

THE NEW VALUE FRONTIER



난삭재 가공용 공구

Cutting tools for Difficult-to-cut material

난삭재의 안정 · 긴수명 가공을 실현

For stable cutting and long tool life of difficult-to-cut material

내열합금용 For Heat Resistant Alloy

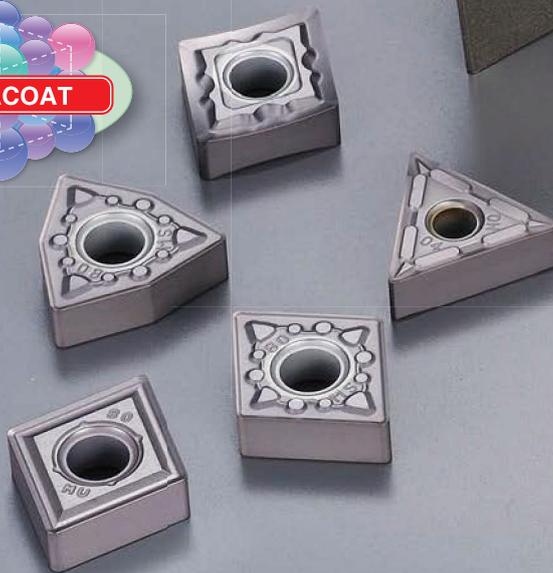
PR13시리즈

PR13 series

(PR13⁰⁵/PR13¹⁰/PR13²⁵)

용도 : 니켈계 내열합금, 철계 내열합금
코발트계 내열합금, 석출 경화계 스테인레스강

Application Nickel base heat resistant alloy, Iron base heat resistant alloy
Cobalt base heat resistant alloy, Precipitation hardening stainless steels



티탄합금용 For Titanium alloy

SW시리즈

SW series

(SW05/SW10/SW25)



ADVANCING PRODUCTIVITY

생산성 향상에 기여하는 교세라

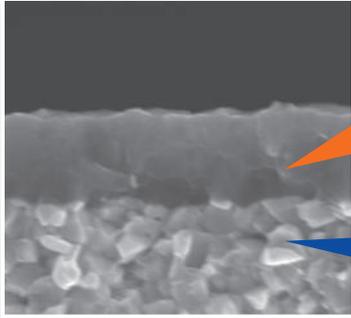
PR13⁰⁵/13¹⁰/13²⁵

MEGACOAT로 긴수명 (PR13시리즈)

Long tool life by MEGACOAT technology

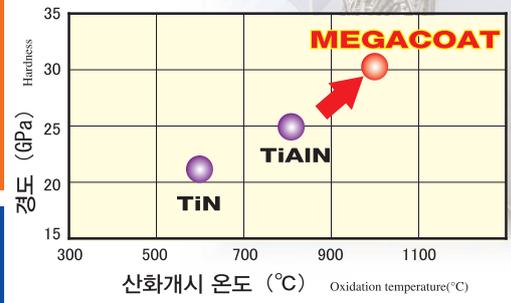
우수한 내마모성·내열성

Excellent wear resistance and heat resistance



MEGACOAT
High hardness and oxidation resistance, smooth surface

특수 초경모재
Special carbide substrate



고경도, 고내열성의 MEGACOAT는 고속·안정가공과 틱의 긴수명화를 실현합니다.

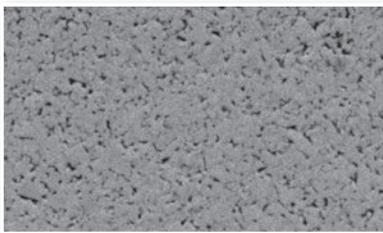
MEGACOAT, with high hardness and oxidation resistance, realizes stable machining at high speed and long tool life.

특수 초경모재

Special carbide substrate

내결손·안정가공

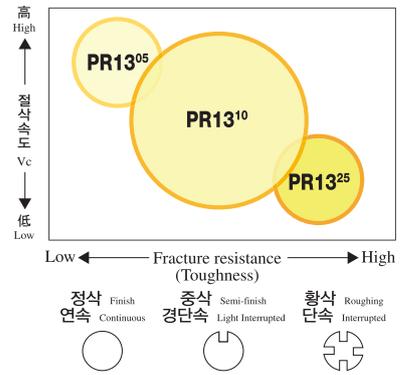
Fracture resistance, Stabilization



균일한 입자로 우수한 내열충격성, 고경도 지속성

Superior heat shock resistance and high hardness stability by uniform grain

재종 Insert Grades	용도 Application
PR13 ⁰⁵	연속·정삭용 재종 Continuous / Finishing
PR13 ¹⁰	제 1 추천 재종 First recommendation
PR13 ²⁵	단속·황삭용 재종 Interrupted / Roughing

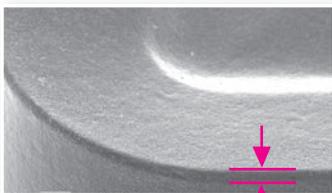


새로운 인선 형상 FET*기술 (PR13시리즈, SW시리즈 공통) *FET: 파인 엣지 트리트먼트

New edge preparation (PR13 series, SW series) *FET: Fine Edge Treatment

저저항에 의한 떨림 억제

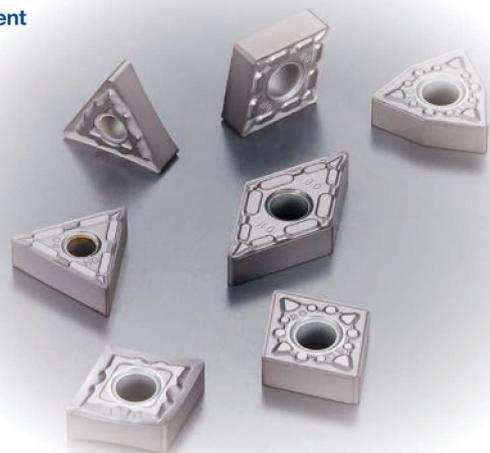
Low cutting force reduces chattering



FET기술에 의해 제어된 인선
Cutting edge condition by FET technology

큰 칩처리각과 작게 제어된 R호닝으로 버·경계 손상을 억제, 워크 정삭면이 우수합니다.

Large rake angle and small radius honing controls prevents burr and notching and improves finished surface.



PR13시리즈 성능 평가

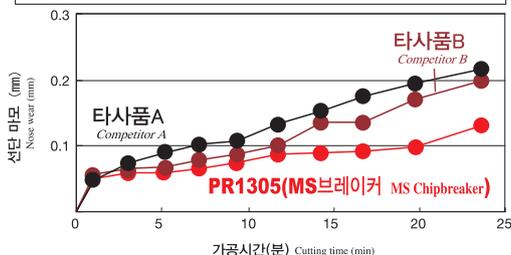
Cutting Performance Evaluation of PR13 series

우수한 내마모성 Excellent wear resistance

· 내마모성 비교(인코넬718)

In-house cutting test (Inconel718) 사내평가 Internal evaluation

절삭조건 Condition : Vc=45m/min, ap=0.25mm, f=0.15mm/rev., wet, 외경 연속 Continuous (External), CNMG120408타입 Type



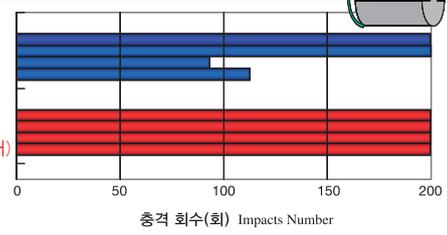
내결손성 우수 High fracture resistance

· 내결손 비교(인코넬718)

Cutting capability (Inconel718) 사내평가 Internal evaluation

절삭조건 Condition : Vc=30m/min, ap=0.25mm, f=0.15mm/rev., wet Inconel 718 (2개 홀), 외경 단속가공 Interrupted (External), CNMG120408타입 Type

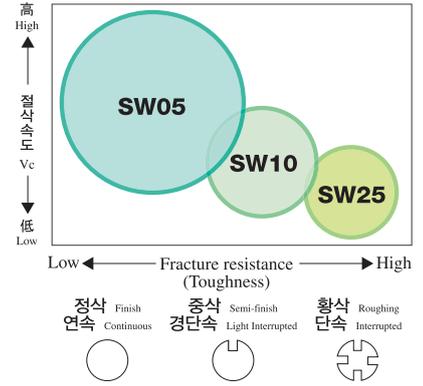
C사 PVD코팅 PVD coating
PR1325 (TK브레이크) (TK Chipbreaker)



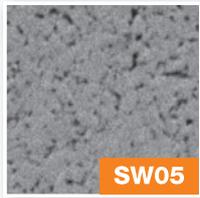
SW05/SW10/SW25

**우수한 내마모성으로
긴수명화를 실현**
Good wear resistance and
long tool life

재종 Insert Grades	용도 Application
SW05	제 1 추천 재종 First recommendation
SW10	인선강도 중시 Tough cutting edge
SW25	단속 · 황삭용 재종 Interrupted / Roughing

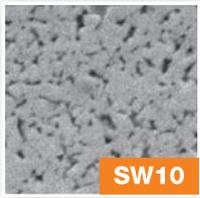


특수 초경 모재 Special carbide substrate



SW05

고온 특성, 열전도가 뛰어난 특수 초경합금으로 높은 내마모성을 실현
고속 정삭~중삭 가공용
Special carbide with high temperature property and thermal conductivity. Improved wear resistance.
High speed finishing to medium cutting.



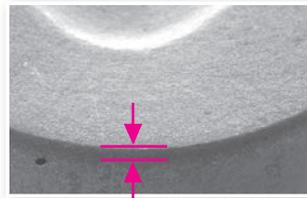
SW10

고온 특성과 고강도를 실현한 특수 초경합금으로 내칩핑성을 향상
경단속, 흑피 가공용
경단속, 흑피 가공용
Special carbide with high temperature property and strength. Improved chipping resistance.
Light interrupted cut, material with scale, etc.



SW25

조성, 조직 최적화에 의한 강인형 초경 합금
각재, 편심 워크 등의 강단속 가공용
Tough carbide with optimized structure.
Heavy interrupted cut of blocks and eccentric materials.

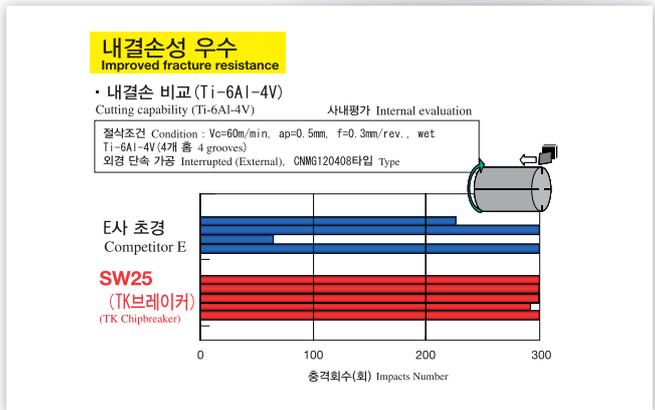
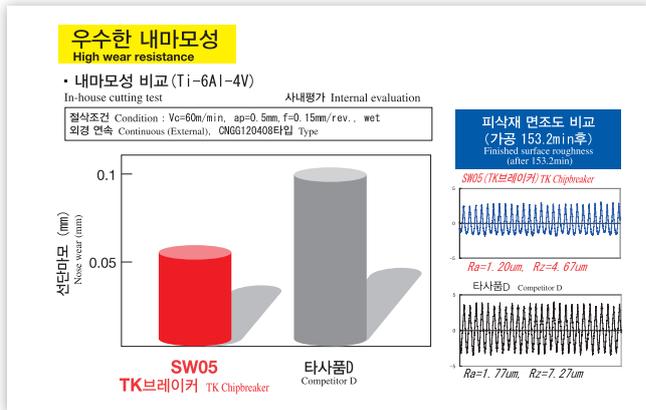


새로운 인선 형상 FET기술에 의한 절삭날 상태
Cutting edge condition by FET Technology

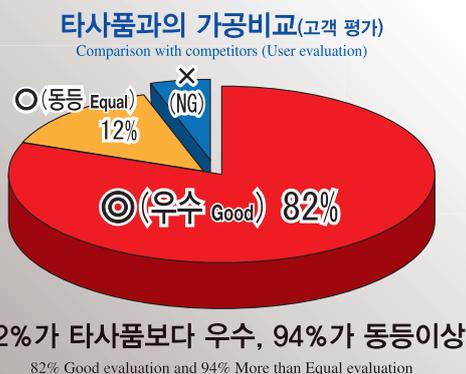


※SW10, SW25는 특수 재종 대응
SW10 and SW25 are available as custom order product.

SW시리즈 성능 평가 Cutting Performance Evaluation of SW series



PR13시리즈 고객 평가 PR13 series, Evaluation by the user



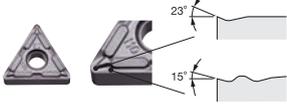
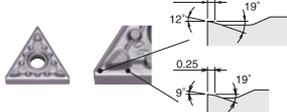
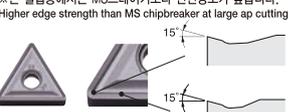
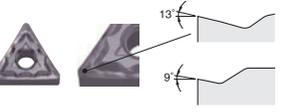
재종 선택 Insert Grades selection

피삭재 Material	절삭 영역 Cutting range	재종 Insert Grades
니켈계 내열합금(인코넬718등) 철계 내열합금(A286등) 코발트계 내열합금(S816, 스텔라이트 등) 석출 경화계 스텔레스강(SUS630등) Nickel base heat resistant alloy (Inconel718, etc) Iron base heat resistant alloy (A286, etc) Cobalt base heat resistant alloy (S816, Stellite, etc) Precipitation hardening stainless steels (SUS630, etc.)	정삭 Finishing	PR1305
	중~황삭 Medium-Roughing	PR1310
	황삭 Roughing	PR1325
티탄합금(Ti-6Al-4V 등) Titanium alloy (Ti-6Al-4V etc.)	정삭 Finishing	SW05
	중~황삭 Medium-Roughing	SW05

※SW10, SW25는 특수 재종 대응 SW10 and SW25 are available as custom order product.

브레이커, 재종의 사용구분

Guide for tool selection

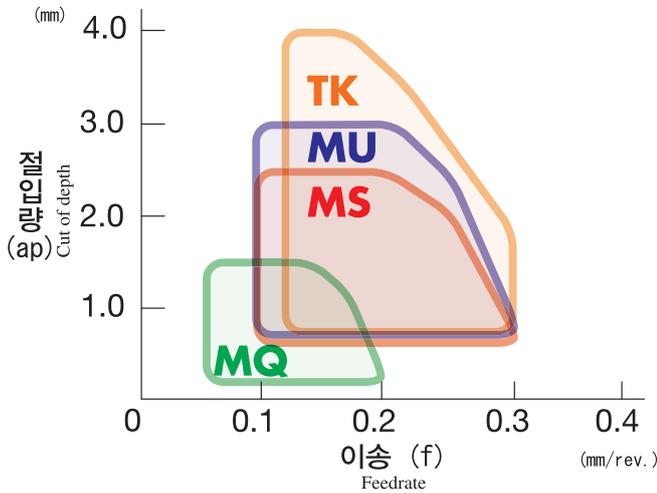
<p>MQ브레이커 MQ Chipbreaker</p> <ul style="list-style-type: none"> 정삭~중삭용 브레이커 From finishing to Medium 큰 경사각, 원호 절삭날 Large rake angle, Circular edge line 저저항으로 우수한 칩처리 Low cutting force and Good chip control 	<p>MS브레이커 MS Chipbreaker</p> <ul style="list-style-type: none"> 중삭~황삭용 제1추천 브레이커 From medium to roughing First recommended chipbreaker 포지티브 랜드 Positive land 절삭성과 인선강도가 우수 Tough cutting edge 우수한 칩처리 Good chip control 	<p>MU브레이커 MU Chipbreaker</p> <ul style="list-style-type: none"> 중삭~황삭용 브레이커 From Medium to Roughing 큰경사각으로 저저항 Large rake angle, Low cutting resistance 경계마모(손상)와 버를 억제 Reduces notching & burrs 절삭성 중시 Sharpness oriented type <p>*큰 절입량에서는 MS브레이커보다 인선강도가 높습니다. Higher edge strength than MS chipbreaker at large ap cutting</p> 	<p>TK브레이커 TK Chipbreaker</p> <ul style="list-style-type: none"> 중삭~황삭용 브레이커 From Medium to Roughing 칩 배출성 중시 Chip evacuation 칩의 굽을 크게 컨트롤 Large curled chip 
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칩 브레이커 선택 기준 Chipbreaker selection

(내열합금/티탄합금) Heat Resistant Alloy, Titanium Alloy

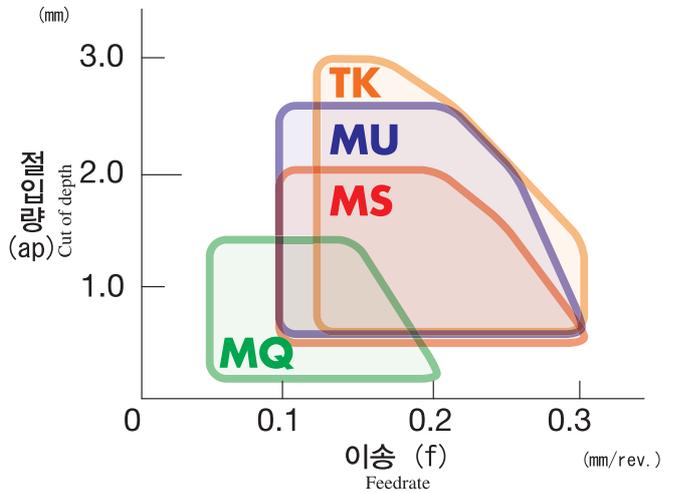
티탄합금용 SW시리즈

SW series for Titanium Alloy



내열합금용 PR13시리즈

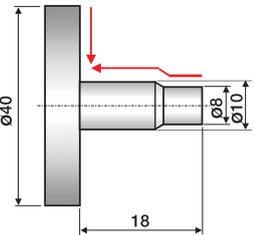
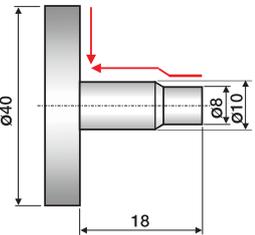
PR13 series for heat resistant alloy



가공 사례

Case Studies

인코넬718 Inconel718	
<ul style="list-style-type: none"> 링 (항공부품) Ring (Aircraft Parts) Vc= 35m/min ap= 1,0 mm f = 0,2mm/rev <p>WET CNMG120408TK (PR1305)</p> 	 <p>PR1305</p>  <p>타사 코팅 F Competitor Coating F</p>
PR1305	10개 이상/코너 more than 10 pcs/edge
타사 코팅 F Competitor Coating F	10개/코너 10 pcs/edge
<p>· 타사 코팅 F에 비해 마모량이 적고 내마모성 우수. 공구수명 연장 가능</p> <p>· Better wear resistance compared with Competitor F. Still applicable for the continued machining.</p>	
고객 평가 Evaluation by the user	

인코넬713 Inconel713	
<ul style="list-style-type: none"> 스테이터 Stator Vc= 40m/min ap= 0,5 mm f = 0,2mm/rev <p>WET WNMG080408MU (PR1310)</p> 	
PR1310	30~40 개/코너 30-40 pcs/edge
타사 코팅 G Competitor Coating G	15~20 개/코너 15-20 pcs/edge
<p>· 타사 코팅 G에 비해 공구수명이 2배 향상.</p> <p>· Kyocera showed 2 times longer tool life than Competitor G.</p>	
고객 평가 Evaluation by the user	

인코로이 A286(철계 내열합금) Incoloy A286	
<ul style="list-style-type: none"> ·숄더 부시 Shoulder bush ·Vc= 70m/min ·ap= 1.5 mm ·f = 0,18mm/rev WET CNMG120408MS 	
PR1310	3개/코너 3 pcs/edge Vc=70m/min
타사 코팅 H Competitor Coating H	2개/코너 2 pcs/edge Vc = 55m/min
【타사 절삭조건 Competitor cutting conditions】 Vc=55m/min	<ul style="list-style-type: none"> · 타사 코팅 H에 비해, 가공수가 1.5배 향상 · 절삭속도가 127% 올라서, 생산성 향상 ·Kyocera processed 1.5 times as many workpieces compared to Competitor H. ·Cutting speed increased 127%. Productivity improved.
고객 평가 Evaluation by the user	

인코넬 718 Inconel718	
<ul style="list-style-type: none"> · 커넥터 Connector ·Vc= 53m/min ·ap= 2.0 mm ·f = 0,2mm/rev WET CNMG120408MS 	
PR1310	7개/코너 7 pcs/edge
타사 코팅 I Competitor Coating I	3개/코너 3 pcs/edge
	<ul style="list-style-type: none"> · 타사코팅 I에 비해, 공구수명이 2 배 이상 향상 ·Kyocera showed 2 times longer tool life than Competitor I.
고객 평가 Evaluation by the user	

SUS 316L	
<ul style="list-style-type: none"> · 노즐(항공부품) Nozzle (Aircraft Parts) ·Vc= 90m/min ·ap= 1,25 mm~2mm ·f = 0,125mm/rev WET CNMG120408MU 	
PR1310	5개 이상/코너 more than 5 pcs/edge
타사 코팅 J Competitor Coating J	1개/코너 1 pcs/edge
	<ul style="list-style-type: none"> · 타사 코팅 J에 비해, 공구수명이 5배 이상 향상 ·Kyocera showed 5 times longer tool life than Competitor J.
고객 평가 Evaluation by the user	

SUS 316L	
<ul style="list-style-type: none"> · 밸브 Valve ·Vc= 200m/min ·ap= ~2,5 mm ·f = 0,25mm/rev WET CNMG120408MS 	
PR1310	110~125 개/코너 110-125 pcs/edge
타사 코팅 K Competitor Coating K	60 개/코너 60 pcs/edge
	<ul style="list-style-type: none"> · 타사 코팅 K에 비해, 공구수명이 약 2 배 향상 ·Kyocera showed 2 times longer tool life than Competitor K.
고객 평가 Evaluation by the user	

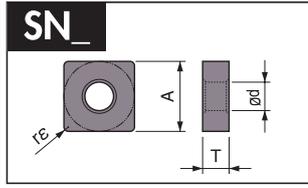
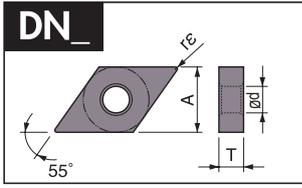
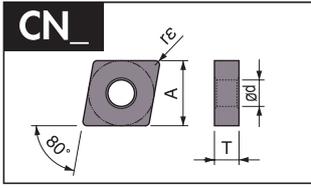
인코넬625 Inconel625	
<ul style="list-style-type: none"> · 항공부품 Aircraft Parts ·Vc= 40m/min ·ap= 1,59 mm ·f = 0,15mm/rev WET CNMG120408MS 	
PR1310	8 개/코너 8 pcs/edge
타사 코팅 L Competitor Coating L	4~5개/코너 4-5 pcs/edge
	<ul style="list-style-type: none"> · 타사 코팅 L에 비해, 공구수명이 1.6~2 배 향상 ·Kyocera showed 1.6 to 2 times longer tool life than Competitor L.
고객 평가 Evaluation by the user	

인코넬718 Inconel718	
<ul style="list-style-type: none"> · 바(각재) Square bar ·Vc= 20m/min ·ap= 1,25 mm ·f = 0,24mm/rev WET CNMG120408MS 	
PR1325	25개/코너 25 pcs/edge
타사 코팅 M Competitor Coating M	6개/코너 6 pcs/edge
	<ul style="list-style-type: none"> · 타사 코팅 M에 비해, 공구수명이 4 배 이상 향상 ·Kyocera showed 4 times longer tool life than Competitor M.
고객 평가 Evaluation by the user	

네가티브 팁

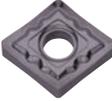
Negative

(mm)



규격 Description	A	T	ød
CN_1204_	12.70	4.76	5.16
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05		7.94
DN_1504_	12.70	4.76	5.16
DN_1506_		6.35	
SN_1204_	12.70	4.76	
SN_1906_	19.05	6.35	7.94

표준재고 규격 Stock items

형상 Shape	규격 Description	차수 (mm) Dimension	MEGACOAT			초경 Carbide		
			rε	PR1305	PR1310	PR1325	SW05	SW10
 정삭 ~ 중삭 Finishing-Medium	CNMG 120404MQ	0.4	●	●	●	●		
	120408MQ	0.8	●	●	●	●		
 중삭 ~ 황삭 Medium-Roughing	CNMG 120404MS	0.4	●	●	●	●		
	120408MS	0.8	●	●	●	●		
	120412MS	1.2	●	●	●	●		
	120416MS	1.6	●	●	●	●		
 중삭 ~ 황삭 Medium-Roughing	CNMG 120404MU	0.4	●	●	●	●		
	120408MU	0.8	●	●	●	●		
	CNMG 160608MU	0.8		●	●			
	160612MU	1.2		●	●			
	160616MU	1.6		●	●			
	CNMG 190612MU	1.2		●	●			
190616MU	1.6		●	●				
 중삭 ~ 황삭 Medium-Roughing	CNMG 120404TK	0.4	●	●	●			
	120408TK	0.8	●	●	●			
 중삭~황삭 · 샤프에지 Medium-Roughing / Sharp Edge	CNGG 120404TK	0.4	●	●		●		
	120408TK	0.8	●	●		●		
 정삭 Finishing	DNMG 150404MQ	0.4	●	●	●	●		
	150408MQ	0.8	●	●	●	●		
	DNMG 150604MQ	0.4	●	●	●	●		
	150608MQ	0.8	●	●	●	●		

표준재고 규격
Available as stock items

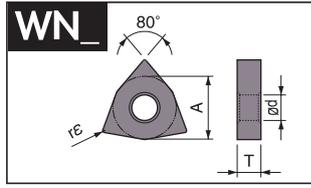
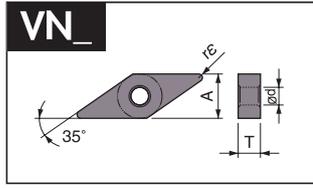
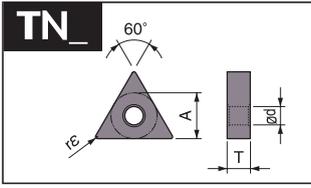
형상 Shape	규격 Description	차수 (mm) Dimension	MEGACOAT			초경 Carbide		
			rε	PR1305	PR1310	PR1325	SW05	SW10
 중삭 ~ 황삭 Medium-Roughing	DNMG 150404MS	0.4	●	●	●	●		
	150408MS	0.8	●	●	●	●		
	150412MS	1.2	●	●	●	●		
	DNMG 150604MS	0.4	●	●	●			
 중삭 ~ 황삭 Medium-Roughing	150608MS	0.8	●	●	●			
	150612MS	1.2	●	●	●			
	DNMG 150404MU	0.4	●	●	●	●		
	150408MU	0.8	●	●	●	●		
 중삭 ~ 황삭 Medium-Roughing	DNMG 150604MU	0.4	●	●	●	●		
	150608MU	0.8	●	●	●	●		
	DNMG 150404TK	0.4	●	●	●			
	150408TK	0.8	●	●	●			
 중삭 ~ 황삭 Medium-Roughing	DNMG 150604TK	0.4	●	●	●			
	150608TK	0.8	●	●	●			
	DNMG 150604TK	0.4	●	●		●		
	150608TK	0.8	●	●		●		
 중삭~황삭 · 샤프에지 Medium-Roughing / Sharp Edge	DNGG 150404TK	0.4	●	●		●		
	150408TK	0.8	●	●		●		
 정삭 ~ 중삭 Finishing-Medium	SNMG 120404MQ	0.4	●	●	●	●		
	120408MQ	0.8	●	●	●	●		
 중삭 ~ 황삭 Medium-Roughing	SNMG 120404MS	0.4	●	●	●	●		
	120408MS	0.8	●	●	●	●		
	120412MS	1.2	●	●	●	●		
	120416MS	1.6	●	●	●			
 중삭 ~ 황삭 Medium-Roughing	SNMG 190612MU	1.2		●	●			
	190616MU	1.6		●	●			

표준재고 규격
Available as stock items

● : 표준재고 ● : Std Stock

네가티브 팁 Negative

(mm)



규격 Description	A	T	ød
TN_1604_	9.525	4.76	3.81
VN_1604_			5.16
WN_0804_	12.70		

표준재고 규격 Stock items

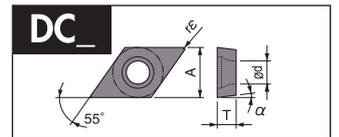
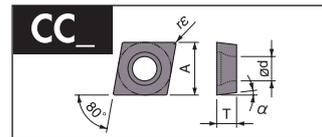
형상 Shape	규격 Description	치수(mm) Dimension	MEGACOAT			초경 Carbide		
			rε	PR1305	PR1310	PR1325	SW05	SW10
정삭 ~ 중삭 Finishing-Medium	TNMG 160404MQ	0.4	●	●	●	●		
	160408MQ	0.8	●	●	●	●		
중삭 ~ 황삭 Medium-Roughing	TNMG 160404MS	0.4	●	●	●	●		
	160408MS	0.8	●	●	●	●		
	160412MS	1.2	●	●	●	●		
중삭 ~ 황삭 Medium-Roughing	TNMG 160404MU	0.4	●	●	●	●		
	160408MU	0.8	●	●	●	●		
중삭 ~ 황삭 · 샤프에지 Medium-Roughing / Sharp Edge	TNGG 160404TK	0.4	●	●		●		
	160408TK	0.8	●	●		●		
정삭 Finishing	VNMG 160404MQ	0.4	●	●	●	●		
	160408MQ	0.8	●	●	●	●		
중삭 ~ 황삭 Medium-Roughing	VNMG 160404MS	0.4	●	●	●	●		
	160408MS	0.8	●	●	●	●		
	160412MS	1.2	●	●	●	●		
중삭 ~ 황삭 Medium-Roughing	VNMG 160404MU	0.4	●	●	●	●		
중삭 ~ 황삭 Medium-Roughing	160408MU	0.8	●	●	●	●		
정삭 ~ 중삭 Finishing-Medium	WNMG 080404MQ	0.4	●	●	●	●		
	080408MQ	0.8	●	●	●	●		
중삭 ~ 황삭 Medium-Roughing	WNMG 080404MS	0.4	●	●	●	●		
	080408MS	0.8	●	●	●	●		
	080412MS	1.2	●	●	●	●		

표준재고 규격
Available as custom order product

형상 Shape	규격 Description	치수(mm) Dimension	MEGACOAT			초경 Carbide		
			rε	PR1305	PR1310	PR1325	SW05	SW10
중삭 ~ 황삭 Medium-Roughing	WNMG 080404MU	0.4	●	●	●	●		
	080408MU	0.8	●	●	●	●		
중삭 ~ 황삭 Medium-Roughing	WNMG 080404TK	0.4	●	●	●			
	080408TK	0.8	●	●	●			
중삭 ~ 황삭 · 샤프에지 Medium-Roughing / Sharp Edge	WNGG 080404TK	0.4	●	●		●		
	080408TK	0.8	●	●		●		

표준재고 규격
Available as custom order product

포지티브 팁 Positive



(mm)

규격 Description	A	T	ød	α
CC_09T3_	9.525	3.97	4.4	7°
DC_0702_	6.35	2.38	2.8	
DC_11T3_	9.525	3.97	4.4	

표준재고 규격

형상 Shape	규격 Description	치수(mm) Dimension	MEGACOAT			초경 Carbide		
			rε	PR1305	PR1310	PR1325	SW05	SW10
정삭 ~ 중삭 Finishing-Medium	CCMT 09T304MQ	0.4	●	●	●	●		
	09T308MQ	0.8	●	●	●	●		
정삭 ~ 중삭 Finishing-Medium	DCMT 070202MQ	0.2	●	●	●	●		
	070204MQ	0.4	●	●	●	●		
	11T304MQ	0.4	●	●	●	●		
	11T308MQ	0.8	●	●	●	●		

●: 표준재고 ●: Std Stock

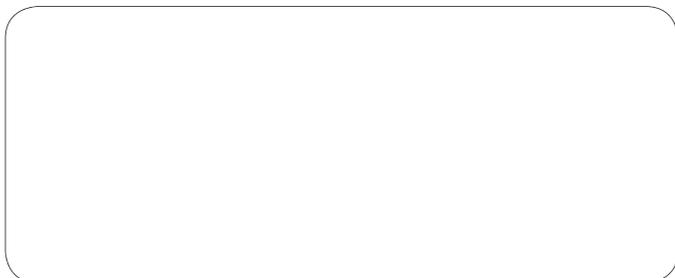
추천 절삭조건

Recommended Cutting Conditions

[절입량은 반경치 (편측) 를 나타냅니다] ap indicates radius

피삭재 Material	절삭 영역 Cutting range	추천 재종 Recommended insert grades	추천 브레이커 Recommended chipbreaker	하한 - 추천 - 상한 Lower Limit - Recommendation - Upper Limit		
				Vc (m/min)	ap (mm)	f (mm/rev.)
니켈계 내열합금 (인코넬718등) Nickel base heat resistant alloy (Inconel718, etc)	정삭 Finishing	PR1305	MQ	45- 55 -80	0.2- 0.5 -1.0	0.05- 0.1 -0.2
	중삭 ~ 황삭 Medium-Roughing	PR1310	MS/MU	40- 45 -60	0.5- 1.0 -2.0	0.1- 0.15 -0.25
	황삭 Roughing	PR1325	TK	35- 40 -50	1.0- 1.5 -3.5	0.1- 0.2 -0.3
철계 내열합금 (A286등) Iron base heat resistant alloy (A286, etc)	정삭 Finishing	PR1305	MQ	50- 70 -90	0.2- 0.5 -1.0	0.05- 0.1 -0.2
	중삭 ~ 황삭 Medium-Roughing	PR1310	MS/MU	45- 55 -70	0.5- 1.0 -2.0	0.1- 0.15 -0.25
	황삭 Roughing	PR1325	TK	40- 45 -55	1.0- 1.5 -3.5	0.1- 0.2 -0.3
코발트계 내열합금 (S816, 스텔라이트등) Cobalt base heat resistant alloy (S816, Stellite, etc)	정삭 Finishing	PR1305	MQ	40- 50 -70	0.2- 0.5 -1.0	0.05- 0.1 -0.2
	중삭 ~ 황삭 Medium-Roughing	PR1310	MS/MU	35- 40 -55	0.5- 1.0 -2.0	0.1- 0.15 -0.25
	황삭 Roughing	PR1325	TK	30- 35 -45	1.0- 1.5 -3.0	0.1- 0.2 -0.3
석출 경화계 스텔레스강 (SUS630등) Precipitation hardening stainless steels (SUS630 etc.)	정삭 Finishing	PR1305	MQ	100- 140 -180	0.2- 0.5 -1.5	0.05- 0.1 -0.2
	중삭 ~ 황삭 Medium-Roughing	PR1310	MS/MU	80- 120 -155	0.5- 1.0 -2.5	0.15- 0.2 -0.3
	황삭 Roughing	PR1325	TK	60- 80 -100	1.0- 2.0 -4.0	0.15- 0.2 -0.35
티탄합금 (Ti-6Al-4V등) Titanium alloy (Ti-6Al-4V etc.)	정삭 Finishing	SW05	MQ	40- 70 -100	0.2- 0.5 -1.0	0.05- 0.1 -0.2
	중삭 ~ 황삭 Medium-Roughing	SW05	MS/MU/TK	40- 60 -80	0.5- 1.0 -4.0	0.15- 0.2 -0.3

공구 형상 CNMG120408을 기준으로 하고 있습니다. Conditions based on CNMG120408 type insert



절삭공구에 관한 기술적인 상담은
032-821-8365 ● 근무시간 9:00~12:30 · 13:30~17:30
 ● 토요일 · 일요일 · 공휴일 등은 쉽니다.
 한국교세라정공(주) 영업본부
 FAX: 032-821-8369



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 http://www.kptk.co.kr