2	0.5	3,000	20,000	0.2	0.5	3,000	20,000	0.15	0.5	2,400	20,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●공구 밀착은 필요 이상으로 하지 말아 주세요. Length of tool overhang must be as short as possible. ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			주철 Cast Irons FCD				탄소강 Carbon Steels S50C/SS400				프리하드강 Prehardened Steels PX5/NAK80				다이스강 Die Steels SKD11/SKD61			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	3.5	20	0.2	0.35	3,000	16,000	0.2	0.35	3,000	16,000	0.2	0.35	3,000	16,000	0.1	0.35	2,400	16,000
		25	0.15	0.3	3,000	16,000	0.15	0.3	3,000	16,000	0.15	0.3	3,000	16,000	0.1	0.3	2,400	16,000
		30	0.12	0.25	2,600	12,000	0.12	0.25	2,600	12,000	0.12	0.25	2,600	12,000	0.08	0.25	2,000	12,000
		35	0.12	0.2	1,800	12,000	0.12	0.2	1,800	12,000	0.12	0.2	1,800	12,000	0.05	0.2	1,500	12,000
	4	10	0.35	0.8	4,000	20,000	0.35	0.8	4,000	20,000	0.35	0.8	4,000	20,000	0.25	0.7	3,400	20,000
		12	0.35	0.7	4,000	20,000	0.35	0.7	4,000	20,000	0.35	0.7	4,000	20,000	0.25	0.7	3,400	20,000
		14	0.3	0.6	4,000	20,000	0.3	0.6	4,000	20,000	0.3	0.6	4,000	20,000	0.2	0.5	3,400	20,000
		15	0.25	0.55	3,500	20,000	0.25	0.55	3,500	20,000	0.25	0.55	3,500	20,000	0.2	0.4	3,000	20,000
		16	0.2	0.5	3,500	20,000	0.2	0.5	3,500	20,000	0.2	0.5	3,500	20,000	0.2	0.3	3,000	20,000
		20	0.2	0.35	3,300	20,000	0.2	0.35	3,300	20,000	0.2	0.35	3,300	20,000	0.15	0.3	2,800	20,000
	5	25	0.15	0.3	2,600	16,000	0.15	0.3	2,600	16,000	0.15	0.3	2,600	16,000	0.12	0.25	2,200	16,000
		30	0.12	0.25	2,600	16,000	0.12	0.25	2,600	16,000	0.12	0.25	2,600	16,000	0.1	0.2	2,200	16,000
		35	0.12	0.2	1,800	14,000	0.12	0.2	1,800	14,000	0.12	0.2	1,800	14,000	0.07	0.15	1,500	14,000
		10	0.4	1.2	4,000	20,000	0.4	1.2	4,000	20,000	0.4	1.2	4,000	20,000	0.3	1	3,400	20,000
		15	0.35	1	4,000	20,000	0.35	1	4,000	20,000	0.35	1	4,000	20,000	0.3	0.9	3,400	20,000
	6	20	0.3	0.7	4,000	20,000	0.3	0.7	4,000	20,000	0.3	0.7	4,000	20,000	0.25	0.7	3,400	20,000
		25	0.25	0.6	3,000	16,000	0.25	0.6	3,000	16,000	0.25	0.6	3,000	16,000	0.2	0.5	2,500	16,000
		30	0.2	0.5	2,400	16,000	0.2	0.5	2,400	16,000	0.2	0.5	2,400	16,000	0.15	0.4	2,000	16,000
		35	0.15	0.4	1,600	14,000	0.15	0.4										



# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALB230  
Model number:IALB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material		고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐(Copper Tungsten)					
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm
2	0.1	0.3	0.003	0.003	60	50,000	0.003	0.003	60	50,000	0.003	0.003	60	50,000	0.005	0.005	80	50,000	
		0.5	0.003	0.003	40	50,000	0.003	0.003	40	50,000	0.003	0.003	40	50,000	0.005	0.005	70	50,000	
	0.15	0.3	0.003	0.005	120	50,000	0.003	0.005	120	50,000	0.003	0.005	120	50,000	0.008	0.01	150	50,000	
		0.5	0.003	0.005	120	50,000	0.003	0.005	120	50,000	0.003	0.005	120	50,000	0.007	0.008	150	50,000	
		1	0.002	0.003	70	50,000	0.002	0.003	70	50,000	0.002	0.003	70	50,000	0.005	0.007	100	50,000	
	0.2	0.5	0.01	0.01	210	50,000	0.01	0.01	210	50,000	0.01	0.01	210	50,000	0.01	0.02	250	50,000	
		0.75	0.005	0.01	210	50,000	0.005	0.01	210	50,000	0.005	0.01	210	50,000	0.01	0.015	250	50,000	
	0.3	0.5	0.01	0.015	210	50,000	0.01	0.015	210	50,000	0.01	0.015	210	50,000	0.012	0.025	250	50,000	
			0.6	0.01	0.015	210	50,000	0.01	0.015	210	50,000	0.01	0.015	210	50,000	0.012	0.025	250	50,000
		0.75	0.007	0.01	210	50,000	0.007	0.01	210	50,000	0.007	0.01	210	50,000	0.01	0.02	250	50,000	
			0.8	0.007	0.01	210	50,000	0.007	0.01	210	50,000	0.007	0.01	210	50,000	0.01	0.02	250	50,000
		1	0.005	0.01	210	50,000	0.005	0.01	210	50,000	0.005	0.01	210	50,000	0.01	0.02	250	50,000	
			1.25	0.005	0.005	210	50,000	0.005	0.005	210	50,000	0.005	0.005	210	50,000	0.008	0.015	250	50,000
		0.4	1.5	0.005	0.005	170	50,000	0.005	0.005	170	50,000	0.005	0.005	170	50,000	0.008	0.015	200	50,000
				1.75	0.005	0.005	170	50,000	0.005	0.005	170	50,000	0.005	0.005	170	50,000	0.008	0.015	200
			2	0.003	0.005	120	50,000	0.003	0.005	120	50,000	0.003	0.005	120	50,000	0.005	0.012	150	50,000
				2.25	0.003	0.005	120	50,000	0.003	0.005	120	50,000	0.003	0.005	120	50,000	0.005	0.012	150
			2.5	0.003	0.003	120	50,000	0.003	0.003	120	50,000	0.003	0.003	120	50,000	0.005	0.01	150	50,000
				2.75	0.003	0.003	120	50,000	0.003	0.003	120	50,000	0.003	0.003	120	50,000	0.005	0.01	150
	0.5	0.5	0.02	0.03	650	50,000	0.02	0.03	650	50,000	0.02	0.03	650	50,000	0.03	0.07	800	50,000	
			0.75	0.02	0.03	650	50,000	0.02	0.03	650	50,000	0.02	0.03	650	50,000	0.03	0.07	800	50,000
		1	0.02	0.03	650	50,000	0.02	0.03	650	50,000	0.02	0.03	650	50,000	0.03	0.07	800	50,000	
			1.2	0.02	0.03	650	50,000	0.02	0.03	650	50,000	0.02	0.03	650	50,000	0.03	0.07	800	50,000
		1.5	0.01	0.02	600	50,000	0.01	0.02	600	50,000	0.01	0.02	600	50,000	0.03	0.05	700	50,000	
2			0.01	0.015	500	50,000	0.01	0.015	500	50,000	0.01	0.015	500	50,000	0.02	0.03	600	50,000	
0.6		2.5	0.01	0.015	380	50,000	0.01	0.015	380	50,000	0.01	0.015	380	50,000	0.02	0.03	450	50,000	
			3	0.01	0.01	340	30,000	0.01	0.01	340	30,000	0.01	0.01	340	30,000	0.015	0.03	400	30,000
		1	0.02	0.05	680	50,000	0.02	0.05	680	50,000	0.02	0.05	680	50,000	0.045	0.07	800	50,000	
			1.5	0.02	0.04	600	50,000	0.02	0.04	600	50,000	0.02	0.04	600	50,000	0.04	0.07	700	50,000
		2.0	0.02	0.03	510	50,000	0.02	0.03	510	50,000	0.02	0.03	510	50,000	0.03	0.06	600	50,000	
			2.5	0.01	0.03	510	50,000	0.01	0.03	510	50,000	0.01	0.03	510	50,000	0.02	0.06	600	50,000
0.7	3	0.01	0.025	420	50,000	0.01	0.025	420	50,000	0.01	0.025	420	50,000	0.02	0.05	500	50,000		
		3.5	0.01	0.02	340	50,000	0.01	0.02	340	50,000	0.01	0.02	340	50,000	0.02	0.045	400	50,000	
	4	0.005	0.01	340	50,000	0.005	0.01	340	50,000	0.005	0.01	340	50,000	0.018	0.03	400	50,000		
		1.0	0.05	0.07	1,000	50,000	0.05	0.07	1,000	50,000	0.05	0.07	1,000	50,000	0.07	0.12	1,200	50,000	
	1.5	0.05	0.07	1,000	50,000	0.05	0.07	1,000	50,000	0.05	0.07	1,000	50,000	0.07	0.12	1,200	50,000		
		2	0.04	0.07	1,000	50,000	0.04	0.07	1,000	50,000	0.04	0.07	1,000	50,000	0.07	0.12	1,200	50,000	
0.8	2.2	0.04	0.07	1,000	50,000	0.04	0.07	1,000	50,000	0.04	0.07	1,000	50,000	0.07	0.12	1,200	50,000		
		2.5	0.03	0.06	1,000	50,000	0.03	0.06	1,000	50,000	0.03	0.06	1,000	50,000	0.05	0.12	1,200	50,000	
	3	0.03	0.06	1,000	50,000	0.03	0.06	1,000	50,000	0.03	0.06	1,000	50,000	0.05	0.12	1,200	50,000		
		3	0.03	0.05	850	50,000	0.03	0.05	850	50,000	0.03	0.05	850	50,000	0.04	0.1	1,000	50,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type A Series

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material		고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐(Copper Tungsten)				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			mm/min	min <sup>-1</sup>			∅p mm	∅e mm			mm/min	min <sup>-1</sup>		
2	0.6	3.5	0.02	0.05	850	50,000	0.02	0.05	850	50,000	0.02	0.05	850	50,000	0.04	0.1	1,000	50,000
		4.0	0.02	0.04	680	50,000	0.02	0.04	680	50,000	0.02	0.04	680	50,000	0.035	0.08	800	50,000
		4.5	0.01	0.03	630	50,000	0.01	0.03	630	50,000	0.01	0.03	630	50,000	0.035	0.08	750	50,000
		5	0.01	0.02	420	30,000	0.01	0.02	420	30,000	0.01	0.02	420	30,000	0.03	0.06	500	30,000
		5.5	0.01	0.01	420	30,000	0.01	0.01	420	30,000	0.01	0.01	420	30,000	0.02	0.03	500	30,000
		6	0.005	0.01	380	30,000	0.005	0.01	380	30,000	0.005	0.01	380	30,000	0.015	0.03	450	30,000
	0.7	2	0.07	0.08	1,300	50,000	0.07	0.08	1,300	50,000	0.07	0.08	1,300	50,000	0.1	0.15	1,500	50,000
		4	0.03	0.06	1,100	50,000	0.03	0.06	1,100	50,000	0.03	0.06	1,100	50,000	0.06	0.12	1,200	50,000
	0.8	6	0.01	0.02	600	30,000	0.01	0.02	600	30,000	0.01	0.02	600	30,000	0.04	0.07	600	30,000
			2.0	0.1	0.12	1,700	50,000	0.1	0.12	1,700	50,000	0.1	0.12	1,700	50,000	0.15	0.2	2,000
		2.2	0.1	0.12	1,700	50,000	0.1	0.12	1,700	50,000	0.1	0.12	1,700	50,000	0.15	0.2	2,000	50,000
			3.0	0.07	0.1	1,500	50,000	0.07	0.1	1,500	50,000	0.07	0.1	1,500	50,000	0.12	0.2	1,800
		4	0.05	0.08	1,300	50,000	0.05	0.08	1,300	50,000	0.05	0.08	1,300	50,000	0.1	0.2	1,500	50,000
			5	0.04	0.07	1,000	50,000	0.04	0.07	1,000	50,000	0.04	0.07	1,000	50,000	0.08	0.15	1,200
	0.9	6	0.03	0.05	750	30,000	0.03	0.05	750	30,000	0.03	0.05	750	30,000	0.03	0.05	750	30,000
			7	0.02	0.03	600	30,000	0.02	0.03	600	30,000	0.02	0.03	600	30,000	0.05	0.08	700
		8	0.01	0.01	420	24,000	0.01	0.01	420	24,000	0.01	0.01	420	24,000	0.02	0.05	500</	



# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALB230  
Model number:IALB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐(Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			ap mm	ae mm			mm/min	min <sup>-1</sup>			ap mm	ae mm			mm/min	min <sup>-1</sup>		
2	1.5	6	0.12	0.2	2,500	30,000	0.12	0.2	2,500	30,000	0.12	0.2	2,500	30,000	0.2	0.45	3,000	30,000
		8.0	0.08	0.18	2,000	30,000	0.08	0.18	2,000	30,000	0.08	0.18	2,000	30,000	0.15	0.4	2,400	30,000
		10.0	0.06	0.12	1,500	30,000	0.06	0.12	1,500	30,000	0.06	0.12	1,500	30,000	0.12	0.3	1,800	30,000
		12	0.05	0.09	1,000	24,000	0.05	0.09	1,000	24,000	0.05	0.09	1,000	24,000	0.1	0.2	1,200	24,000
		14	0.04	0.07	1,000	24,000	0.04	0.07	1,000	24,000	0.04	0.07	1,000	24,000	0.1	0.15	1,200	24,000
		16	0.035	0.06	680	18,000	0.035	0.06	680	18,000	0.035	0.06	680	18,000	0.07	0.12	800	18,000
	1.6	4	0.17	0.25	3,400	24,000	0.17	0.25	3,400	24,000	0.17	0.25	3,400	24,000	0.3	0.45	4,000	24,000
		8	0.09	0.2	2,500	24,000	0.09	0.2	2,500	24,000	0.09	0.2	2,500	24,000	0.15	0.45	3,000	24,000
		12	0.06	0.12	1,500	24,000	0.06	0.12	1,500	24,000	0.06	0.12	1,500	24,000	0.1	0.25	1,800	24,000
		16	0.035	0.07	550	18,000	0.035	0.07	550	18,000	0.035	0.07	550	18,000	0.08	0.15	650	18,000
	1.8	8	0.12	0.2	2,100	20,000	0.12	0.2	2,100	20,000	0.12	0.2	2,100	20,000	0.2	0.45	2,500	20,000
		12.0	0.07	0.15	1,500	16,000	0.07	0.15	1,500	16,000	0.07	0.15	1,500	16,000	0.15	0.3	1,800	16,000
		16	0.06	0.1	1,400	14,000	0.06	0.1	1,400	14,000	0.06	0.1	1,400	14,000	0.12	0.2	1,600	14,000
		20	0.05	0.07	850	12,000	0.05	0.07	850	12,000	0.05	0.07	850	12,000	0.1	0.15	1,000	12,000
	2	3.0	0.2	0.5	3,400	30,000	0.2	0.5	3,400	30,000	0.2	0.5	3,400	30,000	0.45	0.7	4,000	30,000
		4	0.2	0.45	3,400	30,000	0.2	0.45	3,400	30,000	0.2	0.45	3,400	30,000	0.45	0.7	4,000	30,000
		6.0	0.2	0.4	2,500	30,000	0.2	0.4	2,500	30,000	0.2	0.4	2,500	30,000	0.38	0.7	3,000	30,000
		8	0.15	0.3	2,100	20,000	0.15	0.3	2,100	20,000	0.15	0.3	2,100	20,000	0.3	0.45	2,500	20,000
		10	0.1	0.2	2,100	20,000	0.1	0.2	2,100	20,000	0.1	0.2	2,100	20,000	0.23	0.45	2,500	20,000
		12.0	0.1	0.15	1,500	16,000	0.1	0.15	1,500	16,000	0.1	0.15	1,500	16,000	0.2	0.3	1,800	16,000
13		0.08	0.13	1,500	16,000	0.08	0.13	1,500	16,000	0.08	0.13	1,500	16,000	0.2	0.3	1,800	16,000	
14		0.07	0.13	1,500	16,000	0.07	0.13	1,500	16,000	0.07	0.13	1,500	16,000	0.15	0.3	1,800	16,000	
15		0.07	0.13	1,500	16,000	0.07	0.13	1,500	16,000	0.07	0.13	1,500	16,000	0.15	0.3	1,800	16,000	
16		0.06	0.11	1,400	14,000	0.06	0.11	1,400	14,000	0.06	0.11	1,400	14,000	0.15	0.25	1,600	14,000	
2.5	6	0.27	0.35	2,500	20,000	0.27	0.35	2,500	20,000	0.27	0.35	2,500	20,000	0.35	0.8	3,000	20,000	
	8	0.25	0.35	2,500	20,000	0.25	0.35	2,500	20,000	0.25	0.35	2,500	20,000	0.3	0.8	3,000	20,000	
	10	0.25	0.35	2,500	20,000	0.25	0.35	2,500	20,000	0.25	0.35	2,500	20,000	0.3	0.8	3,000	20,000	
	15	0.1	0.2	2,100	20,000	0.1	0.2	2,100	20,000	0.1	0.2	2,100	20,000	0.25	0.45	2,500	20,000	
	20	0.08	0.15	1,500	16,000	0.08	0.15	1,500	16,000	0.08	0.15	1,500	16,000	0.15	0.3	1,800	16,000	
	25	0.05	0.1	1,400	14,000	0.05	0.1	1,400	14,000	0.05	0.1	1,400	14,000	0.1	0.2	1,600	14,000	
3	6	0.25	0.5	3,400	20,000	0.25	0.5	3,400	20,000	0.25	0.5	3,400	20,000	0.5	1	4,000	20,000	
	8	0.2	0.5	3,400	20,000	0.2	0.5	3,400	20,000	0.2	0.5	3,400	20,000	0.45	0.8	4,000	20,000	
	10.0	0.2	0.45	3,400	20,000	0.2	0.45	3,400	20,000	0.2	0.45	3,400	20,000	0.45	0.8	4,000	20,000	
	12	0.2	0.4	2,500	20,000	0.2	0.4	2,500	20,000	0.2	0.4	2,500	20,000	0.3	0.6	3,000	20,000	
	14	0.15	0.35	2,500	20,000	0.15	0.35	2,500	20,000	0.15	0.35	2,500	20,000	0.3	0.6	3,000	20,000	
	15	0.13	0.35	2,500	20,000	0.13	0.35	2,500	20,000	0.13	0.35	2,500	20,000	0.23	0.6	3,000	20,000	
	16	0.13	0.35	2,500	20,000	0.13	0.35	2,500	20,000	0.13	0.35	2,500	20,000	0.23	0.5	3,000	20,000	
	20.0	0.1	0.2	1,500	16,000	0.1	0.2	1,500	16,000	0.1	0.2	1,500	16,000	0.23	0.45	1,800	16,000	
	25	0.1	0.16	1,000	16,000	0.1	0.16	1,000	16,000	0.1	0.16	1,000	16,000	0.2	0.4	1,200	16,000	
	30	0.07	0.12	680	12,000	0.07	0.12	680	12,000	0.07	0.12	680	12,000	0.15	0.3	800	12,000	
3.5	10	0.2	0.6	3,600	20,000	0.2	0.6	3,600	20,000	0.2	0.6	3,600	20,000	0.45	0.8	4,000	20,000	
	15	0.15	0.5	2,400	20,000	0.15	0.5	2,400	20,000	0.15	0.5	2,400	20,000	0.23	0.6	4,000	20,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●공구 홀더는 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●공구 폭 방향, ae 반경 방향. ap=Axial Depth of Cut ae=Radial Depth of Cut. ●공구 폭 방향, ae 반경 방향. ap=Axial Depth of Cut ae=Radial Depth of Cut. ●공구 폭 방향, ae 반경 방향. ap=Axial Depth of Cut ae=Radial Depth of Cut. ●공구 폭 방향, ae 반경 방향. ap=Axial Depth of Cut ae=Radial Depth of Cut.

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			고속도강 High Speed Steels HAP5R/HAP72/ASP23				스테인리스강 Stainless Steels SUS304				스테인리스강 Stainless Steels HPM/STAVAX				동 합금 Copper Alloy 동 텅스텐(Copper Tungsten)			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			ap mm	ae mm			mm/min	min <sup>-1</sup>			ap mm	ae mm			mm/min	min <sup>-1</sup>		
2	3.5	20	0.1	0.35	2,400	16,000	0.1	0.35	2,400	16,000	0.1	0.35	2,400	16,000	0.23	0.45	3,000	16,000
		25	0.1	0.3	2,400	16,000	0.1	0.3	2,400	16,000	0.1	0.3	2,400	16,000	0.2	0.4	3,000	16,000
		30	0.08	0.25	2,000	12,000	0.08	0.25	2,000	12,000	0.08	0.25	2,000	12,000	0.15	0.3	2,600	12,000
		35	0.05	0.2	1,500	12,000	0.05	0.2	1,500	12,000	0.05	0.2	1,500	12,000	0.15	0.3	1,800	12,000
		10	0.25	0.7	3,400	20,000	0.25	0.7	3,400	20,000	0.25	0.7	3,400	20,000	0.55	1.2	4,000	20,000
	4	12	0.25	0.7	3,400	20,000	0.25	0.7	3,400	20,000	0.25	0.7	3,400	20,000	0.53	1	4,000	20,000
		14	0.2	0.5	3,400	20,000	0.2	0.5	3,400	20,000	0.2	0.5	3,400	20,000	0.45	1	4,000	20,000
		15	0.2	0.4	3,000	20,000	0.2	0.4	3,000	20,000	0.2	0.4	3,000	20,000	0.38	0.8	3,500	20,000
		16	0.2	0.3	3,000	20,000	0.2	0.3	3,000	20,000	0.2	0.3	3,000	20,000	0.3	0.8	3,500	20,000
		20	0.15	0.3	2,800	20,000	0.15	0.3	2,800	20,000	0.15	0.3	2,800	20,000	0.3	0.5	3,300	20,000
	5	25	0.12	0.25	2,200	16,000	0.12	0.25	2,200	16,000	0.12	0.25	2,200	16,000	0.23	0.45	2,600	16,000
		30	0.1	0.2	2,200	16,000	0.1	0.2	2,200	16,000	0.1	0.2	2,200	16,000	0.2	0.4	2,600	16,000
		35	0.07	0.15	1,500	14,000	0.07	0.15	1,500	14,000	0.07	0.15	1,500	14,000	0.18	0.3	1,800	14,000
		10	0.3	1	3,400	20,000	0.3	1	3,400	20,000	0.3	1	3,400	20,000	0.6	1.8	4,000	20,000
		15	0.3	0.9	3,400	20,000	0.3	0.9	3,400	20,000	0.3	0.9	3,400	20,000	0.55	1.5	4,000	20,000
	6	20	0.25	0.7	3,400	20,000	0.25	0.7	3,400	20,000	0.25	0.7	3,400	20,000	0.45	1	4,000	20,000
		25	0.2	0.5	2,500	16,000	0.2	0.5	2,500	16,000	0.2	0.5	2,500	16,000	0.38	0.9	3,000	

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALB230  
Model number:IALB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)					
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>		
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm				
2	0.1	0.3	0.005	0.005	80	50,000	0.005	0.005	80	50,000	0.003	0.003	60	50,000		
		0.5	0.005	0.005	70	50,000	0.005	0.005	70	50,000	0.003	0.003	40	50,000		
	0.15	0.3	0.008	0.01	150	50,000	0.008	0.01	150	50,000	0.003	0.005	120	50,000		
		0.5	0.007	0.008	150	50,000	0.007	0.008	150	50,000	0.003	0.005	120	50,000		
		1	0.005	0.007	100	50,000	0.005	0.007	100	50,000	0.002	0.003	70	50,000		
	0.2	0.5	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.01	0.01	210	50,000		
		0.75	0.01	0.015	250	50,000	0.01	0.015	250	50,000	0.005	0.01	210	50,000		
	0.3	0.5	0.012	0.025	250	50,000	0.012	0.025	250	50,000	0.01	0.015	210	50,000		
			0.6	0.012	0.025	250	50,000	0.012	0.025	250	50,000	0.01	0.015	210	50,000	
			0.75	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.007	0.01	210	50,000	
		0.8	1	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.005	0.01	210	50,000	
			1.25	0.008	0.015	250	50,000	0.008	0.015	250	50,000	0.005	0.005	210	50,000	
			1.5	0.008	0.015	200	50,000	0.008	0.015	200	50,000	0.005	0.005	170	50,000	
		0.4	1	1.75	0.008	0.015	200	50,000	0.008	0.015	200	50,000	0.005	0.005	170	50,000
				2	0.005	0.012	150	50,000	0.005	0.012	150	50,000	0.003	0.005	120	50,000
				2.25	0.005	0.012	150	50,000	0.005	0.012	150	50,000	0.003	0.005	120	50,000
			2	2.5	0.005	0.01	150	50,000	0.005	0.01	150	50,000	0.003	0.003	120	50,000
				2.75	0.005	0.01	150	50,000	0.005	0.01	150	50,000	0.003	0.003	120	50,000
				3	0.005	0.007	150	50,000	0.005	0.007	150	50,000	0.003	0.003	120	50,000
	0.5	0.5	0.03	0.07	800	50,000	0.03	0.07	800	50,000	0.02	0.03	650	50,000		
			0.75	0.03	0.07	800	50,000	0.03	0.07	800	50,000	0.02	0.03	650	50,000	
			1	0.03	0.07	800	50,000	0.03	0.07	800	50,000	0.02	0.03	650	50,000	
		1.2	0.03	0.07	800	50,000	0.03	0.07	800	50,000	0.02	0.03	650	50,000		
			1.5	0.03	0.05	700	50,000	0.03	0.05	700	50,000	0.01	0.02	600	50,000	
2			0.02	0.03	600	50,000	0.02	0.03	600	50,000	0.01	0.015	500	50,000		
2.5		0.02	0.03	450	50,000	0.02	0.03	450	50,000	0.01	0.015	380	50,000			
		3	0.015	0.03	400	30,000	0.015	0.03	400	30,000	0.01	0.01	340	30,000		
		3.5	0.015	0.03	400	30,000	0.015	0.03	400	30,000	0.01	0.01	340	30,000		
0.6	1	0.045	0.07	800	50,000	0.045	0.07	800	50,000	0.02	0.05	680	50,000			
		1.5	0.04	0.07	700	50,000	0.04	0.07	700	50,000	0.02	0.04	600	50,000		
		2.0	0.03	0.06	600	50,000	0.03	0.06	600	50,000	0.02	0.03	510	50,000		
	2.5	0.02	0.06	600	50,000	0.02	0.06	600	50,000	0.01	0.03	510	50,000			
		3	0.02	0.05	500	50,000	0.02	0.05	500	50,000	0.01	0.025	420	50,000		
0.7	3.5	0.02	0.045	400	50,000	0.02	0.045	400	50,000	0.01	0.02	340	50,000			
		4	0.018	0.03	400	50,000	0.018	0.03	400	50,000	0.005	0.01	340	50,000		
		1.0	0.07	0.12	1,200	50,000	0.07	0.12	1,200	50,000	0.05	0.07	1,000	50,000		
	1.5	0.07	0.12	1,200	50,000	0.07	0.12	1,200	50,000	0.05	0.07	1,000	50,000			
		2	0.07	0.12	1,200	50,000	0.07	0.12	1,200	50,000	0.04	0.07	1,000	50,000		
		2.2	0.07	0.12	1,200	50,000	0.07	0.12	1,200	50,000	0.04	0.07	1,000	50,000		
		2.5	0.05	0.12	1,200	50,000	0.05	0.12	1,200	50,000	0.03	0.06	1,000	50,000		
0.8	3	0.04	0.1	1,000	50,000	0.04	0.1	1,000	50,000	0.03	0.05	850	50,000			

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 쿨런트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일된 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm			
2	0.6	3.5	0.04	0.1	1,000	50,000	0.04	0.1	1,000	50,000	0.02	0.05	850	50,000	
			4.0	0.035	0.08	800	50,000	0.035	0.08	800	50,000	0.02	0.04	680	50,000
		4.5	0.035	0.08	750	50,000	0.035	0.08	750	50,000	0.01	0.03	630	50,000	
			5	0.03	0.06	500	30,000	0.03	0.06	500	30,000	0.01	0.02	420	30,000
		5.5	0.02	0.03	500	30,000	0.02	0.03	500	30,000	0.01	0.01	420	30,000	
			6	0.015	0.03	450	30,000	0.015	0.03	450	30,000	0.005	0.01	380	30,000
		0.7	2	0.1	0.15	1,500	50,000	0.1	0.15	1,500	50,000	0.07	0.08	1,300	50,000
				4	0.06	0.12	1,200	50,000	0.06	0.12	1,200	50,000	0.03	0.06	1,100
		0.8	6	0.04	0.07	600	30,000	0.04	0.07	600	30,000	0.01	0.02	600	30,000
				2.0	0.15	0.2	2,000	50,000	0.15	0.2	2,000	50,000	0.1	0.12	1,700
			2.2	0.15	0.2	2,000	50,000	0.15	0.2	2,000	50,000	0.1	0.12	1,700	50,000
				3.0	0.12	0.2	1,800	50,000	0.12	0.2	1,800	50,000	0.07	0.1	1,500
	4		0.1	0.2	1,500	50,000	0.1	0.2	1,500	50,000	0.05	0.08	1,300	50,000	
			5	0.08	0.15	1,200	50,000	0.08	0.15	1,200	50,000	0.04	0.07	1,000	50,000
	6		0.07	0.12	900	30,000	0.07	0.12	900	30,000	0.03	0.05	750	30,000	
			7	0.05	0.08	700	30,000	0.05	0.08	700	30,000	0.02	0.03	600	30,000
	8		0.02	0.05	500	24,000	0.02	0.05	500	24,000	0.01	0.01	420	24,000	
			0.9	2	0.2	0.3	2,800	50,000	0.2	0.3	2,800	50,000	0.1	0.2	2,000
	4				0.15	0.25	2,000	50,000	0.15	0.25	2,000	50,000	0.05	0.12	1,500
	1		6	0.1	0.2	1,300	30,000	0.1	0.2	1,300	30,000	0.035	0.05	1,000	30,000
		8		0.055	0.08	800	30,000	0.055	0.08	800	30,000	0.025	0.04	700	30,000
		2	0.25	0.4	3,500	50,000	0.25	0.4	3,500	50,000	0.12	0.3	2,500	50,000	
			2.5	0.25	0.4	3,200	50,000	0.25	0.4	3,200	50,000	0.12	0.3	2,500	50,000
		3	0.25	0.4	3,000	50,000	0.25	0.4	3,000	50,000	0.12	0.3	2,500	50,000	
			4	0.2	0.4	2,500	50,000	0.2	0.4	2,500	50,000	0.1	0.2	2,100	50,000
		6.0	0.15	0.3	1,500	50,000	0.15	0.3	1,500	50,000	0.07	0.12	1,200	50,000	
			7	0.12	0.3	1,300	30,000	0.12	0.3	1,300	30,000	0.06	0.1	1,100	30,000
		8	0.08	0.15	1,200	30,000	0.08	0.15	1,200	30,000	0.05	0.08	1,000	30,000	
			9.0	0.06	0.1	1,000	30,000	0.06	0.1	1,000	30,000	0.05	0.05	850	30,000
		10	0.05	0.08	800	30,000	0.05	0.08	800	30,000	0.03	0.05	680	30,000	
			12	0.02	0.04	600	20,000	0.02	0.04	600	20,000	0.01	0.03	510	20,000
	1.2	2.4	0.3	0.45	3,400	30,000	0.3	0.45	3,400	30,000	0.12	0.3	2,500	30,000	
			4	0.28	0.45	3,000	30,000	0.28	0.45	3,000	30,000	0.12	0.3	2,500	30,000
		6	0.15	0.4	2,000	30,000	0.15	0.4	2,000	30,000	0.08	0.17	1,700	30,000	
			8	0.12	0.3	1,300	30,000	0.12	0.3	1,300	30,000	0.06			

# ion Depo Type A Series

# ion Depo Type A Series

ion Depo Type A 추천 절삭 조건표  
Recommended Milling Conditions

■형번:IALB230  
Model number:IALB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material		알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)					
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm			
2	1.5	6	0.2	0.45	3,000	30,000	0.2	0.45	3,000	30,000	0.12	0.2	2,500	30,000	
		8.0	0.15	0.4	2,400	30,000	0.15	0.4	2,400	30,000	0.08	0.18	2,000	30,000	
		10.0	0.12	0.3	1,800	30,000	0.12	0.3	1,800	30,000	0.06	0.12	1,500	30,000	
		12	0.1	0.2	1,200	24,000	0.1	0.2	1,200	24,000	0.05	0.09	1,000	24,000	
		14	0.1	0.15	1,200	24,000	0.1	0.15	1,200	24,000	0.04	0.07	1,000	24,000	
		16	0.07	0.12	800	18,000	0.07	0.12	800	18,000	0.035	0.06	680	18,000	
	1.6	4	0.3	0.45	4,000	24,000	0.3	0.45	4,000	24,000	0.17	0.25	3,400	24,000	
		8	0.15	0.45	3,000	24,000	0.15	0.45	3,000	24,000	0.09	0.2	2,500	24,000	
		12	0.1	0.25	1,800	24,000	0.1	0.25	1,800	24,000	0.06	0.12	1,500	24,000	
		16	0.08	0.15	650	18,000	0.08	0.15	650	18,000	0.035	0.07	550	18,000	
	1.8	8	0.2	0.45	2,500	20,000	0.2	0.45	2,500	20,000	0.12	0.2	2,100	20,000	
		12.0	0.15	0.3	1,800	16,000	0.15	0.3	1,800	16,000	0.07	0.15	1,500	16,000	
	2	2	3.0	0.45	0.7	4,000	30,000	0.45	0.7	4,000	30,000	0.2	0.5	3,400	30,000
			4	0.45	0.7	4,000	30,000	0.45	0.7	4,000	30,000	0.2	0.45	3,400	30,000
			6.0	0.38	0.7	3,000	30,000	0.38	0.7	3,000	30,000	0.2	0.4	2,500	30,000
			8	0.3	0.45	2,500	20,000	0.3	0.45	2,500	20,000	0.15	0.3	2,100	20,000
			10	0.23	0.45	2,500	20,000	0.23	0.45	2,500	20,000	0.1	0.2	2,100	20,000
			12.0	0.2	0.3	1,800	16,000	0.2	0.3	1,800	16,000	0.1	0.15	1,500	16,000
		2.5	13	0.2	0.3	1,800	16,000	0.2	0.3	1,800	16,000	0.08	0.13	1,500	16,000
			14	0.15	0.3	1,800	16,000	0.15	0.3	1,800	16,000	0.07	0.13	1,500	16,000
15			0.15	0.3	1,800	16,000	0.15	0.3	1,800	16,000	0.07	0.13	1,500	16,000	
16			0.15	0.25	1,600	14,000	0.15	0.25	1,600	14,000	0.06	0.11	1,400	14,000	
18			0.1	0.2	1,600	14,000	0.1	0.2	1,600	14,000	0.05	0.1	1,400	14,000	
20			0.1	0.15	1,000	12,000	0.1	0.15	1,000	12,000	0.05	0.07	850	12,000	
3	6	0.35	0.8	3,000	20,000	0.35	0.8	3,000	20,000	0.27	0.35	2,500	20,000		
	8	0.3	0.8	3,000	20,000	0.3	0.8	3,000	20,000	0.25	0.35	2,500	20,000		
	10	0.3	0.8	3,000	20,000	0.3	0.8	3,000	20,000	0.25	0.35	2,500	20,000		
	15	0.25	0.45	2,500	20,000	0.25	0.45	2,500	20,000	0.1	0.2	2,100	20,000		
	20	0.15	0.3	1,800	16,000	0.15	0.3	1,800	16,000	0.08	0.15	1,500	16,000		
	6	0.5	1	4,000	20,000	0.5	1	4,000	20,000	0.25	0.5	3,400	20,000		
3.5	8	0.45	0.8	4,000	20,000	0.45	0.8	4,000	20,000	0.2	0.5	3,400	20,000		
	10.0	0.45	0.8	4,000	20,000	0.45	0.8	4,000	20,000	0.2	0.45	3,400	20,000		
	12	0.3	0.6	3,000	20,000	0.3	0.6	3,000	20,000	0.2	0.4	2,500	20,000		
	14	0.3	0.6	3,000	20,000	0.3	0.6	3,000	20,000	0.15	0.35	2,500	20,000		
	15	0.23	0.6	3,000	20,000	0.23	0.6	3,000	20,000	0.13	0.35	2,500	20,000		
	16	0.23	0.5	3,000	20,000	0.23	0.5	3,000	20,000	0.13	0.35	2,500	20,000		
	20.0	0.23	0.45	1,800	16,000	0.23	0.45	1,800	16,000	0.1	0.2	1,500	16,000		
	25	0.2	0.4	1,200	16,000	0.2	0.4	1,200	16,000	0.1	0.16	1,000	16,000		
10	0.45	0.8	4,000	20,000	0.45	0.8	4,000	20,000	0.2	0.45	3,400	20,000			
15	0.23	0.6	4,000	20,000	0.23	0.6	4,000	20,000	0.13	0.35	2,500	20,000			

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material		알루미늄 합금 Aluminum Alloy A5000번				알루미늄 합금 Aluminum Alloy A7000번				내열 합금 Heat Resistant Alloy 티타늄 합금(Titanium Alloy)				
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	3.5	20	0.23	0.45	3,000	16,000	0.23	0.45	3,000	16,000	0.1	0.2	2,000	16,000
		25	0.2	0.4	3,000	16,000	0.2	0.4	3,000	16,000	0.1	0.16	1,500	16,000
		30	0.15	0.3	2,600	12,000	0.15	0.3	2,600	12,000	0.07	0.15	1,200	12,000
		35	0.15	0.3	1,800	12,000	0.15	0.3	1,800	12,000	0.05	0.12	1,000	12,000
	4	10	0.55	1.2	4,000	20,000	0.55	1.2	4,000	20,000	0.25	0.7	3,400	20,000
		12	0.53	1	4,000	20,000	0.53	1	4,000	20,000	0.25	0.7	3,400	20,000
		14	0.45	1	4,000	20,000	0.45	1	4,000	20,000	0.2	0.5	3,400	20,000
		15	0.38	0.8	3,500	20,000	0.38	0.8	3,500	20,000	0.2	0.4	3,000	20,000
		16	0.3	0.8	3,500	20,000	0.3	0.8	3,500	20,000	0.2	0.3	3,000	20,000
		20	0.3	0.5	3,300	20,000	0.3	0.5	3,300	20,000	0.15	0.3	2,800	20,000
	5	25	0.23	0.45	2,600	16,000	0.23	0.45	2,600	16,000	0.12	0.25	2,200	16,000
		30	0.2	0.4	2,600	16,000	0.2	0.4	2,600	16,000	0.1	0.2	2,200	16,000
		35	0.18	0.3	1,800	14,000	0.18	0.3	1,800	14,000	0.07	0.15	1,500	14,000
		10	0.6	1.8	4,000	20,000	0.6	1.8	4,000	20,000	0.3	1	3,400	20,000
		15	0.55	1.5	4,000	20,000	0.55	1.5	4,000	20,000	0.3	0.9	3,400	20,000
		20	0.45	1	4,000	20,000	0.45	1	4,000	20,000	0.25	0.7	3,400	20,000
		25	0.38	0.9	3,000	16,000	0.38	0.9	3,000	16,000	0.2	0.5	2,500	16,000
		30	0.3	0.8	2,400	16,000	0.3	0.8	2,400	16,000	0.15	0.4	2,000	16,000
	6	35	0.23	0.6	1,600	14,000	0.23	0.6	1,600	14,000	0.15	0.3	1,400	14,000
		40	0.23	0.45	1,200	12,000	0.23	0.45	1,200	12,000	0.12	0.2	1,000	12,000
10.0		0.75	2.3	4,000	18,000	0.75	2.3	4,000	18,000	0.35	1.2	3,400	18,000	
15		0.75	2	4,000	18,000	0.75	2	4,000	18,000	0.35	1.2	3,400	18,000	
20		0.75	1.8	4,000	18,000	0.75	1.8	4,000	18,000	0.35	1.1	3,400	18,000	
25		0.6	1.5	4,000	18,000	0.6	1.5	4,000	18,000	0.3	0.8	3,400	18,000	
30.0		0.53	1	3,000	12,000	0.53	1	3,000	12,000	0.25	0.6	2,500	12,000	
35		0.53	0.8	2,500	12,000	0.53	0.8	2,500	12,000	0.2	0.5	2,100	12,000	
40		0.38	0.6	2,300	12,000	0.38	0.6	2,300	12,000	0.2	0.4	1,900	12,000	
45.0		0.38	0.6	1,500	8,000	0.38	0.6	1,500	8,000	0.2	0.35	1,200	8,000	
50.0	0.3	0.6	1,500	8,000	0.3	0.6	1,500	8,000	0.2	0.3	1,200	8,000		

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●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

## 초경 엔드밀 Carbide End Mill



### 특징

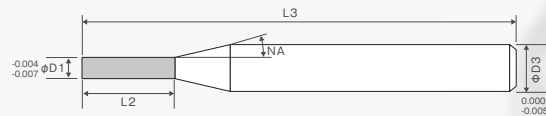
- 이온 플레이팅 방식의 코팅 ion Depo Type U는 고경도재 가공에 최적!
- 내열성이 뛰어난 코팅으로 황삭 가공부터 정삭가공까지 모든 가공에 대응!
- 당사 독자적인 재연마, 재코팅 기술에 의해 성능 노화를 억제하여 한층 더 원가 절감에 공헌!
- 표준품 외 특별 주문품도 단납기에 제공 가능!

### Features

- ion Depo Type U plating for high hardness materials.
- Heat resistance coating supports all processing from roughing to finishing.
- TOWA re-polishing and re-coating technology enhances cutting tool life and reduces overall tooling cost.
- Non-standard custom-made products available.

## 초경 스퀘어 엔드밀 Carbide Square End Mill

■ 형번: IUS230 Model number: IUS230



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의에 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IUS230-0010-00020	0.1	0.2	15	4	50	5,760
IUS230-0020-00040	0.2	0.4	15	4	50	3,680
IUS230-0030-00060	0.3	0.6	15	4	50	2,880
IUS230-0040-00080	0.4	0.8	15	4	50	3,360
IUS230-0050-00100	0.5	1	15	4	50	2,000
IUS230-0060-00120	0.6	1.2	15	4	50	2,800
IUS230-0070-00140	0.7	1.4	15	4	50	3,040
IUS230-0080-00160	0.8	1.6	15	4	50	2,000
IUS230-0090-00180	0.9	1.8	15	4	50	3,040
IUS230-0100-00200	1	2	15	4	50	1,760
IUS230-0110-00220	1.1	2.2	15	4	50	3,120
IUS230-0120-00240	1.2	2.4	15	4	50	2,000
IUS230-0130-00260	1.3	2.6	15	4	50	3,120
IUS230-0140-00280	1.4	2.8	15	4	50	3,120
IUS230-0150-00300	1.5	3	15	4	50	1,840
IUS230-0160-00320	1.6	3.2	15	4	50	3,120
IUS230-0170-00340	1.7	3.4	15	4	50	3,120
IUS230-0180-00360	1.8	3.6	15	4	50	2,000
IUS230-0190-00380	1.9	3.8	15	4	50	3,120
IUS230-0200-00400	2	4	15	4	50	1,840
IUS230-0210-00420	2.1	4.2	15	4	50	3,120
IUS230-0220-00440	2.2	4.4	15	4	50	3,120
IUS230-0230-00460	2.3	4.6	15	4	50	3,120
IUS230-0240-00480	2.4	4.8	15	4	50	3,120
IUS230-0250-00500	2.5	5	15	4	50	1,840
IUS230-0260-00520	2.6	5.2	15	4	50	4,000
IUS230-0270-00540	2.7	5.4	15	4	50	4,000
IUS230-0280-00560	2.8	5.6	15	4	50	4,000
IUS230-0290-00580	2.9	5.8	15	4	50	4,000
IUS230-0300-00600	3	6	15	4	50	2,320
IUS230-0350-00700	3.5	7	15	6	50	3,520
IUS230-0400-00800	4	8	15	6	50	2,560
IUS230-0450-00900	4.5	9	15	6	50	4,000
IUS230-0500-01000	5	10	15	6	50	2,720
IUS230-0550-01100	5.5	11	15	6	50	4,000
IUS230-0600-01200	6	12	-	6	50	2,960

CBN Series, Hard Star A Series, Hard Star TT Series, Hard Star TT Series, ion Depo A Series, ion Depo U Series, DLC Series, Non-Coat Series, ion Depo R Series



ion Depo Type U 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IUS230  
Model number: IUS230

스퀘어 엔드밀 Square End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.1	0.2	0.003	0.05	130	40,000	0.002	0.04	100	40,000	0.002	0.03	70	40,000
	0.2	0.4	0.003	0.1	200	30,000	0.003	0.08	160	30,000	0.003	0.06	120	30,000
	0.3	0.6	0.003	0.15	300	30,000	0.003	0.12	250	30,000	0.003	0.09	200	30,000
	0.4	0.8	0.005	0.2	370	30,000	0.005	0.16	340	30,000	0.005	0.12	260	25,000
	0.5	1	0.01	0.25	450	25,000	0.007	0.2	400	23,000	0.005	0.15	360	20,000
	0.6	1.2	0.01	0.3	530	25,000	0.007	0.25	430	23,000	0.005	0.18	380	20,000
	0.7	1.4	0.03	0.35	650	25,000	0.02	0.28	500	23,000	0.012	0.21	450	20,000
	0.8	1.6	0.03	0.4	780	25,000	0.02	0.32	650	23,000	0.012	0.24	550	20,000
	0.9	1.8	0.03	0.4	800	25,000	0.02	0.32	700	23,000	0.012	0.24	600	20,000
	1	2	0.05	0.5	1,000	23,000	0.04	0.4	900	18,000	0.03	0.3	600	14,000
	1.1	2.2	0.05	0.5	1,000	23,000	0.04	0.4	900	18,000	0.03	0.3	600	14,000
	1.2	2.4	0.05	0.5	1,000	23,000	0.04	0.4	900	18,000	0.03	0.3	600	14,000
	1.3	2.6	0.05	0.5	1,000	23,000	0.04	0.4	900	18,000	0.03	0.3	600	14,000
	1.4	2.8	0.05	0.5	1,000	23,000	0.04	0.4	900	18,000	0.03	0.3	600	14,000
	1.5	3	0.05	0.75	900	20,000	0.04	0.6	800	18,000	0.03	0.45	600	14,000
	1.6	3.2	0.05	0.75	900	20,000	0.04	0.6	800	18,000	0.03	0.45	600	14,000
	1.7	3.4	0.05	0.75	900	20,000	0.04	0.6	800	18,000	0.03	0.45	600	14,000
	1.8	3.6	0.05	0.75	900	20,000	0.04	0.6	800	18,000	0.03	0.45	600	14,000
	1.9	3.8	0.05	0.75	900	20,000	0.04	0.6	800	18,000	0.03	0.45	600	14,000
	2	4	0.08	1	900	18,000	0.06	0.8	750	15,000	0.04	0.6	550	12,000
	2.1	4.2	0.08	1	900	18,000	0.06	0.8	750	15,000	0.04	0.6	550	12,000
	2.2	4.4	0.08	1	900	18,000	0.06	0.8	750	15,000	0.04	0.6	550	12,000
	2.3	4.6	0.08	1	900	18,000	0.06	0.8	750	15,000	0.04	0.6	550	12,000
	2.4	4.8	0.08	1	900	18,000	0.06	0.8	750	15,000	0.04	0.6	550	12,000
2.5	5	0.07	1.25	800	14,000	0.05	1	700	10,000	0.03	0.75	500	8,000	
2.6	5.2	0.07	1.25	800	14,000	0.05	1	700	10,000	0.03	0.75	500	8,000	
2.7	5.4	0.07	1.25	800	14,000	0.05	1	700	10,000	0.03	0.75	500	8,000	
2.8	5.6	0.07	1.25	800	14,000	0.05	1	700	10,000	0.03	0.75	500	8,000	
2.9	5.8	0.07	1.25	800	14,000	0.05	1	700	10,000	0.03	0.75	500	8,000	
3	6	0.1	1.5	850	14,000	0.07	1.2	750	10,000	0.05	0.9	550	8,000	
3.5	7	0.1	1.5	850	14,000	0.07	1.2	750	10,000	0.05	0.9	550	8,000	
4	8	0.1	2	850	10,000	0.07	1.8	750	9,000	0.05	1.5	650	9,000	
4.5	9	0.1	2	850	10,000	0.07	1.8	750	9,000	0.05	1.5	650	9,000	
5	10	0.1	2.5	800	6,000	0.07	2.3	700	5,000	0.06	2	600	4,500	
5.5	11	0.1	2.5	800	6,000	0.07	2.3	700	5,000	0.06	2	600	4,500	
6	12	0.12	3	800	5,000	0.09	2.8	700	4,000	0.08	2.5	700	3,500	

●공구는 볼더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입량은, 장삭 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 쿨런트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 뿔끝은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series

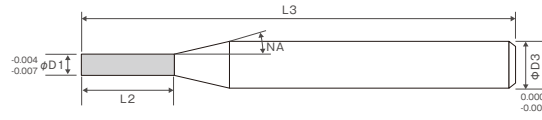


# ion Depo Type U Series

초경 스퀘어 엔드밀 Carbide Square End Mill

■형번: IUS430 Model number: IUS430

ion U super MG 4 날수 30° 벨리스각 목각 15° Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) <sup>*)</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IUS430-0100-00200	1	2	15	4	50	5,040
IUS430-0150-00300	1.5	3	15	4	50	5,040
IUS430-0200-00400	2	4	15	4	50	5,040
IUS430-0300-00600	3	6	15	4	50	5,840
IUS430-0400-00800	4	8	15	6	50	6,320
IUS430-0600-01200	6	12	—	6	60	6,640
IUS430-0600-01800		18	—	6	60	7,120
IUS430-0800-01600	8	16	—	8	70	9,920
IUS430-0800-02400		24	—	8	70	11,040
IUS430-1000-02000	10	20	—	10	80	15,520
IUS430-1000-03000		30	—	10	80	16,000
IUS430-1200-02400	12	24	—	12	110	19,600
IUS430-1200-03600		36	—	12	110	20,320
IUS430-1400-03500	14	35	—	14	120	11,760
IUS430-1600-04000	16	40	—	16	130	18,080
IUS430-1800-04500	18	45	—	18	140	21,040
IUS430-2000-05000	20	50	—	20	140	26,400

# ion Depo Type U Series

ion Depo Type U 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IUS430  
Model number: IUS430

스퀘어 엔드밀 Square End Mill

피삭재 Work Material	고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)						고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
	날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				∂p mm	∂e mm			∂p mm	∂e mm			∂p mm	∂e mm		
4	1	2	1.5	0.03	800	30,000	1.5	0.02	500	25,000	1.5	0.02	240	20,000	
	1.5	3	2.2	0.045	860	20,000	2.2	0.03	560	16,000	2.2	0.03	330	14,000	
	2	4	3	0.06	920	15,000	3	0.04	630	12,000	3	0.04	480	10,000	
	3	6	4.5	0.09	1,000	10,000	4.5	0.06	700	8,000	4.5	0.06	560	7,000	
	4	8	6	0.12	1,200	8,500	6	0.08	800	7,000	6	0.08	600	6,000	
	6	12	9	0.18	1,200	6,400	9	0.12	1000	5,300	9	0.12	600	4,600	
		18	9	0.12	1,000	5,800	9	0.09	900	4,800	9	0.09	450	4,200	
	8	16	12	0.24	1,300	4,800	12	0.16	900	4,000	12	0.16	650	3,400	
		24	12	0.2	1,000	4,300	12	0.12	700	3,600	12	0.12	500	3,000	
	10	20	15	0.3	1,300	3,800	15	0.2	900	3,200	15	0.2	650	2,600	
		30	15	0.25	1,000	3,400	15	0.15	700	2,800	15	0.15	500	2,300	
	12	24	18	0.36	1,300	3,200	18	0.24	900	2,600	18	0.24	650	2,200	
		36	18	0.3	1,000	2,800	18	0.18	700	2,300	18	0.18	500	2,000	
	14	35	21	0.35	700	2,400	21	0.28	550	2,400	21	0.28	500	2,400	
	16	40	24	0.4	600	2,100	24	0.32	450	2,100	24	0.32	400	2,100	
	18	45	27	0.45	550	1,800	27	0.36	400	1,800	27	0.36	350	1,800	
20	50	30	0.5	500	1,600	30	0.4	350	1,600	30	0.4	300	1,600		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절입량은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.

●오일 미스트 분사 또는 물수용성 절삭유를 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 절삭 가공을 행하는 경우의 최대치입니다. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

●∂p: 축 방향, ∂e: 반경 방향. ∂p=Axial Depth of Cut ∂e=Radial Depth of Cut.

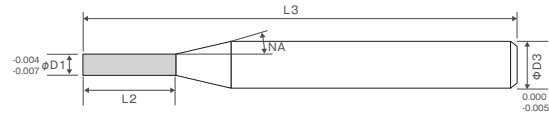
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type U Series

초경 스퀘어 엔드밀 Carbide Square End Mill

■형번: IUS630 Model number: IUS630

ion U super MG 날수 6 벨리스각 30° 목각 15° Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) <sup>*)</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IUS630-0500-01000	5	10	15	6	50	6,720
IUS630-0500-01500		15	15	6	50	7,440
IUS630-0600-01200	6	12	—	6	50	7,280
IUS630-0600-01800		18	—	6	60	8,080
IUS630-0800-01600	8	16	—	8	70	9,920
IUS630-0800-02400		24	—	8	70	11,040
IUS630-1000-02000	10	20	—	10	80	13,200
IUS630-1000-03000		30	—	10	80	14,720
IUS630-1200-02400	12	24	—	12	110	16,880
IUS630-1200-03600		36	—	12	110	18,720
IUS630-1400-03500	14	35	—	14	120	12,800
IUS630-1600-04000	16	40	—	16	130	22,320
IUS630-1800-04500	18	45	—	18	140	25,280
IUS630-2000-05000	20	50	—	20	140	28,000

# ion Depo Type U Series

ion Depo Type U 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IUS630  
Model number: IUS630

스퀘어 엔드밀 Square End Mill

날수 Number of Flutes	외경 Dia.	날장 Length of cut	고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
			Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>
6	5	10	7.5	0.15	1,600	7,600	7.5	0.1	1,200	6,200	7.5	0.1	800	5,300
		15	7.5	0.1	1,400	6,800	7.5	0.07	1,000	5,600	7.5	0.07	600	4,800
	6	12	9	0.18	1,800	6,400	9	0.12	1,200	5,300	9	0.12	800	4,600
		18	9	0.12	1,600	5,800	9	0.09	1,000	4,800	9	0.09	600	4,200
	8	16	12	0.24	2,000	4,800	12	0.16	1,400	4,000	12	0.16	1,000	3,400
		24	12	0.2	1,800	4,300	12	0.12	1,200	3,600	12	0.12	800	3,000
	10	20	15	0.3	2,000	3,800	15	0.2	1,600	3,200	15	0.2	1,000	2,600
		30	15	0.25	1,800	3,400	15	0.15	1,400	2,800	15	0.15	800	2,300
	12	24	18	0.36	2,000	3,200	18	0.24	1,600	2,600	18	0.24	1,000	2,200
		36	18	0.3	1,800	2,800	18	0.18	1,400	2,300	18	0.18	800	2,000
	14	35	21	0.35	1,000	2,400	21	0.28	830	2,400	21	0.28	750	2,400
	16	40	24	0.4	900	2,100	24	0.32	670	2,100	24	0.32	600	2,100
18	45	27	0.45	820	1,800	27	0.36	600	1,800	27	0.36	530	1,800	
20	50	30	0.5	750	1,600	30	0.4	520	1,600	30	0.4	450	1,600	

●공구는 홀더에 확실하게 고정시키고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량, 정삭 기준을 설정하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.

●오일 미스트 분사 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 출몰은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.

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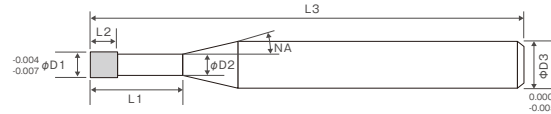
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type U Series

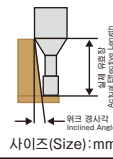
초경 롱 넥 스퀘어 엔드밀  
Carbide Long Neck Square End Mill

ion U super MG 날수 2 벨릭스각 30° 목각 15° Shank 0/-0.005

■형번: IULS230 Model number: IULS230



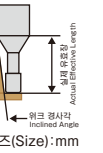
표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

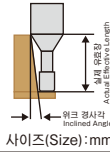
코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
IULS230-0010-0030	0.1	0.3	0.08	0.08	15	4	50	8,400	0.35	0.36	0.37	0.39	0.42
IULS230-0010-0050		0.5	0.08	0.08	15	4	50	9,120	0.56	0.57	0.60	0.62	0.67
IULS230-0015-0030	0.15	0.3	0.12	0.13	15	4	50	11,200	0.35	0.36	0.37	0.39	0.42
IULS230-0015-0050		0.5	0.12	0.13	15	4	50	8,400	0.56	0.57	0.60	0.62	0.67
IULS230-0020-0050	0.2	0.5	0.15	0.18	15	4	50	10,000	0.56	0.57	0.60	0.62	0.67
IULS230-0020-0075		0.75	0.15	0.18	15	4	50	5,760	0.81	0.84	0.87	0.91	0.98
IULS230-0020-0100		1	0.15	0.18	15	4	50	5,920	1.07	1.11	1.15	1.19	1.29
IULS230-0030-0100	0.3	1	0.25	0.27	15	4	50	8,800	1.09	1.13	1.17	1.21	1.31
IULS230-0030-0150		1.5	0.25	0.27	15	4	50	5,040	1.61	1.66	1.72	1.79	1.93
IULS230-0030-0200		2	0.25	0.27	15	4	50	5,040	2.13	2.20	2.28	2.36	2.56
IULS230-0030-0250	0.4	2.5	0.25	0.27	15	4	50	6,240	2.64	2.73	2.83	2.94	3.18
IULS230-0030-0300		3	0.25	0.27	15	4	50	6,480	3.16	3.27	3.39	3.51	3.80
IULS230-0040-0100		1	0.3	0.37	15	4	50	6,480	1.09	1.13	1.17	1.21	1.31
IULS230-0040-0150	0.4	1.5	0.3	0.37	15	4	50	3,680	1.61	1.66	1.72	1.79	1.93
IULS230-0040-0200		2	0.3	0.37	15	4	50	3,680	2.13	2.20	2.28	2.36	2.56
IULS230-0040-0250		2.5	0.3	0.37	15	4	50	3,680	2.64	2.73	2.83	2.94	3.18
IULS230-0040-0300	0.5	3	0.3	0.37	15	4	50	3,680	3.16	3.27	3.39	3.51	3.80
IULS230-0050-0100		1	0.4	0.47	15	4	50	2,640	1.09	1.13	1.17	1.21	1.31
IULS230-0050-0150		1.5	0.4	0.47	15	4	50	2,640	1.61	1.66	1.72	1.79	1.93
IULS230-0050-0200	0.5	2	0.4	0.47	15	4	50	2,640	2.13	2.20	2.28	2.36	2.56
IULS230-0050-0250		2.5	0.4	0.47	15	4	50	2,640	2.64	2.73	2.83	2.94	3.18
IULS230-0050-0300		3	0.4	0.47	15	4	50	2,640	3.16	3.27	3.39	3.51	3.80
IULS230-0050-0350	0.6	3.5	0.4	0.47	15	4	50	2,640	3.68	3.80	3.94	4.09	4.42
IULS230-0050-0400		4	0.4	0.47	15	4	50	2,640	4.19	4.34	4.50	4.66	5.04
IULS230-0060-0150		1.5	0.5	0.57	15	4	50	2,800	1.61	1.66	1.72	1.79	1.93
IULS230-0060-0200	0.6	2	0.5	0.57	15	4	50	2,800	2.13	2.20	2.28	2.36	2.56
IULS230-0060-0300		3	0.5	0.57	15	4	50	2,800	3.16	3.27	3.39	3.51	3.80
IULS230-0060-0400		4	0.5	0.57	15	4	50	2,800	4.19	4.34	4.50	4.66	5.04
IULS230-0060-0500	0.6	5	0.5	0.57	15	4	50	2,800	5.23	5.41	5.60	5.81	6.29
IULS230-0060-0600		6	0.5	0.57	15	4	50	2,800	6.26	6.48	6.71	6.96	7.53

# ion Depo Type U Series



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코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
IULS230-0070-0200	0.7	2	0.55	0.67	15	4	50	3,200	2.13	2.20	2.28	2.36	2.56
IULS230-0070-0400		4	0.55	0.67	15	4	50	3,200	4.19	4.34	4.50	4.66	5.04
IULS230-0070-0600		6	0.55	0.67	15	4	50	3,200	6.26	6.48	6.71	6.96	7.53
IULS230-0080-0300	0.8	3	0.65	0.77	15	4	50	3,120	3.16	3.27	3.39	3.51	3.80
IULS230-0080-0400		4	0.65	0.77	15	4	50	3,120	4.19	4.34	4.50	4.66	5.04
IULS230-0080-0500		5	0.65	0.77	15	4	50	3,120	5.23	5.41	5.60	5.81	6.29
IULS230-0080-0600		6	0.65	0.77	15	4	50	3,120	6.26	6.48	6.71	6.96	7.53
IULS230-0080-0800	1	8	0.65	0.77	15	4	50	3,120	8.33	8.62	8.93	9.26	10.01
IULS230-0100-0200		2	0.8	0.95	15	4	50	2,800	2.16	2.24	2.32	2.41	2.60
IULS230-0100-0300		3	0.8	0.95	15	4	50	2,800	3.20	3.31	3.43	3.56	3.85
IULS230-0100-0400		4	0.8	0.95	15	4	50	2,800	4.23	4.38	4.54	4.71	5.09
IULS230-0100-0500		5	0.8	0.95	15	4	50	2,800	5.26	5.45	5.64	5.86	6.33
IULS230-0100-0600		6	0.8	0.95	15	4	50	2,800	6.30	6.52	6.75	7.01	7.57
IULS230-0100-0700		7	0.8	0.95	15	4	50	2,800	7.33	7.59	7.86	8.16	8.82
IULS230-0100-0800		8	0.8	0.95	15	4	50	2,800	8.37	8.66	8.97	9.31	10.06
IULS230-0100-0900	1.2	9	0.8	0.95	15	4	50	2,800	9.40	9.73	10.08	10.46	11.30
IULS230-0100-1000		10	0.8	0.95	15	4	50	2,800	10.43	10.80	11.19	11.61	12.55
IULS230-0100-1200		12	0.8	0.95	15	4	50	2,800	12.50	12.94	13.40	13.91	15.03
IULS230-0120-0600	1.4	6	1	1.15	15	4	50	2,960	6.30	6.52	6.75	7.01	7.57
IULS230-0120-0800		8	1	1.15	15	4	50	2,960	8.37	8.66	8.97	9.31	10.06
IULS230-0120-1000		10	1	1.15	15	4	50	2,960	10.43	10.80	11.19	11.61	12.55
IULS230-0120-1200		12	1	1.15	15	4	50	2,960	12.50	12.94	13.40	13.91	15.03
IULS230-0120-1600	1.5	16	1	1.15	15	4	50	4,720	16.64	17.21	17.84	18.50	20.01
IULS230-0140-0600		6	1.1	1.35	15	4	50	3,040	6.30	6.52	6.75	7.01	7.57
IULS230-0140-1200		12	1.1	1.35	15	4	50	3,040	12.50	12.94	13.40	13.91	15.03
IULS230-0150-0400	1.6	4	1.2	1.45	15	4	50	2,960	4.23	4.38	4.54	4.71	5.09
IULS230-0150-0600		6	1.2	1.45	15	4	50	2,960	6.30	6.52	6.75	7.01	7.57
IULS230-0150-0800		8	1.2	1.45	15	4	50	2,960	8.37	8.66	8.97	9.31	10.06
IULS230-0150-1000		10	1.2	1.45	15	4	50	2,960	10.43	10.80	11.19	11.61	12.55
IULS230-0150-1200	1.8	12	1.2	1.45	15	4	50	2,960	12.50	12.94	13.40	13.91	15.03
IULS230-0150-1400		14	1.2	1.45	15	4	50	3,040	14.57	15.08	15.62	16.21	17.52
IULS230-0150-1600		16	1.2	1.45	15	4	50	3,040	16.64	17.21	17.84	18.50	20.01
IULS230-0160-0600	2	6	1.3	1.55	15	4	50	3,040	6.30	6.52	6.75	7.01	7.57
IULS230-0160-0800		8	1.3	1.55	15	4	50	3,040	8.37	8.66	8.97	9.31	10.06
IULS230-0180-0600		6	1.4	1.75	15	4	50	3,040	6.30	6.52	6.75	7.01	7.57
IULS230-0180-0800		8	1.4	1.75	15	4	50	3,040	8.37	8.66	8.97	9.31	10.06
IULS230-0180-1000	2	10	1.4	1.75	15	4	50	3,040	10.43	10.80	11.19	11.61	12.55
IULS230-0180-1200		12	1.4	1.75	15	4	50	3,040	12.50	12.94	13.40	13.91	15.03
IULS230-0180-1400		14	1.4	1.75	15	4	50	3,040	14.57	15.08	15.62	16.21	17.52
IULS230-0180-1600	2	16	1.4	1.75	15	4	50	3,040	16.64	17.21	17.84	18.50	20.01
IULS230-0200-0400		4	1.6	1.94	15	4	50	2,960	4.25	4.40	4.56	4.73	5.11
IULS230-0200-0600		6	1.6	1.94	15	4	50	2,960	6.32	6.54	6.77	7.03	7.60
IULS230-0200-0800		8	1.6	1.94	15	4	50	2,960	8.39	8.68	8.99	9.33	10.08
IULS230-0200-1000	2	10	1.6	1.94	15	4	50	2,960	10.45	10.82	11.21	11.63	12.57
IULS230-0200-1200		12	1.6	1.94	15	4	50	2,960	12.52	12.96	13.42	13.93	15.06



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코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부지)경 (D2) Neck Diameter	목각 (NA) <sup>1)</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
IULS230-0200-1400	2	14	1.6	1.94	15	4	50	2,960	14.59	15.10	15.64	16.23	17.54
IULS230-0200-1600		16	1.6	1.94	15	4	50	2,960	16.65	17.23	17.86	18.53	FREE
IULS230-0200-1800		18	1.6	1.94	15	4	50	2,960	18.72	19.37	20.07	20.83	FREE
IULS230-0200-2000		20	1.6	1.94	15	4	50	2,960	20.79	21.51	22.29	23.13	FREE
IULS230-0250-0800	2.5	8	2	2.44	15	4	50	3,120	8.39	8.68	8.99	9.33	10.08
IULS230-0250-1200		12	2	2.44	15	4	50	3,120	12.52	12.96	13.42	13.93	FREE
IULS230-0250-1600		16	2	2.44	15	4	50	3,120	16.65	17.23	17.86	18.53	FREE
IULS230-0250-2000		20	2	2.44	15	4	50	3,120	20.79	21.51	22.29	23.13	FREE
IULS230-0300-0800	3	8	4.5	2.85	15	4	50	4,000	8.56	8.86	9.18	9.52	FREE
IULS230-0300-1200		12	4.5	2.85	15	4	50	4,000	12.69	13.14	13.61	14.12	FREE
IULS230-0300-1600		16	4.5	2.85	15	4	50	4,000	16.83	17.41	18.04	FREE	FREE
IULS230-0300-2000		20	4.5	2.85	15	4	50	4,000	20.96	21.69	FREE	FREE	FREE
IULS230-0300-2500		25	4.5	2.85	15	4	60	4,000	26.13	27.04	FREE	FREE	FREE
IULS230-0300-3000		30	4.5	2.85	15	4	60	4,800	31.30	FREE	FREE	FREE	FREE
IULS230-0400-1000	4	10	3	3.8	15	6	50	4,180	10.72	11.10	11.50	11.93	12.89
IULS230-0400-1500		15	3	3.8	15	6	50	4,180	15.89	16.44	17.04	17.68	FREE
IULS230-0400-2000		20	3	3.8	15	6	50	4,180	21.06	21.79	22.58	23.43	FREE
IULS230-0500-1500	5	15	3.5	4.8	15	6	50	5,260	15.89	16.44	17.04	FREE	FREE
IULS230-0500-2000		20	3.5	4.8	15	6	50	5,490	21.06	21.79	FREE	FREE	FREE
IULS230-0600-1500	6	15	6	5.8	15	6	50	5,260	FREE	FREE	FREE	FREE	FREE
IULS230-0600-2000		20	6	5.8	15	6	50	5,260	FREE	FREE	FREE	FREE	FREE
IULS230-0600-3000		30	6	5.8	15	6	60	5,490	FREE	FREE	FREE	FREE	FREE

## ion Depo Type U 추천 절삭 조건표 Recommended Milling Conditions

■형번: IULS230  
Model number: IULS230

### 롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

날수 Number of Flutes	외경 Dia.	유효장 Effective Length	고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
			Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	
2	0.1	0.3	0.003	0.05	120	40,000	0.002	0.04	100	40,000	0.002	0.03	70	40,000	
		0.5	0.003	0.05	80	40,000	0.002	0.04	60	40,000	0.002	0.03	50	40,000	
		0.15	0.3	0.003	0.07	150	40,000	0.002	0.06	120	40,000	0.002	0.04	100	40,000
			0.5	0.003	0.07	120	40,000	0.002	0.06	100	40,000	0.002	0.04	80	40,000
		0.2	0.5	0.003	0.1	200	30,000	0.003	0.08	160	30,000	0.003	0.06	120	30,000
			0.75	0.003	0.1	180	30,000	0.003	0.08	140	30,000	0.003	0.06	100	30,000
	0.3	1	0.003	0.1	150	30,000	0.003	0.08	120	30,000	0.003	0.06	80	30,000	
		1.5	0.003	0.15	200	30,000	0.003	0.12	250	30,000	0.003	0.09	200	30,000	
		2	0.003	0.15	150	30,000	0.003	0.12	120	30,000	0.003	0.09	100	25,000	
		2.5	0.002	0.15	100	25,000	0.002	0.12	80	25,000	0.002	0.09	60	20,000	
	0.4	3	0.002	0.15	50	25,000	0.002	0.12	40	25,000	0.002	0.09	30	20,000	
		1	0.005	0.2	400	30,000	0.005	0.16	350	30,000	0.005	0.12	300	25,000	
		1.5	0.005	0.2	360	30,000	0.005	0.16	330	30,000	0.005	0.12	250	25,000	
		2	0.005	0.2	320	30,000	0.005	0.16	280	25,000	0.005	0.12	220	25,000	
		2.5	0.005	0.2	280	25,000	0.004	0.16	250	25,000	0.004	0.12	200	20,000	
		3	0.004	0.2	260	25,000	0.003	0.16	220	20,000	0.003	0.12	180	18,000	
	0.5	1	0.01	0.25	500	25,000	0.007	0.2	450	23,000	0.005	0.15	400	20,000	
		1.5	0.01	0.25	450	25,000	0.007	0.2	400	23,000	0.005	0.15	360	20,000	
		2	0.01	0.25	420	25,000	0.007	0.2	380	23,000	0.005	0.15	320	20,000	
		2.5	0.008	0.25	400	25,000	0.006	0.2	360	23,000	0.004	0.15	300	20,000	
		3	0.007	0.25	350	25,000	0.005	0.2	320	23,000	0.003	0.15	280	20,000	
		3.5	0.006	0.25	320	25,000	0.003	0.2	280	23,000	0.003	0.15	240	20,000	
	0.6	4	0.005	0.25	280	25,000	0.003	0.2	240	23,000	0.002	0.15	200	20,000	
		1.5	0.01	0.3	550	25,000	0.007	0.25	450	23,000	0.005	0.18	400	20,000	
2		0.01	0.3	500	25,000	0.007	0.25	400	23,000	0.005	0.18	350	20,000		
3		0.007	0.3	450	25,000	0.005	0.25	350	23,000	0.003	0.18	300	20,000		
4		0.005	0.3	400	25,000	0.003	0.25	300	23,000	0.002	0.18	250	20,000		
5		0.003	0.3	350	20,000	0.003	0.25	250	18,000	0.002	0.18	200	16,000		
0.7	6	0.002	0.3	300	20,000	0.002	0.25	200	18,000	0.001	0.18	150	16,000		
	2	0.03	0.35	600	25,000	0.02	0.28	450	23,000	0.012	0.21	400	20,000		
	4	0.02	0.35	560	25,000	0.015	0.28	400	23,000	0.007	0.21	320	20,000		
0.8	6	0.015	0.35	410	20,000	0.012	0.28	300	18,000	0.007	0.21	240	16,000		
	3	0.03	0.4	780	25,000	0.02	0.32	650	23,000	0.012	0.24	550	20,000		
	4	0.025	0.4	700	25,000	0.015	0.32	600	23,000	0.007	0.24	500	20,000		
	5	0.02	0.4	630	23,000	0.012	0.32	530	20,000	0.006	0.24	450	18,000		
	6	0.02	0.4	550	20,000	0.01	0.32	450	18,000	0.005	0.24	350	16,000		
	8	0.007	0.4	400	16,000	0.005	0.32	300	14,000	0.003	0.24	200	12,000		
1	2	0.06	0.5	1,000	23,000	0.05	0.4	900	18,000	0.035	0.3	600	14,000		
	3	0.05	0.5	1,000	23,000	0.04	0.4	900	18,000	0.03	0.3	600	14,000		
	4	0.04	0.5	900	23,000	0.03	0.4	800	18,000	0.02	0.3	500	14,000		
1	5	0.03	0.5	800	20,000	0.02	0.4	700	16,000	0.012	0.3	450	12,000		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입량은, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 쿨런트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

## ion Depo Type U 추천 절삭 조건표 Recommended Milling Conditions

■형번: IULS230  
Model number: IULS230

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm			
2	1	6	0.02	0.5	700	18,000	0.01	0.4	600	14,000	0.007	0.3	400	10,000	
		7	0.02	0.5	650	18,000	0.01	0.4	550	14,000	0.006	0.3	370	10,000	
		8	0.02	0.5	600	16,000	0.01	0.4	500	12,000	0.005	0.3	340	8,000	
		9	0.015	0.5	550	16,000	0.007	0.4	450	12,000	0.005	0.3	300	8,000	
		10	0.01	0.5	500	14,000	0.007	0.4	400	10,000	0.005	0.3	250	6,000	
		12	0.01	0.5	400	13,000	0.005	0.4	300	10,000	0.004	0.3	180	6,000	
	1.2	6	0.03	0.6	700	18,000	0.02	0.5	600	14,000	0.01	0.4	400	10,000	
		8	0.02	0.6	600	16,000	0.01	0.5	500	12,000	0.007	0.4	340	8,000	
		10	0.02	0.6	500	12,000	0.01	0.5	430	10,000	0.005	0.4	300	8,000	
		12	0.01	0.6	500	10,000	0.007	0.5	400	9,000	0.005	0.4	250	7,000	
		16	0.01	0.6	300	9,000	0.005	0.5	260	8,000	0.003	0.4	180	6,000	
		1.4	6	0.04	0.7	800	20,000	0.03	0.56	700	18,000	0.02	0.42	450	12,000
	12	0.01	0.7	500	13,000	0.007	0.56	400	11,000	0.005	0.42	280	8,000		
	1.5	4	0.05	0.75	900	20,000	0.04	0.6	800	18,000	0.03	0.45	600	14,000	
		6	0.04	0.75	800	20,000	0.03	0.6	700	18,000	0.02	0.45	500	14,000	
		8	0.03	0.75	600	18,000	0.03	0.6	600	14,000	0.01	0.45	380	10,000	
		10	0.03	0.75	500	16,000	0.02	0.6	500	14,000	0.01	0.45	350	10,000	
		12	0.02	0.75	500	14,000	0.02	0.6	430	12,000	0.007	0.45	310	8,000	
		14	0.02	0.75	400	12,000	0.01	0.6	380	10,000	0.007	0.45	250	7,500	
	1.6	16	0.01	0.75	360	10,000	0.007	0.6	300	9,000	0.005	0.45	200	6,800	
		6	0.04	0.8	850	19,000	0.03	0.64	750	17,000	0.025	0.48	600	13,000	
		8	0.03	0.8	750	17,000	0.03	0.64	600	14,000	0.015	0.48	430	10,000	
		1.8	6	0.05	0.9	900	18,000	0.04	0.7	750	15,000	0.03	0.5	600	12,000
		8	0.04	0.9	800	16,000	0.03	0.7	600	12,000	0.02	0.5	500	9,500	
10		0.04	0.9	700	14,000	0.03	0.7	500	12,000	0.02	0.5	450	9,500		
2	12	0.03	0.9	600	12,000	0.02	0.7	500	10,000	0.01	0.5	400	8,200		
	14	0.03	0.9	600	12,000	0.02	0.7	430	10,000	0.01	0.5	360	8,200		
	16	0.02	0.9	500	10,000	0.01	0.7	400	9,200	0.007	0.5	340	7,500		
	4	0.08	1	1,000	18,000	0.06	0.8	800	15,000	0.04	0.6	600	12,000		
	6	0.06	1	900	18,000	0.05	0.8	750	15,000	0.03	0.6	600	12,000		
	8	0.05	1	800	16,000	0.04	0.8	600	12,000	0.02	0.6	500	9,500		
2.5	10	0.05	1	700	14,000	0.04	0.8	500	12,000	0.02	0.6	450	9,500		
	12	0.04	1	600	12,000	0.03	0.8	500	10,000	0.01	0.6	400	8,200		
	14	0.03	1	600	12,000	0.02	0.8	430	10,000	0.007	0.6	360	8,200		
	16	0.03	1	500	10,000	0.02	0.8	400	9,200	0.007	0.6	340	7,500		
	18	0.02	1	410	9,200	0.01	0.8	370	8,500	0.005	0.6	320	6,000		
	20	0.02	1	380	9,200	0.01	0.8	340	8,500	0.005	0.6	260	6,000		
3	8	0.07	1.25	800	14,000	0.05	1	700	10,000	0.03	0.75	500	8,000		
	12	0.06	1.25	700	12,000	0.04	1	600	9,600	0.02	0.75	480	7,500		
	16	0.05	1.25	600	10,000	0.02	1	500	8,500	0.01	0.75	400	7,000		
20	0.05	1.25	500	8,200	0.02	1	500	7,500	0.01	0.75	400	5,000			
3	8	0.1	1.5	900	14,000	0.07	1.2	800	10,000	0.05	0.9	600	8,000		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입방은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 콜린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	3	12	0.08	1.5	800	12,000	0.06	1.2	700	9,200	0.04	0.9	500	7,200
		16	0.07	1.5	700	10,000	0.05	1.2	600	8,500	0.03	0.9	400	6,500
		20	0.07	1.5	700	9,000	0.04	1.2	600	7,800	0.02	0.9	400	5,800
		25	0.06	1.5	600	8,200	0.03	1.2	500	7,000	0.01	0.9	360	5,000
		30	0.03	1.5	600	7,000	0.02	1.2	500	6,500	0.007	0.9	330	4,500
		4	10	0.1	2	900	10,000	0.07	1.8	800	9,000	0.05	1.5	700
	4	15	0.07	2	800	8,000	0.05	1.8	700	7,000	0.04	1.5	600	6,500
		20	0.06	2	750	7,000	0.04	1.8	650	6,000	0.03	1.5	550	5,500
		5	15	0.1	2.5	850	6,000	0.07	2.3	750	5,000	0.06	2	650
	6	20	0.08	2.5	800	5,000	0.06	2.3	700	4,000	0.05	2	600	3,500
		15	0.12	3	850	5,000	0.09	2.8	750	4,000	0.08	2.5	650	3,500
		20	0.1	3	800	4,000	0.07	2.8	700	3,000	0.06	2.5	600	2,500
	30	0.08	3	700	3,000	0.06	2.8	600	2,000	0.05	2.5	500	1,500	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절입방은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 콜린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

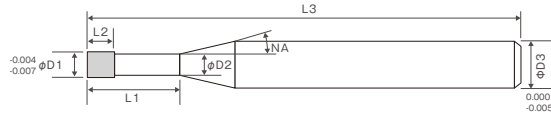


# ion Depo Type U Series

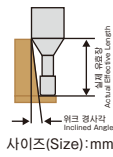
초경 롱 넥 스퀘어 엔드밀  
Carbide Long Neck Square End Mill

ion U super MG 날수 4 헬릭스각 30° 목각 15° Shank 0/-0.005

■형번: IULS430 Model number: IULS430



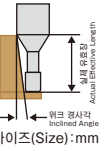
표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
IULS430-0100-0400	1	4	0.8	0.95	15	4	50	3,960	4.23	4.38	4.54	4.71	5.09
IULS430-0100-0600		6	0.8	0.95	15	4	50	3,960	6.30	6.52	6.75	7.01	7.57
IULS430-0100-0800		8	0.8	0.95	15	4	50	3,960	8.37	8.66	8.97	9.31	10.06
IULS430-0100-1000		10	0.8	0.95	15	4	50	3,960	10.43	10.80	11.19	11.61	12.55
IULS430-0120-0600	1.2	6	1	1.15	15	4	50	3,960	6.30	6.52	6.75	7.01	7.57
IULS430-0120-0800		8	1	1.15	15	4	50	3,960	8.37	8.66	8.97	9.31	10.06
IULS430-0120-1000		10	1	1.15	15	4	50	3,960	10.43	10.80	11.19	11.61	12.55
IULS430-0120-1200		12	1	1.15	15	4	50	3,960	12.50	12.94	13.40	13.91	15.03
IULS430-0150-0600	1.5	6	1.2	1.45	15	4	50	3,960	6.30	6.52	6.75	7.01	7.57
IULS430-0150-0800		8	1.2	1.45	15	4	50	3,960	8.37	8.66	8.97	9.31	10.06
IULS430-0150-1000		10	1.2	1.45	15	4	50	3,960	10.43	10.80	11.19	11.61	12.55
IULS430-0150-1200		12	1.2	1.45	15	4	50	3,960	12.50	12.94	13.40	13.91	15.03
IULS430-0150-1400	1.8	14	1.2	1.45	15	4	50	3,960	14.57	15.08	15.62	16.21	17.52
IULS430-0150-1600		16	1.2	1.45	15	4	50	3,960	16.64	17.21	17.84	18.50	20.01
IULS430-0180-0600		6	1.4	1.75	15	4	50	3,960	6.30	6.52	6.75	7.01	7.57
IULS430-0180-0800		8	1.4	1.75	15	4	50	3,960	8.37	8.66	8.97	9.31	10.06
IULS430-0180-1000	2	10	1.4	1.75	15	4	50	3,960	10.43	10.80	11.19	11.61	12.55
IULS430-0180-1200		12	1.4	1.75	15	4	50	3,960	12.50	12.94	13.40	13.91	15.03
IULS430-0180-1400		14	1.4	1.75	15	4	50	3,960	14.57	15.08	15.62	16.21	17.52
IULS430-0180-1600		16	1.4	1.75	15	4	50	3,960	16.64	17.21	17.84	18.50	20.01
IULS430-0200-0600	2.5	6	1.6	1.94	15	4	50	3,960	6.32	6.54	6.77	7.03	7.60
IULS430-0200-0800		8	1.6	1.94	15	4	50	3,960	8.39	8.68	8.99	9.33	10.08
IULS430-0200-1000		10	1.6	1.94	15	4	50	3,960	10.45	10.82	11.21	11.63	12.57
IULS430-0200-1200		12	1.6	1.94	15	4	50	3,960	12.52	12.96	13.42	13.93	15.06
IULS430-0200-1400	2	14	1.6	1.94	15	4	50	3,960	14.59	15.10	15.64	16.23	17.54
IULS430-0200-1600		16	1.6	1.94	15	4	50	3,960	16.65	17.23	17.86	18.53	FREE
IULS430-0200-1800		18	1.6	1.94	15	4	50	3,960	18.72	19.37	20.07	20.83	FREE
IULS430-0200-2000		20	1.6	1.94	15	4	50	3,960	20.79	21.51	22.29	23.13	FREE
IULS430-0250-0800	2.5	8	2	2.44	15	4	50	3,960	8.39	8.68	8.99	9.33	10.08
IULS430-0250-1200		12	2	2.44	15	4	50	3,960	12.52	12.96	13.42	13.93	FREE

# ion Depo Type U Series



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코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
IULS430-0250-1600	2.5	16	2	2.44	15	4	50	3,960	16.65	17.23	17.86	18.53	FREE
IULS430-0250-2000		20	2	2.44	15	4	50	3,960	20.79	21.51	22.29	FREE	FREE
IULS430-0300-0800	3	8	4.5	2.85	15	4	50	5,600	8.56	8.86	9.18	9.52	FREE
IULS430-0300-1200		12	4.5	2.85	15	4	50	5,600	12.69	13.14	13.61	14.12	FREE
IULS430-0300-1600		16	4.5	2.85	15	4	50	5,600	16.83	17.41	18.04	FREE	FREE
IULS430-0300-2000		20	4.5	2.85	15	4	50	5,600	20.96	21.69	FREE	FREE	FREE
IULS430-0300-2500		25	4.5	2.85	15	4	60	5,920	26.13	27.04	FREE	FREE	FREE
IULS430-0300-3000		30	4.5	2.85	15	4	60	6,400	31.30	FREE	FREE	FREE	FREE
IULS430-0400-1200	4	12	6	3.8	15	6	50	5,840	12.79	13.24	13.71	14.23	15.38
IULS430-0400-1600		16	6	3.8	15	6	50	5,840	16.92	17.51	18.15	18.83	FREE
IULS430-0400-2000		20	6	3.8	15	6	50	5,840	21.06	21.79	22.58	23.43	FREE
IULS430-0400-2500		25	6	3.8	15	6	60	6,160	26.23	27.14	28.12	FREE	FREE
IULS430-0400-3000		30	6	3.8	15	6	60	6,800	31.40	32.49	33.66	FREE	FREE
IULS430-0400-3500		35	6	3.8	15	6	70	7,360	36.56	37.84	FREE	FREE	FREE
IULS430-0500-1600	5	16	7.5	4.8	15	6	50	7,360	16.92	17.51	18.15	FREE	FREE
IULS430-0500-2500		25	7.5	4.8	15	6	60	7,680	26.23	27.14	FREE	FREE	FREE
IULS430-0500-3500		35	7.5	4.8	15	6	70	8,000	36.56	FREE	FREE	FREE	FREE
IULS430-0600-2000	6	20	9	5.8	15	6	50	7,360	FREE	FREE	FREE	FREE	FREE
IULS430-0600-3000		30	9	5.8	15	6	60	7,680	FREE	FREE	FREE	FREE	FREE
IULS430-0600-4000		40	9	5.8	15	6	70	8,000	FREE	FREE	FREE	FREE	FREE
IULS430-0600-5000		50	9	5.8	15	6	80	11,200	FREE	FREE	FREE	FREE	FREE

# ion Depo Type U Series

# ion Depo Type U Series

ion Depo Type U 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IULS430  
Model number: IULS430

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm			
4	1	4	0.04	0.5	1,800	23,000	0.03	0.4	1,600	18,000	0.02	0.3	1,000	14,000	
			6	0.02	0.5	1,400	18,000	0.01	0.4	1,200	14,000	0.007	0.3	800	10,000
			8	0.02	0.5	1,200	16,000	0.01	0.4	1,000	12,000	0.005	0.3	680	8,000
			10	0.01	0.5	1,000	14,000	0.007	0.4	800	10,000	0.005	0.3	500	6,000
	1.2	6	0.03	0.6	1,400	18,000	0.02	0.5	1,200	14,000	0.01	0.4	800	10,000	
			8	0.02	0.6	1,200	16,000	0.01	0.5	1,000	12,000	0.007	0.4	680	8,000
			10	0.02	0.6	1,000	12,000	0.01	0.5	850	10,000	0.005	0.4	600	8,000
			12	0.01	0.6	1,000	10,000	0.007	0.5	800	9,000	0.005	0.4	500	7,000
	1.5	6	0.04	0.75	1,600	20,000	0.03	0.6	1,400	18,000	0.02	0.45	1,000	14,000	
			8	0.03	0.75	1,200	18,000	0.03	0.6	1,200	14,000	0.01	0.45	750	10,000
			10	0.03	0.75	1,000	16,000	0.02	0.6	1,000	14,000	0.01	0.45	700	10,000
			12	0.02	0.75	1,000	14,000	0.02	0.6	850	12,000	0.007	0.45	620	8,000
	1.8	6	0.02	0.75	800	12,000	0.01	0.6	750	10,000	0.007	0.45	500	7,500	
			14	0.02	0.75	800	12,000	0.01	0.6	750	10,000	0.007	0.45	500	7,500
			16	0.01	0.75	720	10,000	0.007	0.6	600	9,000	0.005	0.45	400	6,800
			6	0.05	0.9	1,800	18,000	0.04	0.7	1,500	15,000	0.03	0.5	1,200	12,000
	2	6	0.04	0.9	1,600	16,000	0.03	0.7	1,200	12,000	0.02	0.5	1,000	9,500	
			8	0.04	0.9	1,400	14,000	0.03	0.7	1,000	12,000	0.02	0.5	900	9,500
			10	0.04	0.9	1,200	12,000	0.02	0.7	1,000	10,000	0.01	0.5	800	8,200
			12	0.03	0.9	1,200	12,000	0.02	0.7	860	10,000	0.01	0.5	720	8,200
	2.5	6	0.02	0.9	1,000	10,000	0.01	0.7	800	9,200	0.007	0.5	680	7,500	
			6	0.06	1	1,800	18,000	0.05	0.8	1,500	15,000	0.03	0.6	1,200	12,000
			8	0.05	1	1,600	16,000	0.04	0.8	1,200	12,000	0.02	0.6	1,000	9,500
			10	0.05	1	1,400	14,000	0.04	0.8	1,000	12,000	0.02	0.6	900	9,500
3	6	0.04	1	1,200	12,000	0.03	0.8	1,000	10,000	0.01	0.6	800	8,200		
		12	0.03	1	1,200	12,000	0.02	0.8	860	10,000	0.007	0.6	720	8,200	
		14	0.03	1	1,000	10,000	0.02	0.8	800	9,200	0.007	0.6	680	7,500	
		16	0.03	1	1,000	10,000	0.02	0.8	800	9,200	0.007	0.6	680	7,500	
4	6	0.02	1	820	9,200	0.01	0.8	740	8,500	0.005	0.6	640	6,000		
		18	0.02	1	820	9,200	0.01	0.8	740	8,500	0.005	0.6	640	6,000	
		20	0.02	1	760	9,200	0.01	0.8	680	8,500	0.005	0.6	520	6,000	
		8	0.07	1.25	1,600	14,000	0.05	1	1,400	10,000	0.03	0.75	1,000	8,000	
2.5	6	0.06	1.25	1,400	12,000	0.04	1	1,200	9,600	0.02	0.75	960	7,500		
		12	0.06	1.25	1,200	10,000	0.02	1	1,000	8,500	0.01	0.75	800	7,000	
		16	0.05	1.25	1,200	10,000	0.02	1	1,000	8,500	0.01	0.75	800	7,000	
		20	0.05	1.25	1,000	8,200	0.02	1	1,000	7,500	0.01	0.75	800	5,000	
3	6	0.07	1.5	1,800	14,000	0.07	1.2	1,600	10,000	0.05	0.9	1,200	8,000		
		12	0.08	1.5	1,600	12,000	0.06	1.2	1,400	9,200	0.04	0.9	1,000	7,200	
		16	0.07	1.5	1,400	10,000	0.05	1.2	1,200	8,500	0.03	0.9	800	6,500	
		20	0.07	1.5	1,400	9,000	0.04	1.2	1,200	7,800	0.02	0.9	800	5,800	
4	6	0.06	1.5	1,200	8,200	0.03	1.2	1,000	7,000	0.01	0.9	720	5,000		
		25	0.06	1.5	1,200	8,200	0.03	1.2	1,000	7,000	0.01	0.9	720	5,000	
		30	0.03	1.5	1,200	7,000	0.02	1.2	1,000	6,500	0.007	0.9	650	4,500	
		12	0.15	2	2,000	9,500	0.08	1.6	1,600	8,000	0.06	1.2	1,000	7,000	
4	6	0.1	2	1,800	8,000	0.06	1.6	1,400	7,000	0.05	1.2	1,200	6,000		
		16	0.1	2	1,800	8,000	0.06	1.6	1,400	7,000	0.05	1.2	1,200	6,000	
		20	0.08	2	1,600	7,000	0.05	1.6	1,200	6,500	0.04	1.2	1,000	5,500	
		25	0.07	2	1,400	6,000	0.04	1.6	1,200	5,200	0.03	1.2	1,000	4,500	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 콜란트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
4	4	30	0.05	2	1,000	4,800	0.03	1.6	850	4,200	0.02	1.2	620	3,500
			35	0.04	2	880	4,200	0.02	1.6	720	3,800	0.01	1.2	550
	5	16	0.12	2.5	1,800	7,000	0.08	2	1,600	5,500	0.06	1.5	1,000	4,500
			25	0.07	2.5	1,400	5,800	0.05	2	1,200	4,200	0.03	1.5	800
	6	35	0.05	2.5	900	4,200	0.03	2	800	3,500	0.02	1.5	600	2,500
			20	0.18	3	1,600	6,500	0.08	2.4	1,400	4,500	0.06	1.8	920
		30	0.12	3	1,200	4,500	0.06	2.4	1,000	3,500	0.04	1.8	660	2,500
			40	0.08	3	1,000	3,000	0.03	2.4	800	2,500	0.02	1.8	550
	50	0.05	3	700	2,500	0.02	2.4	500	2,000	0.01	1.8	380	1,500	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 콜란트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

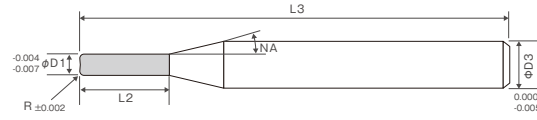
# ion Depo Type U Series

초경 래디우스 엔드밀 Carbide Radius End Mill

■형번: IUR430 Model number: IUR430



ion U super MG 4 날수 4 헬릭스각 30° 목각 15° Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	날장 (L2) Length of Cut	목각 (NA) Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IUR430-0300-0200-00600	3	0.2	6	15	4	50	10,000
IUR430-0300-0300-00600		0.3	6	15	4	50	10,000
IUR430-0300-0500-00600		0.5	6	15	4	50	10,000
IUR430-0400-0200-00800	4	0.2	8	15	6	50	10,800
IUR430-0400-0300-00800		0.3	8	15	6	50	10,800
IUR430-0400-0500-00800		0.5	8	15	6	50	10,800
IUR430-0600-0200-01200	6	0.2	12	—	6	60	12,400
IUR430-0600-0300-01200		0.3	12	—	6	60	12,400
IUR430-0600-0500-01200		0.5	12	—	6	60	12,400
IUR430-0600-1000-01200	8	1	12	—	6	60	12,400
IUR430-0800-0300-01600		0.3	16	—	8	70	17,200
IUR430-0800-0500-01600		0.5	16	—	8	70	17,200
IUR430-0800-1000-01600	10	1	16	—	8	70	17,200
IUR430-1000-0300-02000		0.3	20	—	10	80	17,200
IUR430-1000-0500-02000		0.5	20	—	10	80	23,360
IUR430-1000-1000-02000	12	1	20	—	10	80	23,360
IUR430-1200-0500-02400		0.5	24	—	12	110	28,160
IUR430-1200-1000-02400		1	24	—	12	110	28,160
IUR430-1200-2000-02400	2	24	—	12	110	28,160	

# ion Depo Type U Series

ion Depo Type U 추천 절삭 조건표

Recommended Milling Conditions

■형번: IUR430

Model number: IUR430

래디우스 엔드밀 Radius End Mill

피삭재 Work Material	고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)						고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
	날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
4	3	6	5	0.09	1,000	10,000	5	0.06	700	8,000	5	0.06	560	7,000	
	4	8	7	0.12	1,200	8,500	7	0.08	800	7,000	7	0.08	600	6,000	
	6	12	9	0.18	1,200	5,600	9	0.12	800	4,700	9	0.12	600	4,000	
	8	16	12	0.23	1,400	4,800	12	0.16	800	4,000	12	0.16	500	3,400	
	10	20	15	0.30	1,500	3,800	15	0.20	900	3,200	15	0.20	600	2,600	
	12	24	18	0.35	1,600	3,200	18	0.24	1,000	2,600	18	0.24	700	2,200	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 절삭 깊이를 늘리는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

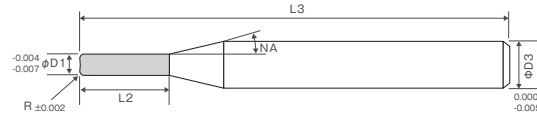
CBN Series  
Hard Star A Series  
Hard Star Ti Series  
Hard Star TT Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series

# ion Depo Type U Series

초경 래디우스 엔드밀 Carbide Radius End Mill

■형번: IUR630 Model number: IUR630

ion U super MG 6 날수 헬릭스각 30° 목각 15° Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	날장 (L2) Length of Cut	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IUR630-0500-0200-01000	5	0.2	10	15	6	50	11,600
IUR630-0500-0300-01000		0.3	10	15	6	50	11,600
IUR630-0500-0500-01000		0.5	10	15	6	50	11,600
IUR630-0500-1000-01000		1	10	15	6	50	11,600
IUR630-0600-0200-01200	6	0.2	12	—	6	60	12,400
IUR630-0600-0300-01200		0.3	12	—	6	60	12,400
IUR630-0600-0500-01200		0.5	12	—	6	60	12,400
IUR630-0600-1000-01200		1	12	—	6	60	12,400
IUR630-0800-0300-01600	8	0.3	16	—	8	70	17,200
IUR630-0800-0500-01600		0.5	16	—	8	70	17,200
IUR630-0800-1000-01600		1	16	—	8	70	17,200
IUR630-0800-1500-01600		1.5	16	—	8	70	17,200
IUR630-1000-0300-02000	10	0.3	20	—	10	80	23,360
IUR630-1000-0500-02000		0.5	20	—	10	80	23,360
IUR630-1000-1000-02000		1	20	—	10	80	23,360
IUR630-1000-1500-02000		1.5	20	—	10	80	23,360
IUR630-1000-2000-02000	12	2	20	—	10	80	23,360
IUR630-1200-0500-02400		0.5	24	—	12	110	28,160
IUR630-1200-1000-02400		1	24	—	12	110	28,160
IUR630-1200-1500-02400		1.5	24	—	12	110	28,160
IUR630-1200-2000-02400	2	24	—	12	110	28,160	

# ion Depo Type U Series

ion Depo Type U 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IUR630  
Model number: IUR630

래디우스 엔드밀 Radius End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>
6	5	10	7.5	0.15	1,600	7,600	7.5	0.1	1,200	6,200	7.5	0.1	800	5,300
	6	12	9	0.18	1,800	6,400	9	0.12	1,200	5,300	9	0.12	800	4,600
	8	16	12	0.23	2,000	4,800	12	0.16	1,400	4,000	12	0.16	1,000	3,400
	10	20	15	0.3	2,000	3,800	15	0.2	1,600	3,200	15	0.2	1,000	2,600
	12	24	18	0.35	2,000	3,200	18	0.24	1,600	2,600	18	0.24	1,000	2,200

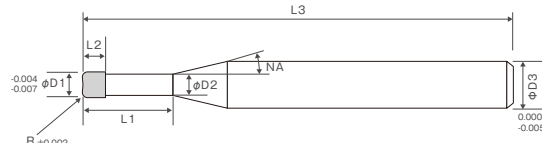
●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량, 정삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.  
●오일 미스트 콜린트, 또는 물수용성 절삭액 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 길이는 필요 이상으로 길지 않아 주세요. Length of tool overhang must be as short as possible.  
●∅PM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type U Series

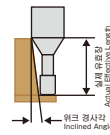
초경 롱 넥 래디우스 엔드밀  
Carbide Long Neck Radius End Mill

ion U super MG 날수 2 헬릭스각 30° 목각 15° Shank 0/-0.005

■형번: IULR230 Model number: IULR230



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

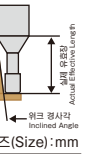


사이즈(Size): mm

●재연마가 가능한 공구의 세부사항에 대해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IULR230-0020-0020-0050	0.2	0.02	0.5	0.15	0.18	15	4	50	8,080	0.55	0.57	0.59	0.61	0.66	
IULR230-0020-0020-0100		0.02	1	0.15	0.18	15	4	50	8,080	1.07	1.11	1.15	1.19	1.28	
IULR230-0020-0050-0050		0.05	0.5	0.15	0.18	15	4	50	8,080	0.55	0.57	0.59	0.61	0.66	
IULR230-0020-0050-0100		0.05	1	0.15	0.18	15	4	50	8,080	1.07	1.11	1.14	1.19	1.28	
IULR230-0030-0020-0100	0.3	0.02	1	0.25	0.27	15	4	50	7,840	1.09	1.13	1.17	1.21	1.31	
IULR230-0030-0020-0150		0.02	1.5	0.25	0.27	15	4	50	7,840	1.61	1.66	1.72	1.79	1.93	
IULR230-0030-0020-0200		0.02	2	0.25	0.27	15	4	50	7,840	2.12	2.20	2.28	2.36	2.55	
IULR230-0030-0020-0250		0.02	2.5	0.25	0.27	15	4	50	9,840	2.64	2.73	2.83	2.94	3.17	
IULR230-0030-0020-0300		0.02	3	0.25	0.27	15	4	50	9,840	3.16	3.27	3.38	3.51	3.79	
IULR230-0030-0050-0100		0.05	1	0.25	0.27	15	4	50	7,840	1.09	1.13	1.17	1.21	1.30	
IULR230-0030-0050-0150		0.05	1.5	0.25	0.27	15	4	50	7,840	1.61	1.66	1.72	1.78	1.92	
IULR230-0030-0050-0200		0.05	2	0.25	0.27	15	4	50	7,840	2.12	2.20	2.27	2.36	2.54	
IULR230-0030-0050-0250		0.05	2.5	0.25	0.27	15	4	50	9,840	2.64	2.73	2.83	2.93	3.17	
IULR230-0030-0050-0300		0.05	3	0.25	0.27	15	4	50	9,840	3.16	3.27	3.38	3.51	3.79	
IULR230-0040-0020-0100	0.4	0.02	1	0.3	0.37	15	4	50	5,200	1.09	1.13	1.17	1.21	1.31	
IULR230-0040-0020-0150		0.02	1.5	0.3	0.37	15	4	50	5,200	1.61	1.66	1.72	1.79	1.93	
IULR230-0040-0020-0200		0.02	2	0.3	0.37	15	4	50	5,200	2.12	2.20	2.28	2.36	2.55	
IULR230-0040-0020-0250		0.02	2.5	0.3	0.37	15	4	50	5,200	2.64	2.73	2.83	2.94	3.17	
IULR230-0040-0020-0300		0.02	3	0.3	0.37	15	4	50	5,200	3.16	3.27	3.38	3.51	3.79	
IULR230-0040-0050-0100		0.05	1	0.3	0.37	15	4	50	5,200	1.09	1.13	1.17	1.21	1.30	
IULR230-0040-0050-0150		0.05	1.5	0.3	0.37	15	4	50	5,200	1.61	1.66	1.72	1.78	1.92	
IULR230-0040-0050-0200		0.05	2	0.3	0.37	15	4	50	5,200	2.12	2.20	2.27	2.36	2.54	
IULR230-0040-0050-0250		0.05	2.5	0.3	0.37	15	4	50	5,200	2.64	2.73	2.83	2.93	3.17	
IULR230-0040-0050-0300		0.05	3	0.3	0.37	15	4	50	5,200	3.16	3.27	3.38	3.51	3.79	
IULR230-0040-0100-0100		0.1	1	0.3	0.37	15	4	50	5,200	1.09	1.12	1.16	1.20	1.29	
IULR230-0040-0100-0200		0.1	2	0.3	0.37	15	4	50	5,200	2.12	2.19	2.27	2.35	2.53	
IULR230-0040-0100-0300		0.1	3	0.3	0.37	15	4	50	5,200	3.16	3.26	3.38	3.50	3.78	
IULR230-0050-0020-0100		0.5	0.02	1	0.4	0.47	15	4	50	4,240	1.09	1.13	1.17	1.21	1.31
IULR230-0050-0020-0200			0.02	2	0.4	0.47	15	4	50	4,240	2.12	2.20	2.28	2.36	2.55
IULR230-0050-0020-0300			0.02	3	0.4	0.47	15	4	50	4,240	3.16	3.27	3.38	3.51	3.79

# ion Depo Type U Series



사이즈(Size): mm

●재연마가 가능한 공구의 세부사항에 대해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IULR230-0050-0020-0400	0.5	0.02	4	0.4	0.47	15	4	50	4,240	4.19	4.34	4.49	4.66	5.04	
IULR230-0050-0050-0100		0.05	1	0.4	0.47	15	4	50	4,240	1.09	1.13	1.17	1.21	1.30	
IULR230-0050-0050-0200		0.05	2	0.4	0.47	15	4	50	4,240	2.12	2.20	2.27	2.36	2.54	
IULR230-0050-0050-0300		0.05	3	0.4	0.47	15	4	50	4,240	3.16	3.27	3.38	3.51	3.79	
IULR230-0050-0100-0400		0.1	1	0.4	0.47	15	4	50	4,240	1.09	1.12	1.16	1.20	1.29	
IULR230-0050-0100-0200		0.1	2	0.4	0.47	15	4	50	4,240	2.12	2.19	2.27	2.35	2.53	
IULR230-0050-0100-0300		0.1	3	0.4	0.47	15	4	50	4,240	3.16	3.26	3.38	3.50	3.78	
IULR230-0050-0100-0400		0.1	4	0.4	0.47	15	4	50	4,240	4.19	4.33	4.48	4.65	5.02	
IULR230-0060-0020-0200		0.6	0.02	2	0.5	0.57	15	4	50	4,560	2.12	2.20	2.28	2.36	2.55
IULR230-0060-0020-0400			0.02	4	0.5	0.57	15	4	50	4,560	4.19	4.34	4.49	4.66	5.04
IULR230-0060-0020-0600			0.02	6	0.5	0.57	15	4	50	4,560	6.26	6.48	6.71	6.96	7.52
IULR230-0060-0050-0200			0.05	2	0.5	0.57	15	4	50	4,560	2.12	2.20	2.27	2.36	2.54
IULR230-0060-0050-0400	0.05		4	0.5	0.57	15	4	50	4,560	4.19	4.34	4.49	4.66	5.03	
IULR230-0060-0050-0600	0.05		6	0.5	0.57	15	4	50	4,560	6.26	6.47	6.71	6.96	7.52	
IULR230-0060-0100-0200	0.1		2	0.5	0.57	15	4	50	4,240	2.12	2.19	2.27	2.35	2.53	
IULR230-0060-0100-0400	0.1		4	0.5	0.57	15	4	50	4,240	4.19	4.33	4.48	4.65	5.02	
IULR230-0060-0100-0600	0.1		6	0.5	0.57	15	4	50	4,240	6.26	6.47	6.70	6.95	7.51	
IULR230-0070-0020-0200	0.7		0.02	2	0.55	0.67	15	4	50	4,800	2.12	2.20	2.28	2.36	2.55
IULR230-0070-0020-0400			0.02	4	0.55	0.67	15	4	50	4,800	4.19	4.34	4.49	4.66	5.04
IULR230-0070-0020-0600			0.02	6	0.55	0.67	15	4	50	4,800	6.26	6.48	6.71	6.96	7.52
IULR230-0070-0050-0200		0.05	2	0.55	0.67	15	4	50	4,800	2.12	2.20	2.27	2.36	2.54	
IULR230-0070-0050-0400		0.05	4	0.55	0.67	15	4	50	4,800	4.19	4.34	4.49	4.66	5.03	
IULR230-0070-0050-0600		0.05	6	0.55	0.67	15	4	50	4,800	6.26	6.47	6.71	6.96	7.52	
IULR230-0070-0100-0200		0.1	2	0.55	0.67	15	4	50	4,800	2.12	2.19	2.27	2.35	2.53	
IULR230-0070-0100-0400		0.1	4	0.55	0.67	15	4	50	4,800	4.19	4.33	4.48	4.65	5.02	
IULR230-0070-0100-0600		0.1	6	0.55	0.67	15	4	50	4,800	6.26	6.47	6.70	6.95	7.51	
IULR230-0080-0020-0200		0.8	0.02	2	0.65	0.77	15	4	50	4,800	2.12	2.20	2.28	2.36	2.55
IULR230-0080-0020-0400			0.02	4	0.65	0.77	15	4	50	4,800	4.19	4.34	4.49	4.66	5.04
IULR230-0080-0020-0600			0.02	6	0.65	0.77	15	4	50	4,800	6.26	6.48	6.71	6.96	7.52
IULR230-0080-0020-0800	0.02		8	0.65	0.77	15	4	50	4,960	8.33	8.62	8.93	9.26	10.01	
IULR230-0080-0050-0200	0.05		2	0.65	0.77	15	4	50	4,800	2.12	2.20	2.27	2.36	2.54	
IULR230-0080-0050-0400	0.05		4	0.65	0.77	15	4	50	4,800	4.19	4.34	4.49	4.66	5.03	
IULR230-0080-0050-0600	0.05		6	0.65	0.77	15	4	50	4,800	6.26	6.47	6.71	6.96	7.52	
IULR230-0080-0050-0800	0.05		8	0.65	0.77	15	4	50	4,960	8.33	8.61	8.92	9.26	10.00	
IULR230-0080-0100-0200	0.1		2	0.65	0.77	15	4	50	4,800	2.12	2.19	2.27	2.35	2.53	
IULR230-0080-0100-0400	0.1		4	0.65	0.77	15	4	50	4,800	4.19	4.33	4.48	4.65	5.02	
IULR230-0080-0100-0600	0.1		6	0.65	0.77	15	4	50	4,800	6.26	6.47	6.70	6.95	7.51	
IULR230-0080-0100-0800	0.1		8	0.65	0.77	15	4	50	4,960	8.32	8.61	8.92	9.25	9.99	
IULR230-0080-0200-0200	0.9	0.2	2	0.65	0.77	15	4	50	4,800	2.12	2.19	2.26	2.33	2.51	
IULR230-0080-0200-0400		0.2	4	0.65	0.77	15	4	50	4,800	4.19	4.32	4.47	4.63	5.00	
IULR230-0080-0200-0600		0.2	6	0.65	0.77	15	4	50	4,800	6.25	6.46	6.69	6.93	7.48	
IULR230-0080-0200-0800		0.2	8	0.65	0.77	15	4	50	4,960	8.32	8.60	8.91	9.23	9.97	
IULR230-0090-0100-0400	0.9	0.1	4	0.7	0.87	15	4	50	5,440	4.19	4.33	4.48	4.65	5.02	
IULR230-0090-0100-0800		0.1	8	0.7	0.87	15	4	50	5,440	8.32	8.61	8.92	9.25	9.99	

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
Ion Depo A Series  
Ion Depo U Series  
DLC Series  
Non-Coat Series  
Ion Depo R Series



ion Depo Type U 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IULR230  
Model number: IULR230

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.2	0.5	0.003	0.04	200	30,000	0.003	0.02	160	30,000	0.003	0.01	120	30,000
		1	0.003	0.04	150	30,000	0.002	0.02	120	30,000	0.002	0.01	80	30,000
	0.3	1	0.003	0.08	300	30,000	0.003	0.04	250	30,000	0.003	0.03	200	30,000
		1.5	0.003	0.08	200	30,000	0.003	0.04	160	30,000	0.003	0.03	120	30,000
		2	0.003	0.08	150	30,000	0.003	0.04	120	30,000	0.003	0.03	100	25,000
		2.5	0.002	0.08	100	25,000	0.002	0.04	80	25,000	0.002	0.03	60	20,000
		3	0.002	0.08	50	25,000	0.002	0.04	40	25,000	0.002	0.03	30	20,000
	0.4	1	0.005	0.1	400	30,000	0.005	0.05	350	28,000	0.004	0.04	300	25,000
		1.5	0.005	0.1	350	30,000	0.005	0.05	300	28,000	0.004	0.04	260	25,000
		2	0.005	0.1	300	30,000	0.005	0.05	250	25,000	0.003	0.04	220	25,000
		2.5	0.004	0.1	280	28,000	0.004	0.05	240	25,000	0.003	0.04	180	20,000
	0.5	3	0.004	0.1	250	25,000	0.003	0.05	220	23,000	0.002	0.04	160	18,000
		1	0.008	0.15	500	25,000	0.006	0.1	450	23,000	0.004	0.08	400	20,000
		2	0.007	0.15	420	25,000	0.005	0.1	360	23,000	0.003	0.08	300	20,000
		3	0.006	0.15	350	25,000	0.004	0.1	320	23,000	0.003	0.08	280	20,000
	0.6	4	0.004	0.15	300	25,000	0.002	0.1	240	23,000	0.002	0.08	180	20,000
		2	0.012	0.2	500	25,000	0.006	0.15	400	23,000	0.004	0.1	320	20,000
	0.7	4	0.007	0.2	400	23,000	0.004	0.15	300	20,000	0.003	0.1	200	18,000
		6	0.005	0.2	200	20,000	0.003	0.15	150	18,000	0.002	0.1	100	12,000
		2	0.012	0.25	700	25,000	0.006	0.15	600	23,000	0.003	0.12	450	20,000
	0.8	4	0.008	0.25	600	25,000	0.005	0.15	500	23,000	0.002	0.12	350	20,000
		6	0.005	0.25	350	20,000	0.003	0.15	250	18,000	0.002	0.12	200	16,000
		2	0.014	0.25	800	25,000	0.006	0.16	700	23,000	0.005	0.14	500	20,000
		4	0.008	0.25	700	25,000	0.005	0.16	600	23,000	0.003	0.14	400	20,000
0.9	6	0.006	0.25	550	20,000	0.004	0.16	450	18,000	0.002	0.14	320	16,000	
	8	0.003	0.25	400	16,000	0.002	0.16	300	14,000	0.002	0.14	200	12,000	
	4	0.03	0.3	850	25,000	0.02	0.2	700	20,000	0.01	0.15	600	18,000	
	8	0.01	0.3	400	16,000	0.008	0.2	350	14,000	0.005	0.15	250	10,000	

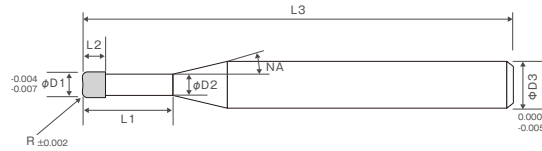
●공구는 홀더에 확실하게 고정되고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭방향, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.  
 ●오일 미스트 콜린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 마세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type U Series

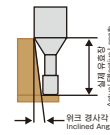
초경 롱 넥 래디우스 엔드밀  
Carbide Long Neck Radius End Mill

■형번: IULR330 Model number: IULR330

ion U super MG 날수 3 헬릭스각 30° 목각 15° Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

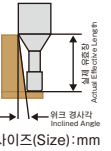


사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IULR330-0060-0020-0200	0.6	0.02	2	0.5	0.57	15	4	50	6,160	2.12	2.20	2.28	2.36	2.55
IULR330-0060-0020-0400		0.02	4	0.5	0.57	15	4	50	6,160	4.19	4.34	4.49	4.66	5.04
IULR330-0060-0020-0600		0.02	6	0.5	0.57	15	4	50	6,160	6.26	6.48	6.71	6.96	7.52
IULR330-0060-0050-0200		0.05	2	0.5	0.57	15	4	50	6,160	2.12	2.20	2.27	2.36	2.54
IULR330-0060-0050-0400		0.05	4	0.5	0.57	15	4	50	6,160	4.19	4.34	4.49	4.66	5.03
IULR330-0060-0050-0600		0.05	6	0.5	0.57	15	4	50	6,160	6.26	6.47	6.71	6.96	7.52
IULR330-0060-0100-0200		0.1	2	0.5	0.57	15	4	50	5,760	2.12	2.19	2.27	2.35	2.53
IULR330-0060-0100-0400		0.1	4	0.5	0.57	15	4	50	5,760	4.19	4.33	4.48	4.65	5.02
IULR330-0060-0100-0600		0.1	6	0.5	0.57	15	4	50	5,760	6.26	6.47	6.70	6.95	7.51
IULR330-0070-0020-0200	0.7	0.02	2	0.55	0.67	15	4	50	6,480	2.12	2.20	2.28	2.36	2.55
IULR330-0070-0020-0400		0.02	4	0.55	0.67	15	4	50	6,480	4.19	4.34	4.49	4.66	5.04
IULR330-0070-0020-0600		0.02	6	0.55	0.67	15	4	50	6,480	6.26	6.48	6.71	6.96	7.52
IULR330-0070-0050-0200		0.05	2	0.55	0.67	15	4	50	6,480	2.12	2.20	2.27	2.36	2.54
IULR330-0070-0050-0400		0.05	4	0.55	0.67	15	4	50	6,480	4.19	4.34	4.49	4.66	5.03
IULR330-0070-0050-0600		0.05	6	0.55	0.67	15	4	50	6,480	6.26	6.47	6.71	6.96	7.52
IULR330-0070-0100-0200		0.1	2	0.55	0.67	15	4	50	6,480	2.12	2.19	2.27	2.35	2.53
IULR330-0070-0100-0400		0.1	4	0.55	0.67	15	4	50	6,480	4.19	4.33	4.48	4.65	5.02
IULR330-0070-0100-0600		0.1	6	0.55	0.67	15	4	50	6,480	6.26	6.47	6.70	6.95	7.51
IULR330-0080-0020-0200	0.8	0.02	2	0.65	0.77	15	4	50	6,480	2.12	2.20	2.28	2.36	2.55
IULR330-0080-0020-0400		0.02	4	0.65	0.77	15	4	50	6,480	4.19	4.34	4.49	4.66	5.04
IULR330-0080-0020-0600		0.02	6	0.65	0.77	15	4	50	6,480	6.26	6.48	6.71	6.96	7.52
IULR330-0080-0020-0800		0.02	8	0.65	0.77	15	4	50	6,720	8.33	8.62	8.93	9.26	10.01
IULR330-0080-0050-0200		0.05	2	0.65	0.77	15	4	50	6,480	2.12	2.20	2.27	2.36	2.54
IULR330-0080-0050-0400		0.05	4	0.65	0.77	15	4	50	6,480	4.19	4.34	4.49	4.66	5.03
IULR330-0080-0050-0600		0.05	6	0.65	0.77	15	4	50	6,480	6.26	6.47	6.71	6.96	7.52
IULR330-0080-0050-0800		0.05	8	0.65	0.77	15	4	50	6,720	8.33	8.61	8.92	9.26	10.00
IULR330-0080-0100-0200		0.1	2	0.65	0.77	15	4	50	6,480	2.12	2.19	2.27	2.35	2.53
IULR330-0080-0100-0400		0.1	4	0.65	0.77	15	4	50	6,480	4.19	4.33	4.48	4.65	5.02
IULR330-0080-0100-0600		0.1	6	0.65	0.77	15	4	50	6,480	6.26	6.47	6.70	6.95	7.51
IULR330-0080-0100-0800		0.1	8	0.65	0.77	15	4	50	6,720	8.32	8.61	8.92	9.25	9.99

# ion Depo Type U Series



사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Outside Tool	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IULR330-0080-0200-0200	0.8	0.2	2	0.65	0.77	15	4	50	6,480	2.12	2.19	2.26	2.33	2.51
IULR330-0080-0200-0400		0.2	4	0.65	0.77	15	4	50	6,480	4.19	4.32	4.47	4.63	5.00
IULR330-0080-0200-0600		0.2	6	0.65	0.77	15	4	50	6,480	6.25	6.46	6.69	6.93	7.48
IULR330-0080-0200-0800		0.2	8	0.65	0.77	15	4	50	6,720	8.32	8.60	8.91	9.23	9.97

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star T Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series

ion Depo Type U 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IULR330  
Model number: IULR330

롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
3	0.6	2	0.012	0.20	750	25,000	0.006	0.15	600	23,000	0.004	0.10	480	20,000
		4	0.007	0.20	600	23,000	0.004	0.15	450	20,000	0.003	0.10	300	18,000
		6	0.005	0.20	300	20,000	0.003	0.15	225	18,000	0.002	0.10	150	12,000
	0.7	2	0.012	0.25	1,050	25,000	0.006	0.15	900	23,000	0.003	0.12	675	20,000
		4	0.008	0.25	900	25,000	0.005	0.15	750	23,000	0.002	0.12	525	20,000
		6	0.005	0.25	525	20,000	0.003	0.15	375	18,000	0.002	0.12	300	16,000
	0.8	2	0.014	0.25	1,200	25,000	0.006	0.16	1,050	23,000	0.005	0.14	750	20,000
		4	0.008	0.25	1,050	25,000	0.005	0.16	900	23,000	0.003	0.14	600	20,000
		6	0.006	0.25	825	20,000	0.004	0.16	675	18,000	0.002	0.14	480	16,000
8		0.003	0.25	600	16,000	0.002	0.16	450	14,000	0.002	0.14	300	12,000	

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량, 절삭 각도를 정하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.

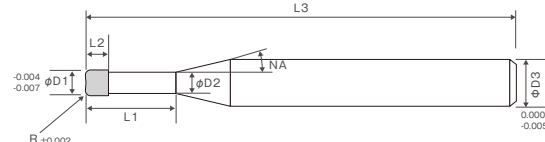
●오일 미스트 절삭액, 또는 분수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●SPM & FEED는 동일안 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type U Series

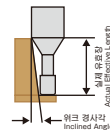
초경 롱 넥 래디우스 엔드밀  
Carbide Long Neck Radius End Mill

■형번: IULR430 Model number: IULR430

ion U super MG 날수 4 벨릭스각 30° 목각 15° Shank 0/-0.005



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

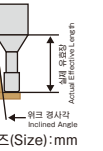


사이즈(Size): mm

●재연마가 가능한 공구의 세부사항에 대해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (JPY) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IULR430-0090-0100-0400	0.9	0.1	4	0.7	0.87	15	4	50	7,360	4.19	4.33	4.48	4.65	5.02
IULR430-0090-0100-0800		0.1	8	0.7	0.87	15	4	50	7,360	8.32	8.61	8.92	9.25	9.99
IULR430-0100-0020-0200		0.02	2	0.8	0.95	15	4	50	4,960	2.16	2.24	2.32	2.40	2.60
IULR430-0100-0020-0300		0.02	3	0.8	0.95	15	4	50	4,960	3.20	3.31	3.43	3.55	3.84
IULR430-0100-0020-0400		0.02	4	0.8	0.95	15	4	50	4,960	4.23	4.38	4.53	4.70	5.08
IULR430-0100-0020-0500		0.02	5	0.8	0.95	15	4	50	4,960	5.26	5.45	5.64	5.85	6.33
IULR430-0100-0020-0600		0.02	6	0.8	0.95	15	4	50	5,440	6.30	6.52	6.75	7.00	7.57
IULR430-0100-0020-0800		0.02	8	0.8	0.95	15	4	50	5,440	8.37	8.66	8.97	9.30	10.06
IULR430-0100-0020-1000		0.02	10	0.8	0.95	15	4	50	5,440	10.43	10.80	11.18	11.60	12.54
IULR430-0100-0050-0200		0.05	2	0.8	0.95	15	4	50	4,960	2.16	2.24	2.31	2.40	2.59
IULR430-0100-0050-0300		0.05	3	0.8	0.95	15	4	50	4,960	3.20	3.31	3.42	3.55	3.83
IULR430-0100-0050-0400		0.05	4	0.8	0.95	15	4	50	4,960	4.23	4.38	4.53	4.70	5.08
IULR430-0100-0050-0500		0.05	5	0.8	0.95	15	4	50	4,960	5.26	5.44	5.64	5.85	6.32
IULR430-0100-0050-0600		0.05	6	0.8	0.95	15	4	50	5,440	6.30	6.51	6.75	7.00	7.56
IULR430-0100-0050-0800		0.05	8	0.8	0.95	15	4	50	5,440	8.36	8.65	8.96	9.30	10.05
IULR430-0100-0050-1000		0.05	10	0.8	0.95	15	4	50	5,440	10.43	10.79	11.18	11.60	12.54
IULR430-0100-0100-0200	1	0.1	2	0.8	0.95	15	4	50	4,960	2.16	2.23	2.31	2.39	2.58
IULR430-0100-0100-0300		0.1	3	0.8	0.95	15	4	50	4,960	3.19	3.30	3.42	3.54	3.82
IULR430-0100-0100-0400		0.1	4	0.8	0.95	15	4	50	4,960	4.23	4.37	4.53	4.69	5.07
IULR430-0100-0100-0500		0.1	5	0.8	0.95	15	4	50	4,960	5.26	5.44	5.63	5.84	6.31
IULR430-0100-0100-0600		0.1	6	0.8	0.95	15	4	50	5,440	6.30	6.51	6.74	6.99	7.55
IULR430-0100-0100-0800		0.1	8	0.8	0.95	15	4	50	5,440	8.36	8.65	8.96	9.29	10.04
IULR430-0100-0100-1000		0.1	10	0.8	0.95	15	4	50	4,960	10.43	10.79	11.18	11.59	12.52
IULR430-0100-0200-0200		0.2	2	0.8	0.95	15	4	50	4,960	2.16	2.23	2.30	2.38	2.56
IULR430-0100-0200-0300		0.2	3	0.8	0.95	15	4	50	4,960	3.19	3.30	3.41	3.53	3.80
IULR430-0100-0200-0400		0.2	4	0.8	0.95	15	4	50	4,960	4.22	4.36	4.52	4.68	5.04
IULR430-0100-0200-0500		0.2	5	0.8	0.95	15	4	50	4,960	5.26	5.43	5.62	5.83	6.29
IULR430-0100-0200-0600		0.2	6	0.8	0.95	15	4	50	5,440	6.29	6.50	6.73	6.98	7.53
IULR430-0100-0200-0800		0.2	8	0.8	0.95	15	4	50	5,440	8.36	8.64	8.95	9.28	10.01
IULR430-0100-0200-1000		0.2	10	0.8	0.95	15	4	50	5,440	10.43	10.78	11.17	11.58	12.50

# ion Depo Type U Series

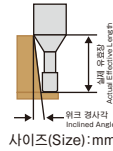


사이즈(Size): mm

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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (JPY) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IULR430-0100-0300-0200	1	0.3	2	0.8	0.95	15	4	50	4,960	2.15	2.22	2.29	2.36	2.53	
IULR430-0100-0300-0300		0.3	3	0.8	0.95	15	4	50	4,960	3.19	3.29	3.40	3.51	3.78	
IULR430-0100-0300-0400		0.3	4	0.8	0.95	15	4	50	4,960	4.22	4.36	4.50	4.66	5.02	
IULR430-0100-0300-0500		0.3	5	0.8	0.95	15	4	50	4,960	5.25	5.43	5.61	5.81	6.26	
IULR430-0100-0300-0600		0.3	6	0.8	0.95	15	4	50	5,440	6.29	6.50	6.72	6.96	7.51	
IULR430-0100-0300-0800		0.3	8	0.8	0.95	15	4	50	5,440	8.36	8.64	8.94	9.26	9.99	
IULR430-0100-0300-1000		0.3	10	0.8	0.95	15	4	50	5,440	10.42	10.78	11.15	11.56	12.48	
IULR430-0120-0100-0500		1.2	0.1	5	1	1.15	15	4	50	5,600	5.26	5.44	5.63	5.84	6.31
IULR430-0120-0100-1000	0.1		10	1	1.15	15	4	50	5,600	10.43	10.79	11.18	11.59	12.52	
IULR430-0120-0200-0500	0.2		5	1	1.15	15	4	50	5,600	5.26	5.43	5.62	5.83	6.29	
IULR430-0120-0200-1000	0.2		10	1	1.15	15	4	50	5,600	10.43	10.78	11.17	11.58	12.50	
IULR430-0120-0300-0500	0.3		5	1	1.15	15	4	50	5,600	5.25	5.43	5.61	5.81	6.26	
IULR430-0120-0300-1000	0.3		10	1	1.15	15	4	50	5,600	10.42	10.78	11.15	11.56	12.48	
IULR430-0150-0020-0300	1.5		0.02	3	1.2	1.45	15	4	50	5,280	3.20	3.31	3.43	3.55	3.84
IULR430-0150-0020-0400			0.02	4	1.2	1.45	15	4	50	5,280	4.23	4.38	4.53	4.70	5.08
IULR430-0150-0020-0600		0.02	6	1.2	1.45	15	4	50	5,280	6.30	6.52	6.75	7.00	7.57	
IULR430-0150-0020-0800		0.02	8	1.2	1.45	15	4	50	5,600	8.37	8.66	8.97	9.30	10.06	
IULR430-0150-0020-1200		0.02	12	1.2	1.45	15	4	50	5,600	12.50	12.93	13.40	13.90	15.03	
IULR430-0150-0020-1500		0.02	15	1.2	1.45	15	4	50	5,600	15.60	16.14	16.73	17.35	18.76	
IULR430-0150-0050-0300		0.05	3	1.2	1.45	15	4	50	5,280	3.20	3.31	3.42	3.55	3.83	
IULR430-0150-0050-0400		0.05	4	1.2	1.45	15	4	50	5,280	4.23	4.38	4.53	4.70	5.08	
IULR430-0150-0050-0600		0.05	6	1.2	1.45	15	4	50	5,280	6.30	6.51	6.75	7.00	7.56	
IULR430-0150-0050-0800		0.05	8	1.2	1.45	15	4	50	5,600	8.36	8.65	8.96	9.30	10.05	
IULR430-0150-0050-1200		0.05	12	1.2	1.45	15	4	50	5,600	12.50	12.93	13.40	13.90	15.02	
IULR430-0150-0050-1500		0.05	15	1.2	1.45	15	4	50	5,600	15.60	16.14	16.72	17.35	18.75	
IULR430-0150-0100-0300		0.1	3	1.2	1.45	15	4	50	5,280	3.19	3.30	3.42	3.54	3.82	
IULR430-0150-0100-0400		0.1	4	1.2	1.45	15	4	50	5,280	4.23	4.37	4.53	4.69	5.07	
IULR430-0150-0100-0600		0.1	6	1.2	1.45	15	4	50	5,280	6.30	6.51	6.74	6.99	7.55	
IULR430-0150-0100-0800		0.1	8	1.2	1.45	15	4	50	5,600	8.36	8.65	8.96	9.29	10.04	
IULR430-0150-0100-1200	0.1	12	1.2	1.45	15	4	50	5,600	12.50	12.93	13.39	13.89	15.01		
IULR430-0150-0100-1500	0.1	15	1.2	1.45	15	4	50	5,600	15.60	16.14	16.72	17.34	18.74		
IULR430-0150-0200-0300	0.2	3	1.2	1.45	15	4	50	5,280	3.19	3.30	3.41	3.53	3.80		
IULR430-0150-0200-0400	0.2	4	1.2	1.45	15	4	50	5,280	4.22	4.36	4.52	4.68	5.04		
IULR430-0150-0200-0600	0.2	6	1.2	1.45	15	4	50	5,280	6.29	6.50	6.73	6.98	7.53		
IULR430-0150-0200-0800	0.2	8	1.2	1.45	15	4	50	5,600	8.36	8.64	8.95	9.28	10.01		
IULR430-0150-0200-1200	0.2	12	1.2	1.45	15	4	50	5,600	12.49	12.92	13.38	13.88	14.99		
IULR430-0150-0200-1500	0.2	15	1.2	1.45	15	4	50	5,600	15.59	16.13	16.71	17.33	18.72		
IULR430-0150-0300-0300	0.3	3	1.2	1.45	15	4	50	5,280	3.19	3.29	3.40	3.51	3.78		
IULR430-0150-0300-0400	0.3	4	1.2	1.45	15	4	50	5,280	4.22	4.36	4.50	4.66	5.02		
IULR430-0150-0300-0600	0.3	6	1.2	1.45	15	4	50	5,280	6.29	6.50	6.72	6.96	7.51		
IULR430-0150-0300-0800	0.3	8	1.2	1.45	15	4	50	5,600	8.36	8.64	8.94	9.26	9.99		
IULR430-0150-0300-1200	0.3	12	1.2	1.45	15	4	50	5,600	12.49	12.92	13.37	13.86	14.96		
IULR430-0150-0300-1500	0.3	15	1.2	1.45	15	4	50	5,600	15.59	16.12	16.70	17.31	18.69		
IULR430-0150-0500-0300	0.5	3	1.2	1.45	15	4	50	5,280	3.18	3.27	3.37	3.48	3.73		
IULR430-0150-0500-0400	0.5	4	1.2	1.45	15	4	50	5,280	4.21	4.34	4.48	4.63	4.97		

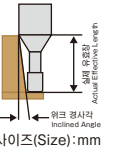
# ion Depo Type U Series



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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IULR430-0150-0500-0600	1.5	0.5	6	1.2	1.45	15	4	50	5,280	6.28	6.48	6.70	6.93	7.46
IULR430-0150-0500-0800		0.5	8	1.2	1.45	15	4	50	5,600	8.35	8.62	8.92	9.23	9.95
IULR430-0150-0500-1200		0.5	12	1.2	1.45	15	4	50	5,600	12.48	12.90	13.35	13.83	14.92
IULR430-0150-0500-1500		0.5	15	1.2	1.45	15	4	50	5,600	15.58	16.11	16.67	17.28	18.65
IULR430-0200-0020-0400	2	0.02	4	1.6	1.94	15	4	50	5,280	4.25	4.40	4.56	4.73	5.11
IULR430-0200-0020-0600		0.02	6	1.6	1.94	15	4	50	5,280	6.32	6.54	6.77	7.02	7.59
IULR430-0200-0020-0800		0.02	8	1.6	1.94	15	4	50	5,600	8.38	8.68	8.99	9.32	10.08
IULR430-0200-0020-1200		0.02	12	1.6	1.94	15	4	50	5,600	12.52	12.95	13.42	13.92	15.05
IULR430-0200-0020-1600		0.02	16	1.6	1.94	15	4	50	5,600	16.65	17.23	17.85	18.52	FREE
IULR430-0200-0020-2000		0.02	20	1.6	1.94	15	4	50	5,600	20.79	21.51	22.29	23.12	FREE
IULR430-0200-0050-0400		0.05	4	1.6	1.94	15	4	50	5,280	4.25	4.40	4.55	4.72	5.10
IULR430-0200-0050-0600		0.05	6	1.6	1.94	15	4	50	5,280	6.32	6.53	6.77	7.02	7.59
IULR430-0200-0050-0800		0.05	8	1.6	1.94	15	4	50	5,600	8.38	8.67	8.99	9.32	10.07
IULR430-0200-0050-1200		0.05	12	1.6	1.94	15	4	50	5,600	12.52	12.95	13.42	13.92	15.05
IULR430-0200-0050-1600		0.05	16	1.6	1.94	15	4	50	5,600	16.65	17.23	17.85	18.52	FREE
IULR430-0200-0050-2000		0.05	20	1.6	1.94	15	4	50	5,600	20.79	21.51	22.28	23.12	FREE
IULR430-0200-0100-0400		0.1	4	1.6	1.94	15	4	50	5,280	4.25	4.39	4.55	4.71	5.09
IULR430-0200-0100-0600		0.1	6	1.6	1.94	15	4	50	4,800	6.31	6.53	6.76	7.01	7.57
IULR430-0200-0100-0800		0.1	8	1.6	1.94	15	4	50	5,600	8.38	8.67	8.98	9.31	10.06
IULR430-0200-0100-1200		0.1	12	1.6	1.94	15	4	50	5,600	12.52	12.95	13.41	13.91	15.03
IULR430-0200-0100-1600		0.1	16	1.6	1.94	15	4	50	5,600	16.65	17.23	17.85	18.51	FREE
IULR430-0200-0100-2000		0.1	20	1.6	1.94	15	4	50	5,600	20.79	21.51	22.28	23.11	FREE
IULR430-0200-0200-0400		0.2	4	1.6	1.94	15	4	50	5,280	4.24	4.38	4.54	4.70	5.07
IULR430-0200-0200-0600		0.2	6	1.6	1.94	15	4	50	4,800	6.31	6.52	6.75	7.00	7.55
IULR430-0200-0200-0800		0.2	8	1.6	1.94	15	4	50	5,600	8.38	8.66	8.97	9.30	10.04
IULR430-0200-0200-1200		0.2	12	1.6	1.94	15	4	50	5,600	12.51	12.94	13.40	13.90	15.01
IULR430-0200-0200-1600		0.2	16	1.6	1.94	15	4	50	5,600	16.65	17.22	17.84	18.50	FREE
IULR430-0200-0200-2000		0.2	20	1.6	1.94	15	4	50	5,600	20.78	21.50	22.27	23.10	FREE
IULR430-0200-0300-0400		0.3	4	1.6	1.94	15	4	50	5,280	4.24	4.38	4.53	4.68	5.04
IULR430-0200-0300-0600		0.3	6	1.6	1.94	15	4	50	4,800	6.31	6.52	6.74	6.98	7.53
IULR430-0200-0300-0800		0.3	8	1.6	1.94	15	4	50	5,600	8.37	8.66	8.96	9.28	10.02
IULR430-0200-0300-1200		0.3	12	1.6	1.94	15	4	50	5,600	12.51	12.94	13.39	13.88	14.99
IULR430-0200-0300-1600	0.3	16	1.6	1.94	15	4	50	5,600	16.64	17.21	17.83	18.48	FREE	
IULR430-0200-0300-2000	0.3	20	1.6	1.94	15	4	50	5,600	20.78	21.49	22.26	23.08	FREE	
IULR430-0200-0500-0400	0.5	4	1.6	1.94	15	4	50	5,280	4.23	4.36	4.50	4.65	5.00	
IULR430-0200-0500-0600	0.5	6	1.6	1.94	15	4	50	5,280	6.30	6.50	6.72	6.95	7.48	
IULR430-0200-0500-0800	0.5	8	1.6	1.94	15	4	50	5,600	8.37	8.64	8.94	9.25	9.97	
IULR430-0200-0500-1200	0.5	12	1.6	1.94	15	4	50	5,600	12.50	12.92	13.37	13.85	14.94	
IULR430-0200-0500-1600	0.5	16	1.6	1.94	15	4	50	5,600	16.64	17.20	17.80	18.45	FREE	
IULR430-0200-0500-2000	0.5	20	1.6	1.94	15	4	50	5,600	20.77	21.48	22.24	23.05	FREE	
IULR430-0250-0100-1000	2.5	0.1	10	2	2.44	15	4	50	5,760	10.45	10.81	11.20	11.61	12.55
IULR430-0250-0100-2000		0.1	20	2	2.44	15	4	50	6,000	20.79	21.51	22.28	FREE	FREE
IULR430-0250-0200-1000		0.2	10	2	2.44	15	4	50	5,760	10.45	10.80	11.19	11.60	12.52
IULR430-0250-0200-2000		0.2	20	2	2.44	15	4	50	6,000	20.78	21.50	22.27	FREE	FREE
IULR430-0250-0300-1000		0.3	10	2	2.44	15	4	50	5,760	10.44	10.80	11.18	11.58	12.50

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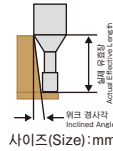


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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IULR430-0250-0300-2000	2.5	0.3	20	2	2.44	15	4	50	6,000	20.78	21.49	22.26	FREE	FREE
IULR430-0250-0500-1000		0.5	10	2	2.44	15	4	50	5,760	10.44	10.78	11.15	11.55	12.46
IULR430-0250-0500-2000		0.5	20	2	2.44	15	4	50	6,000	20.77	21.48	22.24	FREE	FREE
IULR430-0300-0050-0400		0.05	4	2.5	2.85	15	4	50	4,800	4.42	4.57	4.74	4.91	5.31
IULR430-0300-0050-0600	0.05	6	2.5	2.85	15	4	50	4,800	6.49	6.71	6.95	7.21	7.79	
IULR430-0300-0050-0800	0.05	8	2.5	2.85	15	4	50	4,800	8.56	8.85	9.17	9.51	FREE	
IULR430-0300-0050-1200	0.05	12	2.5	2.85	15	4	50	5,760	12.69	13.13	13.60	14.11	FREE	
IULR430-0300-0050-1600	0.05	16	2.5	2.85	15	4	50	7,200	16.83	17.41	18.04	FREE	FREE	
IULR430-0300-0050-2000	0.05	20	2.5	2.85	15	4	50	7,200	20.96	21.69	FREE	FREE	FREE	
IULR430-0300-0100-0400	0.1	4	2.5	2.85	15	4	50	4,800	4.42	4.57	4.73	4.91	5.30	
IULR430-0300-0100-0600	0.1	6	2.5	2.85	15	4	50	4,800	6.49	6.71	6.95	7.21	7.78	
IULR430-0300-0100-0800	0.1	8	2.5	2.85	15	4	50	4,800	8.56	8.85	9.17	9.51	FREE	
IULR430-0300-0100-1200	0.1	12	2.5	2.85	15	4	50	5,760	12.69	13.13	13.60	14.11	FREE	
IULR430-0300-0100-1600	0.1	16	2.5	2.85	15	4	50	7,200	16.82	17.41	18.03	FREE	FREE	
IULR430-0300-0100-2000	0.1	20	2.5	2.85	15	4	50	7,200	20.96	21.69	FREE	FREE	FREE	
IULR430-0300-0100-2500	0.1	25	2.5	2.85	15	4	60	7,200	26.13	27.03	FREE	FREE	FREE	
IULR430-0300-0100-3000	0.1	30	2.5	2.85	15	4	60	8,080	31.30	FREE	FREE	FREE	FREE	
IULR430-0300-0200-0400	0.2	4	2.5	2.85	15	4	50	4,800	4.42	4.56	4.72	4.89	5.27	
IULR430-0300-0200-0600	0.2	6	2.5	2.85	15	4	50	4,800	6.48	6.70	6.94	7.19	7.76	
IULR430-0300-0200-0800	0.2	8	2.5	2.85	15	4	50	4,800	8.55	8.84	9.16	9.49	FREE	
IULR430-0300-0200-1200	0.2	12	2.5	2.85	15	4	50	5,760	12.69	13.12	13.59	14.09	FREE	
IULR430-0300-0200-1600	0.2	16	2.5	2.85	15	4	50	7,200	16.82	17.40	18.02	FREE	FREE	
IULR430-0300-0200-2000	0.2	20	2.5	2.85	15	4	50	7,200	20.96	21.68	FREE	FREE	FREE	
IULR430-0300-0200-2500	0.2	25	2.5	2.85	15	4	60	7,200	26.12	27.03	FREE	FREE	FREE	
IULR430-0300-0200-3000	0.2	30	2.5	2.85	15	4	60	8,080	31.29	FREE	FREE	FREE	FREE	
IULR430-0300-0300-0400	0.3	4	2.5	2.85	15	4	50	4,800	4.41	4.56	4.71	4.88	5.25	
IULR430-0300-0300-0600	0.3	6	2.5	2.85	15	4	50	4,800	6.48	6.70	6.93	7.18	7.74	
IULR430-0300-0300-0800	0.3	8	2.5	2.85	15	4	50	4,800	8.55	8.84	9.14	9.48	FREE	
IULR430-0300-0300-1200	0.3	12	2.5	2.85	15	4	50	5,760	12.68	13.11	13.58	14.08	FREE	
IULR430-0300-0300-1600	0.3	16	2.5	2.85	15	4	50	7,200	16.82	17.39	18.01	FREE	FREE	
IULR430-0300-0300-2000	0.3	20	2.5	2.85	15	4	50	7,200	20.95	21.67	FREE	FREE	FREE	
IULR430-0300-0300-2500	0.3	25	2.5	2.85	15	4	60	7,200	26.12	27.02	FREE	FREE	FREE	
IULR430-0300-0300-3000	0.3	30	2.5	2.85	15	4	60	8,080	31.29	FREE	FREE	FREE	FREE	
IULR430-0300-0500-0400	0.5	4	2.5	2.85	15	4	50	4,800	4.41	4.54	4.69	4.85	5.20	
IULR430-0300-0500-0600	0.5	6	2.5	2.85	15	4	50	4,800	6.47	6.68	6.91	7.15	7.69	
IULR430-0300-0500-0800	0.5	8	2.5	2.85	15	4	50	4,800	8.54	8.82	9.12	9.45	FREE	
IULR430-0300-0500-1200	0.5	12	2.5	2.85	15	4	50	5,760	12.68	13.10	13.56			



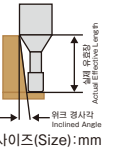
# ion Depo Type U Series



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코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.					
										30'	1°	1°30'	2°	3°	
IULR430-0300-1000-2500	3	1	25	2.5	2.85	15	4	60	7,200	26.10	26.97	FREE	FREE	FREE	
IULR430-0300-1000-3000		1	30	2.5	2.85	15	4	60	8,080	31.27	FREE	FREE	FREE	FREE	
IULR430-0400-0100-0800		0.1	8	3.2	3.8	15	6	50	7,200	8.65	8.95	9.27	9.61	10.39	
IULR430-0400-0100-1200	0.1	12	3.2	3.8	15	6	50	7,200	12.79	13.23	13.70	14.21	15.36		
IULR430-0400-0100-1600	0.1	16	3.2	3.8	15	6	50	7,200	16.92	17.51	18.14	18.81	FREE		
IULR430-0400-0100-2400	0.1	24	3.2	3.8	15	6	60	8,000	25.19	26.06	27.00	28.01	FREE		
IULR430-0400-0100-3200	0.1	32	3.2	3.8	15	6	70	8,000	33.46	34.62	35.87	FREE	FREE		
IULR430-0400-0200-0800	0.2	8	3.2	3.8	15	6	50	7,200	8.65	8.94	9.26	9.60	10.36		
IULR430-0400-0200-1200	0.2	12	3.2	3.8	15	6	50	7,200	12.78	13.22	13.69	14.20	15.33		
IULR430-0400-0200-1600	0.2	16	3.2	3.8	15	6	50	7,200	16.92	17.50	18.13	18.80	FREE		
IULR430-0400-0200-2400	0.2	24	3.2	3.8	15	6	60	8,000	25.19	26.06	26.99	28.00	FREE		
IULR430-0400-0200-3200	0.2	32	3.2	3.8	15	6	70	8,000	33.46	34.62	35.86	FREE	FREE		
IULR430-0400-0300-0800	4	0.3	8	3.2	3.8	15	6	50	7,200	8.65	8.94	9.25	9.58	10.34	
IULR430-0400-0300-1200		0.3	12	3.2	3.8	15	6	50	7,200	12.78	13.21	13.68	14.18	15.31	
IULR430-0400-0300-1600		0.3	16	3.2	3.8	15	6	50	7,200	16.91	17.49	18.11	18.78	FREE	
IULR430-0400-0300-2400		0.3	24	3.2	3.8	15	6	60	8,000	25.18	26.05	26.98	27.98	FREE	
IULR430-0400-0300-3200		0.3	32	3.2	3.8	15	6	70	8,000	33.45	34.61	35.85	FREE	FREE	
IULR430-0400-0500-0800		0.5	8	3.2	3.8	15	6	50	7,200	8.64	8.92	9.23	9.55	10.29	
IULR430-0400-0500-1200		0.5	12	3.2	3.8	15	6	50	7,200	12.77	13.20	13.66	14.15	15.27	
IULR430-0400-0500-1600		0.5	16	3.2	3.8	15	6	50	7,200	16.91	17.48	18.09	18.75	FREE	
IULR430-0400-0500-2400		0.5	24	3.2	3.8	15	6	60	8,000	25.18	26.04	26.96	27.95	FREE	
IULR430-0400-0500-3200		0.5	32	3.2	3.8	15	6	70	8,000	33.45	34.59	35.83	FREE	FREE	
IULR430-0400-1000-0800		1	8	3.2	3.8	15	6	50	7,200	8.62	8.89	9.17	9.48	10.18	
IULR430-0400-1000-1200		1	12	3.2	3.8	15	6	50	7,200	12.76	13.17	13.61	14.08	15.15	
IULR430-0400-1000-1600	1	16	3.2	3.8	15	6	50	7,200	16.89	17.45	18.04	18.68	FREE		
IULR430-0400-1000-2400	1	24	3.2	3.8	15	6	60	8,000	25.16	26.00	26.91	27.88	FREE		
IULR430-0400-1000-3200	1	32	3.2	3.8	15	6	70	8,000	33.43	34.56	35.77	FREE	FREE		
IULR430-0500-0100-1500	5	0.1	15	4	4.8	15	6	50	10,240	15.89	16.44	17.03	FREE	FREE	
IULR430-0500-0100-2000		0.1	20	4	4.8	15	6	50	10,240	21.06	21.79	FREE	FREE	FREE	
IULR430-0500-0100-4000		0.1	40	4	4.8	15	6	70	12,800	41.73	FREE	FREE	FREE	FREE	
IULR430-0500-0200-1500		0.2	15	4	4.8	15	6	50	10,240	15.88	16.43	17.02	FREE	FREE	
IULR430-0500-0200-2000		0.2	20	4	4.8	15	6	50	10,240	21.05	21.78	FREE	FREE	FREE	
IULR430-0500-0200-4000		0.2	40	4	4.8	15	6	70	12,800	41.73	FREE	FREE	FREE	FREE	
IULR430-0500-0300-1500		0.3	15	4	4.8	15	6	50	10,240	15.88	16.42	17.01	FREE	FREE	
IULR430-0500-0300-2000		0.3	20	4	4.8	15	6	50	10,240	21.05	21.77	FREE	FREE	FREE	
IULR430-0500-0300-4000		0.3	40	4	4.8	15	6	70	12,800	41.72	FREE	FREE	FREE	FREE	
IULR430-0500-0500-1500		0.5	15	4	4.8	15	6	50	10,240	15.87	16.41	16.98	FREE	FREE	
IULR430-0500-0500-2000		0.5	20	4	4.8	15	6	50	10,240	21.04	21.76	FREE	FREE	FREE	
IULR430-0500-0500-4000		0.5	40	4	4.8	15	6	70	12,800	41.72	FREE	FREE	FREE	FREE	
IULR430-0500-1000-1500		1	15	4	4.8	15	6	50	10,240	15.86	16.38	16.93	FREE	FREE	
IULR430-0500-1000-2000		1	20	4	4.8	15	6	50	10,240	21.03	21.72	FREE	FREE	FREE	
IULR430-0500-1000-4000		1	40	4	4.8	15	6	70	12,800	41.70	FREE	FREE	FREE	FREE	
IULR430-0600-0100-1200		6	0.1	12	5	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0100-1800			0.1	18	5	5.8	15	6	50	13,200	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0100-2400			0.1	24	5	5.8	15	6	60	13,200	FREE	FREE	FREE	FREE	FREE

# ion Depo Type U Series



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	코너 (R) Corner Radius	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤희 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IULR430-0600-0100-4800	6	0.1	48	5	5.8	15	6	80	16,080	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0200-1200		0.2	12	5	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0200-1800		0.2	18	5	5.8	15	6	50	13,200	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0200-2400		0.2	24	5	5.8	15	6	60	13,200	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0200-4800		0.2	48	5	5.8	15	6	80	16,080	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0300-1200		0.3	12	5	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0300-1800		0.3	18	5	5.8	15	6	50	13,200	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0300-2400		0.3	24	5	5.8	15	6	60	13,200	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0300-4800		0.3	48	5	5.8	15	6	80	16,080	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0500-1200		0.5	12	5	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0500-1800		0.5	18	5	5.8	15	6	50	13,200	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0500-2400		0.5	24	5	5.8	15	6	60	13,200	FREE	FREE	FREE	FREE	FREE
IULR430-0600-0500-4800		0.5	48	5	5.8	15	6	80	16,080	FREE	FREE	FREE	FREE	FREE
IULR430-0600-1000-1200		1	12	5	5.8	15	6	50	10,400	FREE	FREE	FREE	FREE	FREE
IULR430-0600-1000-1800		1	18	5	5.8	15	6	50	13,200	FREE	FREE	FREE	FREE	FREE
IULR430-0600-1000-2400		1	24	5	5.8	15	6	60	13,200	FREE	FREE	FREE	FREE	FREE
IULR430-0600-1000-4800		1	48	5	5.8	15	6	80	16,080	FREE	FREE	FREE	FREE	FREE

## ion Depo Type U 추천 절삭 조건표 Recommended Milling Conditions

■형번: IULR430  
Model number: IULR430

### 롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm			
4	0.9	4	0.03	0.3	1,700	25,000	0.02	0.2	1,400	20,000	0.01	0.15	1,200	18,000	
			8	0.01	0.3	800	16,000	0.008	0.2	700	14,000	0.005	0.15	500	10,000
		2	0.012	0.3	2,300	25,000	0.01	0.25	2,000	21,000	0.008	0.2	1,400	17,000	
			3	0.012	0.3	2,100	23,000	0.01	0.25	1,800	20,000	0.008	0.2	1,300	16,000
			4	0.01	0.3	1,800	21,000	0.008	0.25	1,500	18,000	0.005	0.2	1,100	14,000
			5	0.008	0.3	1,600	19,000	0.005	0.25	1,400	16,000	0.003	0.2	1,000	13,000
	1.0	6	0.008	0.3	1,400	16,000	0.005	0.25	1,200	14,000	0.003	0.2	850	11,000	
		8	0.006	0.3	1,100	15,000	0.005	0.25	900	13,000	0.002	0.2	650	10,000	
		10	0.004	0.3	800	13,000	0.003	0.25	700	11,000	0.002	0.2	500	9,000	
		1.2	5	0.045	0.4	1,800	20,000	0.03	0.3	1,500	17,000	0.02	0.2	1,100	14,000
	10		0.03	0.4	1,100	13,000	0.01	0.3	950	11,000	0.005	0.2	700	9,000	
	1.5	3	0.012	0.5	2,300	23,000	0.01	0.4	2,000	20,000	0.008	0.3	1,400	16,000	
			4	0.012	0.5	2,000	21,000	0.01	0.4	1,700	18,000	0.008	0.3	1,200	14,000
		6	0.01	0.5	1,800	19,000	0.008	0.4	1,500	16,000	0.005	0.3	1,100	13,000	
			8	0.01	0.5	1,500	16,000	0.008	0.4	1,300	14,000	0.003	0.3	900	11,000
		12	0.008	0.5	1,100	13,000	0.005	0.4	950	11,000	0.002	0.3	650	9,000	
			15	0.005	0.5	800	11,000	0.003	0.4	700	9,000	0.002	0.3	500	7,000
	2	4	0.015	0.6	2,300	20,000	0.012	0.5	2,000	17,000	0.008	0.35	1,400	14,000	
			6	0.015	0.6	2,100	18,000	0.012	0.5	1,800	15,000	0.008	0.35	1,300	12,000
		8	0.012	0.6	1,800	16,000	0.01	0.5	1,500	14,000	0.005	0.35	1,100	11,000	
			12	0.01	0.6	1,400	13,000	0.008	0.5	1,200	11,000	0.003	0.35	850	9,000
		16	0.008	0.6	1,100	11,000	0.005	0.5	950	9,500	0.002	0.35	650	7,500	
			20	0.005	0.6	650	8,000	0.003	0.5	550	7,000	0.002	0.35	400	5,500
	2.5	10	0.07	0.7	1,800	13,000	0.05	0.5	1,500	11,000	0.03	0.5	1,100	9,000	
20		0.04	0.7	1,100	9,000	0.02	0.5	950	7,500	0.01	0.5	650	6,000		
3	4	0.1	0.8	2,300	15,000	0.07	0.7	550	13,000	0.05	0.6	1,400	10,000		
		6	0.1	0.8	2,100	13,000	0.07	0.7	2,000	11,000	0.05	0.6	1,300	9,000	
	8	0.1	0.8	1,800	11,000	0.07	0.7	1,800	9,500	0.05	0.6	1,100	7,500		
		12	0.08	0.8	1,600	11,000	0.06	0.7	1,400	9,500	0.04	0.6	1,000	7,500	
	16	0.07	0.8	1,500	10,000	0.05	0.7	1,200	8,500	0.03	0.6	900	7,000		
		20	0.05	0.8	1,100	8,000	0.04	0.7	950	7,000	0.02	0.6	700	5,500	
	25	0.04	0.8	1,000	7,500	0.02	0.7	850	6,500	0.01	0.6	600	5,000		
		30	0.03	0.8	650	6,500	0.02	0.7	550	5,500	0.007	0.6	400	4,500	
4	8	0.15	1.2	2,100	10,000	0.08	1	1,800	8,500	0.06	0.8	1,300	7,000		
		12	0.15	1.2	2,100	10,000	0.08	1	1,800	8,500	0.06	0.8	1,300	7,000	
	16	0.1	1.2	1,800	8,000	0.06	1	1,500	7,000	0.05	0.8	1,100	5,500		
		20	0.08	1.2	1,400	7,000	0.05	1	1,200	6,000	0.03	0.8	800	5,000	
	24	0.08	1.2	1,300	6,500	0.05	1	1,100	5,500	0.03	0.8	750	4,500		
		32	0.04	1.2	1,100	5,500	0.02	1	950	4,500	0.01	0.8	650	3,500	
5	15	0.15	2	2,000	8,000	0.08	1.6	1,700	7,000	0.06	1.2	1,200	5,500		
	20	0.1	2	1,600	6,500	0.07	1.6	1,400	5,500	0.05	1.2	1,000	4,500		
	40	0.05	2	1,000	4,000	0.02	1.6	850	3,500	0.01	1.2	600	3,000		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 클린트, 또는 불수용성 절삭액 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

### 롱 넥 래디우스 엔드밀 Long Neck Radius End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm			
4	6	12	0.18	2.5	2,100	6,500	0.08	2	1,800	5,500	0.06	1.5	1,300	4,500	
			18	0.18	2.5	1,800	5,500	0.08	2	1,500	4,500	0.06	1.5	1,100	3,500
			24	0.15	2.5	1,500	5,000	0.07	2	1,300	4,000	0.05	1.5	900	3,000
			48	0.05	2.5	750	2,500	0.03	2	650	2,000	0.02	1.5	450	2,000

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

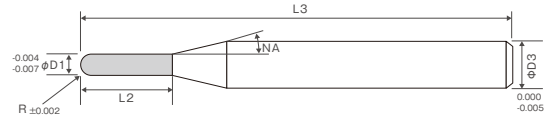
●오일 미스트 클린트, 또는 불수용성 절삭액 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type U Series

초경 볼 엔드밀 Carbide Ball End Mill

■형번:IUB230 Model number:IUB230

ion U super MG 날수 2 헬릭스각 30° 목각 15° Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	볼 반경 (R) Ball R	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IUB230-0010-0050-00010	0.05	0.1	0.1	15	4	50	8,640
IUB230-0015-0075-00015	0.075	0.15	0.15	15	4	50	8,400
IUB230-0020-0100-00020	0.1	0.2	0.2	15	4	50	6,880
IUB230-0030-0150-00030	0.15	0.3	0.3	15	4	50	4,960
IUB230-0040-0200-00060	0.2	0.6	0.4	15	4	50	3,360
IUB230-0050-0250-00080	0.25	0.8	0.5	15	4	50	3,120
IUB230-0060-0300-00090	0.3	0.9	0.6	15	4	50	3,040
IUB230-0080-0400-00120	0.4	1.2	0.8	15	4	50	3,040
IUB230-0100-0500-00150	0.5	1.5	1	15	4	50	2,800
IUB230-0150-0750-00230	0.75	2.3	1.5	15	4	50	3,360
IUB230-0200-1000-00300	1	3	2	15	4	50	3,040
IUB230-0250-1250-00380	1.25	3.8	2.5	15	4	50	4,240
IUB230-0300-1500-00500	1.5	5	3	15	4	50	3,040
IUB230-0400-2000-00600	2	6	4	15	6	50	3,440
IUB230-0500-2500-00800	2.5	8	5	15	6	50	4,160
IUB230-0600-3000-01000	3	10	6	—	6	50	4,320
IUB230-0800-4000-01200	4	12	8	—	8	70	10,960
IUB230-1000-5000-01500	5	15	10	—	10	80	14,080
IUB230-1200-6000-02000	6	20	12	—	12	110	20,240
IUB230-1600-8000-02400	8	24	16	—	16	160	32,000
IUB230-1800-9000-02700	9	27	18	—	18	180	40,080
IUB230-2000-10000-03000	10	30	20	—	20	180	49,920

# ion Depo Type U Series

ion Depo Type U 추천 절삭 조건표

Recommended Milling Conditions

■형번:IUB230

Model number:IUB230

볼 엔드밀 Ball End Mill

피삭재 Work Material	고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)						고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)				
	날수 Number of Flutes	외경 Dia.	날장 Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
				∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.1	0.1	0.003	0.005	120	40,000	0.002	0.005	100	40,000	0.002	0.003	70	40,000	
	0.15	0.15	0.003	0.005	180	40,000	0.002	0.005	150	40,000	0.002	0.003	100	40,000	
	0.2	0.2	0.01	0.01	350	40,000	0.006	0.005	300	40,000	0.003	0.003	200	40,000	
	0.3	0.3	0.01	0.015	350	40,000	0.007	0.01	300	40,000	0.003	0.005	280	40,000	
	0.4	0.6	0.03	0.05	800	40,000	0.03	0.03	720	40,000	0.009	0.02	580	40,000	
	0.5	0.8	0.03	0.05	1,000	40,000	0.02	0.03	860	40,000	0.01	0.02	650	40,000	
	0.6	0.9	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	
	0.8	1.2	0.1	0.15	2,000	40,000	0.07	0.1	1,600	40,000	0.05	0.1	1,200	30,000	
	1	1.5	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000	
	1.5	2.3	0.15	0.3	3,000	30,000	0.1	0.3	2,500	30,000	0.1	0.2	2,000	25,000	
	2	3	0.2	0.5	3,000	25,000	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000	
	2.5	3.8	0.3	0.4	2,800	20,000	0.2	0.5	2,300	20,000	0.15	0.4	2,000	18,000	
	3	5	0.2	0.8	3,000	20,000	0.2	0.6	2,500	18,000	0.2	0.5	2,000	14,000	
	4	6	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000	
	5	8	0.3	1.5	3,000	18,000	0.2	1.2	2,500	12,000	0.2	0.7	2,000	9,200	
	6	10	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000	
	8	12	0.4	2.4	450	3,600	0.35	1.8	400	2,600	0.35	1.8	350	2,600	
	10	15	0.5	2	450	2,900	0.45	1.5	400	1,900	0.45	1.5	350	1,900	
	12	20	0.6	2.4	450	2,400	0.55	2	400	1,400	0.55	2	350	1,400	
	16	24	0.8	3.2	450	1,800	0.75	2	400	1,000	0.75	2	350	1,000	
18	27	0.9	3.6	450	1,600	0.85	2	400	900	0.85	2	350	900		
20	30	1	4	450	1,450	0.9	2.5	400	800	0.9	2.5	350	800		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 절삭 가능할 때까지의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●RPM, FEED는 동위원 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

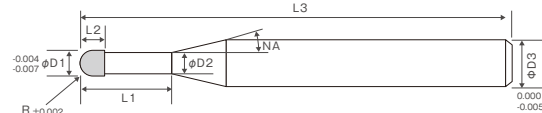
●드릴 미스트 플런저, 또는 물용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동위원 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type U Series

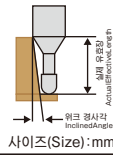
초경 롱 넥 볼 엔드밀  
Carbide Long Neck Ball End Mill

■형번: IULB230 Model number: IULB230

ion U super MG 날수 2 벨릭스각 30° 목각 15° Shank 0/-0.005



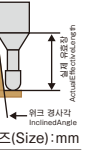
표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.



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코드 No. Code No.	볼 반경 (R) Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IULB230-0010-0050-0020	0.05	0.2	0.07	0.1	0.08	15	4	50	8,240	0.24	0.25	0.26	0.27	0.28
IULB230-0010-0050-0030		0.3	0.07	0.1	0.08	15	4	50	8,240	0.35	0.36	0.37	0.38	0.41
IULB230-0010-0050-0050		0.5	0.07	0.1	0.08	15	4	50	8,960	0.55	0.57	0.59	0.61	0.66
IULB230-0015-0075-0030	0.075	0.3	0.1	0.15	0.13	15	4	50	9,600	0.35	0.36	0.37	0.38	0.40
IULB230-0015-0075-0050		0.5	0.1	0.15	0.13	15	4	50	10,160	0.55	0.57	0.59	0.61	0.65
IULB230-0020-0100-0030	0.1	0.3	0.15	0.2	0.18	15	4	50	5,760	0.35	0.35	0.36	0.37	0.40
IULB230-0020-0100-0050		0.5	0.15	0.2	0.18	15	4	50	5,760	0.55	0.57	0.58	0.60	0.64
IULB230-0020-0100-0075		0.75	0.15	0.2	0.18	15	4	50	5,760	0.81	0.84	0.86	0.89	0.96
IULB230-0020-0100-0100	0.15	1	0.15	0.2	0.18	15	4	50	5,760	1.07	1.10	1.14	1.18	1.27
IULB230-0030-0150-0050		0.5	0.2	0.3	0.27	15	4	50	5,680	0.57	0.58	0.60	0.62	0.66
IULB230-0030-0150-0060		0.6	0.2	0.3	0.27	15	4	50	5,680	0.67	0.69	0.71	0.73	0.78
IULB230-0030-0150-0075	0.15	0.75	0.2	0.3	0.27	15	4	50	5,680	0.83	0.85	0.88	0.90	0.97
IULB230-0030-0150-0100		1	0.2	0.3	0.27	15	4	50	5,680	1.09	1.12	1.15	1.19	1.28
IULB230-0030-0150-0125		1.25	0.2	0.3	0.27	15	4	50	6,080	1.34	1.39	1.43	1.48	1.59
IULB230-0030-0150-0150	0.2	1.5	0.2	0.3	0.27	15	4	50	6,080	1.60	1.65	1.71	1.77	1.90
IULB230-0030-0150-0175		1.75	0.2	0.3	0.27	15	4	50	6,080	1.86	1.92	1.99	2.05	2.21
IULB230-0030-0150-0200		2	0.2	0.3	0.27	15	4	50	6,080	2.12	2.19	2.26	2.34	2.52
IULB230-0030-0150-0225	0.25	2.25	0.2	0.3	0.27	15	4	50	6,240	2.38	2.46	2.54	2.63	2.83
IULB230-0030-0150-0250		2.5	0.2	0.3	0.27	15	4	50	6,240	2.64	2.72	2.82	2.92	3.14
IULB230-0030-0150-0300		3	0.2	0.3	0.27	15	4	50	6,240	3.15	3.26	3.37	3.49	3.76
IULB230-0040-0200-0050	0.2	0.5	0.3	0.4	0.37	15	4	50	3,920	0.57	0.58	0.59	0.61	0.64
IULB230-0040-0200-0080		0.8	0.3	0.4	0.37	15	4	50	3,920	0.88	0.90	0.93	0.95	1.02
IULB230-0040-0200-0100		1	0.3	0.4	0.37	15	4	50	3,920	1.08	1.12	1.15	1.18	1.27
IULB230-0040-0200-0150	0.25	1.5	0.3	0.4	0.37	15	4	50	4,000	1.60	1.65	1.70	1.76	1.89
IULB230-0040-0200-0200		2	0.3	0.4	0.37	15	4	50	4,080	2.12	2.19	2.26	2.33	2.51
IULB230-0040-0200-0250		2.5	0.3	0.4	0.37	15	4	50	4,240	2.64	2.72	2.81	2.91	3.13
IULB230-0040-0200-0300	0.25	3	0.3	0.4	0.37	15	4	50	4,480	3.15	3.26	3.37	3.48	3.75
IULB230-0050-0250-0100		1	0.35	0.5	0.47	15	4	50	3,920	1.08	1.11	1.14	1.18	1.26
IULB230-0050-0250-0150		1.5	0.5	0.5	0.47	15	4	50	3,920	1.60	1.65	1.70	1.75	1.88
IULB230-0050-0250-0200	0.25	2	0.35	0.5	0.47	15	4	50	3,920	2.12	2.18	2.25	2.33	2.50

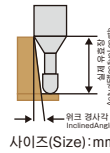
# ion Depo Type U Series



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코드 No. Code No.	볼 반경 (R) Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IULB230-0050-0250-0250	0.25	2.5	0.35	0.5	0.47	15	4	50	3,920	2.63	2.72	2.81	2.90	3.12
IULB230-0050-0250-0300		3	0.5	0.5	0.47	15	4	50	3,920	3.15	3.25	3.36	3.48	3.74
IULB230-0050-0250-0350		3.5	0.35	0.5	0.47	15	4	50	3,920	3.67	3.79	3.91	4.05	4.36
IULB230-0050-0250-0400		4	0.35	0.5	0.47	15	4	50	3,920	4.18	4.32	4.47	4.63	4.98
IULB230-0060-0300-0100	0.3	1	0.45	0.6	0.57	15	4	50	3,360	1.08	1.11	1.14	1.17	1.24
IULB230-0060-0300-0150		1.5	0.45	0.6	0.57	15	4	50	3,040	1.60	1.64	1.69	1.74	1.87
IULB230-0060-0300-0200		2	0.45	0.6	0.57	15	4	50	3,040	2.12	2.18	2.25	2.32	2.49
IULB230-0060-0300-0250		2.5	0.45	0.6	0.57	15	4	50	3,120	2.63	2.71	2.80	2.89	3.11
IULB230-0060-0300-0300	0.3	3	0.45	0.6	0.57	15	4	50	3,120	3.15	3.25	3.35	3.47	3.73
IULB230-0060-0300-0350		3.5	0.45	0.6	0.57	15	4	50	3,200	3.67	3.78	3.91	4.04	4.35
IULB230-0060-0300-0400		4	0.45	0.6	0.57	15	4	50	3,200	4.18	4.32	4.46	4.62	4.97
IULB230-0060-0300-0450		4.5	0.45	0.6	0.57	15	4	50	3,200	4.70	4.85	5.02	5.19	5.59
IULB230-0060-0300-0500	0.35	5	0.45	0.6	0.57	15	4	50	3,200	5.22	5.39	5.57	5.77	6.22
IULB230-0060-0300-0550		5.5	0.45	0.6	0.57	15	4	50	3,200	5.73	5.92	6.13	6.34	6.84
IULB230-0060-0300-0600		6	0.45	0.6	0.57	15	4	50	3,200	6.25	6.46	6.68	6.92	7.46
IULB230-0070-0350-0200		0.4	2	0.5	0.7	0.67	15	4	50	3,440	2.11	2.18	2.24	2.31
IULB230-0070-0350-0400	4		0.5	0.7	0.67	15	4	50	3,680	4.18	4.31	4.46	4.61	4.96
IULB230-0070-0350-0600	6		0.5	0.7	0.67	15	4	50	3,680	6.25	6.45	6.67	6.91	7.45
IULB230-0080-0400-0200	0.4		2	0.6	0.8	0.77	15	4	50	3,040	2.11	2.17	2.24	2.31
IULB230-0080-0400-0300		3	0.6	0.8	0.77	15	4	50	3,200	3.15	3.24	3.34	3.46	3.71
IULB230-0080-0400-0400		4	0.6	0.8	0.77	15	4	50	3,200	4.18	4.31	4.45	4.60	4.95
IULB230-0080-0400-0500		5	0.6	0.8	0.77	15	4	50	3,200	5.21	5.38	5.56	5.75	6.19
IULB230-0080-0400-0600	0.45	6	0.6	0.8	0.77	15	4	50	3,200	6.25	6.45	6.67	6.90	7.44
IULB230-0080-0400-0700		7	0.6	0.8	0.77	15	4	50	3,200	7.28	7.52	7.78	8.05	8.68
IULB230-0080-0400-0800		8	0.6	0.8	0.77	15	4	50	3,200	8.31	8.59	8.89	9.20	9.92
IULB230-0090-0450-0200		0.5	2	0.65	0.9	0.87	15	4	50	3,440	2.11	2.17	2.23	2.30
IULB230-0090-0450-0400	4		0.65	0.9	0.87	15	4	50	3,680	4.18	4.31	4.45	4.60	4.94
IULB230-0090-0450-0600	6		0.65	0.9	0.87	15	4	50	3,680	6.24	6.45	6.66	6.90	7.42
IULB230-0090-0450-0800	8		0.65	0.9	0.87	15	4	50	3,680	8.31	8.59	8.88	9.20	9.91
IULB230-0100-0500-0200	0.5	2	0.75	1	0.95	15	4	50	2,560	2.15	2.20	2.27	2.33	2.49
IULB230-0100-0500-0250		2.5	0.75	1	0.95	15	4	50	2,560	2.66	2.74	2.82	2.91	3.11
IULB230-0100-0500-0300		3	0.8	1	0.95	15	4	50	2,560	3.18	3.27	3.37	3.48	3.73
IULB230-0100-0500-0400		4	0.75	1	0.95	15	4	50	2,880	4.21	4.34	4.48	4.63	4.97
IULB230-0100-0500-0500	0.5	5	0.75	1	0.95	15	4	50	2,880	5.25	5.41	5.59	5.78	6.22
IULB230-0100-0500-0600		6	0.8	1	0.95	15	4	50	3,120	6.28	6.48	6.70	6.93	7.46
IULB230-0100-0500-0700		7	0.75	1	0.95	15	4	50	3,120	7.32	7.55	7.81	8.08	8.70
IULB230-0100-0500-0800		8	0.75	1	0.95	15	4	50	3,120	8.35	8.62	8.92	9.23	9.95
IULB230-0100-0500-0900	0.6	9	0.75	1	0.95	15	4	50	3,120	9.38	9.69	10.02	10.38	11.19
IULB230-0100-0500-1000		10	0.8	1	0.95	15	4	50	3,120	10.42	10.76	11.13	11.53	12.43
IULB230-0100-0500-1200		12	0.75	1	0.95	15	4	50	3,120	12.48	12.90	13.35	13.83	14.92
IULB230-0120-0600-0240		0.6	2.4	0.9	1.2	1.15	15	4	50	3,840	2.56	2.63	2.70	2.78
IULB230-0120-0600-0400	4		0.9	1.2	1.15	15	4	50	3,840	4.21	4.34	4.47	4.62	4.95
IULB230-0120-0600-0600	6		0.9	1.2	1.15	15	4	50	4,160	6.28	6.48	6.69	6.92	7.44
IULB230-0120-0600-0800	8		0.9	1.2	1.15	15	4	50	4,160	8.35	8.62	8.91	9.22	9.92
IULB230-0120-0600-1000	0.6	10	0.9	1.2	1.15	15	4	50	4,160	10.41	10.76	11.12	11.52	12.41

# ion Depo Type U Series

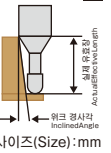


사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	볼 반경 Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IULB230-0120-0600-1200	0.6	12	0.9	1.2	1.15	15	4	50	4,160	12.48	12.89	13.34	13.82	14.90
IULB230-0140-0700-0800	0.7	8	1	1.4	1.35	15	4	50	3,600	8.34	8.61	8.90	9.20	9.90
IULB230-0140-0700-1200		12	1	1.4	1.35	15	4	50	3,600	12.48	12.89	13.33	13.80	14.87
IULB230-0140-0700-1600		16	1	1.4	1.35	15	4	50	3,600	16.61	17.17	17.76	18.40	19.84
IULB230-0150-0750-0300		3	1.1	1.5	1.45	15	4	50	2,960	3.17	3.26	3.35	3.45	3.67
IULB230-0150-0750-0400	0.75	4	1.1	1.5	1.45	15	4	50	2,960	4.21	4.33	4.46	4.60	4.92
IULB230-0150-0750-0600		6	1.1	1.5	1.45	15	4	50	2,960	6.27	6.47	6.67	6.90	7.40
IULB230-0150-0750-0800		8	1.1	1.5	1.45	15	4	50	3,120	8.34	8.61	8.89	9.20	9.89
IULB230-0150-0750-1000		10	1.1	1.5	1.45	15	4	50	3,360	10.41	10.74	11.11	11.50	12.37
IULB230-0150-0750-1200		12	1.1	1.5	1.45	15	4	50	3,600	12.48	12.88	13.32	13.80	14.86
IULB230-0150-0750-1400		14	1.1	1.5	1.45	15	4	50	3,600	14.54	15.02	15.54	16.09	17.35
IULB230-0150-0750-1600		16	1.1	1.5	1.45	15	4	50	3,600	16.61	17.16	17.76	18.39	19.83
IULB230-0160-0800-0800		0.8	8	1.2	1.6	1.55	15	4	50	4,160	8.34	8.60	8.88	9.19
IULB230-0160-0800-1200	12		1.2	1.6	1.55	15	4	50	4,160	12.47	12.88	13.32	13.79	14.85
IULB230-0160-0800-1600	16		1.2	1.6	1.55	15	4	50	4,160	16.61	17.16	17.75	18.39	19.82
IULB230-0200-1000-0300	1	3	1.5	2	1.94	15	4	50	2,560	3.18	3.26	3.34	3.43	3.64
IULB230-0200-1000-0400		4	1.5	2	1.94	15	4	50	2,560	4.22	4.33	4.45	4.58	4.88
IULB230-0200-1000-0600		6	1.5	2	1.94	15	4	50	2,880	6.28	6.47	6.67	6.88	7.37
IULB230-0200-1000-0800		8	1.5	2	1.94	15	4	50	3,120	8.35	8.61	8.88	9.18	9.85
IULB230-0200-1000-1000		10	1.5	2	1.94	15	4	50	3,120	10.42	10.75	11.10	11.48	12.34
IULB230-0200-1000-1200		12	1.5	2	1.94	15	4	50	3,120	12.49	12.89	13.32	13.78	14.83
IULB230-0200-1000-1300		13	1.5	2	1.94	15	4	50	3,120	13.52	13.96	14.43	14.93	16.07
IULB230-0200-1000-1400		14	1.5	2	1.94	15	4	50	3,120	14.55	15.03	15.53	16.08	17.31
IULB230-0200-1000-1600		16	1.5	2	1.94	15	4	50	3,120	16.62	17.17	17.75	18.38	19.80
IULB230-0200-1000-1800		18	1.5	2	1.94	15	4	50	3,120	18.69	19.30	19.97	20.68	FREE
IULB230-0200-1000-2000		20	1.5	2	1.94	15	4	50	3,120	20.76	21.44	22.18	22.98	FREE
IULB230-0250-1250-0600		1.25	6	2.3	2.5	2.44	15	4	50	3,840	6.28	6.45	6.64	6.84
IULB230-0250-1250-0800	8		2.3	2.5	2.44	15	4	50	3,360	8.34	8.59	8.86	9.14	9.80
IULB230-0250-1250-1000	10		2.3	2.5	2.44	15	4	50	4,080	10.41	10.73	11.07	11.44	12.28
IULB230-0250-1250-1500	15		2.3	2.5	2.44	15	4	50	4,160	15.58	16.08	16.62	17.19	FREE
IULB230-0250-1250-2000	20		2.3	2.5	2.44	15	4	50	4,880	20.75	21.43	22.16	FREE	FREE
IULB230-0300-1500-0600	1.5	6	2.5	3	2.85	15	4	50	3,120	6.44	6.61	6.80	7.00	7.46
IULB230-0300-1500-0800		8	2.5	3	2.85	15	4	50	3,120	8.51	8.75	9.02	9.30	9.95
IULB230-0300-1500-1000		10	2.5	3	2.85	15	4	50	3,600	10.58	10.89	11.23	11.60	FREE
IULB230-0300-1500-1200		12	2.5	3	2.85	15	4	50	3,760	12.64	13.03	13.45	13.90	FREE
IULB230-0300-1500-1400		14	2.5	3	2.85	15	4	50	4,160	14.71	15.17	15.67	FREE	FREE
IULB230-0300-1500-1600		16	2.5	3	2.85	15	4	50	4,160	16.78	17.31	17.88	FREE	FREE
IULB230-0300-1500-2000		20	2.5	3	2.85	15	4	50	4,000	20.91	21.59	FREE	FREE	FREE
IULB230-0300-1500-2500		25	2.5	3	2.85	15	4	60	4,000	26.08	26.94	FREE	FREE	FREE
IULB230-0300-1500-3000		30	2.5	3	2.85	15	4	60	4,560	31.25	FREE	FREE	FREE	FREE
IULB230-0350-1750-1500	1.75	15	2.8	3.5	3.35	15	6	50	5,280	15.74	16.22	16.75	17.31	18.59
IULB230-0350-1750-2000		20	2.8	3.5	3.35	15	6	50	5,280	20.90	21.57	22.29	23.06	24.81
IULB230-0350-1750-2500		25	2.8	3.5	3.35	15	6	60	5,600	26.07	26.92	27.83	28.81	FREE
IULB230-0350-1750-3000		30	2.8	3.5	3.35	15	6	60	5,600	31.24	32.27	33.37	34.56	FREE
IULB230-0350-1750-3500		35	2.8	3.5	3.35	15	6	70	7,200	36.41	37.62	38.91	FREE	FREE

# ion Depo Type U Series



사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	볼 반경 Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30'	1°	1°30'	2°	3°
IULB230-0400-2000-0800	2	8	3	4	3.8	15	6	50	3,200	8.59	8.82	9.07	9.33	9.95
IULB230-0400-2000-1000		10	3	4	3.8	15	6	50	3,200	10.66	10.96	11.28	11.63	12.43
IULB230-0400-2000-1200		12	3	4	3.8	15	6	50	4,160	12.72	13.10	13.50	13.93	14.92
IULB230-0400-2000-1400		14	3	4	3.8	15	6	50	4,160	14.79	15.24	15.72	16.23	17.41
IULB230-0400-2000-1500		15	3	4	3.8	15	6	50	4,160	15.82	16.31	16.82	17.38	18.65
IULB230-0400-2000-2000		20	3	4	3.8	15	6	50	4,160	20.99	21.65	22.37	23.13	FREE
IULB230-0400-2000-2500		25	3	4	3.8	15	6	60	4,160	26.16	27.00	27.91	28.88	FREE
IULB230-0400-2000-3000		30	3	4	3.8	15	6	60	4,160	31.33	32.35	33.45	FREE	FREE
IULB230-0400-2000-3500		35	3	4	3.8	15	6	70	4,800	36.50	37.70	38.99	FREE	FREE
IULB230-0500-2500-1500		2.5	15	3.5	5	4.8	15	6	50	6,880	15.81	16.27	16.77	FREE
IULB230-0500-2500-2000	20		3.5	5	4.8	15	6	50	6,960	20.98	21.62	FREE	FREE	FREE
IULB230-0500-2500-2500	25		3.5	5	4.8	15	6	60	6,960	26.14	26.97	FREE	FREE	FREE
IULB230-0500-2500-3000	30		3.5	5	4.8	15	6	60	7,440	31.31	FREE	FREE	FREE	FREE
IULB230-0500-2500-4000	40		3.5	5	4.8	15	6	70	9,280	41.65	FREE	FREE	FREE	FREE
IULB230-0600-3000-1000	3		10	6	6	5.8	15	6	50	5,200	FREE	FREE	FREE	FREE
IULB230-0600-3000-1500		15	6	6	5.8	15	6	50	5,200	FREE	FREE	FREE	FREE	FREE
IULB230-0600-3000-2000		20	6	6	5.8	15	6	50	5,200	FREE	FREE	FREE	FREE	FREE
IULB230-0600-3000-2500		25	6	6	5.8	15	6	60	5,200	FREE	FREE	FREE	FREE	FREE
IULB230-0600-3000-3000		30	6	6	5.8	15	6	60	5,360	FREE	FREE	FREE	FREE	FREE
IULB230-0600-3000-3500		35	6	6	5.8	15	6	70	5,360	FREE	FREE	FREE	FREE	FREE
IULB230-0600-3000-4000		40	6	6	5.8	15	6	70	5,840	FREE	FREE	FREE	FREE	FREE
IULB230-0600-3000-5000		50	6	6	5.8	15	6	80	6,320	FREE	FREE	FREE	FREE	FREE
IULB230-0600-3000-6000	60	6	6	5.8	15	6	90	6,800	FREE	FREE	FREE	FREE	FREE	



# ion Depo Type U Series

# ion Depo Type U Series

ion Depo Type U 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IULB230  
Model number: IULB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.1	0.2	0.003	0.005	120	40,000	0.002	0.005	100	40,000	0.002	0.003	70	40,000
		0.3	0.003	0.005	100	40,000	0.002	0.005	70	40,000	0.002	0.003	50	40,000
		0.5	0.002	0.003	70	40,000	0.001	0.003	50	40,000	0.001	0.002	30	40,000
	0.15	0.3	0.003	0.005	180	40,000	0.002	0.005	150	40,000	0.002	0.003	100	40,000
		0.5	0.003	0.005	150	40,000	0.002	0.005	120	40,000	0.002	0.003	70	40,000
	0.2	0.3	0.01	0.01	350	40,000	0.006	0.005	300	40,000	0.003	0.003	200	40,000
		0.5	0.008	0.01	320	40,000	0.005	0.005	280	40,000	0.003	0.003	180	40,000
		0.75	0.005	0.01	280	40,000	0.003	0.005	200	40,000	0.002	0.003	150	40,000
	0.3	1	0.003	0.005	250	40,000	0.002	0.003	160	40,000	0.001	0.002	120	40,000
		0.5	0.01	0.015	350	40,000	0.007	0.01	300	40,000	0.003	0.005	280	40,000
		0.6	0.007	0.01	350	40,000	0.005	0.007	300	40,000	0.003	0.005	250	40,000
		0.75	0.007	0.01	330	40,000	0.005	0.007	280	40,000	0.003	0.005	230	40,000
		1	0.007	0.01	320	40,000	0.005	0.007	250	40,000	0.003	0.005	200	40,000
		1.25	0.005	0.007	280	40,000	0.003	0.005	200	40,000	0.002	0.003	160	40,000
		1.5	0.005	0.007	230	40,000	0.003	0.005	180	40,000	0.002	0.003	120	40,000
		1.75	0.003	0.005	180	40,000	0.002	0.003	150	40,000	0.002	0.002	100	40,000
		2	0.003	0.005	150	40,000	0.002	0.003	120	40,000	0.002	0.002	90	40,000
		2.25	0.002	0.003	120	40,000	0.001	0.002	100	40,000	0.001	0.001	80	40,000
	0.4	2.5	0.002	0.003	100	40,000	0.001	0.002	80	40,000	0.001	0.001	70	40,000
		3	0.001	0.003	80	40,000	0.001	0.002	70	40,000	0.001	0.001	60	40,000
		0.5	0.03	0.05	800	40,000	0.03	0.03	720	40,000	0.009	0.02	580	40,000
		0.8	0.02	0.05	800	40,000	0.02	0.03	720	40,000	0.008	0.02	580	40,000
		1	0.02	0.05	800	40,000	0.02	0.03	720	40,000	0.008	0.02	580	40,000
		1.5	0.01	0.03	620	40,000	0.01	0.02	500	40,000	0.005	0.01	400	40,000
2		0.01	0.02	500	40,000	0.01	0.01	380	40,000	0.005	0.007	300	40,000	
2.5		0.007	0.01	420	40,000	0.005	0.007	300	40,000	0.003	0.005	260	40,000	
3		0.007	0.01	300	40,000	0.005	0.007	240	40,000	0.003	0.005	200	40,000	
0.5		1	0.03	0.05	1,000	40,000	0.02	0.03	860	40,000	0.01	0.02	650	40,000
	1.5	0.02	0.05	850	40,000	0.01	0.03	720	40,000	0.007	0.02	520	40,000	
	2	0.02	0.03	720	40,000	0.01	0.02	650	40,000	0.007	0.01	400	40,000	
	2.5	0.01	0.02	600	40,000	0.007	0.01	530	40,000	0.005	0.007	360	40,000	
	3	0.01	0.02	500	40,000	0.007	0.01	420	40,000	0.005	0.007	320	40,000	
	3.5	0.007	0.01	420	40,000	0.005	0.007	360	40,000	0.003	0.005	280	40,000	
0.6	4	0.007	0.01	350	40,000	0.005	0.007	300	40,000	0.003	0.005	260	40,000	
	1	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	
	1.5	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	
	2	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	
	2.5	0.03	0.05	1,200	40,000	0.02	0.04	840	40,000	0.02	0.03	640	30,000	
	3	0.03	0.05	1,200	40,000	0.02	0.04	840	40,000	0.02	0.03	640	30,000	
	3.5	0.02	0.03	1,000	40,000	0.01	0.03	620	40,000	0.01	0.02	480	30,000	
	4	0.02	0.03	1,000	40,000	0.01	0.03	620	40,000	0.01	0.02	480	30,000	
4.5	0.02	0.03	900	35,000	0.01	0.02	580	35,000	0.008	0.015	430	30,000		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●공구 RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.6	5	0.01	0.02	720	30,000	0.007	0.015	500	30,000	0.007	0.01	400	30,000
		5.5	0.01	0.015	700	30,000	0.007	0.01	450	30,000	0.005	0.008	360	30,000
		6	0.007	0.01	500	30,000	0.005	0.007	380	30,000	0.004	0.006	320	30,000
	0.7	2	0.07	0.1	1,600	40,000	0.05	0.08	1,300	40,000	0.03	0.07	1,000	30,000
		4	0.04	0.06	1,300	40,000	0.03	0.04	820	40,000	0.015	0.02	600	30,000
		6	0.01	0.03	800	30,000	0.01	0.015	500	30,000	0.006	0.01	420	25,000
	0.8	2	0.1	0.15	2,000	40,000	0.07	0.1	1,600	40,000	0.05	0.1	1,200	30,000
		3	0.1	0.15	2,000	40,000	0.07	0.1	1,600	40,000	0.05	0.05	1,200	30,000
		4	0.05	0.1	1,600	40,000	0.05	0.05	1,200	40,000	0.03	0.05	860	30,000
		5	0.05	0.05	1,600	40,000	0.03	0.05	1,000	40,000	0.02	0.03	620	30,000
		6	0.03	0.05	1,200	30,000	0.02	0.03	760	30,000	0.01	0.02	560	25,000
		7	0.02	0.03	1,000	30,000	0.01	0.02	680	30,000	0.007	0.01	520	25,000
	0.9	8	0.01	0.02	820	30,000	0.007	0.01	600	30,000	0.005	0.01	480	25,000
		2	0.1	0.2	2,200	40,000	0.08	0.15	1,800	30,000	0.06	0.1	1,300	30,000
		4	0.05	0.12	1,800	40,000	0.04	0.08	1,400	30,000	0.03	0.05	900	25,000
		6	0.035	0.05	1,200	30,000	0.025	0.035	800	25,000	0.015	0.025	600	20,000
	1	8	0.025	0.04	1,000	30,000	0.015	0.025	700	23,000	0.008	0.015	500	20,000
		2	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000
		2.5	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000
		3	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000
		4	0.1	0.2	2,500	40,000	0.05	0.15	1,800	30,000	0.05	0.1	1,200	25,000
		5	0.05	0.15	2,000	30,000	0.04	0.1	1,600	25,000	0.03	0.05	920	20,000
		6	0.05	0.1	1,800	30,000	0.04	0.05	1,200	25,000	0.02	0.05	740	20,000
		7	0.04	0.06	1,200	30,000	0.03	0.04	950	25,000	0.02	0.03	680	20,000
		8	0.04	0.06	1,000	30,000	0.03	0.04	860	25,000	0.02	0.03	560	20,000
		9	0.03	0.05	820	25,000	0.02	0.03	750	20,000	0.01	0.02	500	18,000
		10	0.03	0.05	750	25,000	0.02	0.03	620	20,000	0.01	0.02	450	18,000
		12	0.01	0.03	600	20,000	0.007	0.02	520	18,000	0.005	0.01	400	16,000
	1.2	2.4	0.1	0.3	2,500	30,000	0.1	0.2	2,000	30,000	0.05	0.1	1,600	25,000
		4	0.1	0.2	2,500	30,000	0.07	0.2	2,000	30,000	0.05	0.1	1,600	25,000
6		0.07	0.1	2,000	30,000	0.05	0.1	1,600	25,000	0.03	0.07	1,200	20,000	
8		0.05	0.1	1,600	30,000	0.03	0.07	1,200	25,000	0.02	0.05	920	20,000	
10		0.03	0.07	1,200	20,000	0.02	0.05	860	20,000	0.01	0.03	680	18,000	
12		0.02	0.05	860	20,000	0.01	0.03	620	20,000	0.007	0.02	480	18,000	
1.4	8	0.12	0.2	2,500	30,000	0.08	0.15	1,800	20,000	0.03	0.08	1,000	20,000	
	12	0.07	0.12	1,400	20,000	0.04	0.08	1,100	18,0					

# ion Depo Type U Series

# ion Depo Type U Series

ion Depo Type U 추천 절삭 조건표  
Recommended Milling Conditions

■형번: IULB230  
Model number: IULB230

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	1.5	12	0.05	0.1	1,800	20,000	0.03	0.1	920	20,000	0.02	0.05	780	18,000
		14	0.05	0.07	1,200	20,000	0.03	0.05	820	20,000	0.02	0.03	650	18,000
		16	0.03	0.05	720	18,000	0.02	0.03	650	18,000	0.01	0.02	580	16,000
	1.6	8	0.1	0.2	2,500	25,000	0.07	0.15	2,000	20,000	0.05	0.1	1,600	18,000
		12	0.07	0.1	1,800	20,000	0.05	0.07	1,500	16,000	0.03	0.05	1,200	14,000
		16	0.03	0.05	720	16,000	0.02	0.03	600	14,000	0.015	0.02	480	12,000
	2	3	0.2	0.5	3,000	25,000	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000
		4	0.2	0.5	3,000	25,000	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000
		6	0.2	0.5	2,500	25,000	0.2	0.3	2,000	25,000	0.15	0.3	1,600	20,000
		8	0.2	0.3	2,000	20,000	0.1	0.2	1,600	18,000	0.1	0.2	1,200	16,000
		10	0.1	0.3	2,000	18,000	0.1	0.2	1,600	16,000	0.1	0.1	1,200	14,000
		12	0.1	0.2	1,600	16,000	0.1	0.1	1,200	14,000	0.05	0.1	940	12,000
		13	0.08	0.2	1,600	16,000	0.06	0.1	1,200	14,000	0.04	0.08	940	12,000
		14	0.07	0.15	1,600	16,000	0.05	0.08	1,200	14,000	0.03	0.07	940	12,000
		16	0.07	0.15	1,600	16,000	0.05	0.08	1,200	14,000	0.03	0.07	940	12,000
		18	0.05	0.1	1,400	14,000	0.03	0.05	1,000	12,000	0.02	0.03	850	10,000
	20	0.05	0.1	1,000	14,000	0.03	0.05	820	12,000	0.02	0.03	720	10,000	
	2.5	6	0.3	0.4	2,800	20,000	0.2	0.5	2,300	20,000	0.15	0.4	2,000	18,000
		8	0.25	0.3	2,600	20,000	0.15	0.3	2,100	20,000	0.12	0.25	1,800	18,000
		10	0.2	0.3	2,500	20,000	0.15	0.2	2,000	20,000	0.1	0.15	1,600	18,000
		15	0.1	0.2	2,000	18,000	0.07	0.15	1,600	16,000	0.05	0.1	1,200	14,000
		20	0.07	0.15	1,500	16,000	0.05	0.1	1,200	14,000	0.03	0.05	1,000	10,000
	3	6	0.2	0.8	3,000	20,000	0.2	0.6	2,500	18,000	0.2	0.5	2,000	14,000
		8	0.2	0.8	3,000	20,000	0.2	0.6	2,500	18,000	0.2	0.5	2,000	14,000
10		0.2	0.6	2,500	20,000	0.2	0.4	2,000	18,000	0.1	0.3	1,500	14,000	
12		0.2	0.6	2,500	20,000	0.2	0.4	2,000	18,000	0.1	0.3	1,500	14,000	
14		0.1	0.4	2,000	18,000	0.1	0.3	1,600	16,000	0.1	0.2	1,200	12,000	
16		0.1	0.4	2,000	18,000	0.1	0.3	1,600	16,000	0.1	0.2	1,200	12,000	
20		0.1	0.3	1,600	18,000	0.1	0.2	1,200	16,000	0.1	0.1	960	12,000	
3.5	25	0.1	0.2	1,200	16,000	0.07	0.15	920	14,000	0.05	0.07	800	10,000	
	30	0.07	0.1	750	14,000	0.05	0.07	640	12,000	0.03	0.05	600	8,600	
	15	0.25	1	3,000	20,000	0.15	0.5	2,300	16,000	0.13	0.4	1,500	14,000	
	20	0.18	0.6	2,500	18,000	0.1	0.3	1,800	15,000	0.1	0.2	1,200	12,000	
	25	0.12	0.35	1,800	16,000	0.1	0.2	1,600	14,000	0.06	0.12	1,000	10,000	
4	30	0.1	0.25	1,500	14,000	0.07	0.15	950	11,000	0.05	0.08	800	9,000	
	35	0.08	0.2	1,200	13,000	0.07	0.12	800	10,000	0.03	0.06	650	7,500	
	8	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000	
	10	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000	
	12	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000	
	14	0.3	1.5	3,000	20,000	0.2	0.8	2,000	16,000	0.2	0.6	1,600	12,000	
	15	0.3	1.5	3,000	20,000	0.2	0.8	2,000	16,000	0.2	0.6	1,600	12,000	
20	0.2	1	2,400	16,000	0.1	0.6	1,800	14,000	0.1	0.4	1,400	10,000		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material			고경도강 Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				고경도강 Hardened Steels SKD11/SKH51 (~60HRC)				고경도강 Hardened Steels ASP23/HAP5R/HAP72(60HRC 이상)			
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	4	25	0.2	0.8	1,600	16,000	0.1	0.4	1,200	14,000	0.1	0.2	1,000	10,000
		30	0.1	0.3	1,600	14,000	0.07	0.2	1,200	10,000	0.05	0.15	1,000	8,200
		35	0.1	0.2	1,200	14,000	0.07	0.15	1,000	10,000	0.05	0.1	820	8,200
	5	15	0.3	1.5	3,000	18,000	0.2	1.2	2,500	12,000	0.2	0.7	2,000	9,200
		20	0.3	1.5	3,000	18,000	0.2	1.2	2,500	12,000	0.2	0.7	2,000	9,200
		25	0.3	1.2	3,000	15,000	0.2	1	2,000	10,000	0.15	0.5	1,600	8,000
		30	0.2	1	2,500	15,000	0.15	0.8	1,800	8,600	0.1	0.3	1,200	7,200
		40	0.2	0.8	2,000	12,000	0.15	0.5	1,500	7,600	0.1	0.2	860	6,400
		10	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
	6	15	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
		20	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
		25	0.3	1.5	3,000	16,000	0.2	1	2,000	8,000	0.15	0.7	1,500	7,000
		30	0.2	1.5	3,000	14,000	0.2	1	2,000	7,200	0.15	0.7	1,500	6,500
		35	0.2	1.2	2,400	13,000	0.17	0.8	1,600	6,800	0.12	0.5	1,200	5,800
		40	0.2	1	1,800	12,000	0.15	0.6	1,200	6,400	0.1	0.4	1,000	5,200
		50	0.1	0.6	1,200	8,200	0.1	0.3	860	4,800	0.05	0.2	620	4,000
		60	0.07	0.3	600	6,000	0.05	0.15	450	3,200	0.03	0.07	300	2,500

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭방향, 장식 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

●오일 미스트 Coolant, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
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# ion Depo Type U Series

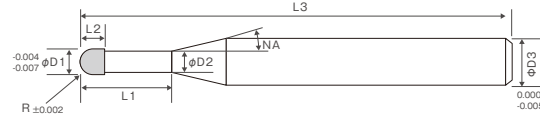
## 초경 롱 넥 볼 엔드밀 Carbide Long Neck Ball End Mill

ion U super MG 날수 2 헬릭스각 30° 목각 15° Shank 0/-0.005

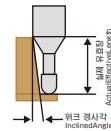
■형번:IUB3D230 Model number:IUB3D230



- 금속 3D 프린터용 목경 규격
- Special (D2) Neck Dia. for Metal 3D printer.



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.



사이즈(Size):mm

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	볼 반경 (R) Ball R	유효장 (L1) Effective Length	날장 (L2) Length of Cut	날경 (D1) Tool Diameter	목(부직)경 (D2) Neck Diameter	목각 (NA)° Neck Taper Angle	샤프크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
										30°	1°	1°30'	2°	3°
IUB3D230-0060-0300-0300	0.3	3	0.45	0.6	0.49	15	4	50	3,120	3.30	3.41	3.52	3.64	3.92
IUB3D230-0080-0400-0300	0.4	3	0.6	0.8	0.69	15	4	50	3,200	3.30	3.40	3.51	3.63	3.89
IUB3D230-0100-0500-0300	0.5	3	0.8	1	0.89	15	4	50	2,560	3.30	3.39	3.50	3.61	3.87

# ion Depo Type U Series

## ion Depo Type U 추천 절삭 조건표 Recommended Milling Conditions

■형번:IUB3D230  
Model number:IUB3D230

### 롱 넥 볼 엔드밀 Long Neck Ball End Mill

피삭재 Work Material		마레이징강 (3D 프린터) Maraging Steels (Metal 3D Printer)				
날수 Number of Flutes	외경 Dia.	유효장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm		
2	0.6	3	0.03	0.03	800	32,000
	0.8	3	0.045	0.045	1,400	32,000
	1	3	0.05	0.05	1,500	30,000

- 공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.
- 절삭방향, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.
- ∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut. ∅e=Radial Depth of Cut.
- 오일 미스트 쿨런트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.
- 공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.
- RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series

초경 엔드밀 Carbide End Mill

DLC super MG 2 45° 15° Shank 0/-0.005



특징

- 마찰계수가 작고 내마모성이 뛰어난 DLC 코팅을 라인업!
- 내용착성이 뛰어나 알루미늄 합금 등의 가공에 최적!
- 표준품 외 특별 주문품도 제공 가능!

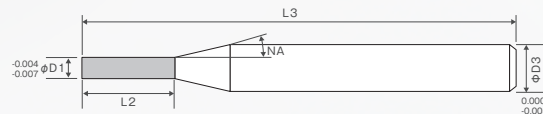
Features

- DLC coatings with a low coefficient of friction and wear resistance.
- Excellent welding resistance, ideal for processing aluminum alloys, etc.
- Non-standard custom-made products available.

초경 스퀘어 엔드밀 Carbide Square End Mill

DLC super MG 2 45° 15° Shank 0/-0.005

■ 형번: DLCS245 Model number: DLCS245



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
DLCS245-0100-00300	1	3	15	4	50	4,480
DLCS245-0150-00450	1.5	4.5	15	4	50	4,480
DLCS245-0200-00600	2	6	15	4	50	4,480
DLCS245-0250-00750	2.5	7.5	15	4	50	4,480
DLCS245-0300-00900	3	9	15	4	50	5,440
DLCS245-0400-01200	4	12	15	6	50	5,600
DLCS245-0500-01500	5	15	15	6	50	6,000
DLCS245-0600-01800	6	18	—	6	60	6,240
DLCS245-0700-02100	7	21	15	8	70	10,080
DLCS245-0800-02400	8	24	—	8	70	10,080
DLCS245-0900-02700	9	27	15	10	80	12,720
DLCS245-1000-03000	10	30	—	10	80	12,720
DLCS245-1100-03300	11	33	15	12	110	17,440
DLCS245-1200-03600	12	36	—	12	110	17,440

CBN Series  
Hard Star A Series  
Hard Star Ti Series  
Hard Star TT Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
스퀘어 Square  
Non-Coat Series  
ion Depo R Series

## DLC 추천 절삭 조건표 Recommended Milling Conditions

■형번:DLCS245  
Model number:DLCS245

### 스퀘어 엔드밀 Square End Mill

피삭재 Work Material			알루미늄 합금 A5000번 Aluminium alloy A5000				알루미늄 합금 A7000번 Aluminium alloy A7000				흑연 Graphite			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>
2	1	3	1.5	0.2	700	20,000	1.5	0.2	700	20,000	0.2	0.6	2,500	30,000
	1.5	4.5	2	0.3	800	20,000	2	0.3	800	20,000	0.3	1	2,500	25,000
	2	6	3	0.4	1,000	20,000	3	0.4	1,000	20,000	0.5	1.2	3,000	20,000
	2.5	7.5	3.5	0.5	1,200	20,000	3.5	0.5	1,200	20,000	0.5	1.5	3,000	20,000
	3	9	4.5	0.6	1,400	20,000	4.5	0.6	1,500	20,000	0.5	2	3,000	20,000
	4	12	6	0.8	1,600	20,000	6	0.8	1,700	20,000	0.8	2.5	3,000	18,000
	5	15	7.5	1	1,900	20,000	7.5	1	2,000	20,000	1	3	3,000	18,000
	6	18	9	1.2	2,100	20,000	9	1.2	2,200	20,000	1	4	3,000	16,000
	7	21	10	1.4	2,200	17,500	10	1.4	2,300	17,500	1.5	5	3,000	15,000
	8	24	12	1.6	2,300	15,000	12	1.6	2,400	15,000	1.5	6	3,000	13,000
	9	27	13	1.8	2,300	13,500	13	1.8	2,400	13,500	1.5	7	3,000	12,000
	10	30	15	2	2,300	12,000	15	2	2,400	12,000	2	8	3,200	10,000
11	33	16	2.2	2,400	11,000	16	2.2	2,500	11,000	2	9	3,200	9,000	
12	36	18	2.4	2,400	10,000	18	2.4	2,500	10,000	2	10	3,200	8,000	

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●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

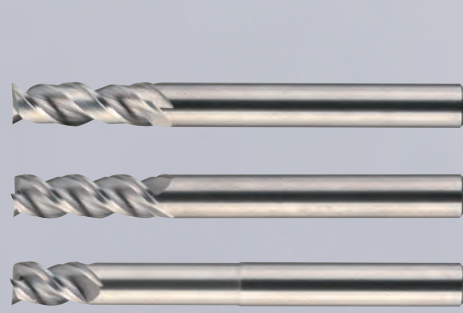
●오일 미스트 쿨런트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
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●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

CBN Series  
Hard Star A Series  
Hard Star T Series  
Hard Star TT Series  
Ion Depo A Series  
Ion Depo U Series  
DLC Series  
스퀘어 Square  
Non-Coat Series  
Ion Depo R Series



## 초경 엔드밀 Carbide End Mill

Non
super MG
날 수 2·3
헬릭스각 45°
목각 15°
Shank 0/-0.005



### 특징

- 알루미늄 합금용 논코팅 공구를 라인업!
- 알루미늄 가공 전용의 선단 설계에 의해 발군의 절삭력을 실현!
- 수지 등의 재료에도 효율적인 절삭 가공이 가능!
- 소재는 초초미립자 합금을 채택하여 우수한 내마모성, 고수명화 실현!

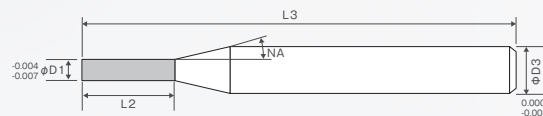
### Features

- Non-coated tools for aluminum alloys.
- Cutter geometry designed for exceptional sharpness in aluminum processing .
- Efficient cutting for various materials including resin.
- Ultra-fine particle alloy technology for wear resistance and long life.

## 초경 스퀘어 엔드밀 Carbide Square End Mill

Non
super MG
날 수 2
헬릭스각 45°
목각 15°
Shank 0/-0.005

■ 형번: ALS245 Model number: ALS245



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사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
ALS245-0100-00300	1	3	15	4	50	3,680
ALS245-0150-00450	1.5	4.5	15	4	50	3,680
ALS245-0200-00600	2	6	15	4	50	3,680
ALS245-0250-00750	2.5	7.5	15	4	50	3,680
ALS245-0300-00900	3	9	15	4	50	4,480
ALS245-0400-01200	4	12	15	6	50	4,640
ALS245-0500-01500	5	15	15	6	50	4,960
ALS245-0600-01800	6	18	—	6	60	5,200
ALS245-0700-02100	7	21	15	8	70	8,400
ALS245-0800-02400	8	24	—	8	70	8,400
ALS245-0900-02700	9	27	15	10	80	10,560
ALS245-1000-03000	10	30	—	10	80	10,560
ALS245-1100-03300	11	33	15	12	110	14,560
ALS245-1200-03600	12	36	—	12	110	14,560

## 비코팅 추천 절삭 조건표 Recommended Milling Conditions

■ **형번: ALS245**  
Model number: ALS245

### 스퀘어 엔드밀 Square End Mill

피삭재 Work Material			알루미늄 합금 A5000번 Aluminium alloy A5000				알루미늄 합금 A7000번 Aluminium alloy A7000			
날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm		
2	1	3	1.5	0.2	700	20,000	1.5	0.2	700	20,000
	1.5	4.5	2	0.3	800	20,000	2	0.3	800	20,000
	2	6	3	0.4	1,000	20,000	3	0.4	1,000	20,000
	2.5	7.5	3.5	0.5	1,200	20,000	3.5	0.5	1,200	20,000
	3	9	4.5	0.6	1,400	20,000	4.5	0.6	1,500	20,000
	4	12	6	0.8	1,600	20,000	6	0.8	1,700	20,000
	5	15	7.5	1	1,900	20,000	7.5	1	2,000	20,000
	6	18	9	1.2	2,100	20,000	9	1.2	2,200	20,000
	7	21	10	1.4	2,200	17,500	10	1.4	2,300	17,500
	8	24	12	1.6	2,300	15,000	12	1.6	2,400	15,000
	9	27	13	1.8	2,300	13,500	13	1.8	2,400	13,500
	10	30	15	2	2,300	12,000	15	2	2,400	12,000
11	33	16	2.2	2,400	11,000	16	2.2	2,500	11,000	
12	36	18	2.4	2,400	10,000	18	2.4	2,500	10,000	

●공구는 홀더에 확실하게 고정되고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭량은, 절삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.

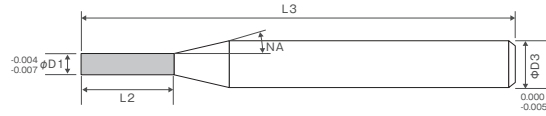
●오일 미스트 Coolant, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 들뜸은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

CBN Series  
 Hard Star A Series  
 Hard Star Ti Series  
 Hard Star TT Series  
 Ion Depo A Series  
 Ion Depo U Series  
 DLC Series  
 Non-Coat Series  
 Ion Depo R Series

## 초경 스퀘어 엔드밀 Carbide Square End Mill

■형번: ALS345 Model number: ALS345

Non super MG 날수 3 헬릭스각 45° 목각 15° Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value. If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오. (Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	날장 (L2) Length of Cut	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
ALS345-0100-00300	1	3	15	4	50	5,120
ALS345-0200-00600	2	6	15	4	50	5,120
ALS345-0300-00900	3	9	15	4	50	6,160
ALS345-0400-01200	4	12	15	6	50	7,120
ALS345-0500-01500	5	15	15	6	50	7,680
ALS345-0600-00900	6	9	—	6	50	7,680
ALS345-0600-01800		18	—	6	60	8,000
ALS345-0800-01200	8	12	—	8	70	12,240
ALS345-0800-02400		24	—	8	70	12,640
ALS345-1000-01500	10	15	—	10	80	17,840
ALS345-1000-03000		30	—	10	80	17,280
ALS345-1200-01800	12	18	—	12	110	23,840
ALS345-1200-03600		36	—	12	110	20,480

## 비코팅 추천 절삭 조건표 Recommended Milling Conditions

■형번: ALS345 Model number: ALS345

### 스퀘어 엔드밀 Square End Mill

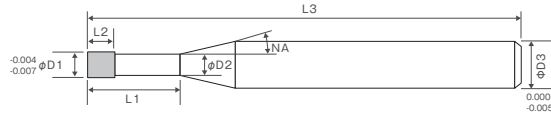
피삭재 Work Material	알루미늄 합금 A5000번 Aluminium alloy A5000						알루미늄 합금 A7000번 Aluminium alloy A7000				
	날수 Number of Flutes	외경 Dia.	날장 Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
				∅p mm	∅e mm			∅p mm	∅e mm		
3	1	3	1	0.3	2,800	20,000	1	0.3	1,100	20,000	
	2	6	2	0.6	1,400	20,000	2	0.6	1,500	20,000	
	3	9	3	0.9	2,100	20,000	3	0.9	2,200	20,000	
	4	12	4	1.2	2,400	20,000	4	1.2	2,500	20,000	
	5	15	5	1.5	3,000	20,000	5	1.5	3,100	20,000	
	6	9	6	1.8	3,400	18,600	6	1.8	3,500	18,600	
		18	6	1.8	3,400	18,600	6	1.8	3,500	18,600	
	8	12	8	2.4	3,400	13,900	8	2.4	3,500	13,900	
		24	8	2.4	3,400	13,900	8	2.4	3,500	13,900	
	10	15	10	3	3,700	11,100	10	3	3,800	11,100	
		30	10	3	3,700	11,100	10	3	3,800	11,100	
	12	18	12	3.6	4,000	9,300	12	3.6	4,100	9,300	
36		12	3.6	4,000	9,300	12	3.6	4,100	9,300		

●공구는 홀더에 확실하게 고정되고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량은, 정삭 가공을 행하는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
●오일 미스트 Coolant, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

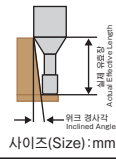
## 초경 롱 넥 스퀘어 엔드밀 Carbide Long Neck Square End Mill

■형번: ALLS345 Model number: ALLS345

Non
super MG
날수 3
헬릭스각 45°
목각 15°
Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.



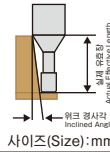
●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
ALLS345-0100-0300	1	3	1.5	0.95	15	4	50	3,920	3.20	3.31	3.43	3.56	3.85
ALLS345-0100-0500		5	1.5	0.95	15	4	50	4,480	5.26	5.45	5.64	5.86	6.33
ALLS345-0110-0330		1.1	3.3	1.7	1.05	15	4	50	5,360	3.51	3.63	3.76	3.90
ALLS345-0120-0360	1.2	3.6	1.8	1.15	15	4	50	5,360	3.82	3.95	4.09	4.25	4.59
ALLS345-0130-0390	1.3	3.9	2	1.25	15	4	50	5,360	4.13	4.27	4.43	4.59	4.96
ALLS345-0140-0420	1.4	4.2	2.1	1.35	15	4	50	5,360	4.44	4.59	4.76	4.94	5.34
ALLS345-0150-0450	1.5	4.5	2.3	1.45	15	4	50	3,920	4.75	4.91	5.09	5.28	5.71
ALLS345-0160-0480	1.6	4.8	2.4	1.55	15	4	50	5,360	5.06	5.23	5.42	5.63	6.08
ALLS345-0170-0510	1.7	5.1	2.6	1.65	15	4	50	5,360	5.37	5.56	5.76	5.97	6.46
ALLS345-0180-0540	1.8	5.4	2.7	1.75	15	4	50	5,360	5.68	5.88	6.09	6.32	6.83
ALLS345-0190-0570	1.9	5.7	2.9	1.85	15	4	50	5,360	5.99	6.20	6.42	6.66	7.20
ALLS345-0200-0600	2	6	3	1.94	15	4	50	3,920	6.32	6.54	6.77	7.03	7.60
ALLS345-0200-1000		10	3	1.94	15	4	50	4,480	10.45	10.82	11.21	11.63	12.57
ALLS345-0210-0630		2.1	6.3	3.2	2.04	15	4	50	5,360	6.63	6.86	7.11	7.37
ALLS345-0220-0660	2.2	6.6	3.3	2.14	15	4	50	5,360	6.94	7.18	7.44	7.72	8.34
ALLS345-0230-0690	2.3	6.9	3.5	2.24	15	4	50	5,360	7.25	7.50	7.77	8.06	8.72
ALLS345-0240-0720	2.4	7.2	3.6	2.34	15	4	50	5,360	7.56	7.82	8.10	8.41	9.09
ALLS345-0250-0750	2.5	7.5	3.8	2.44	15	4	50	3,920	7.87	8.14	8.44	8.75	9.46
ALLS345-0260-0780	2.6	7.8	3.9	2.54	15	4	50	6,560	8.18	8.46	8.77	9.10	9.84
ALLS345-0270-0810	2.7	8.1	4.1	2.64	15	4	50	6,560	8.49	8.78	9.10	9.44	10.21
ALLS345-0280-0840	2.8	8.4	4.2	2.74	15	4	50	6,560	8.80	9.11	9.43	9.79	10.58
ALLS345-0290-0870	2.9	8.7	4.4	2.84	15	4	50	6,560	9.11	9.43	9.77	10.13	FREE
ALLS345-0300-0900	3	9	4.5	2.85	15	4	50	4,720	9.59	9.93	10.29	10.67	FREE
ALLS345-0300-1500		15	4.5	2.85	15	4	50	5,440	15.79	16.34	16.93	FREE	FREE
ALLS345-0310-0930		3.1	9.3	4.7	2.95	15	6	50	6,560	9.90	10.25	10.62	11.02
ALLS345-0320-0960	3.2	9.6	4.8	3.05	15	6	50	6,560	10.21	10.57	10.95	11.36	12.28
ALLS345-0330-0990	3.3	9.9	5	3.15	15	6	50	6,560	10.52	10.89	11.28	11.71	12.65
ALLS345-0340-1020	3.4	10.2	5.1	3.25	15	6	50	6,560	10.83	11.21	11.62	12.05	13.03
ALLS345-0350-1050	3.5	10.5	5.3	3.35	15	6	50	5,760	11.14	11.53	11.95	12.40	13.40
ALLS345-0360-1080	3.6	10.8	5.4	3.45	15	6	50	6,560	11.45	11.85	12.28	12.74	13.77

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코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부직)경 (D2) Neck Diameter	목각 (NA) <sup>°</sup> Neck Taper Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
ALLS345-0370-1110	3.7	11.1	5.6	3.55	15	6	50	6,560	11.76	12.17	12.61	13.09	14.15
ALLS345-0380-1140	3.8	11.4	5.7	3.65	15	6	50	6,560	12.07	12.49	12.94	13.43	14.52
ALLS345-0390-1170	3.9	11.7	5.9	3.75	15	6	50	6,560	12.38	12.81	13.28	13.78	14.89
ALLS345-0400-1200	4	12	6	3.8	15	6	50	4,880	12.79	13.24	13.71	14.23	15.38
ALLS345-0400-2000		20	6	3.8	15	6	50	6,080	21.06	21.79	22.58	23.43	FREE
ALLS345-0410-1230	4.1	12.3	6.2	3.9	15	6	50	6,880	13.10	13.56	14.05	14.57	15.75
ALLS345-0420-1260	4.2	12.6	6.3	4	15	6	50	6,880	13.41	13.88	14.38	14.92	16.13
ALLS345-0430-1290	4.3	12.9	6.5	4.1	15	6	50	6,880	13.72	14.20	14.71	15.26	FREE
ALLS345-0440-1320	4.4	13.2	6.6	4.2	15	6	50	6,880	14.03	14.52	15.04	15.61	FREE
ALLS345-0450-1350	4.5	13.5	6.8	4.3	15	6	50	6,080	14.34	14.84	15.38	15.95	FREE
ALLS345-0460-1380	4.6	13.8	6.9	4.4	15	6	50	6,880	14.65	15.16	15.71	16.30	FREE
ALLS345-0470-1410	4.7	14.1	7.1	4.5	15	6	50	6,880	14.96	15.48	16.04	16.64	FREE
ALLS345-0480-1440	4.8	14.4	7.2	4.6	15	6	50	6,880	15.27	15.80	16.37	16.99	FREE
ALLS345-0490-1470	4.9	14.7	7.4	4.7	15	6	50	6,880	15.58	16.12	16.71	FREE	FREE
ALLS345-0500-1500	5	15	7.5	4.8	15	6	50	5,280	15.89	16.44	17.04	FREE	FREE
ALLS345-0500-2500		25	7.5	4.8	15	6	60	6,720	26.23	27.14	FREE	FREE	FREE
ALLS345-0510-1530	5.1	15.3	7.7	4.9	15	6	50	7,440	16.20	16.77	FREE	FREE	FREE
ALLS345-0520-1560	5.2	15.6	7.8	5	15	6	50	7,440	16.51	17.09	FREE	FREE	FREE
ALLS345-0530-1590	5.3	15.9	8	5.1	15	6	50	7,440	16.82	17.41	FREE	FREE	FREE
ALLS345-0540-1620	5.4	16.2	8.1	5.2	15	6	50	7,440	17.13	FREE	FREE	FREE	FREE
ALLS345-0550-1650	5.5	16.5	8.3	5.3	15	6	50	6,640	17.44	FREE	FREE	FREE	FREE
ALLS345-0560-1680	5.6	16.8	8.4	5.4	15	6	50	7,440	17.75	FREE	FREE	FREE	FREE
ALLS345-0570-1710	5.7	17.1	8.6	5.5	15	6	50	7,440	FREE	FREE	FREE	FREE	FREE
ALLS345-0580-1740	5.8	17.4	8.7	5.6	15	6	50	7,440	FREE	FREE	FREE	FREE	FREE
ALLS345-0590-1770	5.9	17.7	8.9	5.7	15	6	50	7,440	FREE	FREE	FREE	FREE	FREE
ALLS345-0600-1800	6	18	9	5.8	15	6	50	5,520	FREE	FREE	FREE	FREE	FREE
ALLS345-0600-3000		30	9	5.8	15	6	60	7,040	FREE	FREE	FREE	FREE	FREE
ALLS345-0610-1830	6.1	18.3	9.2	5.9	15	8	70	11,280	19.30	19.97	20.70	21.47	FREE
ALLS345-0620-1860	6.2	18.6	9.3	6	15	8	70	11,280	19.61	20.30	21.03	21.82	FREE
ALLS345-0630-1890	6.3	18.9	9.5	6.1	15	8	70	11,280	19.92	20.62	21.36	22.16	FREE
ALLS345-0640-1920	6.4	19.2	9.6	6.2	15	8	70	11,280	20.23	20.94	21.69	22.51	FREE
ALLS345-0650-1950	6.5	19.5	9.8	6.3	15	8	70	11,280	20.54	21.26	22.03	FREE	FREE
ALLS345-0660-1980	6.6	19.8	9.9	6.4	15	8	70	11,280	20.85	21.58	22.36	FREE	FREE
ALLS345-0670-2010	6.7	20.1	10.1	6.5	15	8	70	11,280	21.16	21.90	22.69	FREE	FREE
ALLS345-0680-2040	6.8	20.4	10.2	6.6	15	8	70	11,280	21.47	22.22	FREE	FREE	FREE
ALLS345-0690-2070	6.9	20.7	10.4	6.7	15	8	70	11,280	21.78	22.54	FREE	FREE	FREE
ALLS345-0700-2100	7	21	10.5	6.8	15	8	70	8,160	22.09	22.86	FREE	FREE	FREE
ALLS345-0710-2130	7.1	21.3	10.7	6.9	15	8	70	11,280	22.40	23.18	FREE	FREE	FREE
ALLS345-0720-2160	7.2	21.6	10.8	7	15	8	70	11,280	22.71	FREE	FREE	FREE	FREE
ALLS345-0730-2190	7.3	21.9	11	7.1	15	8	70	11,280	23.02	FREE	FREE	FREE	FREE
ALLS345-0740-2220	7.4	22.2	11.1	7.2	15	8	70	11,280	23.33	FREE	FREE	FREE	FREE
ALLS345-0750-2250	7.5	22.5	11.3	7.3	15	8	70	11,280	23.64	FREE	FREE	FREE	FREE
ALLS345-0760-2280	7.6	22.8	11.4	7.4	15	8	70	11,280	FREE	FREE	FREE	FREE	FREE
ALLS345-0770-2310	7.7	23.1	11.6	7.5	15	8	70	11,280	FREE	FREE	FREE	FREE	FREE
ALLS345-0780-2340	7.8	23.4	11.7	7.6	15	8	70	11,280	FREE	FREE	FREE	FREE	FREE

CBN Series  
 Hard Star A Series  
 Hard Star TT Series  
 Hard Star TT Series  
 Ion Depo A Series  
 Ion Depo U Series  
 DLC Series  
 Non-Coat Series  
 Ion Depo R Series



●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

코드 No. Code No.	날경 (D1) Tool Diameter	유효장 (L1) Effective Length	날장 (L2) Length of Cut	목(부지)경 (D2) Neck Diameter	목각 (NA) <sup>*</sup> Neck Taper Angle	샤홅크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)	피삭재 경사각에 대한 실제 유효장 Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
ALLS345-0790-2370	7.9	23.7	11.9	7.7	15	8	70	11,280	FREE	FREE	FREE	FREE	FREE
ALLS345-0800-2400	8	24	12	7.8	15	8	70	8,160	FREE	FREE	FREE	FREE	FREE
ALLS345-0800-4000		40	12	7.8	15	8	80	10,560	FREE	FREE	FREE	FREE	FREE
ALLS345-0810-2430	8.1	24.3	12.2	7.9	15	10	80	14,320	25.50	26.39	27.35	FREE	FREE
ALLS345-0820-2460	8.2	24.6	12.3	8	15	10	80	14,320	25.81	26.71	27.68	FREE	FREE
ALLS345-0830-2490	8.3	24.9	12.5	8.1	15	10	80	14,320	26.12	27.03	28.01	FREE	FREE
ALLS345-0840-2520	8.4	25.2	12.6	8.2	15	10	80	14,320	26.43	27.36	28.34	FREE	FREE
ALLS345-0850-2550	8.5	25.5	12.8	8.3	15	10	80	14,320	26.74	27.68	FREE	FREE	FREE
ALLS345-0860-2580	8.6	25.8	12.9	8.4	15	10	80	14,320	27.05	28.00	FREE	FREE	FREE
ALLS345-0870-2610	8.7	26.1	13.1	8.5	15	10	80	14,320	27.36	28.32	FREE	FREE	FREE
ALLS345-0880-2640	8.8	26.4	13.2	8.6	15	10	80	14,320	27.67	28.64	FREE	FREE	FREE
ALLS345-0890-2670	8.9	26.7	13.4	8.7	15	10	80	14,320	27.98	28.96	FREE	FREE	FREE
ALLS345-0900-2700	9	27	13.5	8.8	15	10	80	10,240	28.29	FREE	FREE	FREE	FREE
ALLS345-0910-2730	9.1	27.3	13.7	8.9	15	10	80	14,320	28.60	FREE	FREE	FREE	FREE
ALLS345-0920-2760	9.2	27.6	13.8	9	15	10	80	14,320	28.91	FREE	FREE	FREE	FREE
ALLS345-0930-2790	9.3	27.9	14	9.1	15	10	80	14,320	29.23	FREE	FREE	FREE	FREE
ALLS345-0940-2820	9.4	28.2	14.1	9.2	15	10	80	14,320	29.54	FREE	FREE	FREE	FREE
ALLS345-0950-2850	9.5	28.5	14.3	9.3	15	10	80	14,320	FREE	FREE	FREE	FREE	FREE
ALLS345-0960-2880	9.6	28.8	14.4	9.4	15	10	80	14,320	FREE	FREE	FREE	FREE	FREE
ALLS345-0970-2910	9.7	29.1	14.6	9.5	15	10	80	14,320	FREE	FREE	FREE	FREE	FREE
ALLS345-0980-2940	9.8	29.4	14.7	9.6	15	10	80	14,320	FREE	FREE	FREE	FREE	FREE
ALLS345-0990-2970	9.9	29.7	14.9	9.7	15	10	80	14,320	FREE	FREE	FREE	FREE	FREE
ALLS345-1000-3000	10	30	15	9.8	15	10	80	10,240	FREE	FREE	FREE	FREE	FREE
ALLS345-1000-5000		50	15	9.8	15	10	100	13,360	FREE	FREE	FREE	FREE	FREE
ALLS345-1010-3030	10.1	30.3	15.2	9.9	15	12	110	20,240	31.71	32.81	34.00	FREE	FREE
ALLS345-1020-3060	10.2	30.6	15.3	10	15	12	110	20,240	32.02	33.13	34.33	FREE	FREE
ALLS345-1030-3090	10.3	30.9	15.5	10.1	15	12	110	20,240	32.33	33.45	FREE	FREE	FREE
ALLS345-1040-3120	10.4	31.2	15.6	10.2	15	12	110	20,240	32.64	33.77	FREE	FREE	FREE
ALLS345-1050-3150	10.5	31.5	15.8	10.3	15	12	110	20,240	32.95	34.09	FREE	FREE	FREE
ALLS345-1060-3180	10.6	31.8	15.9	10.4	15	12	110	20,240	33.26	34.42	FREE	FREE	FREE
ALLS345-1070-3210	10.7	32.1	16.1	10.5	15	12	110	20,240	33.57	34.74	FREE	FREE	FREE
ALLS345-1080-3240	10.8	32.4	16.2	10.6	15	12	110	20,240	33.88	FREE	FREE	FREE	FREE
ALLS345-1090-3270	10.9	32.7	16.4	10.7	15	12	110	20,240	34.19	FREE	FREE	FREE	FREE
ALLS345-1100-3300	11	33	16.5	10.8	15	12	110	14,400	34.50	FREE	FREE	FREE	FREE
ALLS345-1110-3330	11.1	33.3	16.7	10.9	15	12	110	20,240	34.81	FREE	FREE	FREE	FREE
ALLS345-1120-3360	11.2	33.6	16.8	11	15	12	110	20,240	35.12	FREE	FREE	FREE	FREE
ALLS345-1130-3390	11.3	33.9	17	11.1	15	12	110	20,240	35.43	FREE	FREE	FREE	FREE
ALLS345-1140-3420	11.4	34.2	17.1	11.2	15	12	110	20,240	FREE	FREE	FREE	FREE	FREE
ALLS345-1150-3450	11.5	34.5	17.3	11.3	15	12	110	20,240	FREE	FREE	FREE	FREE	FREE
ALLS345-1160-3480	11.6	34.8	17.4	11.4	15	12	110	20,240	FREE	FREE	FREE	FREE	FREE
ALLS345-1170-3510	11.7	35.1	17.6	11.5	15	12	110	20,240	FREE	FREE	FREE	FREE	FREE
ALLS345-1180-3540	11.8	35.4	17.7	11.6	15	12	110	20,240	FREE	FREE	FREE	FREE	FREE
ALLS345-1190-3570	11.9	35.7	17.9	11.7	15	12	110	20,240	FREE	FREE	FREE	FREE	FREE
ALLS345-1200-3600	12	36	18	11.8	15	12	110	14,400	FREE	FREE	FREE	FREE	FREE
ALLS345-1200-6000		60	18	11.8	15	12	130	17,920	FREE	FREE	FREE	FREE	FREE

## 비코팅 추천 절삭 조건표 Recommended Milling Conditions

■형번: ALLS345  
Model number: ALLS345

### 롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material		알루미늄 합금 A5000번 Aluminium alloy A5000					알루미늄 합금 A7000번 Aluminium alloy A7000				
		Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
날수 Number of Flutes	외경 Dia. Effective Length	날장 Effective Length	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	∅p mm	∅e mm	mm/min	min <sup>-1</sup>	
			3	1	3	1	0.3	1,100	20,000	1	0.3
5	3	0.3			900	20,000	3	0.3	1,000	20,000	
1.1	3.3	1		0.3	1,100	20,000	1	0.3	1,200	20,000	
	3.6	1		0.3	1,100	20,000	1	0.3	1,200	20,000	
	3.9	1		0.3	1,100	20,000	1	0.3	1,200	20,000	
	4.2	1		0.3	1,100	20,000	1	0.3	1,200	20,000	
	4.5	1		0.3	1,100	20,000	1	0.3	1,200	20,000	
	4.8	1		0.6	1,100	20,000	1	0.6	1,200	20,000	
	5.1	1		0.6	1,100	20,000	1	0.6	1,200	20,000	
1.8	5.4	1		0.6	1,100	20,000	1	0.6	1,200	20,000	
	5.7	1		0.6	1,100	20,000	1	0.6	1,200	20,000	
	2	6		3	0.6	1,700	20,000	3	0.6	1,800	20,000
		10		6	0.6	1,400	20,000	6	0.6	1,500	20,000
	2.1	6.3		3	0.6	1,700	20,000	3	0.6	1,800	20,000
	2.2	6.6		3	0.6	1,700	20,000	3	0.6	1,800	20,000
	2.3	6.9		3	0.6	1,700	20,000	3	0.6	1,800	20,000
2.4	7.2	4		0.6	1,700	20,000	4	0.6	1,800	20,000	
	7.5	4		0.6	1,700	20,000	4	0.6	1,800	20,000	
	7.8	4		0.6	1,700	20,000	4	0.6	1,800	20,000	
	8.1	4	0.9	1,700	20,000	4	0.9	1,800	20,000		
	8.4	4	0.9	1,700	20,000	4	0.9	1,800	20,000		
	8.7	4	0.9	1,700	20,000	4	0.9	1,800	20,000		
	3	9	4	0.9	1,900	20,000	4	0.9	2,000	20,000	
15		9	0.9	1,600	20,000	9	0.9	1,700	20,000		
3.1	9.3	4	0.9	1,900	20,000	4	0.9	2,000	20,000		
	9.6	4	0.9	1,900	20,000	4	0.9	2,000	20,000		
	9.9	4	0.9	1,900	20,000	4	0.9	2,000	20,000		
	10.2	5	0.9	1,900	20,000	5	0.9	2,000	20,000		
	10.5	5	0.9	1,900	20,000	5	0.9	2,000	20,000		
	10.8	5	1.2	1,900	20,000	5	1.2	2,000	20,000		
	11.1	5	1.2	1,900	20,000	5	1.2	2,000	20,000		
3.8	11.4	5	1.2	1,900	20,000	5	1.2	2,000	20,000		
	11.7	5	1.2	1,900	20,000	5	1.2	2,000	20,000		
	4	12	8	1.2	2,100	20,000	8	1.2	2,200	20,000	
		20	12	1.2	1,700	20,000	12	1.2	1,800	20,000	
	4.1	12.3	8	1.2	2,100	20,000	8	1.2	2,200	20,000	
	4.2	12.6	8	1.2	2,100	20,000	8	1.2	2,200	20,000	
	4.3	12.9	8	1.2	2,100	20,000	8	1.2	2,200	20,000	
4.4	13.2	8	1.2	2,100	20,000	8	1.2	2,200	20,000		
	13.5	9	1.2	2,100	20,000	9	1.2	2,200	20,000		
	13.8	9	1.2	2,100	20,000	9	1.2	2,200	20,000		
	14.1	9	1.5	2,100	20,000	9	1.5	2,200	20,000		

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●공구 유효장은, 장시 가공을 할 때는 경우의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
●오일 미스트 Coolant, 또는 물수용성 절삭액 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 유효장은, 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.



## 비코팅 추천 절삭 조건표 Recommended Milling Conditions

■형번: ALLS345  
Model number: ALLS345

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			알루미늄 합금 A5000번 Aluminium alloy A5000				알루미늄 합금 A7000번 Aluminium alloy A7000			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm		
3	4.8	14.4	9	1.5	2,100	20,000	9	1.5	2,200	20,000
	4.9	14.7	9	1.5	2,100	20,000	9	1.5	2,200	20,000
	5	15	10	1.5	2,600	20,000	10	1.5	2,700	20,000
		25	15	1.5	1,900	20,000	15	1.5	2,000	20,000
	5.1	15.3	10	1.5	2,600	20,000	10	1.5	2,700	20,000
	5.2	15.6	10	1.5	2,600	20,000	10	1.5	2,700	20,000
	5.3	15.9	10	1.5	2,600	20,000	10	1.5	2,700	20,000
	5.4	16.2	10	1.5	2,600	20,000	10	1.5	2,700	20,000
	5.5	16.5	10	1.5	2,600	20,000	10	1.5	2,700	20,000
	5.6	16.8	10	1.8	2,600	20,000	10	1.8	2,700	20,000
	5.7	17.1	11	1.8	2,600	20,000	11	1.8	2,700	20,000
	5.8	17.4	11	1.8	2,600	20,000	11	1.8	2,700	20,000
	5.9	17.7	11	1.8	2,600	20,000	11	1.8	2,700	20,000
	6	18	12	1.8	2,900	17,500	12	1.8	3,000	17,500
		30	18	1.8	2,400	17,500	18	1.8	2,500	17,500
	6.1	18.3	12	1.8	2,900	17,500	12	1.8	3,000	17,500
	6.2	18.6	12	1.8	2,900	17,500	12	1.8	3,000	17,500
	6.3	18.9	12	1.8	2,900	17,500	12	1.8	3,000	17,500
	6.4	19.2	14	1.8	2,900	17,500	14	1.8	3,000	17,500
	6.5	19.5	14	1.8	2,900	17,500	14	1.8	3,000	17,500
6.6	19.8	14	1.8	2,900	17,500	14	1.8	3,000	17,500	
6.7	20.1	14	1.8	2,900	17,500	14	1.8	3,000	17,500	
6.8	20.4	14	1.8	2,900	17,500	14	1.8	3,000	17,500	
6.9	20.7	14	1.8	2,900	17,500	14	1.8	3,000	17,500	
7	21	14	2.1	2,900	15,000	14	2.1	3,000	15,000	
7.1	21.3	14	2.1	2,900	15,000	14	2.1	3,000	15,000	
7.2	21.6	14	2.1	2,900	15,000	14	2.1	3,000	15,000	
7.3	21.9	14	2.1	2,900	15,000	14	2.1	3,000	15,000	
7.4	22.2	15	2.1	2,900	15,000	15	2.1	3,000	15,000	
7.5	22.5	14	2.1	2,900	15,000	14	2.1	3,000	15,000	
7.6	22.8	14	2.1	2,900	15,000	14	2.1	3,000	15,000	
7.7	23.1	14	2.1	2,900	15,000	14	2.1	3,000	15,000	
7.8	23.4	14	2.1	2,900	15,000	14	2.1	3,000	15,000	
7.9	23.7	14	2.1	2,900	15,000	14	2.1	3,000	15,000	
8	24	16	2.4	2,900	13,000	16	2.4	3,000	13,000	
	40	24	2.4	2,400	13,000	24	2.4	2,500	13,000	
8.1	24.3	16	2.4	2,900	13,000	16	2.4	3,000	13,000	
8.2	24.6	16	2.4	2,900	13,000	16	2.4	3,000	13,000	
8.3	24.9	16	2.4	2,900	13,000	16	2.4	3,000	13,000	
8.4	25.2	18	2.4	2,900	13,000	18	2.4	3,000	13,000	
8.5	25.5	18	2.4	2,900	13,000	18	2.4	3,000	13,000	
8.6	25.8	18	2.4	2,900	13,000	18	2.4	3,000	13,000	

●공구는 홀더에 확실하게 고정되고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭방향, 정삭 가공을 할 때는 정삭의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 클린트, 또는 물수용성 절삭액 사용에 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

롱 넥 스퀘어 엔드밀 Long Neck Square End Mill

피삭재 Work Material			알루미늄 합금 A5000번 Aluminium alloy A5000				알루미늄 합금 A7000번 Aluminium alloy A7000			
날수 Number of Flutes	외경 Dia.	날장 Effective Length	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>	Depth of Cut		Feed mm/min	Spindle Speed min <sup>-1</sup>
			∅p mm	∅e mm			∅p mm	∅e mm		
3	8.7	26.1	18	2.4	2,900	13,000	18	2.4	3,000	13,000
	8.8	26.4	18	2.4	2,900	13,000	18	2.4	3,000	13,000
	8.9	26.7	18	2.4	2,900	13,000	18	2.4	3,000	13,000
	9	27	18	2.7	2,900	12,000	18	2.7	3,000	12,000
	9.1	27.3	18	2.7	2,900	12,000	18	2.7	3,000	12,000
	9.2	27.6	18	2.7	2,900	12,000	18	2.7	3,000	12,000
	9.3	27.9	18	2.7	2,900	12,000	18	2.7	3,000	12,000
	9.4	28.2	19	2.7	2,900	12,000	19	2.7	3,000	12,000
	9.5	28.5	19	2.7	2,900	12,000	19	2.7	3,000	12,000
	9.6	28.8	19	2.7	2,900	12,000	19	2.7	3,000	12,000
	9.7	29.1	19	2.7	2,900	12,000	19	2.7	3,000	12,000
	9.8	29.4	19	2.7	2,900	12,000	19	2.7	3,000	12,000
	9.9	29.7	19	2.7	2,900	12,000	19	2.7	3,000	12,000
	10	30	19	3	3,150	10,500	19	3	3,250	10,500
		50	30	3	2,700	10,500	30	3	2,800	10,500
	10.1	30.3	20	3	3,150	10,500	20	3	3,250	10,500
	10.2	30.6	20	3	3,150	10,500	20	3	3,250	10,500
	10.3	30.9	20	3	3,150	10,500	20	3	3,250	10,500
	10.4	31.2	20	3	3,150	10,500	20	3	3,250	10,500
	10.5	31.5	20	3	3,150	10,500	20	3	3,250	10,500
10.6	31.8	20	3	3,150	10,500	20	3	3,250	10,500	
10.7	32.1	20	3	3,150	10,500	20	3	3,250	10,500	
10.8	32.4	20	3	3,150	10,500	20	3	3,250	10,500	
10.9	32.7	20	3	3,150	10,500	20	3	3,250	10,500	
11	33	22	3.3	3,250	9,500	22	3.3	3,350	9,500	
11.1	33.3	22	3.3	3,250	9,500	22	3.3	3,350	9,500	
11.2	33.6	22	3.3	3,250	9,500	22	3.3	3,350	9,500	
11.3	33.9	22	3.3	3,250	9,500	22	3.3	3,350	9,500	
11.4	34.2	22	3.3	3,250	9,500	22	3.3	3,350	9,500	
11.5	34.5	22	3.3	3,250	9,500	22	3.3	3,350	9,500	
11.6	34.8	22	3.3	3,250	9,500	22	3.3	3,350	9,500	
11.7	35.1	23	3.3	3,250	9,500	23	3.3	3,350	9,500	
11.8	35.4	23	3.3	3,250	9,500	23	3.3	3,350	9,500	
11.9	35.7	23	3.3	3,250	9,500	23	3.3	3,350	9,500	
12	36	24	3.6	3,250	9,000	24	3.6	3,350	9,000	
	60	36	3.6	2,700	7,500	36	3.6	2,800	7,500	

●공구는 홀더에 확실하게 고정되고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
 ●절삭방향, 정삭 가공을 할 때는 정삭의 최대치입니다. Depth of Cut shows the maximum value for finishing.  
 ●∅p 축 방향, ∅e 반경 방향. ∅p=Axial Depth of Cut ∅e=Radial Depth of Cut.  
 ●오일 미스트 클린트, 또는 물수용성 절삭액 사용에 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
 ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible.  
 ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

## 초경 드릴 Carbide Drill



### 특징

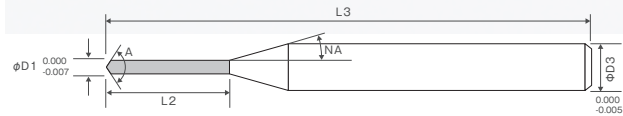
- 드릴용 이온 플레이팅 방식의 코팅 ion Depo Type R을 라인업!
- 강성과 절삭력을 양립한 선단에서 뛰어난 절삭력을 발휘, 폭넓은 피삭재 드릴 가공에 대응!
- 드릴 공정을 삭감할 수 있는 더블 앵글 드릴을 라인업!
- 표준품 외 특별 주문품도 단납기에 제공 가능!

### Features

- ion Depo Type R coated drills.
- Outstanding penetration rate with cutting edge design for rigidity and sharpness, supporting drilling a wide range of work materials.
- Double angle drills available for reduced drilling cycle time
- Non-standard custom-made products can be provided at a short delivery time.

## 초경 드릴 Carbide Drill

■ 형번: IRD230 Model number: IRD230



표기된 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size): mm

코드 No. Code No.	날경 (D1) Tool Diameter	홀길이 (L2) Flute Length	날각 (A) Point Angle	생크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IRD230-0100-00800	1	8	130	4	50	1,940
IRD230-0200-01000	2	10	130	4	50	4,360
IRD230-0250-01400	2.5	14	130	4	50	4,360
IRD230-0260-01400	2.6	14	130	4	50	4,360
IRD230-0300-01400	3	14	130	4	50	4,360
IRD230-0340-01600	3.4	16	130	4	50	4,690
IRD230-0350-01600	3.5	16	130	4	50	4,690
IRD230-0400-01600	4	16	130	4	50	4,930
IRD230-0430-02000	4.3	20	130	6	60	5,290
IRD230-0450-02000	4.5	20	130	6	60	5,290
IRD230-0500-02000	5	20	130	6	60	5,660
IRD230-0510-02000	5.1	20	130	6	60	5,970
IRD230-0520-02000	5.2	20	130	6	60	5,970
IRD230-0590-02000	5.9	20	130	6	60	6,260
IRD230-0600-02000	6	20	130	6	60	6,260
IRD230-0650-03000	6.5	30	130	8	70	6,260
IRD230-0660-03000	6.6	30	130	8	70	6,660
IRD230-0680-03000	6.8	30	130	8	70	6,660
IRD230-0690-03000	6.9	30	130	8	70	6,660
IRD230-0700-03000	7	30	130	8	70	6,660
IRD230-0800-03000	8	30	130	8	70	7,420
IRD230-0850-03500	8.5	35	130	10	90	7,820
IRD230-0860-03500	8.6	35	130	10	90	8,240
IRD230-0900-03500	9	35	130	10	90	8,240
IRD230-1000-03500	10	35	130	10	90	9,040
IRD230-1050-03500	10.5	35	130	12	110	9,440
IRD230-1100-04800	11	48	130	12	120	9,760
IRD230-1150-04800	11.5	48	130	12	120	10,240
IRD230-1200-04800	12	48	130	12	120	10,560
★ IRD230-1300-06500	13	65	130	14	150	19,200
★ IRD230-1300-10400		104	130	14	190	22,480
IRD230-1400-07000	14	70	130	14	150	20,160
IRD230-1400-11200		112	130	14	190	23,920
★ IRD230-1500-07500	15	75	130	16	160	21,440
★ IRD230-1500-12000		120	130	16	210	25,280
IRD230-1600-08000	16	80	130	16	200	22,880
IRD230-1600-12800		128	130	16	210	27,040
★ IRD230-1700-08500	17	85	130	18	180	28,320
★ IRD230-1700-13600		136	130	18	230	32,720
IRD230-1800-09000	18	90	130	18	210	33,360
IRD230-1800-14400		144	130	18	230	38,720
★ IRD230-1900-09500	19	95	130	20	190	38,160
★ IRD230-1900-15200		152	130	20	250	43,840
IRD230-2000-10000	20	100	130	20	230	43,280
IRD230-2000-16000		160	130	20	250	46,160

★주문품 (Ordered product)

CBN Series  
Hard Star A Series  
Hard Star TT Series  
Hard Star TT Series  
ion Depo A Series  
ion Depo U Series  
DLC Series  
Non-Coat Series  
ion Depo R Series  
E Drill

## ion Depo Type R 추천 절삭 조건표 Recommended Milling Conditions

■형번:IRD230  
Model number:IRD230

### 초경 드릴 Carbide Drills

피삭재 Work Material		주철 Cast Iron FCD		탄소강 Carbon Steels S50C/SS400		프리카하드강 Prehardened Steels PX5/NAK80		다이스강 Die Steels SKD11/SKD61		고속도강 High Speed Steels HAP5R/HAP72/ASP23		스테인리스강 Stainless Steels SUS304		스테인리스강 Stainless Steels HPM/STAVAX	
외경 Drill Dia (mm)	날장 Flute Length (mm)	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed
		min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev
1	8	13,000	0.04~0.08	13,000	0.04~0.08	7,500	0.04~0.06	7,500	0.04~0.06	7,500	0.04~0.06	10,000	0.04~0.08	7,500	0.04~0.06
2	10	12,700	0.04~0.09	12,700	0.04~0.09	7,200	0.04~0.06	7,200	0.04~0.06	7,200	0.04~0.06	9,500	0.04~0.08	7,200	0.04~0.06
2.5	14	12,700	0.04~0.09	12,700	0.04~0.09	7,200	0.04~0.06	7,200	0.04~0.06	7,200	0.04~0.06	9,500	0.04~0.08	7,200	0.04~0.06
2.6	14	12,700	0.04~0.09	12,700	0.04~0.09	7,200	0.04~0.06	7,200	0.04~0.06	7,200	0.04~0.06	9,500	0.04~0.08	7,200	0.04~0.06
3	14	11,000	0.06~0.12	11,000	0.06~0.12	4,800	0.06~0.09	4,800	0.06~0.09	4,800	0.06~0.09	8,500	0.06~0.12	4,800	0.06~0.09
3.4	16	11,000	0.06~0.12	11,000	0.06~0.12	4,800	0.06~0.09	4,800	0.06~0.09	4,800	0.06~0.09	8,500	0.06~0.12	4,800	0.06~0.09
3.5	16	11,000	0.06~0.12	11,000	0.06~0.12	4,800	0.06~0.09	4,800	0.06~0.09	4,800	0.06~0.09	8,500	0.06~0.12	4,800	0.06~0.09
4	16	8,000	0.08~0.16	8,000	0.08~0.16	3,600	0.08~0.12	3,600	0.08~0.12	3,600	0.08~0.12	6,400	0.08~0.16	3,600	0.08~0.12
3.4	20	8,000	0.08~0.16	8,000	0.08~0.16	3,600	0.08~0.12	3,600	0.08~0.12	3,600	0.08~0.12	6,400	0.08~0.16	3,600	0.08~0.12
3.5	20	8,000	0.08~0.16	8,000	0.08~0.16	3,600	0.08~0.12	3,600	0.08~0.12	3,600	0.08~0.12	6,400	0.08~0.16	3,600	0.08~0.12
5	20	6,400	0.1~0.2	6,400	0.1~0.2	2,900	0.1~0.15	2,900	0.1~0.15	2,900	0.1~0.15	5,100	0.1~0.2	2,900	0.1~0.15
5.1	20	6,400	0.1~0.2	6,400	0.1~0.2	2,900	0.1~0.15	2,900	0.1~0.15	2,900	0.1~0.15	5,100	0.1~0.2	2,900	0.1~0.15
5.2	20	6,400	0.1~0.2	6,400	0.1~0.2	2,900	0.1~0.15	2,900	0.1~0.15	2,900	0.1~0.15	5,100	0.1~0.2	2,900	0.1~0.15
5.9	20	6,400	0.1~0.2	6,400	0.1~0.2	2,900	0.1~0.15	2,900	0.1~0.15	2,900	0.1~0.15	5,100	0.1~0.2	2,900	0.1~0.15
6	20	5,300	0.12~0.24	5,300	0.12~0.24	2,400	0.12~0.18	2,400	0.12~0.18	2,400	0.12~0.18	4,200	0.12~0.24	2,400	0.12~0.18
6.5	30	5,300	0.12~0.24	5,300	0.12~0.24	2,400	0.12~0.18	2,400	0.12~0.18	2,400	0.12~0.18	4,200	0.12~0.24	2,400	0.12~0.18
6.6	30	5,300	0.12~0.24	5,300	0.12~0.24	2,400	0.12~0.18	2,400	0.12~0.18	2,400	0.12~0.18	4,200	0.12~0.24	2,400	0.12~0.18
6.8	30	5,300	0.12~0.24	5,300	0.12~0.24	2,400	0.12~0.18	2,400	0.12~0.18	2,400	0.12~0.18	4,200	0.12~0.24	2,400	0.12~0.18
6.9	30	5,300	0.12~0.24	5,300	0.12~0.24	2,400	0.12~0.18	2,400	0.12~0.18	2,400	0.12~0.18	4,200	0.12~0.24	2,400	0.12~0.18
7	30	4,500	0.14~0.26	4,500	0.14~0.26	2,000	0.14~0.21	2,000	0.14~0.21	2,000	0.14~0.21	3,600	0.14~0.26	2,000	0.14~0.21
8	30	4,000	0.16~0.28	4,000	0.16~0.28	1,800	0.16~0.24	1,800	0.16~0.24	1,800	0.16~0.24	3,200	0.16~0.28	1,800	0.16~0.24
8.5	35	4,000	0.16~0.28	4,000	0.16~0.28	1,800	0.16~0.24	1,800	0.16~0.24	1,800	0.16~0.24	3,200	0.16~0.28	1,800	0.16~0.24
8.6	35	4,000	0.16~0.28	4,000	0.16~0.28	1,800	0.16~0.24	1,800	0.16~0.24	1,800	0.16~0.24	3,200	0.16~0.28	1,800	0.16~0.24
9	35	3,500	0.18~0.3	3,500	0.18~0.3	1,600	0.18~0.27	1,600	0.18~0.27	1,600	0.18~0.27	2,800	0.18~0.3	1,600	0.18~0.27
10	35	3,200	0.2~0.3	3,200	0.2~0.3	1,400	0.2~0.3	1,400	0.2~0.3	1,400	0.2~0.3	2,500	0.2~0.3	1,400	0.2~0.3
10.5	35	3,200	0.2~0.3	3,200	0.2~0.3	1,400	0.2~0.3	1,400	0.2~0.3	1,400	0.2~0.3	2,500	0.2~0.3	1,400	0.2~0.3
11	48	2,900	0.2~0.3	2,900	0.2~0.3	1,300	0.2~0.3	1,300	0.2~0.3	1,300	0.2~0.3	2,300	0.2~0.3	1,300	0.2~0.3
11.5	48	2,900	0.2~0.3	2,900	0.2~0.3	1,300	0.2~0.3	1,300	0.2~0.3	1,300	0.2~0.3	2,300	0.2~0.3	1,300	0.2~0.3
12	48	2,700	0.21~0.3	2,700	0.21~0.3	1,200	0.21~0.3	1,200	0.21~0.3	1,200	0.21~0.3	2,100	0.21~0.3	1,200	0.21~0.3
13	65	2,700	0.21~0.3	2,700	0.21~0.3	1,200	0.21~0.3	1,200	0.21~0.3	1,200	0.21~0.3	2,100	0.21~0.3	1,200	0.21~0.3
	104	2,700	0.21~0.3	2,700	0.21~0.3	1,200	0.21~0.3	1,200	0.21~0.3	1,200	0.21~0.3	2,100	0.21~0.3	1,200	0.21~0.3
14	70	2,300	0.22~0.35	2,300	0.22~0.35	1,000	0.22~0.35	1,000	0.22~0.35	1,000	0.22~0.35	1,800	0.22~0.35	1,000	0.22~0.35
	112	2,300	0.22~0.35	2,300	0.22~0.35	1,000	0.22~0.35	1,000	0.22~0.35	1,000	0.22~0.35	1,800	0.22~0.35	1,000	0.22~0.35
15	75	2,300	0.22~0.35	2,300	0.22~0.35	1,000	0.22~0.35	1,000	0.22~0.35	1,000	0.22~0.35	1,800	0.22~0.35	1,000	0.22~0.35
	120	2,300	0.22~0.35	2,300	0.22~0.35	1,000	0.22~0.35	1,000	0.22~0.35	1,000	0.22~0.35	1,800	0.22~0.35	1,000	0.22~0.35
16	80	2,000	0.25~0.36	2,000	0.25~0.36	900	0.25~0.36	900	0.25~0.36	900	0.25~0.36	1,600	0.25~0.36	900	0.25~0.36
	128	2,000	0.25~0.36	2,000	0.25~0.36	900	0.25~0.36	900	0.25~0.36	900	0.25~0.36	1,600	0.25~0.36	900	0.25~0.36
17	85	2,000	0.25~0.36	2,000	0.25~0.36	900	0.25~0.36	900	0.25~0.36	900	0.25~0.36	1,600	0.25~0.36	900	0.25~0.36
	136	2,000	0.25~0.36	2,000	0.25~0.36	900	0.25~0.36	900	0.25~0.36	900	0.25~0.36	1,600	0.25~0.36	900	0.25~0.36
18	90	1,800	0.28~0.38	1,800	0.28~0.38	800	0.28~0.38	800	0.28~0.38	800	0.28~0.38	1,400	0.28~0.38	800	0.28~0.38
	144	1,800	0.28~0.38	1,800	0.28~0.38	800	0.28~0.38	800	0.28~0.38	800	0.28~0.38	1,400	0.28~0.38	800	0.28~0.38
19	95	1,800	0.28~0.38	1,800	0.28~0.38	800	0.28~0.38	800	0.28~0.38	800	0.28~0.38	1,400	0.28~0.38	800	0.28~0.38

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●공구 속 방향, ②e 반경 방향. ②a=Axial Depth of Cut. ②r=Radial Depth of Cut. ●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

### 초경 드릴 Carbide Drills

피삭재 Work Material		주철 Cast Iron FCD		탄소강 Carbon Steels S50C/SS400		프리카하드강 Prehardened Steels PX5/NAK80		다이스강 Die Steels SKD11/SKD61		고속도강 High Speed Steels HAP5R/HAP72/ASP23		스테인리스강 Stainless Steels SUS304		스테인리스강 Stainless Steels HPM/STAVAX	
외경 Drill Dia (mm)	날장 Length of cut (mm)	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed
		min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev
19	152	1,800	0.28~0.38	1,800	0.28~0.38	800	0.28~0.38	800	0.28~0.38	800	0.28~0.38	1,400	0.28~0.38	800	0.28~0.38
20	100	1,600	0.3~0.4	1,600	0.3~0.4	700	0.3~0.4	700	0.3~0.4	700	0.3~0.4	1,300	0.3~0.4	700	0.3~0.4
	160	1,600	0.3~0.4	1,600	0.3~0.4	700	0.3~0.4	700	0.3~0.4	700	0.3~0.4	1,300	0.3~0.4	700	0.3~0.4

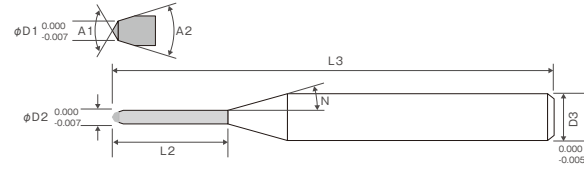
●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●공구 속 방향, ②e 반경 방향. ②a=Axial Depth of Cut. ②r=Radial Depth of Cut. ●오일 미스트 클린트, 또는 물수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid. ●공구 돌출은 필요 이상으로 하지 않아 주세요. Length of tool overhang must be as short as possible. ●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

# ion Depo Type R Series

## 초경 더블 앵글 드릴 Carbide Double Angle Drill

■형번:IRDAD230 Model number:IRDAD230

ion R super MG 날수 2 헬릭스각 30° 목각 15° Shank 0/-0.005



표기한 목각(NA)은 예상 기준치입니다. 피삭재에 간섭이 우려되는 경우는 꼭 실측 확인을 해주세요.  
The neck angle (NA) shown is a reference value.  
If concerned about interference with the work material, please check by actual measurement.

●재연마가 가능한 공구의 세부사항에 관해서는 문의해 주십시오.(Regrinding is possible. Please contact us for details.)

사이즈(Size):mm

코드 No. Code No.	제1 외경 (D1) First Diameter	제2 외경 (D2) Second Diameter	홀길이 (L2) Flute Length	날각 (A1) First Angle	날각 (A2) Second Angle	샙크 (D3) Shank Diameter	전장 (L3) Overall Length	표준가격 (엔) Retail Price (JPY)
IRDAD230-0180-01500	0.5	1.8	15	130	60	4	50	5,230
IRDAD230-0200-01500	0.65	2	15	130	60	4	50	5,230
IRDAD230-0220-01500	1.6	2.2	15	130	60	4	50	5,230
IRDAD230-0250-01500	0.9	2.5	15	130	60	4	50	5,230
IRDAD230-0300-01500	1	3	15	130	60	4	50	5,230
IRDAD230-0340-0100-01500	1	3.4	15	130	60	4	50	5,630
IRDAD230-0340-0150-01500	1.5	3.4	15	130	60	4	50	5,630
IRDAD230-0450-01500	1.5	4.5	15	130	60	6	50	6,350

# ion Depo Type R Series

## ion Depo Type R 추천 절삭 조건표 Recommended Milling Conditions

■형번:IRDAD230  
Model number:IRDAD230

### 초경 더블 앵글 드릴 Carbide double angle drills

피삭재 Work Material	주철 Cast Iron FCD		탄소강 Carbon Steels S50C/SS400		프리하드강 Prehardened Steels PX5/NAK80		다이스강 Die Steels SKD11/SKD61		고속도강 High Speed Steels HAP5R/HAP72/ASP23		스테인리스강 Stainless Steels SUS304		스테인리스강 Stainless Steels HPM/STAVAX	
	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed	Speed	Feed
제1 외경 Second Diameter	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev	min-1	mm/rev
1.8	4,500	0.03	4,500	0.03	4,500	0.03	4,500	0.03	4,500	0.03	4,000	0.03	4,500	0.03
2	4,000	0.03	4,000	0.03	4,000	0.03	4,000	0.03	4,000	0.03	3,600	0.03	4,000	0.03
2.2	3,500	0.05	3,500	0.05	3,500	0.05	3,500	0.05	3,500	0.05	3,200	0.05	3,500	0.05
2.5	3,500	0.05	3,500	0.05	3,500	0.05	3,500	0.05	3,500	0.05	3,200	0.05	3,500	0.05
3	2,600	0.07	2,600	0.07	2,600	0.07	2,600	0.07	2,600	0.07	2,300	0.07	2,600	0.07
3.4	2,500	0.07	2,500	0.07	2,500	0.07	2,500	0.07	2,500	0.07	2,200	0.07	2,500	0.07
4.5	2,000	0.12	2,000	0.12	2,000	0.12	2,000	0.12	2,000	0.12	1,800	0.12	2,000	0.12

●공구는 홀더에 확실하게 고정하고, 진동을 억제해 주세요. Reduce tool deflection by mounting the tool securely into the holder.  
●절삭량, 절삭 가동 방향은 절삭 방향에 따라 달라집니다. Depth of Cut shows the maximum value for finishing.  
●공구 속 방향, &e-안정 방향. &e-axial Depth of Cut. &e=Radial Depth of Cut.  
●오일 미스트 플린트, 또는 불수용성 절삭액을 사용해 주세요. We recommend using oil mist coolant or non-water soluble cutting fluid.  
●공구 돌출은 절삭 방향에 따라 달라집니다. Length of tool overhang must be as short as possible.  
●RPM & FEED는 동일한 비율로 조정해 주세요. Adjust milling conditions according to the depth of cut and the rigidity of the machine and work holding.

CBN Series

Hard Star A Series

Hard Star TT Series

Hard Star TT Series

ion Depo A Series

ion Depo U Series

DLC Series

Non-Coat Series

ion Depo R Series  
5-flute Drill











## 사용 시 주의사항

- 절삭날을 맨손으로 직접 만지지 마십시오. 다칠 위험이 있습니다.
- 공구를 케이스에서 꺼내거나 기계에 장착할 때는 보호장갑 등을 사용하십시오.
- 사용 전에 공구의 흠집, 깨짐 등이 없는 것을 확인하십시오.
- 공구에 흠집이나 깨짐 등이 있을 경우, 사용 중 파손되어 파편이 날릴 위험이 있습니다.
- 사용 전에 공구 사이즈와 가공물 사이즈를 확인하십시오.
- 절삭조건표에 적혀있는 수치는 예상 기준치입니다. 가공물이나 기계 성능에 맞추어 절삭조건이 조정 필요함입니다.
- 가공 중 공구에 충격적인 부하나 공구의 손상으로 인하여 공구 파편이 날릴 위험이 있습니다. 안전커버나 보호안경 등 보호구를 사용하십시오.
- 이미 마모가 진행된 상태나 손상된 상태인 공구를 계속해서 사용하면 파손의 원인이 됩니다. 공구를 교환하십시오.
- 가공 중 이상한 진동이나 이상음이 발생한 경우는 당장 가공을 중지하십시오.
- 절삭유는 용도에 따라서 선택하십시오. 방화 대책을 반드시 시행하십시오.

### Attention on Safety

- Do not directly touch the cutting edge. It could cause injury.
- When removing tools from their packaging, ALWAYS use safety covers.
- Make sure there are no scratches or cracks on the tool before use.
- If the tool has scratches or cracks, there is a risk of damage and scattering during use.
- Verify dimensions of tools and workpiece before starting operation.
- It is necessary to adjust cutting conditions according to part shape, and machine/ work holding rigidity.
- As tools may be scattered due to an impact or damage to the tool during machining.  
ALWAYS use safety covers and eye protection.
- Continued use of worn or damaged tools may cause damage, please replace the tool.
- If abnormal vibration, sound, etc. occurs during machining, stop machine immediately.
- Select a cutting fluid appropriate to the particular usage. Ensure that you take proper fire-prevention measures.

## Global Tool Sales base detail



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**TOWA** 주식회사



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