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CUTTING TOOLS



2023/01



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- Boru Endüstrisi / *Tube Industry*
- Merdane İşleme Endüstrisi / *Roll Machining Industry*
- Demiryolu Endüstrisi / *Railway Industry*



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KALİTE KODLAMA SİSTEMİ

GRADE CODING SYSTEM

T	C	0	1	10	J
1	2	3	4	5	6

1	UÇ MALZEMESİ INSERT MATERIAL
T : Tungsten esaslı semente karbür <i>Tungsten based cemented carbide</i> C : Sermet / <i>Cermet</i> S : Seramik / <i>Ceramic</i> D : PCD B : CBN	

2	KAPLAMA COATING
P : PVD C : CVD N : Kaplamasız / <i>Uncoated</i> S : Solid	

3	KAPLAMA RENGİ COLOR OF COATING
0 - Sarı-Siyah / <i>Yellow-Black</i> 1 - Sarı / <i>Yellow</i> 2 - Siyah / <i>Black</i> 3 - Mor / <i>Purple</i> 4 - Bronz / <i>Bronze</i> 5 - Gri-Siyah / <i>Gray-Black</i> 6 - Naco Mavi / <i>NACO Blue</i> 7 - Kaplamasız / <i>Uncoated</i>	

4	İŞ PARÇASI MALZEMELERİ WORKPIECE MATERIAL			
1	2	3	4	
Çelik <i>Steel</i>	Dökme Demir <i>Cast Iron</i>	Paslanmaz Çelik <i>Stainless Steel</i>	Isıya Dirençli Alaşım ve Süper Sert Malzeme <i>Heat Resistant Alloy and</i> <i>Super Hard Material</i>	
	5	6		
	Alüminyum ve Demir Dışı Metaller <i>Aluminium & Non Ferrous</i> <i>Metals</i>	Genel İşlem <i>General Machining</i>		

5	ISO KALİTESİ ISO GRADE
01-40	

6	A / G / J / N / S / X / V
Kategori / <i>Category</i>	



KALİTE SEÇİM TABLOSU

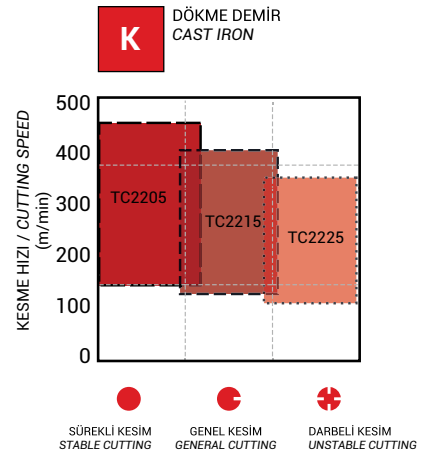
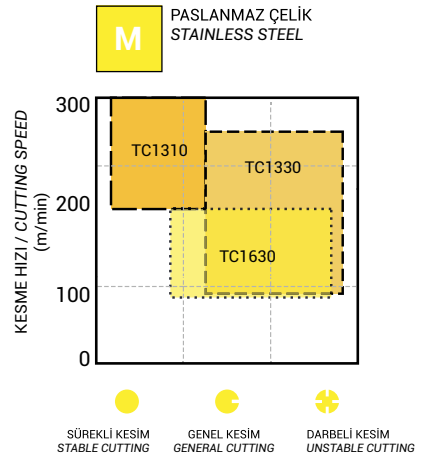
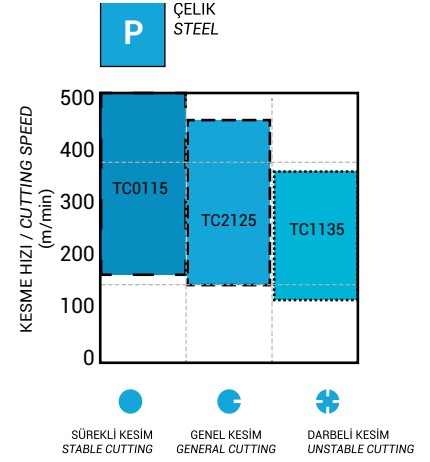
GRADE SELECTION CHART

ISO	KAPLAMALI KALİTELER / COATED GRADES		KAPLAMASIZ KALİTELER	SERMET	PCD I PCBN SOLID
	PVD	CVD	UNCOATED GRADES	CERMET	
P 01 10 20 30 40 Çelik Steel		TC0115 TC2115		CP1610 CN7610	
	TP2620 TP5620	TC0125 TC2125		CP1615 CN7615	
	TP4630	TC0130 TC2135	TC2140		
M 01 10 20 30 40 Paslanmaz Çelik Stainless Steel	TP3320	TC2315		CP1610 CN7610	
	TP2630 TP3630	TC2330			
	TP2620 TP5620	TC2340	TC1620		
	TP4630		TC1630		
K 01 10 20 30 40 Dökme Demir Cast Iron		TC2205			
		TC2210 TC2215 TC0215	TN7210	CN7615 CN7610	BN7210
	TP2620 TP3630 TP4630	TC2225	TC1630		BP2204
N 01 10 20 30 40 Alüminyum & Demir Diği Metaller Aluminium & Non-Ferrous Metals			TN7501		DN7505 DN7510
					DN7530
HRSA 01 10 15 20 25 30 Süper Alaşımlar & Sertleştirilmiş Çelik Heat Res. Super Alloy & Hardened Steel	TP5410				BN7405 BN7410 BP1405 BP1410
	TP4420	TC2415			
	TP3630 TP4630				

CVD KAPLAMALI KALİTELER

CVD COATED GRADES

ISO	Kalite Grade	Kaplama Coating	Uygulama Application
P05 - P15	TC0115 TC1115 TC2115	MT-TiCN + Al ₂ O ₃ + TiN	Özellikle dövme çeliğin yüksek hızda sürekli kesimi. High speed turning of steel in continuous operations.
P15 - P30	TC0120 TC2120 TC0125 TC2125	MT-TiCN + Al ₂ O ₃ + TiN	Çeliğin genel işlenmesi. Steel turning in wide operations.
P25 - P35	TC1130 TC1135 TC2135	MT-TiCN + Al ₂ O ₃ + TiN	Çeliğin genelden darbeye tormalanması. General to heavy machining of steel.
P35 - P45	TC2140	MT-TiCN + Al ₂ O ₃ + TiN	Çeliğin ağır darbeye tormalanması. Heavy interrupted turning of steel.
P15 - P25 M15 - M25	TC2620	MT-TiCN + Al ₂ O ₃ + TiN	Çeliğin genel işlenmesi, paslanmaz çeliğin finiş tormalanması. Special carbide substrate combined with high fracture resistance. General machining of steel and finish and semi-finishing of cast steel and stainless steel.
P25 - P35 M25 - M35	TC1630 TC2630	MT-TiCN + Al ₂ O ₃ + TiN	Çelik ve paslanmaz çeliğin kaba tormalanması. Light roughing and roughing of steel and stainless steel.
P35 - P45 M35 - M45	TC1640 TC2640	MT-TiCN + Al ₂ O ₃	Çelik ve paslanmaz çeliğin darbeye tormalama operasyonları. Interrupted cutting of steel and stainless steel.
M10 - M20	TC2315	MT-TiCN + Al ₂ O ₃ + TiN	Paslanmaz çeliğin sürekli işlenmesi. Continuous machining of stainless steel.
M20 - M30	TC2330	MT-TiCN + Al ₂ O ₃ + TiN	Paslanmaz çeliğin genel işlenmesi; sürekli darbeye kesime, hassastan kaba işleme kadar. General machining of stainless steel; from continuous to interrupted, finishing to roughing.
M30 - M40	TC2340	MT-TiCN + Al ₂ O ₃ + TiN	Östenitli paslanmaz çelikten dupeks paslanmaz çeliklere kadar geniş bir aralıkta düşük kesme hızında kaba tormalama için uygundur. Roughing of austenitic stainless to duplex stainless steels at low cutting speeds.
K05 - K15	TC2205	MT-TiCN + Al ₂ O ₃	Dökme demirin yüksek hızda tormalanması. High-speed turning of cast iron.
K10 - K20	TC0210 TC2210 TC0215 TC2215	MT-TiCN + Al ₂ O ₃	Özellikle sfero dökme demirin yüksek hızda tormalanması. Especially for high-speed turning of nodular cast iron.
K20 - K30	TC2220 TC2225	MT-TiCN + Al ₂ O ₃	Hafiften ağır darbeye kesimler için özellikle zor kesme koşulları için uygundur. Suitable for light to heavy interrupted cuts, especially in average to difficult machining conditions.
S05 - S15	TC2415V	MT-TiCN + Al ₂ O ₃	Isıya dayanıklı alaşımlar için daha düşük hızlarda yüksek hızlı finiş tormalama veya düşük hızlarda uzun işlemler. High speed finishing or long cuts at lower speeds for heat resistant alloys.



CVD Kaplama Kesidi CVD Coating Section



Geliştirilmiş ısıya dirençli üst kaplama
Top coat with improved welding resistance

Yüksek hızda kesim için alumina kaplama katmanı
Alumina coating layer for high speed cutting

Daha güçlü talaşlanma dirençli Titanyum kaplama katmanı
Titanium coating layer with stronger resistance to chipping

Hafif ve ağır darbe ve sürekli kesim için iyileştirilmiş sert iç yapı
Tough substrate optimized for continuous cutting and both light & heavy interruption



PVD KAPLAMALI KALİTELER

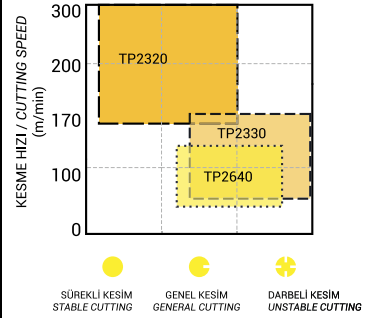
PVD COATED GRADES

ISO	Kalite Grade	Kaplama Coating	Uygulama Application
P15 - P25 M15 - M25 K15 - K25 S15 - S25	TP2620 TP3620 TP4620 TP5620	AlTiN	Çoğu iş parçası malzemesinin daha yüksek hızlarda finiş ve genel işlenmesi için idealdir. <i>Finishing to general machining of most workpiece materials at higher speeds such as steels, stainless steels, cast irons and super alloys under stable conditions.</i>
P25 - P35 M25 - M35 K25 - K35 S10 - S20	TP2630 TP3630 TP4630	AlTiN	TP2630 kalitesi, darbeli kesimler ve yüksek ilerleme hızları için geliştirilmiş kenar tokluğu ile çok çeşitli hız ve ilerlemelerde çoğu çelik, paslanmaz çelik, ısıya dirençli alaşımların genel işlenmesi için idealdir. <i>TP2630 grade is ideal for general machining of most steels, stainless steels, heat resistant super alloys, cast irons and in a wide range of speeds and feeds with improved edge toughness.</i>
P35 - P40 M35 - M40 K35 - K40 S20 - S30	TP2640	AlTiN	Düşük kesme hızı koşullarında çelik, paslanmaz çelik ve dökme demir, ısıya dayanıklı süper alaşımların darbeli ve kaba işlenmesi. <i>Interrupted and rough machining of steel, stainless steel and cast iron, heat resistant super alloys in low speed conditions.</i>
M15 - M25	TP1320 TP2320 TP3320	TiAlN	Paslanmaz çeliğin hafif darbeliden darbelye işlenmesi. <i>Light interrupted to interrupted machining of stainless steel.</i>
M25 - M35	TP2330 TP3330	TiAlN	Paslanmaz çeliğin orta ila kaba işlenmesi. <i>Medium to roughing of stainless steel.</i>
S05 - S15	TP2410 TP4410 TP5410	TiSiN	İşlenmesi zor malzemelerin yüksek hızda ve sürekli kesimi. <i>High speed and continuous medium cutting of difficult to cut materials.</i>
S15 - S25	TP4420 TP5420	TiSiN	İşlenmesi zor malzemelerin orta ila düşük kesme hızlarında orta ila kaba işlenmesi. <i>Medium to low speed and medium to rough cutting of difficult to cut materials.</i>

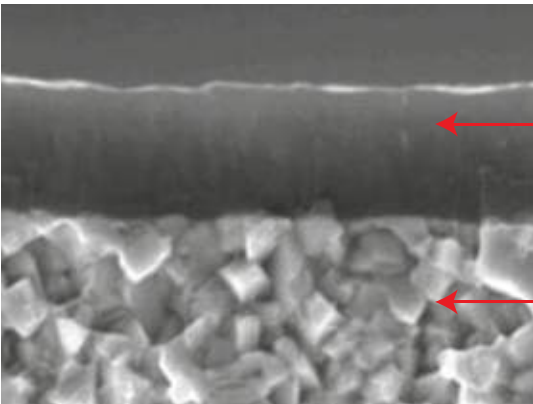
S ISIYA DAYANIKLI ALAŞIMLI
HIGH TEMP ALLOYS



M PASLANMAZ ÇELİK
STAINLESS STEEL



PVD Kaplama Kesidi PVD Coating Section



Oksitlenme dirençli ve yüksek sertliklerle mükemmel yüzey pürüzlülüğü ile aşınmaya yüksek ısı direnci.
It prevents wear at a high temperature to apply excellent surface roughness and coating with oxidation resistance and high hardness.

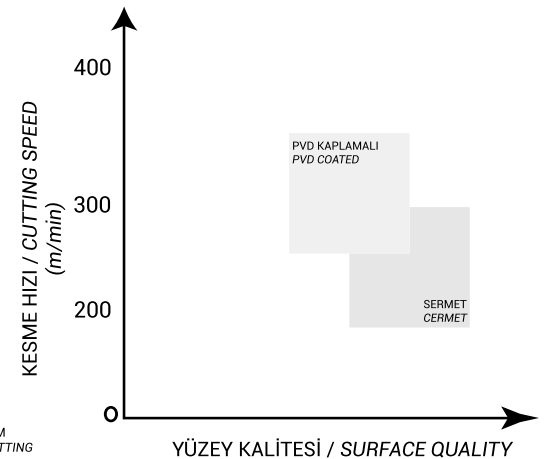
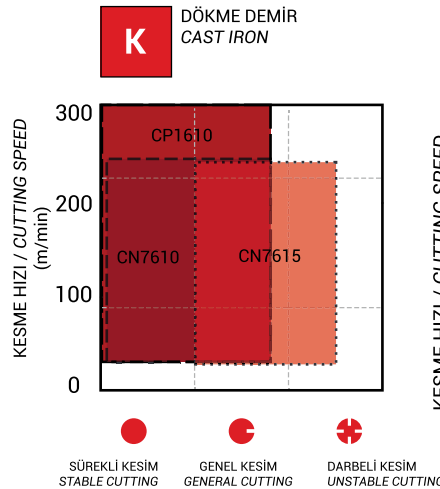
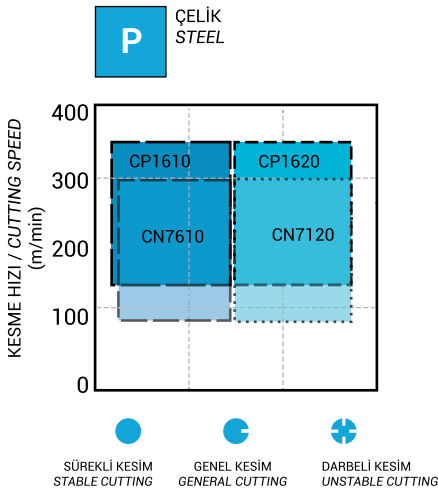
Aşınma direncini, talaşlanmayı iyileştirmek, köşeler arasında istikrarı sağlamak ve alt mikron matrisi dengelemek için aşınma direnci geliştirir.
It improves wear resistance to equalize submicron matrix, secure stability between corners and improve chipping and wear resistance.

SERMET & KAPLAMALI SERMET

CERMET & COATED CERMET



ISO	Kalite Grade	Kaplama Coating	Uygulama Application
P01 - P10 K01 - K10	CN7605	Kaplamasız Uncoated	Çelik ve dökme demir işleme için sermet kalitesi. Yüksek hızda ve sürekli kesmede uzun takım ömrü sağlar. Hassas delik işleme için ilk tercih. <i>Cermet grade for steel and cast iron machining. Sustains long tool life in high speed and continuous cutting. First choice for precision boring.</i>
P01 - P10 M01 - M10 K05 - K10	CN7610		Çelik, paslanmaz çelik ve dökme demirin işlenmesi için genel kalite. Üstün kırılma ve aşınma direnci sunar. <i>General grade for machining steel, stainless steel and cast iron. Offers superior fracture and wear resistance.</i>
P05 - P25 K10 - K20	CN7615		Çelik, paslanmaz çelik ve dökme demirin sürekli ila darbeli kesim işlenmesi. <i>Machining of steel, stainless steel and cast iron for continuous to interruption.</i>
P01 - P10 K01 - K10	CP1605 CP5605	PVD Kaplamalı PVD coated	Çelik ve dökme demirin yüksek hızlı tornalanması için PVD kaplı sermet kalitesi. Üstün aşınma ve yapışma direnci. <i>PVD coated cermet for light cutting of steel and cast iron in high speed machining. Superior wear and adhesion resistance.</i>
P01 - P20 M01 - M10 K05 - K10	CP1610 CP5610		Orta veya yüksek hızlı işlemede çelik, paslanmaz çelik ve dökme demir için uygundur. Hem kuru hem de ıslak kesimde kullanılabilir. <i>Light cutting for steel, stainless steel and cast iron in medium or high speed machining. Applicable both for dry and wet cutting.</i>



CBN KALİTELER

CBN GRADES

Avantajları Advantages

- Mükemmel aşınma direnci ve çatlak direncine sahip kaplamasız CBN.
- Isıya dayanıklı bağlayıcı mikro tanecikli CBN üzerinde ısıya dayanıklı TiNCo kaplama.
- Yüksek CBN oranı ve özel bağlayıcı sayesinde mükemmel aşınma direnci.
- Sert bağlayıcı fazlı, ısıya dayanıklı katı CBN bakımından zengin alt tabaka.
- Sert bağlayıcı alt katmana sahip, ısıya dirençli solid CBN.

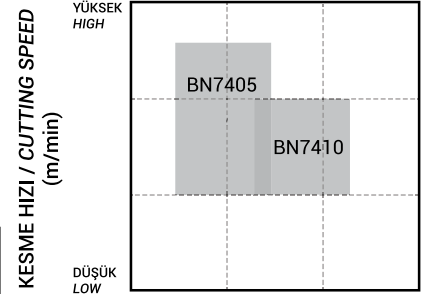
- Excellent wear resistance and crack resistance, non-coated CBN.
- TiNCo coating on micro-grain CBN with heat-resistant binder phase.
- High CBN content ratio due.
- Excellent wear resistance due to high CBN content and special binder.
- Heat-resistant solid CBN rich substrate with hard binder phase.

Malzeme Material	Kalite Grade	Kaplama Rengi Coating Color	Tanecik Boyutu Grain Size (μm)	Alt Tabakanın Sertliği Hardness of Substrate (GPA)	Enine Kopma Direnci Transverse Strength (MPa)
H SERTLEŞTİRİLMİŞ ÇELİK HARDENED STEEL	BN7405	KAPLAMASIZ	2	28	1000
	BN7410	UNCOATED	1 / <	25	1250
	BP1405	SARI	2	28	1000
	BP1410	YELLOW	1 / <	25	1250
SİNERLENMİŞ ÇELİK SINTERED STEEL	BN7415	KAPLAMASIZ	2-4	34	1350
		UNCOATED			
K DÖKME DEMİR CAST IRON	BN7210	KAPLAMASIZ	2	39	1400
	BS7204	UNCOATED	9	31	630
	BP2204	SİYAH BLACK	0,5-6	33	1250

Kalite Grade	Uygulama Application
BN7405	Sertleştirilmiş kalıp çeliğinin finiş ve sürekli işlenmesi. Finishing and continuous machining of hardened die steel.
BN7410	Sertleştirilmiş çelik için genel kullanım. General purpose for hardened steel.
BP1405	Sertleştirilmiş kalıp çeliğinin yüksek hızda finiş işlenmesi. High speed finishing of hardened die steel.
BP1410	Sertleştirilmiş çeliğin yüksek kesme hızlarında stabil şekilde işlenmesi. Stable machining of hardened steel at high cutting speeds.
BN7415	Sinterlenmiş çeliğin işlenmesi (çapak oluşumunun engellenmesi.) Machining of sintered steel (preventing burr formation.)
BN7210	Gri dökme demirin yüksek hızda işlenmesi. High speed machining of gray cast iron.
BS7204	Gri dökme demirin yüksek hızda işlenmesi. High speed machining of gray cast iron. (Solid CBN)
BP2204	Sertleştirilmiş çelik, rulo çelik ve dökme demirin darbeli ve finiş işlenmesi için kaplamalı solid CBN kalitesi. Heavy duty, interrupted machining and finishing of hardened steel, hardened roll steel and cast iron, coated solid CBN grade.



H SERTLEŞMİŞ ÇELİK HARDENED STEEL

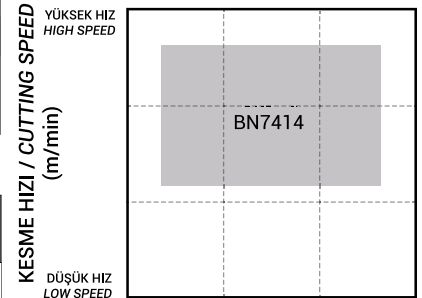


● SÜREKLİ KESİM
STABLE CUTTING

○ GENEL KESİM
GENERAL CUTTING

⊕ DARBELİ KESİM
UNSTABLE CUTTING

H SİNERLENMİŞ ÇELİK SINTERED STEEL

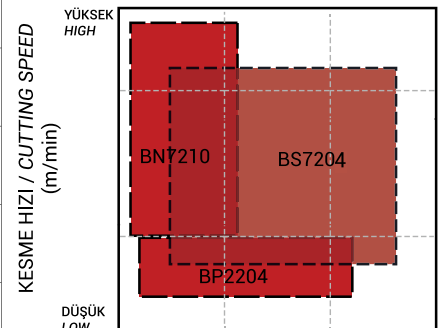


● SÜREKLİ KESİM
STABLE CUTTING

○ GENEL KESİM
GENERAL CUTTING

⊕ DARBELİ KESİM
UNSTABLE CUTTING

K DÖKME DEMİR CAST IRON



● SÜREKLİ KESİM
STABLE CUTTING

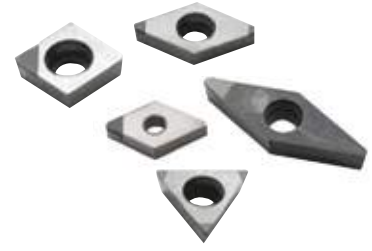
○ GENEL KESİM
GENERAL CUTTING

⊕ DARBELİ KESİM
UNSTABLE CUTTING

PCD KALİTELER

PCD GRADES

Özellikler Properties



Demir dışı metallerin ve metal olmayan malzemelerin işlenmesi için kullanılır. Kenar birikmesi olmaması yüksek hassasiyette işleme sağlar. İyi yüzey kalitesi ortaya çıkarır.

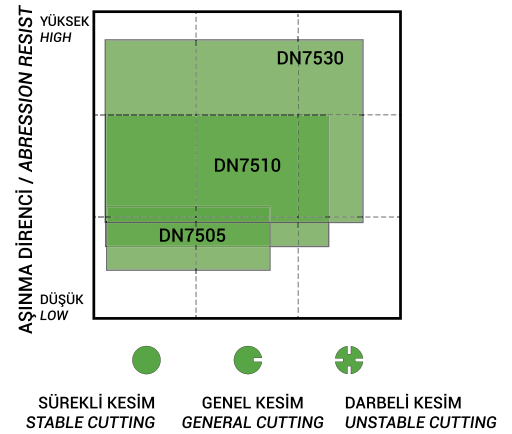
It is applicable to machining non-ferrous metals and non-metals. No edge formation ensures high precision machining. Good surface quality is achieved.

Avantajları Advantages

Süper mikro tanecikli PCD, kesme kenarı mukaveti, aşınma direnci, kırılma direnci, iyi kenar bileme performansı ve daha uzun istikrarlı takım ömrü özelliklerine sahiptir.

Super micro-grain PCD features cutting edge strength, wear resistance, fracture resistance, good edge-sharpening performance and longer, stable tool life.

İş Parçası Malzemesi Workpiece Material		Demir Olmayan Metaller Non-Ferrous Materials			
Kesme Aralığı Cutting Range		FINİŞ İŞLEME FINISHING			KABA İŞLEME ROUGH CUTTING
Sınıflandırma Classification		N01	N10	N20	N30
PCD		DN7510			
		DN7505			
		DN7530			



MALZEME MATERIAL	KALİTE GRADE	ORTALAMA TANECİK BOYUTU AVERAGE GRAIN SIZE (μm)	AVANTAJLAR ADVANTAGES
N	DN7505	0.5	Uygulama: Alüminyum alaşımlarının, pirincin, demir dışı metallerin ve plastikler ve karbür dahil metal olmayanların yüksek hızda işlenmesi. Application: High speed machining of aluminium alloys, brass, non-ferrous metals and non-metals including plastics and carbide.
	DN7510	10	Uygulama: Alüminyum alaşımlarının, pirincin, demir dışı metallerin ve plastikler ve karbür dahil metal olmayanların yüksek hızda işlenmesi. Application: High speed machining of aluminium alloys, brass, non-ferrous metals and non-metals including plastics and carbide.
	DN7530	2-30	Uygulama: Alüminyum alaşımlarının, pirincin, demir dışı metallerin ve plastikler ve karbür dahil metal olmayanların yüksek hızda işlenmesi. Application: High speed machining of aluminium alloys, brass, non-ferrous metals and non-metals including plastics and carbide.



TORNALAMA UÇLARI
TURNING INSERTS

FREZELEME UÇLARI
MILLING INSERTS

KANAL AÇMA UÇLARI
GROOVING INSERTS

DELİK AÇMA UÇLARI
THREADING INSERTS

 **EUROLOY**

KARBÜR UÇLAR

CARBIDE INSERTS

DELİK İŞLEME UÇLARI
DRILLING INSERTS

SERMET UÇLAR
CERMET INSERTS

CBN UÇLAR
CBN INSERTS






PCD UÇLAR
PCD INSERTS

TALAŞ KIRICI SEÇİM TABLOSU

CHIP BREAKER SELECTION TABLE







●● Tavsiye Edilen
Primary Application

● İkincil
Other Application

ISO Değişirilebilir Uçlar - Negatif ISO Indexable Inserts - Negative						
Operasyon Machining	Finish				Finish-Medium	
						
Geometri Geometry	EF3	EF1	GF	EF2	ES1	AL1
Kesici Uç Şekli Indexable inserts shape	D	D	C,D,S,T,V,W	C, D, S, T, V, W	D, T, W	C, D, S, T, V, W
P Çelik Steel	●●	●●	●●		●●	
M Paslanmaz çelik Stainless steel				●●		
K Dökme demir Cast iron						
N Demir dışı metaller Non ferrous metals						●●
S Isıya dirençli alaşımlar Heat resistant alloys				●		
H Sert malzemeler Hard materials						
a_p (mm)	0.2~0.8	0.2~0.5	0.30~2.0	0.6~2.0	0.5~3.0	0.5~2.5
f_n (mm/rev)	0.09~0.23	0.10~0.35	0.05~0.30	0.09~0.25	0.15~0.40	0.03~0.30

●● Tavsiye Edilen
Primary Application

● İkincil
Other Application







ISO Değişirilebilir Uçlar - Negatif ISO Indexable Inserts - Negative						
Operasyon Machining	Medium					
						
Geometri Geometry	EMT	MA	SM1	SM2	VF	GM
Kesici Uç Şekli Indexable inserts shape	C, S, T, V, W	C, S, T, W	C, D, S, T, V, W	C, D, S, T, V, W	D, T	C, D, S, T, V, W
P Çelik Steel	●●	C			●●	●●
M Paslanmaz çelik Stainless steel	C	●●	●●	●●	●	
K Dökme demir Cast iron	●●					●●
N Demir dışı metaller Non ferrous metals						
S Isıya dirençli alaşımlar Heat resistant alloys			●●	●●		
H Sert malzemeler Hard materials		●				
a_p (mm)	1.20~5.0	0.30~4.0	1.20~4.50	0.50~3.0	1.0~4.5	1.50~5.0
f_n (mm)	0.17~0.55	0.20~0.50	0.12~0.45	0.10~0.30	0.12~0.50	0.15~0.50

TALAŞ KIRICI SEÇİM TABLOSU

CHIP BREAKER SELECTION TABLE

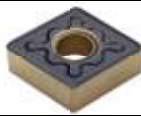



●● Tavsiye Edilen
Primary Application

● İkincil
Other Application

ISO Değiştirilebilir Uçlar - Negatif ISO Indexable Inserts – Negative						
Operasyon Machining	Medium-Rough					
						
Geometri Geometry	EN	ST	DM	EM2	PM1	TM
Kesici Uç Şekli Indexable inserts shape	C, D, T, W	C, D, S, T, V, W	C, D, S, T, V, W	C, D, T, W	C, D, S, T, V, W	C, D, S, T, V, W
P Çelik Steel	●●	●	●●		●●	●●
M Paslanmaz çelik Stainless steel	●●			●●		
K Dökme demir Cast iron	●●	●●	●●		●	
N Demir dışı metaller Non ferrous metals						
S Isıya dirençli alaşımlar Heat resistant alloys	●●			●●		
H Sert malzemeler Hard materials	●●					
a _p (mm)	0.50~2.50	1.0~4.0	1.50~5.0	1.0~4.0	1.50~5.0	1.0~5.0
f _n (mm)	0.20~0.50	0.15~0.40	0.13~0.50	0.16~0.40	0.13~0.50	0.20~0.50

●● Tavsiye Edilen
Primary Application

● İkincil
Other Application







ISO Değiştirilebilir Uçlar - Negatif ISO Indexable Inserts – Negative				
Operasyon Machining	Rough			
				
Geometri Geometry	GH	GR	SR1	SR2
Kesici Uç Şekli Indexable inserts shape	C, D, T	C, D, S, T, V, W	C, D, S, T, W	C, D, S, T, W
P Çelik Steel		●●		
M Paslanmaz çelik Stainless steel			●●	●●
K Dökme demir Cast iron	●●	●●		
N Demir dışı metaller Non ferrous metals				
S Isıya dirençli alaşımlar Heat resistant alloys			●●	●●
H Sert malzemeler Hard materials				
a _p (mm)	1.5~6.0	3.0~12	2.4~6.0	0.70~3.8
f _n (mm)	0.25~0.60	0.30~0.80	0.18~0.48	0.12~0.35

TALAŞ KIRICI SEÇİM TABLOSU

CHIP BREAKER SELECTION TABLE





●● Tavsiye Edilen
Primary Application

● İkincil
Other Application

ISO Değişirilebilir Uçlar - Pozitif ISO indexable inserts – Positive						
Operasyon Machining	Finish			Medium		
						
Geometri Geometry	HF	TF	EF2	EH	PS2	HM
Kesici Uç Şekli Indexable inserts shape	C, D, T	C, D, S, T	C, D, S, T	C, D, T	C, D, V	D, C, S, T, V
P Çelik Steel	●●	●●		●●	●●	●●
M Paslanmaz çelik Stainless steel		●●	●●		●●	●●
K Dökme demir Cast iron	●●					●●
N Demir dışı metaller Non ferrous metals						
S Isıya dirençli alaşımlar Heat resistant alloys			●			
H Sert malzemeler Hard materials						
a_p (mm)	0.8~2.0	0.30~2.0	0.60~2.0	0.30~3.0	0.50~3.5	1.0~3.0
f_n (mm/rev)	0.09~0.30	0.08~0.30	0.09~0.30	0.05~0.35	0.08~0.40	0.20~0.50

●● Tavsiye Edilen
Primary Application

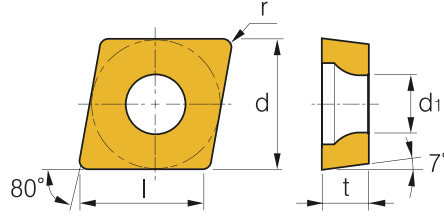
● İkincil
Other Application

ISO Değişirilebilir Uçlar - Pozitif ISO indexable inserts – Positive					
Operasyon Machining	Medium				Rough
					
Geometri Geometry	EN	SM1	AL1	ST	HR
Kesici Uç Şekli Indexable inserts shape	C, D, T, V	C, D, R, S, T, V	C, D, S, T, V	D, C, S, T, V	C, D, S, T
P Çelik Steel	●●			●	●
M Paslanmaz çelik Stainless steel	●●	●●			
K Dökme demir Cast iron	●●			●●	●●
N Demir dışı metaller Non ferrous metals			●●		
S Isıya dirençli alaşımlar Heat resistant alloys	●●	●●			
H Sert malzemeler Hard materials					
a_p (mm)	0.30~2.5	0.60~2.5	0.10~4.0	0.90~3.0	2.0~6.0
f_n (mm/rev)	0.10~0.18	0.12~0.25	0.03~0.40	0.18~0.40	0.25~0.50

TORNALAMA UÇLARI

TURNING INSERTS

CCGT



Boyutlar / Size (mm)			
Ölçü	d	t	d1
06	6.35	2.35	2.8
09	9.525	3.97	4.4
12	12.7	4.76	5.5

AL1

060202/04/08
09T302/04/08
120402/04/08



AL

060202/04/08
09T302/04/08
120404



CCMT

EN

060204
09T304
09T308
120404
120408



EF2

09T304
09T308
120404
120408



EH

060204
060208
09T304
09T308



EP3

060202/04/08
09T302/04/08
120402/04/08



HM

060204
060208
09T304
09T308
120404
120408



HF

060202/04/08
09T302/04/08
120402/04/08



PS2

060204
09T304



ST

060204/08
09T304/08
120404/08

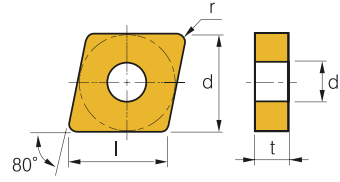


TF

060202/04/08
09T302/04/08
120402/04/08



CNMG



Boyutlar / Size (mm)			
Ölçü	d	t	d1
12	12.7	4.76	5.16
16	15.875	6.35	6.35
19	19.0	6.35	7.93
25	25.4	9.52	9.12

AL

120404
120408
120412

DM

120404
120408

EF2

120404
120408
120412

EM2

120404
120408

EMT

120404/08/12
190612/16

EN

120404
120408
120412

GM

090304/08
120404/08/12

GH

090304/08
120404/08/12

GR

120408/12/16
150608/12
190612/16
250724
250924

MA

120404
120408
120412

MR

120404/08/12
160608/12
190608/12/16

PM1

120404/08/12
160608/12/16

SR2

120408
120412
190616

ST

120404/08/12
160608/12/16
190608/12/16

TM

120404
120408
120412

CNMA

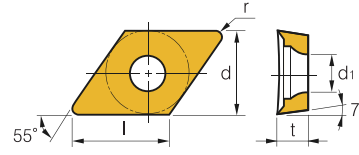
120404/08/12/16
160608/12/16
190612/16

CNMM-ER

160612/16
190612/16/24
250724
250924



DCGT



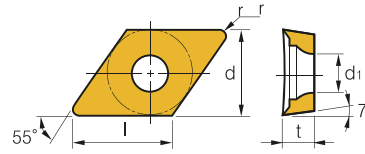
Boyutlar / Size (mm)			
Ölçü	d	t	d ₁
7	6.35	2.38	2.8
11	9.525	3.97	4.4

AL1



070202
070204
11T302
11T304
11T308

DCMT



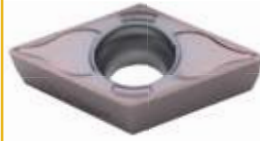
Boyutlar / Size (mm)			
Ölçü	d	t	d ₁
7	6.35	2.38	2.8
11	9.525	3.97	4.4

EN



070204
11T304
11T308

EF2



070202
11T304
11T308

ER



070202/04/08
11T302/04/08

HM



070204
070208
11T304
11T308

HF



070204
070208

SM1



070204
070208
11T304
11T308
11T312

ST



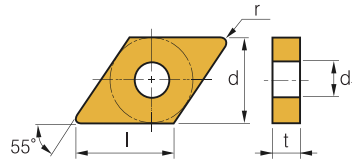
070204
070208
11T304
11T308

TF



070202/04/08
11T302/04/08

DNMG



Boyutlar / Size (mm)			
Ölçü	d	t	d ₁
11	9.525	4.76	3.81
15	12.7	4.76~6.35	5.16

AL

150604
150608
150612

DM

150604
150608
150612

DNMA

150404
150408
150604
150608
150612
150616

EF1

150608

EF2

150604
150608
150612

EF3

150608

ES1

150604
150608
150612

EM2

150604
150608
150612

EN

110404/08
150408
150604/08/12

GM

150604
150608
150612

GH

150608
150612

GF

110404/08/12
150404/08/12
150604/08/12

PM1

110404
110408
150604/08/12

R/L

150404
150408
150604
150608
150612

SM1

150404
150408
150604
150608
150612

SM2

150404/08/12/16
160404/08/12/16

ST

150604
150608
150612

TM

150604
150608
150612

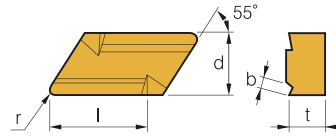
VF

150604R/L
150608R/L

TORNALAMA UÇLARI

TURNING INSERTS

KNUX



Boyutlar/Size (mm)		
Ölçü	d	t
16	9.5254	4.76

R/L11

160405R11
160410R11
160405L11
160410L11

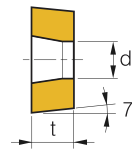
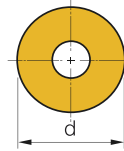


R/L12

160405R12
160410R12
160405L12
160410L12



RCMT



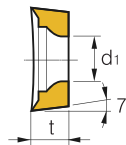
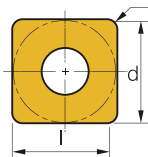
Boyutlar/Size (mm)			
Ölçü	d	t	d ₁
10	10.0	3.18	3.16
32	32.0	9.52	9.55

RCMT

1003MO
1204MO
1606MO
2006MO
2507MO
3209MO



SCMT



Boyutlar/Size (mm)			
Ölçü	d	t	d ₁
09	9.525	3.97	4.4
12	12.7	4.76	5.5

SCGT-AL1

09T302
09T304
09T308
120404
120408



EF2

09T304
09T308
120404
120408
120412



HM

09T304
09T308
120404
120408

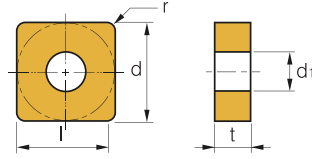


ST

09T304
09T308
120404
120408



SNMG



Boyutlar/Size (mm)			
Ölçü	d	t	d ₁
12	12.7	4.76	5.16
15	15.875	6.35	6.35
19	19.05	4.76~6.35	6.35
25	25.4	6.35~9.52	9.12

EF2

120404
120408
120412

DM

120404
120408
150608
190608
190612
190616

GR

120408/12/16
150608/12
190612/16
250724
250924

GM

120408
120412
160608
150612
190612

MA

120404
120408
120412

GH

120408

PM1

120408
120412
150612
250924

R/L

120404
120408
120412

ST

090304/08
120404/08/12/16
150608/12
190612/16

TM

120404
120408
120412

SNMA

120404/08/12
150608/12
190608/12

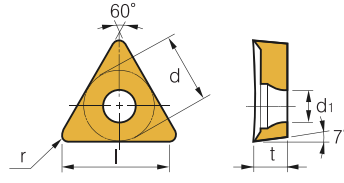
SNMM-ER

120408/12/16
150608/12
190612/16
250724
250924

TORNALAMA UÇLARI

TURNING INSERTS

TCGT



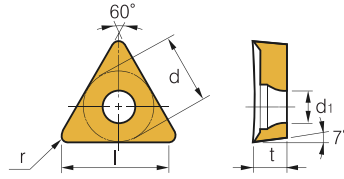
Boyutlar/Size (mm)			
Ölçü	d	t	d
9	5.56	2.38	2.5
11	6.35	2.38	2.8
16	9.525	3.77	4.4

AL1

090202/04/08
110202/04/08
16T302/04/08



TCMT



Boyutlar/Size (mm)			
Ölçü	d	t	d
9	5.56	2.38	2.5
11	6.35	2.38	2.8
16	9.525	3.77	4.4

EF2

110204/08
16T304/08



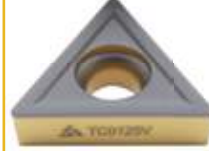
EP2

110204/08
16T304/08



HR

16T308
220408



HF

110204/08
16T304/08



TF

110204/08
16T304/08



HM

090204
090208
110204
110208
16T304
16T308

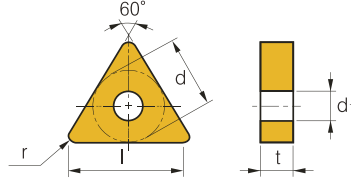


ST

110204/08
16T304/08



TNMG



Boyutlar/Size (mm)			
Ölçü	d	t	d ₁
11	6.35	3.18	2.40
16	9.525	3.18~4.76	3.81
22	12.7	4.76	5.16
27	15.875	6.35	6.35
33	19.05	9.52	7.93

AL

160404
160408
160412

EM2

160404
160408
160412
220408
220412

EF2

160404
160408
220404
220408

EN

160404
160408
220404
220408

ER

270612
330704
330924

ES1

160404
160408
160412

GF

160404
160408
160412
220408
220412

MA

160404
160408
160412

MR

160404
160408
160412
220408
220412

PM1

160404
160408
160412
220408
220412

R/L

160404
160408
160412

SR1

160408
160412
220412
220416

ST

160404/08/12
220408/12
270612
330704
330916/24

TM

160404
160408
160412
220408
220412

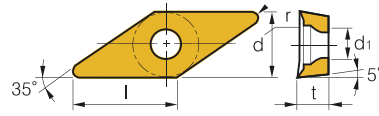
TNMA

160404
160408
160412
160416
220408
220412

TORNALAMA UÇLARI

TURNING INSERTS

VBMT



Boyutlar / Size (mm)			
Ölçü	d	t	d ₁
16	9.525	4.76	4.4

AL

160404
160408



EN

110304



EF2

110204/08
110304/08
160404/08/12



EP3

160404
160408



HM

160404
160408
160412



ST

160404
160408

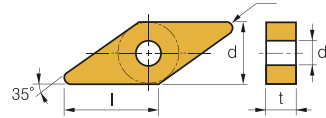


TM

160404
160408



VCGT



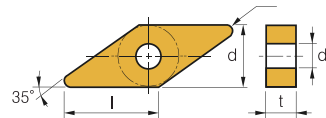
Boyutlar/Size (mm)			
Ölçü	d	t	d ₁
11	6.35	3.18	2.8
16	9.525	4.76	4.4
22	12.7	5.56	5.6

AL1

110202/04
110301/02/04/08
160402/04/08
220530



VNMG



Boyutlar/Size (mm)			
Ölçü	d	t	d ₁
16	9.525	4.76	4.4
22	12.7	5.56	5.6

GF

160404
160408
160412
220408
220412



PM1

160404
160408



ST

160404
160408
160412



TM

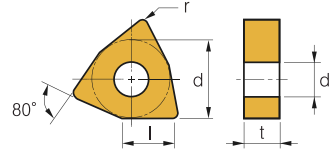
160404
160408
160412



TORNALAMA UÇLARI

TURNING INSERTS

WNMG



Boyutlar/Size (mm)			
Ölçü	d	t	d ₁
06	9.525	4.76	3.81
08	12.7	4.76	5.16

AL



060404
060408
080404
080408
080412

DM



080404
080408
080412

EM1



080404
080408
080412

EM2



080404
080408
080412

EN



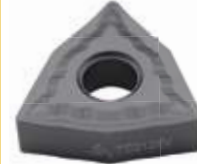
060204
080404
080408
080412

ES1



080404
080408
080412

EMT



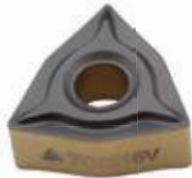
080404
080408
080412

EH



080404
080408
080412

EF2



060404/08
080404
080408
080412

MA



080404
080408
080412

PM1



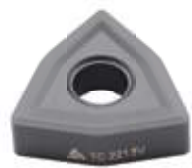
080404
080408
080412

SM1



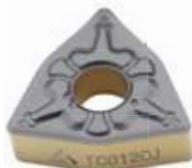
060408
080404
080408
080412

ST



080404
080408
080412

TM



080404
080408

WNMA



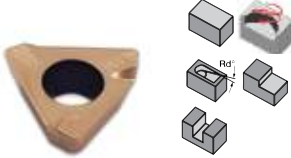
060404/08/12
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FREZELEME UÇLARI

MILLING INSERTS

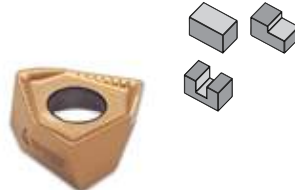
3PKT-M

100408R
150508R
190608R



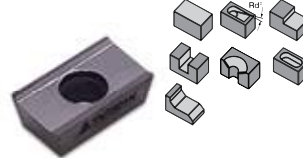
6NGU-M

060408R
090508R



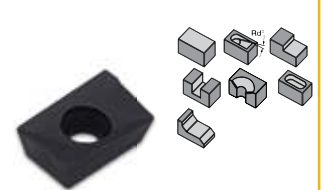
APKT-AL

1003PDFR
1135PDFR
1604PDFR



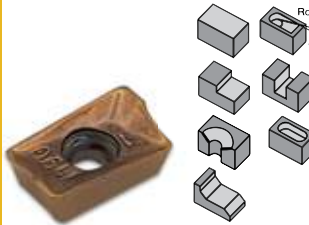
APKT-EF

1003PDR
11T304/08/12/16



APKT-HM90

1003PDR



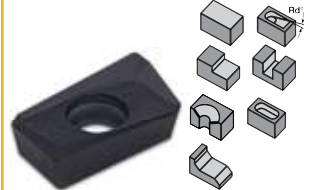
APKT-EM

11T304/08/12/16
160408
1705PER



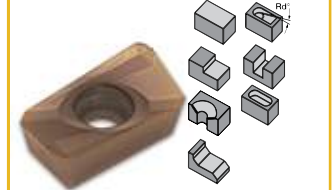
APMT-M2

1135PDER
1604PDER



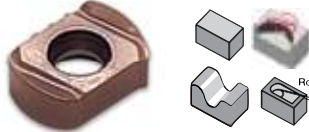
APMT-H2

1135PDSR
1604PDSR



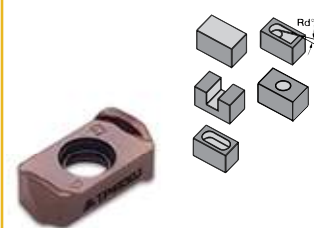
BLMP-M

0603R
0904R
1205R
1306R



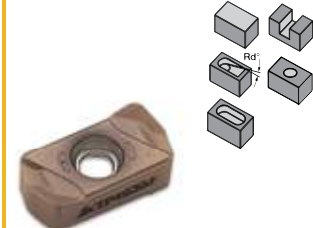
LNGX-GM

03031EKR



LNMU-MJ

0303ZER



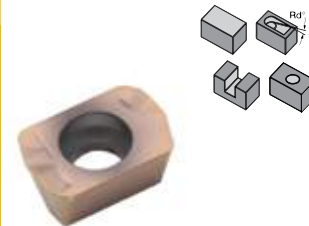
LNMX-EM

100605PNR
151008PNR



LPGT-GM

010210ER



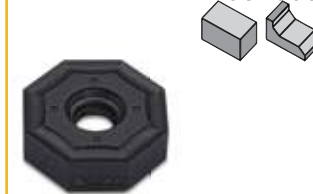
OFMT-EN

050405TR
05T305TN
060508TN



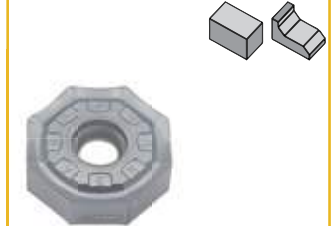
ONHU-PM

060408
08T508



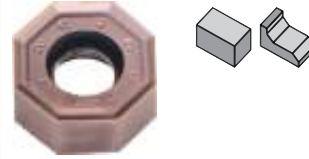
ONMX-EF

080608



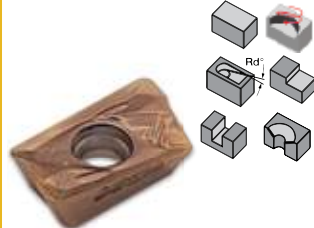
ONMX-EM

050505
070508
080608



R390-PM

11T308



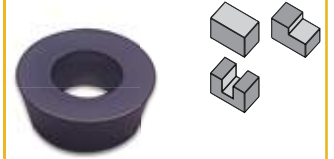
RCE

8 10 12 16
20 25 30 32



RDKW

1003MO
1204MO
1604MO

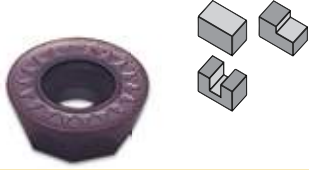


FREZELEME UÇLARI

MILLING INSERTS

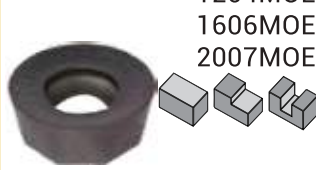
RDMT-S

10T3MO
1204MO



RPMT-F2

0803MOE
10T3MOE
1204MOE
1606MOE
2007MOE



SDMT-DM

09T312
120412



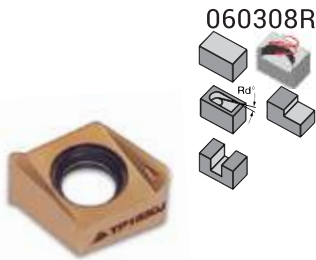
SEKT-EM

1204AFR



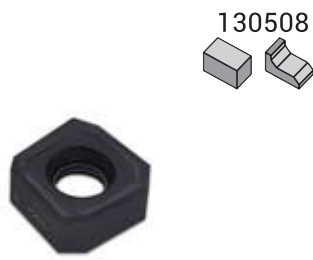
SNKT-M

060308R



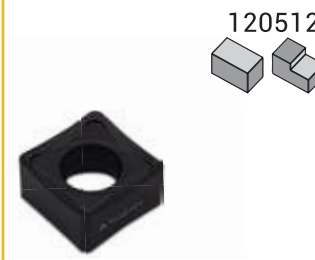
SNMU

130508



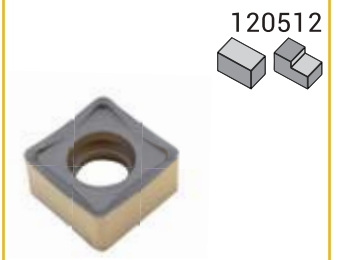
SNMX

120512



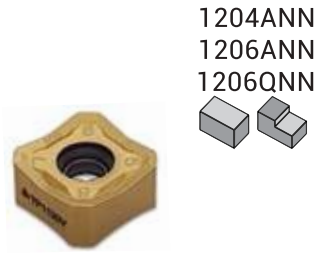
SNMX-F57

120512



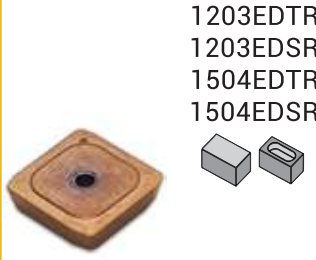
SNMX-EM

1204ANN
1206ANN
1206QNN



SPKN-EN

1203EDTR
1203EDSR
1504EDTR
1504EDSR



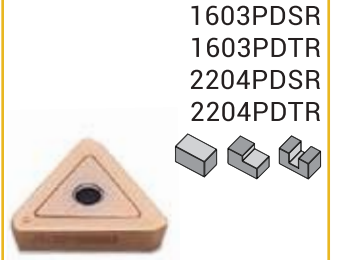
SPMT-PM

120408



TPKN-NN

1603PDSR
1603PDTR
2204PDSR
2204PDTR



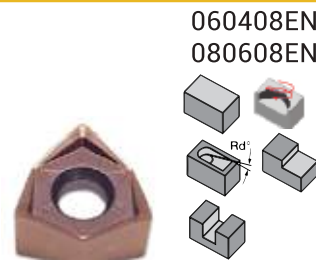
WNGX-EM

09T316XNN



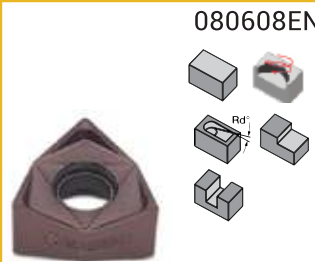
WNMU-GM

060408EN
080608EN



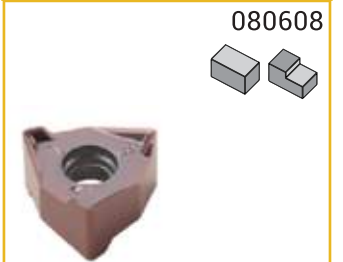
WNMU-GH

080608EN



XNEX-TR

080608



KANAL AÇMA UÇLARI

GROOVING INSERTS

MGMN-G

Genişlik: 1,50-6.0mm
Width: 1,50-6.0mm



MGMN-T

Genişlik: 1.5-6.0mm
Width: : 1.5-6.0mm



MRMN-M

Genişlik: 2.0-8.0mm
Width: 2.0-8.0mm



TDC

Genişlik: 2.0-4.0mm
Width: 2.0-4.0mm



TDJ

Genişlik: 2.0-4.0mm
Width: 2.0-4.0mm



TDT

Genişlik: 3.0-4.0mm
Width: 3.0-4.0mm



TDXU

Genişlik: 3.0-4.0mm
Width: 3.0-4.0mm



SPB

160 600
180 800
200 900
300 AAA
500 AAA



DGN

2002C
3102C



DGR-6D

2202C
3102C



GRIP

3003Y
4004Y
5005Y



N123 G2-CM

0250-002
0500-002



N123 J2-GF

0200-002
0300-002
0400-002



N123 G2-CR

0300-0003



N123 H2-GM

0400-0003



N123 H2-TM

0400-0003



N151-4E

2-200
2-300
2-400
2-600
2-800



ZT.-MG

ZTED0203
ZTFD0303
ZTGD0404
ZTHD0504
ZTKD0608



GER/GIL

16 GER/GIL 1.00
16 GER/GIL 1.20
16 GER/GIL 1.40
16 GER/GIL 1.70
16 GER/GIL 2.00



DİŞ ÇEKME UÇLARI THREADING INSERTS

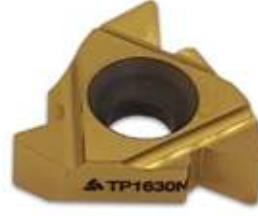
IR



IRT



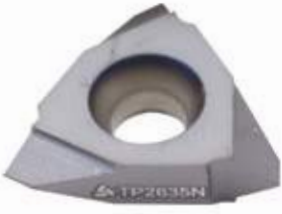
ER



ERT



VER



- Partial Profile 60°
- Partial Profile 55°
- Iso metric (Full Profile)
- American UN (Full Profile)
UN, UNC, UNF, UNEF
- Whitworth (Full Profile)
BSW, BSF, BSP
- British Standard Pipe Thread
(Full Profile) BSPT
- National Pipe Thread
(Full Profile) NPT
- National Pipe Threads - Dryseal

- Round DIN 405
- Trapez DIN 103
- American ACM
- Stub ACM
- UNJ
- American Buttress
- British Buttress
- Metric Buttress-Sagengewinde
- API
- API Buttress Casing
- API Round Casing & Tubing
- EL-Extreme Line

DELİK İŞLEME UÇLARI

DRILLING INSERTS

SOMT

SOMT-DP



050204
060204
070306
08T306
09T308
11T308

SPMG

SPMG-DG



050204
060204
07T308
090408
110408
140512

SPGT

SPGT - AL



050204
060204
07T308
090408
110408
140512

TPMX

TPMX



0902
1403
1704
2405

WCKT

WCKT - DA



030208
040208
050308
06T308

WCMX

WCMX-FN



030208R
040208R
050308R
06T308R
080412R

RAPID DRILL

RAPID DRILL



Ø10-Ø39.99
Uç Kaliteleri / *Insert Grades*
Çelik - CPE
Paslanmaz - CME
Dökme Demir - CKE
Alüminyum - CNE
HSSPM

APMT-H2

1135PDER
1604PDER



CCGT-RL

040101/02/04
060204
09T302/04



CCGT-H

060200R/L
060202R/L
060204R/L
09T300R/L
09T302R/L
09T304R/L



CCMT-CMT

060204
09T304
09T308



CCMT-CFG

060204
09T304
09T308



CCMT-CF1

060202
060204
09T302
09T304



CNGG-ST

120402R/L
120404R/L
120408R/L



CNGG-H

120402R/L
120404R/L
120408R/L



CNMG-CES

120404
120408



CNMG-ST

120404
120408



CNMG-CS

120404
120408



DCGT-ST

11T301R/L
070201R/L
070202R/L
070204R/L
11T302R/L
11T304R/L



DCGT-H

11T302R/L
11T304R/L
11T308R/L



DCMT-CFG

070204
11T304
11T308



DCMT-CP

070204
11T304
11T308



DCMT-CF1

070202
070204
11T302
11T304
11T308



DNGG-ST

110402R/L
110404R/L
110408R/L
150402R/L
150404R/L
150408R/L



DNGG-H

110402R/L
110404R/L
110408R/L
150402R/L
150404R/L
150408R/L



DNMG-CES

150404
150408
150604
150608



DNMG-R/L

150404



SERMET UÇLAR

CERMET INSERTS

DNMG-ST

150404
150408
150604
150608



MGGN-G

200-02
250-02
300-03
400-03



RCKT-PM

1204M0



RPMT-EB

1203
1604



SCMT-CMT

09T304
09T308



SNMG-CMT

120404
120408



SNMG-CES

120404
120408



SNGG-ST

090302/04/08R/L
120402/04/08R/L



TBGT-ST

060102R/L
060104R/L



TCGT-ST

110202R/L
110204R/L
110302R/L
110304R/L



TCMT-CF1

090202/04
110202/04/08
110304
16T304



TNGG-ST

160401R/L
160402R/L
160404R/L
160408R/L



TNGG-H

160401R/L
160402R/L
160404R/L
160408R/L
220402R/L



TNMG-CES

160404
160408



TNMG-R/L

160404
160408



TNMG-CMT

160404
160408



TNMG-CFG

160404
160408



TNMG-CS

160404
160408



TNMG-ST

160404
160408



TPGH-ST

110302R/L
110304R/L



TPGT-ST

080202R/L
080204R/L
090202R/L
090204R/L



TPMT-CFG

110204
110304
16T304



VBMT-CFG

110304
160404



VBMT-CF1

110304
160404



VNGG-ST

160402R/L
160404R/L
160408R/L



VNGG-H

160402R/L
160404R/L
160408R/L



VNMG-CMT

160404
160408



WNGG-R/L

06040/04/08
080402/04/08



WNMG-CES

080404
080408
080412



WNMG-CS

080404
080408



APGW

1135L
1135R
160402



One Tip, Two Tips

CCGW

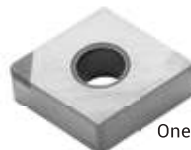
040101/02
050/060/080202
090302
09T302
120402



One Tip, Two Tips,
Four Tips

CNGA

090402
120402
160604
190604



One Tip, Two Tips,
Four Tips

CNGN

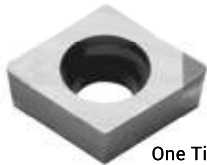
120408
120412



Solid cBn

CPGW

080202
090302



One Tip, Two Tips,
Four Tips

DCGW

070202
11T302
150404



One Tip, Two Tips

DNGA

110404
150404
150604
190604



One Tip, Two Tips,
Four Tips

DNGN

150404
150408
150412



Solid CBN

MGMN

150 400
200 500
250 600
300



One Tip, Two Tips

MRMN

200
300
400
500



One Tip, Two Tips

RCGW

080300
100300
120400
160600
200600



RCGX

060300
090300
090700
120400
120700
191000



SNGA

090304
120404
150404
150604
190604



One Tip, Two Tips,
Four Tips

SNGN

090302
090304
090308
120404
120408



Solid CBN

SPGN

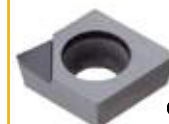
050202
070202
090302
120302



One Tip, Two Tips,
Four Tips

SPGW

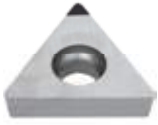
060202
060302
080302
090302
09T304
120404



One Tip, Two Tips,
Four Tips

TBGW

060101
060201



One Tip

TCGW

090202/04
110202/04/08
16T302/04/08



One Tip, Three Tips

TNGA

110302
160402
220402
270602



One Tip,
Three Tips
Six Tips

TNGN

110304
110308
160408
160412



Solid CBN

TPGN

060201
090202
160302



One Tip, Three Tips

TPGW

080202/04-090202/04
1102(03)02/04
1603(04)02/04/08



One Tip, Three Tips

VCGW

080202
110202
110302
220404
220504



One Tip, Two Tips

VNGA

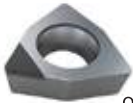
160404
220404



One Tip, Two Tips,
Four Tips

WCGW

030202
040202
050302
06T302



One Tip, Three Tips

WNGA

060402
080404
100604



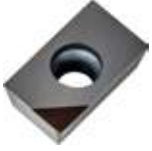
One Tip, Three Tips,
Six Tips

PCD UÇLAR

PCD INSERTS

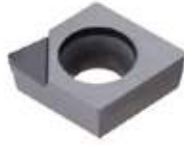
APGW

1135L
1135R
160402



CCGW

040102
040202
050202
060202



CCGW

080202
090302
09T302
120402



CPGW

080202
090302



DCGW

070202
11T302
150404



MGMN

150 400
200 500
250 600
300



MRMN

200
300
400
500
600



RCGW

080300
100300
120400
160600
200600



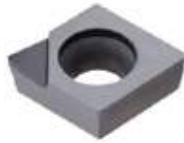
SPGN

050202
070202
090302
120302
150404



SPGW

080202
090302
09T304
120404



TCGW

090202/04
110202/04/08
16T302/04/08



TPGN

060201
~90202
60302



TPGW

080202/04-090202/04
1102(03)02/04
1603(04)02/04/08



VCGW

080202
110202
110302
160404
220404
220504



VNGA

160404
220404



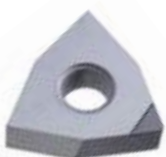
WCGW

030202
040202
050302
06T302
100504



WNGA

060402
080404
100604





DIŞ ÇAP TORNA KATERLERİ
EXTERNAL TURNING TOOLHOLDERS

İÇ ÇAP TORNA KATERLERİ
INTERNAL TURNING TOOLHOLDERS

SAPLI TARAMALAR
INDEXABLE END MILLS

FREZE KAFALARI
FACE MILLING

VİDALI TAKIMLAR
SCREW TYPE MILLING TOOLS

EUROLEY

TAKIMLAR

TOOL HOLDERS

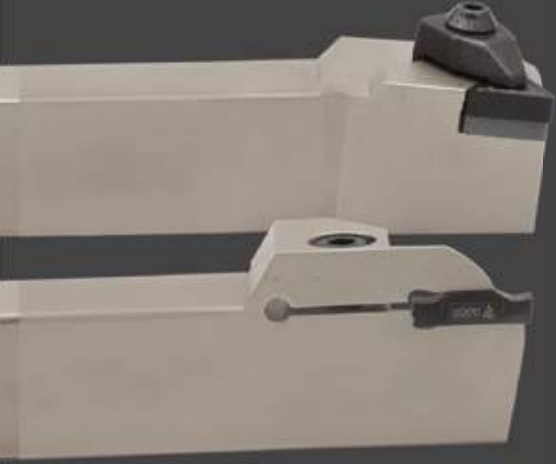
DEĞİŞTİRİLEBİLİR KARBÜR FREZELER
INTERCHANGEABLE CARBIDE MILLING

KANAL İŞLEME TAKIMLARI
GROOVING TOOLS

DİŞ ÇEKME TAKIMLARI
THREADING HOLDERS

DELİK İŞLEME TAKIMLARI
DRILLING HOLDERS

KARBÜR TAKIMLAR
SOLID CARBIDE TOOLS



DIŞ ÇAP TORNA KATERLERİ

EXTERNAL TURNING TOOLHOLDERS

CKNJR/L



2020-K16
2525-M16
3232-P16
4040-R16

Uç: KNUX16

MTENN



1616-K16
2020-K16
2525-M16
3232-P16
2525-M22
3232-P22

Uç: TN** 16&22

MTJNR/L



1616-K16
2020-K16
2525-M16
3232-P16
2525-M22
3232-P22
4040-R22

Uç: TN** 16&22

TCLNR/L



3232-P12/P16/P19
2525-M12/M16
3232-P12/P16/P19
4040-R16/R19

Uç: CN** 12&16&19

TCMNN



2020-K12
2525-M12
3232-P12

Uç: CN** 12

TCZNN



2020-K12
2525-M12
3232-P12

Uç: CN** 12

TDJNR/L



1616-K11/K15
2020-K11/K15
2525-M11/M15
3232-P15
4040-R15

Uç: DN** 11&15

TDNNN



1616-H11
2020-K11
2525-M11
2020-K15
2525-M15
3232-P15
4040-R15

Uç: DN** 11&15

TSDNN



2020-K12
2525-M12

Uç: SN** 12

TSLNR/L



2020-K12
2525-M12
4040-R19

Uç: SN** 12&19

TSSNR/L



2020-K12
2525-M12
3232-P12
3232-P15
3232-P19
4040-R19

Uç: SN** 12&15&19

TTJNR/L



1616-H16
2020-K16
2525-M16
2020-K22
2525-M22
3232-P22

Uç: TN** 16&22

TVJNR/L



1616-K16
2020-K16
2525-M16
3232-P16

Uç: VN** 16

TVNNN



2020-K16
2525-M16
3232-P16

Uç: VN** 16

TWLNR/L



1616-K06
2020-K06
2525-M06
2020-K08
2525-M08
3232-P08
4040-R08

Uç: WN** 06&08

DIŞ ÇAP TORNA KATERLERİ

EXTERNAL TURNING TOOLHOLDERS

MTENN



1616-K16
2020-K16
2525-M16
3232-P16
2525-M22
3232-P22

Uç: TN** 16&22

MTJNR/L



1616-K16
2020-K16
2525-M16
3232-P16
2525-M22
3232-P22
4040-R22

Uç: TN** 16&22

MWLNR/L



1616-H06
2020-K06
2525-M06
2020-K08
2525-M08
3232-P08
4040-R08

Uç: WN** 06&08

MWLNR/L



1616-H06
2020-K06
2525-M06
2020-K08
2525-M08
3232-P08
4040-R08

Uç: WN** 06&08

PCLNR/L



2020-K12
2525-M12/M16
3232-P12/P16/P19
4040-R12/R16/R19

Uç: CN** 12&16&19

PCLNR/L



2020-K12
2525-M12/M16
3232-P12/P16/P19
4040-R12/R16/R19

Uç: CN** 12&16&19

PDJNR/L



2020-K15
2525-M15
3232-P15
4040-R15

Uç: DN** 15

PDJNR/L



2020-K15
2525-M15
3232-P15
4040-R15

Uç: DN** 15

PTJNR/L



2020-K16
2525-M16
3232-P16
2525-M22

Uç: TN** 16&22

PTJNR/L



2020-K16
2525-M16
3232-P16
2525-M22

Uç: TN** 16&22

PWLNR/L



2020-K08
2525-M08
3232-P08
4040-T08

Uç: WN** 08

PWLNR/L



2020-K08
2525-M08
3232-P08
4040-R08

Uç: WN** 08

SCLCR/L



0808-H06
1010-H06
1212-H06
1616-H06
1212-H09
1616-H09
2020-K09

Uç: SC** 06&09

SCLCR/L



0808-H06
1010-H06
1212-H06
1616-H06
1212-H09
1616-H09
2020-K09

Uç: SC** 06&09

SCLCR/L



2525-M09
1616-H12
2020-K12
2525-M12
3232-P12

Uç: SC** 09&12

DIŞ ÇAP TORNA KATERLERİ

EXTERNAL TURNING TOOLHOLDERS

SCNCN



0808-H06
1010-H06
1212-H06
1212-H09
1616-H09
2020-K09
2525-M12

Uç: SC** 06&09&12

SDJCR/L



0808-H07
1010-H07
1212-H07
1616-H07
1616-H11

Uç: DC** 07&11

SDJCR/L



2020-K11
2525-M11
3232-P11

Uç: DC** 11

SDNCN



0808-H07 1212-M11
1010-H07 2020-K11
1212-H07 2525-M11
1616-H07-H11 3232-P11

Uç: DC** 07&11

SRDCN



1616-H08/H10
2020-K08/K10/K12
2525-M08/M10/M12/M16
3232-P10/P12

Uç: RC** 08&10&12&16

SRGCR/L



2020-K08
2525-M08
2020-K10
2525-M10
2020-K12
2525-M12

Uç: RC** 08&10&12

SRHCR



1616-H08/K12
2020-K08/K12
2525-M08/M10/M12
2020-K10

Uç: RC** 10&12

STFCR/L



1212-H11
1616-H11
2020-K16
2525-M16

Uç: TC** 11&16

SVHBR/L



1616-H11
2020-K11
2020-K16
2525-M16
3232-P16

Uç: VB** 11&16

SVJBR/L



1212-H11
1616-H11/H16
2020-K11/K16
2525-M11/M16
3232-P16

Uç: VB** 11&16

SVVBN



1212-H11
1616-H11
2020-K11
1616-H16
2020-K16
2525-M16
3232-P16

Uç: VB** 11&16

SVJCR/L



1212-H11
1616-H11
2020-K11
1616-H16
2020-K16
2525-M16
3232-P16

Uç: VC** 11&16

SVVCN



1212-H11
1616-H11
2020-K11
1616-H16
2020-K16
2525-M16
3232-P16

Uç: VC** 11&16

İÇ ÇAP TORNA KATERLERİ

INTERNAL TURNING TOOLHOLDERS

CKUNR/L



S25S-16
S32T-16
S40V-16
S50W-16

Uç: KNUX16

MTUNR/L



S20R-16
S25S-16
S32T-16
S40V-16
S32T-22
S40V-22
S50W-22

Uç: TN** 16&22

MT-NR/L



S20R-16
S25S-16
S32T-16
S40V-16
S32T-22
S40V-22

Uç: TN** 16&22

MWLNRL/L



S16-06
S20R-06
S25S-08
S32T-08
S40V-08
S50W-08

Uç: WNM*06&08

SCLCR/L



A06-08H-06 A08H-06
A12M-06 A10K-06
A12M-09
A16Q-06
A16Q-09
A20R-09
A25S-12

Uç: CC** 06&09&12

SCLCR/L



S06-08H-06 S08H-06
S10K-06 S12M-06/09
S16Q-06/09
S20R-09
S25S-09/12
S32T-09/12
S40V-12

Uç: CC** 06&09&12

SDUCR/L



S10K-07 S12M-07
S16Q-07/11 S20R-07/11
S25S-07/11
S32T-11

Uç: DC**07&11

SDQCR/I



S10K-07
S12M-07
S16Q-07/11
S20R-07/11
S25S-07/11
S32T-11

Uç: DC**07&11

SDQCR/L



A10K-07
A12M-07
A16Q-11
A20R-11

Uç: DC**07&11

SD-CR/L



S10K-07 S20R-11
S12M-07 S25S-11
S16Q-07 S32T-11
S16Q-11 S40V-11

Uç: DC**07&11

SDXCR/L



S12M-07
S16Q-07
S16Q-11
S20R-11
S25S-11
S32T-11

Uç: DC**07&11

SDUCR/L



A25R-11
A16Q-11
A20R-11
A10K-07
A12M-07

Uç: DC**07&11

İÇ ÇAP TORNA KATERLERİ

INTERNAL TURNING TOOLHOLDERS

STFCR/L



S16Q-16
S20R-16
S25S-16
S32T-16

Uç: TC**16

SVJBR/L



S25S-16
S32T-16
S40V-16

Uç: VB**16

SVUBR/L



S16Q-11
S20R-11
S25S-16
S32T-16
S40V-16

Uç: VB**11&16

SVUCR/L



S16Q-11
S20R-11
S25S-16
S32T-16
S40V-16

Uç: VC**11&16

TCLNR/L



S25S-12 S32T-12/16
S40V-12/16/19
S50W-16/19
S60W-16

Uç: CN**12&16&19

TDQNR/L



S25S-15
S32T-15
S40V-15
S50W-15

Uç: DN**15

TDUNR/L



S20R-11
S25S-15
S32T-15
S40V-15
S50W-15
S60W-15

Uç: DN**11&15

TD-NR/L



S32-15
S40V-15

Uç: DN**11&15

TWLNR/L



S20R-06 S32T-08
S20R-06 S40V-08
S25S-08 S50W-08
A25S-08 S60W-08

Uç: WN**06&08

PCLNR/L



S25S-12
S32T-12
S40V-12
S32T-16
S40V-16
S40V-19

Uç: CN**12&16&19

PDUNR/L



S25S-15
S32T-15
S40V-15

Uç: DN**15

PTUNR/L



S32T-22
S40V-22

Uç: TN**22

MSG

012-__-AP10-__ 025-__-AP10-__
 014-__-AP10-__ 026-__-AP10-__
 016-__-AP10-__ 028-__-AP10-__
 018-__-AP10-__ 030-__-AP10-__



Uç: AP**10

MSG

020-__-AP10-__
 022-__-AP10-__
 032-__-AP10-__
 035-__-AP10-__
 040-__-AP10-__



Uç: AP**10

MSG

016-__-AP11-__ 021-__-AP11-__
 017-__-AP11-__ 025-__-AP11-__
 018-__-AP11-__ 026-__-AP11-__
 020-__-AP11-__ 032-__-AP11-__



Uç: AP**11

MSG

025-__-AP16-__
 026-__-AP16-__
 032-__-AP16-__
 033-__-AP16-__



Uç: AP**16

MSG

020-__-RD1003-__ 032-__-RD10T3-__
 025-__-RD1003-__ 040-__-RD10T3-__
 032-__-RD1003-__ 025-__-RD1204-__
 025-__-RD10T3-__ 032-__-RD1204-__
 040-__-RD1204-__



Uç: RD**

MSG

035-02-TP16-100
 040-03-TP16-100
 050-03-TP16-100



Uç: TPKN1603

MSK

014-__-LN10-__ 016-__-LN10-__
 018-__-LN10-__ 020-__-LN10-__
 025-__-LN10-__ 032-__-LN10-__
 040-__-LN10-__
 050-__-LN10-__



Uç: LNMX10

MSK

025-02-WN09-150
 032-03-WN09-150



Uç: WNMX09

MSK

016-02-WN06-150
 017-02-WN06-150
 020-03-WN06-150
 021-03-WN06-150



Uç: WNMX06

MST

016-__-BL06-__ 017-__-BL06-__
 020-__-BL06-__ 021-__-BL06-__
 025-__-BL06-__ 026-__-BL06-__
 032-__-BL06-__
 033-__-BL06-__



Uç: BLMP 06

MSY

016-__-LN03-__-C
 017-__-LN03-__-C
 018-__-LN03-__-C
 020-__-LN03-__-C
 021-__-LN03-__-C



Uç: LNGX0303

MSY

022-__-LN03-__-C
 025-__-LN03-__-C
 026-__-LN03-__-C
 028-__-LN03-__-C
 032-__-LN03-__-C
 033-__-LN03-__-C



Uç: LNGX0303

MSW

010-01-RC10-130
 012-01-RC12-130
 016-01-RC16-140
 020-01-RC20-160
 025-01-RC25-160



Uç: RCE

FREZE KAFALARI

FACE MILLING

MCG



040-05-AP10
050-06-AP10
063-06-AP10
063-07-AP10
080-08-AP10
100-09-AP10

Uç: AP**10

MCT



040-06-BL06
050-07-BL06
063-08-BL06

Uç: BLMP 06

MCY



040-06-LN03
050-06-LN03
050-07-LN03
052-06-LN03
052-07-LN03

Uç: LNGX0303

MCK



040-04-LN10 050-04-LN15
040-05-LN10 063-06-LN15
050-06-LN10 080-07-LN15
100-08-LN15
125-10-LN15
160-12-LN15

Uç: LNMX1510

MCU



040-06-LN03
050-07-LN03
063-08-LN03

Uç: LNMU03

MCK



050-05-SN12-45
063-06-SN12-45
080-08-SN12-45
100-10-SN12-45
125-11-SN12-45
160-12-SN12-45

Uç: SNMX12A

MCK



050-05-SN12-88
063-06-SN12-88
080-08-SN12-88
100-10-SN12-88
125-11-SN12-88
160-12-SN12-88
250-08-SN12-88

Uç: SNMX12Q

MCG



050-03-TP16 080-04-TP22
063-04-TP16 100-05-TP22
080-05-TP16 125-06-TP22
100-06-TP16 160-07-TP22
063-03-TP22 200-08-TP22
250-10-TP22

Uç: TPKN16&22

MCY



050-04-WN08 080-05/06-WN08
052-04-WN08 100-07-WN08
063-04-WN08 125-08-WN08
063-05-WN08 160-10-WN08
063-06-WN08 200-12-WN08
250-14-WN08

Uç: WNMU08

MCK



040-03/04-WN09
050-05-WN09
052-04/05/06-WN09
063-05-WN09
066-06-WN09

Uç: WNGX09T3

MCG



040-04-RD1003
050-05-RD1003
063-06-RD1003
080-07-RD1003
100-08-RD1003

Uç: RD**1003

MCG



040-0-4RD1204
050-05-RD1204
063-06-RD1204
080-07-RD1204
100-08-RD1204

Uç: RD**1204

MCG



050-04-RD1604 066-05-RD1604
052-04-RD1604 080-05-RD1604
063-05-RD1604 100-06-RD1604
125-07-RD1604
160-08-RD1604
180-11-RD1604
200-12-RD1604

Uç: RD**1604

MCG



050-05-RD10T3
050-06-RD10T3
080-07-RD10T3

Uç: RD**10T3

VİDALI TAKIMLAR VE SAPLAR

SCREW TYPE END MILLS AND HOLDERS

MTK



025-02-WN09-M12
032-03-WN09-M16
035-03-WN09-M16
035-04-WN09-M16
040-04-WN09-M16

Uç: WNGX09T3

MTK



016-02-WN06-M08
020-03-WN06-M10
025-03-WN06-M12
025-04-WN06-M12
032-05-WN06-M16
035-05-WN06-M16

Uç: WNGX0603

MTT



020-03-BL06-M10
025-04-BL06-M12
032-05-BL06-M16
040-06-BL06-M16
042-06-BL06-M16

Uç: BLMP06

MTU



020-03-LN03-M10
025-04-LN03-M12
032-04-LN03-M16
032-05-LN03-M16
035-04-LN03-M16
040-06-LN03-M16
042-05-LN03-M16
Uç: LNMU0303

MTY



020-03-LN03-M10
025-04-LN03-M12
032-05-LN03-M16
035-05-LN03-M16
040-06-LN03-M16
042-06-LN03-M16

Uç: LNGX0303

MTK



ET D15 C16 M08 L120-H
ET D18 C20 M10 L120/170-H
ET D24 C25 M12 L160/200/250-H
ET D31 C32 M16 L160-200-250-H

DEĞİŞTİRİLEBİLİR KARBÜR FREZELER

INTERCHANGEABLE CARBIDE MILLING HEADS

T-S4Z



Çap:Ø8 - Ø32
Diameter:Ø8- Ø32



T-S6Z



Çap:Ø8 - Ø32
Diameter:Ø8- Ø32



T-H4Z



Çap:Ø8 - Ø32
Diameter:Ø8- Ø32



T-BZ4



Çap:ØR4 - ØR12,5
Diameter:ØR4 - ØR12,5



T-B2Z



Çap:ØR4 - ØR12,5
Diameter:ØR4 - ØR12,5



T-B2ZA



Çap:ØR4 - ØR16
Diameter:ØR4 - ØR16



T-S4ZR



Çap:Ø8 - ØR32
Diameter:Ø8 - ØR32



DEĞİŞTİRİLEBİLİR KARBÜR FREZELER

INTERCHANGEABLE CARBIDE MILLING SHANKS

AVS

Çap:Ø8 - Ø42
Metrik: M4 - M20
Diameter:Ø8 - Ø42
Metric: M4 - M20



AVL

Çap:Ø10 - Ø32
Metrik: M6 - M16
Diameter:Ø10 - Ø32
Metric: M6 - M16



AFV

Çap:Ø12 - Ø32
Metrik: M6 - M16
Diameter:Ø12 - Ø32
Metric: M6 - M16



AVC

Çap:Ø19 - Ø32
Metrik: M20 - M42
Diameter:Ø19 - Ø32
Metric: M20 - M42



KANAL İŞLEME TAKIMLARI

GROOVING TOOLS

GEKR/L

1616-T__-MG-__
2020-T__-MG-__
2525-T__-MG-__
3232-T__-MG-__



MGMN MGGN
MGMR MRMN

GIKR/L

2016-T__-MG-__ 2520-T__-MG-__
2925-T__-MG-__ 2116-T__-MG-__
3025-T__-MG-__ 3125-T__-MG-__
3732-T__-MG-__



MGMN MGGN
MGMR MRMN

GFKR/L

1616-T__-MG-__
2020-T__-MG-__
2525-T__-MG-__



MGMN

MGMN İÇİN KESME LAMASI

BLADE FOR MGMN

MGMN-KESME LAMASI

EMB-332
EMB-432



Uç: MGGN & MGMN
MGMR & MRMN

KESME LAMA TUTUCU GÖVDE

ETB-2026
ETB-2526
ETB-3032
ETB-2532
ETB-3232



DİŞ ÇEKME TAKIMLARI

THREADING HOLDERS

TVR/L

2020-K11/K16
2525-M11/M16/M22
3225-P11/P16/P22



TER/L

12-H11S 25-M22S
16-H11S 32-P22S
16-K16C 3232-P27C
20-K16C 4040-P27C
25-M16C
32-P16C



TIR/L

10K-11S 32-T16C
12M-11S 40-V16C
16-Q11S 25-S22C
20-T16S 32-T22C
25s-16c 40-V22C



DELİK İŞLEME TAKIMLARI

DRILLING TOOLS

SPMG /D2T/D3T/D4T/D5T



D_T-1320-SP05
D_T-1420-SP05
D_T-1520-SP05
D_T-1625-SP06
D_T-1725-SP06
D_T-1825-SP06

SPMG /D2T/D3T/D4T/D5T



D_T-1925-SP06
D_T-19525-SP06
D_T-2025-SP06
D_T-20525-SP06
D_T-2125-SP06
D_T-2225-SP07

SPMG /D2T/D3T/D4T/D5T



D_T-2325-SP07
D_T-2425-SP07
D_T-2525-SP07
D_T-2625-SP07
D_T-2725-SP07
D_T-27525-SP09

SPMG /D2T/D3T/D4T/D5T



D_T-3532-SP11
D_T-3632-SP11
D_T-3732-SP11
D_T-3832-SP11
D_T-3932-SP11
D_T-4032-SP11
D_T-4132-SP11

SPMG /D2T/D3T/D4T/D5T



D_T-2825-SP09
D_T-2925-SP09
D_T-3032-SP09
D_T-3132-SP09
D_T-3232-SP09
D_T-3332-SP09
D_T-3432-SP11

WCMX /D2T/D3T/D4T/D5T



D_G-1625-WC03
D_G-1725-WC03
D_G-1825-WC03
D_G-18525-WC03
D_G-1925-WC03
D_G-19525-WC03

WCMX /D2T/D3T/D4T/D5T



D_G-2025-WC04
D_G-2125-WC04
D_G-21525-WC04
D_G-2225-WC04
D_G-2325-WC04
D_G-2425-WC05

WCMX /D2T/D3T/D4T/D5T



D_G-2525-WC05
D_G-2625-WC05
D_G-2725-WC05
D_G-2825-WC05
D_G-2925-WC05
D_G-3032-WC06

WCMX /D2T/D3T/D4T/D5T



D_G-3132-WC06
D_G-3232-WC06
D_G-3332-WC06
D_G-3432-WC06
D_G-3532-WC06
D_G-3632-WC06

WCMX /D2T/D3T/D4T/D5T



D_G-3732-WC06
D_G-3832-WC06
D_G-3932-WC06
D_G-4032-WC06
D_G-4132-WC06
D_G-4232-WC06
D_G-4332-WC06

WCMX /D2T/D3T/D4T/D5T



D_G-4432-WC06
D_G-4540-WC08
D_G-4640-WC08
D_G-4740-WC08
D_G-4840-WC08
D_G-4940-WC08
D_G-5040-WC08

RAPID DRILL



















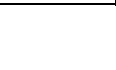

Ø10 - Ø39.99
Takım Boyu: 3D/5D/8D
Total Length: 3D/5D/8D



KARBÜR FREZE SEÇİM TABLOSU

ENDMILL SELECTION TABLE

★ Önerilir / Recommended
○ Kullanılabilir / Acceptable

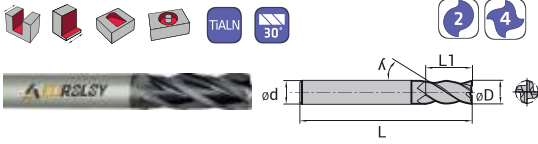
Takım Kodu Team No	Şekil Shape	Çubuk Kalitesi Rod Grade	Resim Image	Kaplama Coating	Kullanım Alanı Application Area	Ağız Sayısı Number of Teeth	İş Parçası / Workpiece					
							P Çelik Steel	M Paslanmaz Çelik Stainless Steel	K Dökme Demir Cast Iron	N Demir Dışı Metal Non-ferrous Metal	S Isıya Dirençli Alaşım Heat Resistant Alloy	H Sertleştirilmiş Çelik Hardened Steel
01	Karbür Düz Freze Flat Carbide Endmill	KH100S		○	Genel General	4	★	○	★			
02	Karbür Uzun Düz Freze Long Flat Carbide Endmill	KH100S		○	Genel General	4	★	○	★			
03	Karbür Küre Freze Ball Nose Carbide Endmill	KH100S		○	Genel General	2-4	★	○	★			
04	Karbür Uzun Küre Freze Long Ball Nose Carbide Endmill	KH100S		○	Genel General	2-4	★	○	★			
05	Karbür Düz Freze Flat Carbide Endmill	KH103S		○	Genel General	4	★	○	★	○	★	
06	Karbür Köşe Radyüs Freze Corner Radius Carbide Endmill	KH085U		○	Yüksek Hız High Speed	4	★		○		★	★
07	Karbür Köşe Uzun Radyüs Freze Corner Radius Long Carbide	KH085U		○	Yüksek Hız High Speed	4	★		○		★	★
08	Karbür Düz Freze Flat Carbide Endmill	KH060S		□	Alüminyum Finiş Aluminum Finish	2-3				★		
09	Karbür Uzun Düz Freze Long Flat Carbide Endmill	KH060S		□	Alüminyum Finiş Aluminum Finish	2-3				★		
10	Karbür Düz Freze Flat Carbide Endmill	KH060S		□	Alüminyum Performans Aluminum Performance	3				★		
11	Karbür Uzun Düz Freze Long Flat Carbide Endmill	KH060S		□	Alüminyum Performans Aluminum Performance	3				★		
12	Karbür Küre Freze Ball Nose Carbide Endmill	KH060S		□	Alüminyum Aluminum	2				★		
13	Karbür Uzun Küre Freze Long Ball Nose Carbide Endmill	KH060S		□	Alüminyum Aluminum	2				★		
14	Karbür Düz Freze Flat Carbide Endmill	KH103S		○	Genel General	4	★				○	
15	Karbür Uzun Düz Freze Long Flat Carbide Endmill	KH103S		○	Genel General	4	★				○	
16	Karbür Düz Freze Flat Carbide Endmill	KH103S		○	Genel General	6	★	★			★	○
17	Karbür Uzun Düz Freze Long Flat Carbide Endmill	KH103S		○	Genel General	6	★	★			★	○
18	Karbür Düz Freze Flat Carbide Endmill	KH103S		○	Genel General	8	★	★			★	○
19	Karbür Uzun Düz Freze Long Flat Carbide Endmill	KH103S		○	Genel General	8	★	★			★	○
20	Karbür Düz Freze Flat Carbide Endmill	KH103S		○	Genel General	3-4	★	○	★	○		
21	Karbür Küre Freze Ball Nose Carbide Endmill	KH103S		○	Genel General	2	★	○	★	○		
22	Karbür İç Bükey Freze Carbide Concaverounding	KH103S		○	Genel General	4-6-8	★	○	★	○		

KARBÜR TAKIMLAR

SOLID CARBIDE TOOLS

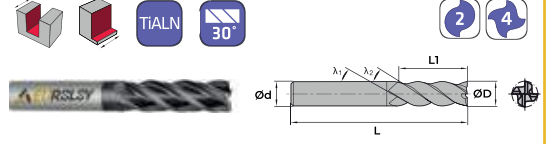
KARBÜR DÜZ FREZE FLAT CARBIDE ENDMILL

Çap:Ø3 - Ø20
Diameter:Ø3 - Ø20



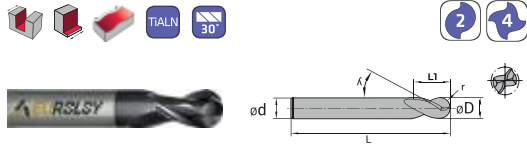
KARBÜR UZUN DÜZ FREZE LONG FLAT CARBIDE ENDMILL

Çap:Ø3 - Ø20
Diameter:Ø3 - Ø20



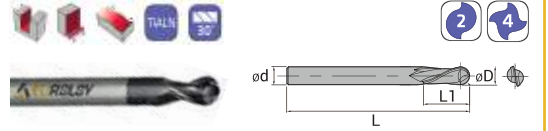
KARBÜR KÜRE FREZE BALL NOSE CARBIDE ENDMILL

Çap:Ø3 - Ø20
Diameter:Ø3 - Ø20



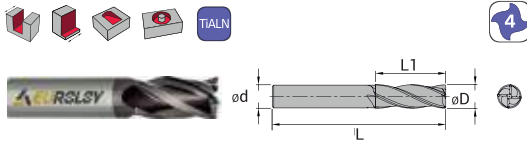
KARBÜR UZUN KÜRE FREZE BALL NOSE LONG CARBIDE ENDMILL

Çap:Ø3 - Ø20
Diameter:Ø3 - Ø20



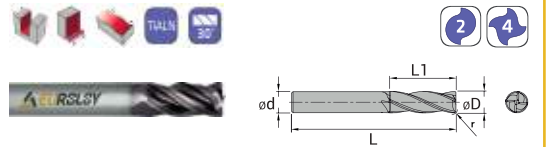
KARBÜR PİRR FREZE CARBIDE CHATTER FREE ENDMILL

Çap:Ø6 - Ø20
Diameter:Ø6 - Ø20



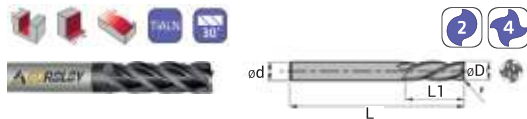
KARBÜR KÖŞE RADIUS FREZE CORNER RADIUS CARBIDE ENDMILL

Çap:Ø3 - Ø20
Diameter:Ø3 - Ø20



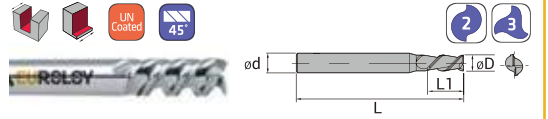
KARBÜR KÖŞE RADIUS UZUN FREZE CORNER RADIUS LONG CARBIDE ENDMILL

Çap:Ø3 - Ø20
Diameter:Ø3 - Ø20



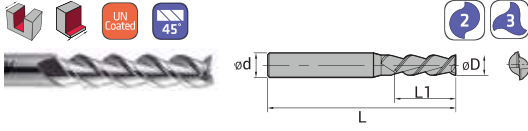
KARBÜR ALUMİNYUM FİNİŞ FREZE CARBIDE ALUMINUM FINISHING ENDMILL

Çap:Ø3 - Ø20
Diameter:Ø3 - Ø20



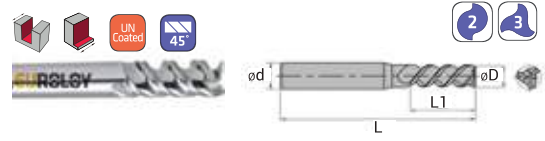
KARBÜR ALÜMİNYUM UZUN FİNİŞ FREZE LONG CARBIDE ALUMINIUM FINISHING ENDMILL

Çap:Ø3 - Ø20
Diameter:Ø3 - Ø20



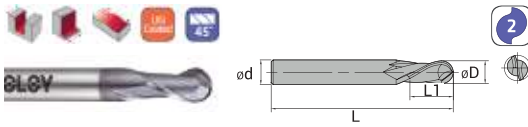
KARBÜR ALUMİNYUM PERFORMANS FREZE CARBIDE ALUMINIUM PERFORMANCE ENDMILL

Çap:Ø3 - Ø20
Diameter:Ø3 - Ø20



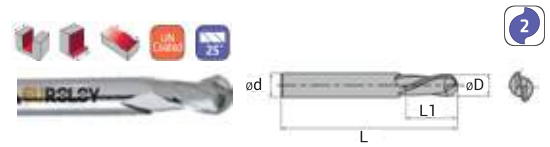
KARBÜR ALÜMİNYUM UZUN PERFORMANS FREZE LONG C. ALUMINIUM PERFORMANCE ENDMILL

Çap:Ø3 - Ø20
Diameter:Ø3 - Ø20



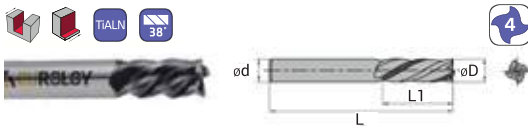
KARBÜR ALUMİNYUM KÜRE FREZE BALL NOSE CARBIDE ALUMINIUM ENDMILL

Çap:Ø3 - Ø20
Diameter:Ø3 - Ø20



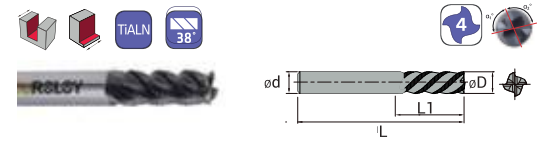
KARBÜR UZUN KABA TALAŞ FREZE LONG CARBIDE ROUGHING ENDMILL

Çap:Ø6 - Ø25
Diameter:Ø6 - Ø25



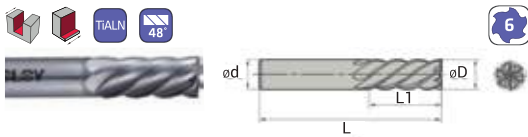
KARBÜR KABA TALAŞ FREZE CARBIDE ROUGHING ENDMILL

Çap:Ø6 - Ø28
Diameter:Ø6 - Ø28



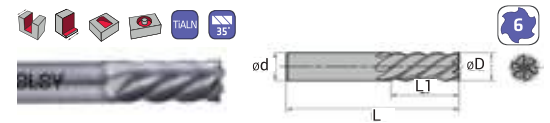
KARBÜR UZUN FİNİŞ FREZE Z6 LONG CARBIDE FINISHING ENDMILL Z6

Çap:Ø6 - Ø25
Diameter:Ø6 - Ø25



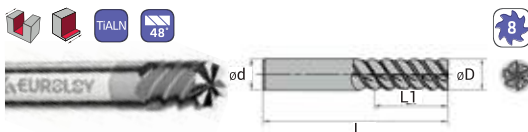
KARBÜR FİNİŞ FREZE Z6 CARBIDE FINISHING ENDMILL Z6

Çap:Ø6 - Ø28
Diameter:Ø6 - Ø28



KARBÜR FİNİŞ FREZE Z8 CARBIDE FINISHING ENDMILL Z8

Çap:Ø10 - Ø28
Diameter:Ø10 - Ø28

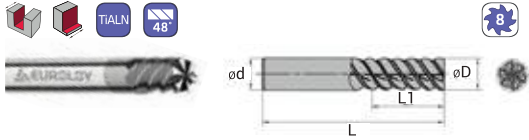


KARBÜR TAKIMLAR

SOLID CARBIDE TOOLS

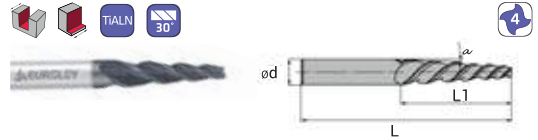
KARBÜR UZUN FİNİŞ FREZE Z8 LONG CARBIDE FINISHING ENDMILL Z8

Çap: Ø10 - Ø25
Diameter: Ø10 - Ø25



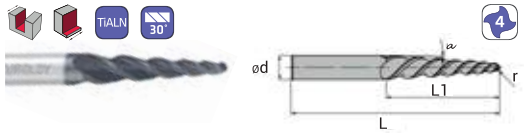
KARBÜR KONİK DÜZ AĞIZLI FREZE TAPERED FLAT CARBIDE ENDMILL

Çap: Ø2 - Ø12
Diameter: Ø2 - Ø12



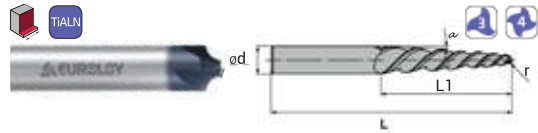
KARBÜR KONİK KÜRE AĞIZLI FREZE TAPERED BALL NOSE CARBIDE ENDMILL

Çap: Ø2 - Ø12
Diameter: Ø2 - Ø12



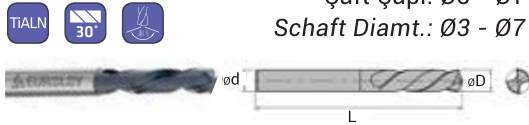
KARBÜR İÇ BÜKEY FREZE CARBIDE ROUNDING CONCAVE CUTTER

Çap: Ø8 - Ø22
Diameter: Ø8 - Ø22



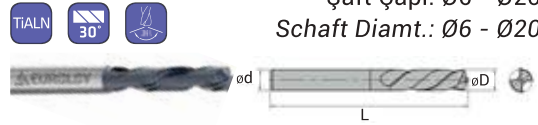
3D KARBÜR MATKAP 3D CARBIDE DRILL

Çap: Ø3 - Ø20
Diameter: Ø3 - Ø20
Şaft Çapı: Ø3 - Ø7
Shaft Diamt.: Ø3 - Ø7



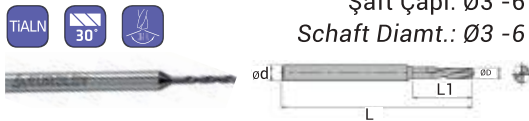
5D KARBÜR MATKAP 5D CARBIDE DRILL

Çap: Ø3 - Ø20
Diameter: Ø3 - Ø20
Şaft Çapı: Ø6 - Ø20
Shaft Diamt.: Ø6 - Ø20



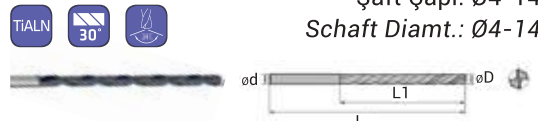
KARBÜR MİKRO MATKAP CARBIDE MICRO DRILL

Çap: Ø1 - Ø2,9
Diameter: Ø1 - Ø2,9
Şaft Çapı: Ø3 - 6
Shaft Diamt.: Ø3 - 6



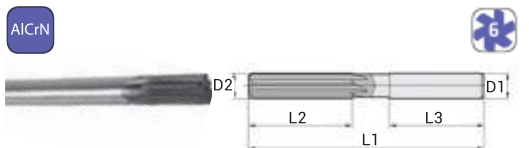
KARBÜR EKSTRA UZUN MATKAP EXTRA LONG CARBIDE DRILL

Çap: Ø3 - Ø14
Diameter: Ø3 - Ø14
Şaft Çapı: Ø4 - 14
Shaft Diamt.: Ø4 - 14



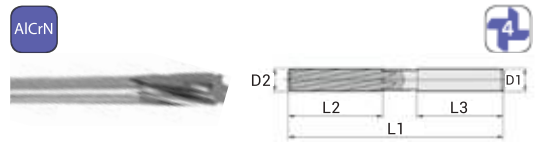
KARBÜR DÜZ RAYBALAR CARBIDE STRAIGHT REAMER

Çap: Ø4 - Ø20
Diameter: Ø4 - Ø20



KARBÜR HELİS RAYBALAR CARBIDE HELIX REAMER

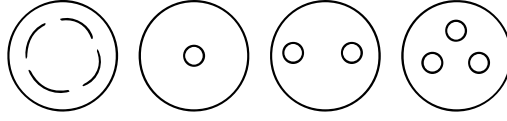
Çap: Ø4 - Ø12
Diameter: Ø4 - Ø12



TUNGSTEN KARBÜR ÇUBUKLAR

CEMENTED CARBIDE RODS

Kalite Bilgisi
Grade Information



Kalite Grade	Co (%)	Sertlik Hardness HRA	Yoğunluk Intensity (g/cm ³)	Çapraz Kırılma Dayancı Cross Breaking Strength	Tane Boyutu Grain Size (um)	Uygulama Alanı Application Area
KH60U	6	93.8	14.8	3900	Superince Ultrafine	PCB matkapları, freze bıçakları ve gravür kamler dahil olmak üzere yüksek sertlikte malzeme işleme uygulanabilir. Applicable to the high hardness material processing, including PCB drills, milling cutters and gravers.
KH060S	6	92.5	14.85	3000	Mikronaltı Submicron	Elyaf takviyeli malzeme (karbon elyafı ve cam elyafı), kompozit malzeme, yüksek silikonlu alüminyum alaşımı ve grafit ürünleri için uygun elmas kaplama için en iyi malzeme. The best material for diamond coating, suitable for fiber reinforced material (carbon fiber and glass fiber), composite material, high-silicon aluminum alloy and graphite products.
KH103S	10.3	92.2	14.43	3800	Superince Ultrafine	Alaşımli çelik, paslanmaz çelik, dökme demir, demir dışı metal, süper alaşım vb. için geçerli olan yüksek hızlı frezeleme ve delmenin genel kullanımı için. For general use of high-speed milling and drilling, applicable to alloy steel, stainless steel, cast iron, non-ferrous metal, süper alloy etc.
KH102S	10	91.8	14.45	3700	Mikronaltı Submicron	Alaşımli çelik, paslanmaz çelik, demir dışı metal, süper alaşım vb. için geçerli olan frezeleme ve delme işlemlerinin genel kullanımı için. For general use of milling and drilling, applicable to alloy steel, stainless steel, non-ferrous metal, süper alloy etc.
KH100S	10	91.8	14.45	3700	Mikronaltı Submicron	Alaşımli çelik, paslanmaz çelik, demir dışı metal, süper alaşım vb. için geçerli ekonomik frezeleme ve delmenin genel kullanımı için. For general use of economic milling and drilling, applicable to alloy steel, stainless steel, non-ferrous metal, süper alloy etc.
KH120U	12.0	92.6	14.12	4200	Süperince Ultrafine	Alaşımli çelik (HRC50-60), paslanmaz çelik, demir dışı metal, titanyum alaşımı, süper alaşım vb. için geçerli olan yüksek hızlı frezelemenin özel karbür malzemesi. Special carbide material of high-speed milling, applicable to alloy steel (HRC50-60), stainless steel, non-ferrous metal, titanium alloy, süper alloy etc.
KH100SR	10.0	91.8	14.45	3700	Mikronaltı Submicron	Alaşımli çelik, demir dışı metal vb. için geçerli frezeleme için ekonomik kalite. Economic grade for milling, applicable to alloy steel, non-ferrous metal etc.
KH090U	9.0	93.0	14.50	3900	Süperince Ultrafine	Sertlik ve işlenmesi zor malzemelerin işlenmesi, paslanmaz işleme ve mikro kesici için geçerlidir. Applicable to processing the hardness and difficult-to-machine materials, stainless machining and micro cutter.

Nano < 0.2 µm	Ultra Fine 0.2 - 0.5 µm	Submicron 0.5 - 0.9 µm	Fine 1.0 - 1.3 µm	Medium 1.4 - 2.0 µm	Medium Coarse 2.1 - 3.4 µm	Coarse 3.5 - 5.0 µm	Extra Coarse > 5.0 µm



KALİTE KARŞILAŞTIRMA TABLOSU

GRADE COMPARISON CHART

CVD Tornalama Kaliteleri CVD Turning Grades

ISO	EURCLOY	ACHTECK	ISCAR	KENAMETAL	KYOCERA	KORLOY	MITSUBISHI	SANDVIK	SECO	SUMITOMO	TAEGUTEC	WALTER	ZCC	GESAC	YG-1
P10	TC0115	AC150P	IC8150 IC9150	KCP05B (KCP05), KCP10B (KCP10)	CA515 CA5515	NC3215	UE6105, MC6015	GC4315, GC4305	TP1500, TP1000	AC8020P, AC8015P (AC810P)	TT8105B, TT8115B	WPP10S (WPP10) WPP10S (WPP10)	YBC152 YBC151	GP1105 GP1115	YG3010 YG3015
P20	TC0125 TC2125	AC250P	IC8250 IC9250	KCP25B (KCP25),	CA525 CA5525	NC3225 NC3120	UE6020 MC6025	GC4325, GC4425	TP2500, TP2000	AC8025P (AC820P)	TT8125B, TT5100	WPP20S (WPP20)	YBC251, YBC252	GP1120 GP1225	YG3020
P30	TC1130	AC350P	IC8350 IC9350	KCP30, KCP40B (KCP40B)	CA530 CA5535	NC3030	MC6035 UH6400	GC4335	TP3500, TP3000, TP40	AC8035P (AC830P)	TT8135, TT7100	WPP30S (WPP30)	YBC351, YBC352	GP1135	YG3030
M10	TC1310		IC6015	KCM15B (KCM15)	CA6515	NC9115	MC7015	GC2015	TM2000		TT9215			GM1115	
M20	TC1320		IC6025	KCM25B (KCM25)	CA6525	NC9125	MC7025	GC2220	CP500	AC6020M (AC610M)	TT9225	WMP20S	YBM151, YBM253	GM1125	
M30	TC1330	AC350M		KCM35B (KCM35)		NC9135		GC2025	TM4000	AC6030M (AC630M)	TT9235		YBM251		YG3030
K10	TC2210	AC100K AC150K	IC5005	KCK05	CA4505		MC5005, UC5105	GC3205	TK1001 TK1000	AC4010K (AC405K)	TT7005, TT7015	WKK10S	YBD052	GK1115	YG1001
K20	TC2215	AC200K AC150K	IC5010, IC8150	KCK15B (KCK15), KCK20, KCP10B, KCP25B	CA4515	NC6315	MC5015, UC5115	GC3210	TK2001 TK2000	AC4015K	TT7915	WKK20S	YBD152C, YBD102, YBD151	GK1120 GK1125	YG3010

PVD Tornalama Kaliteleri PVD Turning Grades

ISO	EURCLOY	ACHTECK	ISCAR	KENAMETAL	KYOCERA	KORLOY	MITSUBISHI	SANDVIK	SECO	SUMITOMO	TAEGUTEC	WALTER	ZCC	GESAC	YG-1
P10					PR930	P8105									
P20	TP3620	AP100U	IC807 (IC907)	KCU10 (KC5010)	PR1025, PR1225	P8110		GC1115		AC1030U			YB9320	GP3125	YG801
P30	TP2630	AP301U	IC830 (IC328)	KCU25 (KC5025)	PR1535	PC5300	VP15TF	GC1125	CP500, CP600		TT5030		YBG205		
M10	TP3310	AP100S	IC807 (IC907)	KCU10 (KC5010)	PR930	P8105	MC7015					WSM10S (WSM10)		GS3115	
M20	TP3620	AP301U			PR1025, PR1225	P8110	VP15TF		AC1030U	TT9080	WSM20S (WSM20)			GS3125 GS3125	YG211 YG213
M30	TP2330		IC830 (IC328)	KCU25 (KC5025)	PR1535	PC5300 PC9030	MP7035	GC2035	CP500 CP600	AC6040M	TT5030	WSM30S (WSM20)	YBG205 YB9320	GM3225	YG214
K10	TP2620		IC807 (IC907)	KCU15, KCU25	PR905	PC5300	VP15TF		CP500 CP600	AC1030U					
K20	TP4630		IC830 (IC328)												
S10	TP4410 TP5410	AP100U, AP100S	IC806 (IC804)	KCU10 (KC5010)	PR005, PR015S	PC8110	MP9005, MP9015	GC1105	TS2000 (CP200)	AC5015S, AC5005S (AC510U)	TT5080, TT3010	WSM10S (WSM10) WSM01	YBG102 YBG105	GS3115	YG211 YG213
S20	TP4420	AP301U, AP100S	IC807 (IC907), IC830 (IC328)	KCU20 (KC5025)	PR1535	PC8115, PC5300	VP20RT	GC1115, GC1125	CP500, TS2500	AC5025S (AC520U)	TT9080	WSM20S (WSM20) WSM30S (WSM30)	YBG205	GS3125	YG214
N10	TN7501	AW100K	IC20	K313	GW05	H01	HT10	H10	KX	H1	K10	WN10	YD101 YD201	GN9115 GN9120 GN9130	YG100 YG10

KALİTE KARŞILAŞTIRMA TABLOSU

GRADE COMPARISON CHART

Sermet Kaplamasız Tornalama Kaliteleri Cermet Uncoated Turning Grades

ISO	EUR3L2Y	ISCAR	KENAMETAL	KYOCERA	KORLOY	MITSUBISHI	SANDVIK	SECO	SUMITOMO	TAEGUTEK	TUNGALOY	ZCC	GESAC
P	CN7610	IC20N	KT315 KT125	TN30, TN60	CN1500, CN1500	NX2525, NX3035	CT5015	CM, C15M	T110A	CT3000	NS520	YNG151	GP91TF
	CN7620	IC30N	KT325	TN620, TN6020, TN90	CN2500	NX335	CT525	TP1020	T1500A	CT7000	NS530, NS9530, NS540, NS730	YNT251	GP91TM

Sermet Kaplamalı Tornalama Kaliteleri Cermet Coated Turning Grades

ISO	EUR3L2Y	ISCAR	KENAMETAL	KYOCERA	KORLOY	MITSUBISHI	SANDVIK	SECO	SUMITOMO	TAEGUTEK	TUNGALOY	ZCC	GESAC
P	CP1610 CP5610	IC520N	KT520	PV30, PV60	CC1500	UP35N, AP25N			T2000Z	PV3010	GT530		GP31TM
	CP1620 CP5620												

CVD Frezeleme Kaliteleri CVD Milling Grades

ISO	EUR3L2Y	ACHTECK	ISCAR	KENAMETAL	KYOCERA	KORLOY	MITSUBISHI	SANDVIK	SECO	SUMITOMO	TAEGUTEK	WALTER	ZCC	GESAC	YG-1
P10	TC0115		IC9080 IC4100 IC9015						MP1501						
P20	TC0125 TC2125	AC301P	IC5100 IC520M			NC5330	F7030	GC4330	MP2501	ACP2000	TT2510	WKP25S (WKP25)	YBC301 YBC302 YBM253	GP2115	
P30	TC1130		IC4050	KCPK30 KC930M		NC5340, NCM325		GC4340				TT7080	WKP35G WSM45X		
M10	TC1310		IC9250												
M20	TC1320	AC301P	IC520M IC9350	KC925M	CA6535	NC5330	F7030	GC1040	MP2501 T350M	ACM200			YBM251 YBM253	GM2125	
M30	TC1330		IC9350, IC4050	KC930M		NC5340, NCM325		GC2040						YBM351 YBC401	GM2140
K10	TC2210			KCK15	CA420M			GC3330			TT7515	WAK15	YBD152		
K20	TC2215	AC301P	IC5100 IC9150	KCPK30		NC5330	MC5020	GC3040	MK1500	ACK2000 (ACK200)		WKP25S (WKP25) WKP35G	YBD252	GK2125	YG5020

PVD Frezeleme Kaliteleri PVD Milling Grades

ISO	EUR3L2Y	ACHTECK	ISCAR	KENAMETAL	KYOCERA	KORLOY	MITSUBISHI	SANDVIK	SECO	SUMITOMO	TAEGUTEK	WALTER	ZCC	GESAC	YG-1
P10	TP1120	AP301U		KC510M									YBG102		
P20	TP1120	ACP351U	IC808 (IC908)	KC522M	PR830	PC3600 PC3500	MP6120		F25M F30M	ACP3000	TT9080, TT9030		YBG202, YBG205, YB9320	GA4225, GP4225	YG602
P30	TP2630	AP401U	IC830 (IC928)	KC725M	PR1225, PR1230	PC5300	MP6130 VP30RT	GC1130, GC1030	F40M	ACU2500		WSP45S		GA4230	YG622 YG603
M10	TP2315	AP301U	IC808 (IC908)	KC522M									YBG102		
M20	TP2325	ACP351U	IC830 (IC328)	KCSM40	PR1225, PR1230		MP7130 MP7030	GC1025 GC1030	F25M MP3000		TT9080, TT9030	WSM35S	YBG202 YBG205 YB9320	GA4225, GA4230	YG602
M30	TP3630	AP401U	IC330 (IC328)	KC725M		PC5300 PC9530	VP15TF	GC1040, GC2030	F40M	ACU2500 ACM300		WSP45S		GS4130	YG603
K10	TP1215	AP301U		KC520M	PR1210	PC6510			MK2050		TT6080		YBG102		YG501
K20	TP2630	ACP351U	IC810 (IC910)			PC5300	VP15TF, VP20	GC1020		ACU2500			YBG152 YBG202 YBG252	GK4125	YG602 YG622
S10	TP2630		IC808 (IC908)	KC510M	PR1210, PR1535			S30T	F40M MS2050	ACU2500 ACM300	TT9080, TT9030		YBG102	GA4230	
S20	TP5630		IC830 (IC928)	KC522M KCSM40		PC5300	MP9120, MP9130, VP15TF					WXM35 WSM35	YBG202 YBG205	GS4130	YG602
N10	TN7501		IC08, IC28		KW10, GW25				H15, H25	H1, H20					

Kanal Açma Kaliteleri
Grooving & Parting Grades

ISO	EURLOY	ACHTECK	ISCAR	KENNAMETAL	KYOCERA	KORLOY	MITSUBISHI	SANDVIK	SECO	SUMITOMO	TAEGUTEC	WALTER	ZCC	GESAC	YG-1
P	TC2125	AP100U	IC807 (IC907)	KCU10 (KC5010)	PR1025, PR1225	NC3120, NC3030		GC1115		AC1030U	TT5100		YB9320	GP3125	YG801
	TP3630	AP301U	IC830 (IC328)	KCU25 (KC5025)	PR1535	PC5300	VP15TF	GC1125	CP500, CP600		TT9080, TT7020		YBG205		
M	TP3630	AP100S	IC807 (IC907)		PR930		MC7015				TT3010	WSM10S (WSM10)		GS3115	
		AP301U		KCU10 (KC5010)	PR1025, PR1225	PC9030	VP15TF		AC1030U	TT9080, TT8020	WSM20S (WSM20)		GS3125, GS3125	YG211, YG213	
			IC830 (IC328)	KCU25 (KC5025)	PR1535	PC5300	MP7035	GC2035	CP500, CP600	AC6040M		WSM30S (WSM20)	YBG205, YBG320	GM3225	YG214
K	TC2215		IC807 (IC907)	KCU15, KCU25	PR905	PC5300			CP500, CP600	AC1030U	TT7505				
	TC3620		IC830 (IC328)				VP15TF				TT6080				
N	TN7501	AW100K	IC20	K313	GW05	H01	HT10	H10	KX	H1		WN10	YD101, YD201	GN9115, GN9120, GN9130	YG100, YG10

Talaş Kırıcı Karşılaştırma Tablosu
Chip Breaker Comparison Chart

UYGULAMA APPLICATION		EURLOY	ACHTECK	GESAC	ISCAR	KENNAMETAL	KORLOY	KYOCERA	MITSUBISHI	SANDVIK	SECO	SUMITOMO	TAEGUTEC	TUNGALOY	WALTER	ZCC		
NEGATİF NEGATIVE	Çelik Steel	Süper Finiş Super Finish	EF1			SF	FF (G-class)	-	DP (G-class)	PK (G-class) FY	PMC	FF1	FA	-	TF	-		
						PF	UF	VL	GP	FH FS SY	QF	FF2	FL FB	FA	NS ZF	NF3		
		Finiş Finish	EF2	PB1	PS	NF SM	FN	VF	PP	FP	PF XF			LU FE	FG	NM NS SS	NF4	DF EF
			GF		GF QF	F3P	K	VB	-	LP SH SA	61	MF2	SU	SF	TS TSF	FP5		
		Ortakaba - Finiş Medium to Finishing	ES1	PB3	GM	TF	LF CT	VQ VC	HQ CQ	C (Cermet)	HM			SE	MC	AS	NS6	DM EM
					QM	-	-	LP	PQ CJ	MV	PMC	MF5	SX	FC	ZM AM	MP3		
	Ortakaba Medium	TM PM GM	PC3	TP TS SV	PP TF	MP MN	VM HM	HK GS HS PS	MA MH	QM SM	M3 M5	GU (UG)	MP MT	TQ TM	NM4 NP5	DM PM		
			PD3 PC4		-	MP	PG	MP	PM, XM	-	GE, UX	PC	DM No C/B	MP5				
	Kaba Roughing	MR	PD5	LR	GN	RP, MR	B25		GM, No C/B	-	M5				TH	-	DR	
				QR	R3P	RN No C/B	GR	PT GT HT PH	GH RP	PR WR	MR5 MR6 MR7	MU ME MX	RT	THS	RP5 NM9			
Ağır İşleme Heavy Duty	ER				NR, HT	RH	GH	PX	HZ	PR, XMR	R4 R5	HG MP	HB RH RX	CH	RP7 NR4 NRF			
					HR	RM	VH	-	HX	QR	R6 R7 R8 PR6	HP	HZ EH	THS TRS	NR8 NR8	HDR HPR DR LR		
					T3P	MM	VT	-	HV	HR	PR9 R56 R57 R68	HU HW HF	HT HY HD	65 TUS	-			
M	Paslanmaz Çelik Stainless Steel	EF2 AL MA BM EM2	MB2	SF LF LV SM LM	SF VL F3M PP TF M3M	FP FF	VP2 MP	MQ GU SK	SH LM	MF XF	FF1 MF1	SU EF	EA SF	SS SF SA	NF4 FM5	EF DF		
				MR		MR R3M	RP P	RM	MU	MA ES	MR XMR MRR	MF5 M5	MU HM EM	ET	S SH	RM5 NRS	ER DR DR LR	
K	Dökme Demir Cast Iron	PM			TF	T-20 FN	MP	No C/B C KQ	LK, MA	KF PMC XF	M4	UZ	MT	CF	NM, MK5	DF EF		
		ST	KC4	UK	GN	UN RP	B25 MK	ZS KG	MK GK No C/B	KM XM	M5	UX GZ	RT, KT	CM No C/B	NM5 RK5	PM HM		
		ER	KD5	HK QH	-MA NR	MR, S-20 -MA	-MA, RK	-MA GC KH	RK -MA	KR XMR KRR	MR7	-MA	-MA	CH	-MA RK7	DR		
S	Isıya Dirençli Alaşımlar HRSA	AL		SF	SF PF	FS (G-class) LF (G-class)	VP1	MQ SK	FJ (G-class)	SF SGF	M1	EF	EA	SF	NF4	NF EF		
		EN	SC3	LM	PP	UP	VP2	TK	LS	23.SR XF SMC	MF1	UP EG	ML	HMM	NFT	NF NM EM		
		MA	MC3 MC4		TF	MS GP P UN	VP3	MS	MS	SM SMR XM	MF4 MR3	EX	EM	HRF	NMS NMT			
N	Alüminyum Aluminium	AL			NF PP	GP MS	HA	AH	MJ	23	MF1	AX	ML	P	FN2 PF2	LC		
																MN2 PM2		
POZİTİF POSITIVE	Uygulama Application	Finiş Finish	HF	PB1 PC2	GS	F3P	UF	VF	GP	SMG (G-class) FV	PF XF	FF1	FC	FA FX	1	FP4	SF HF	
					GS	F3P	UF	VF	GP	SV, FP	UF	F1	FB LU (FP, FK)		PSF PF	FK6		
				KC2	MM	14	LF FP	HMP	XQ	LP	PM XM	MF2	LB NF	FG	PSS	MP4 FM2 FM4 MK4	EF EM HF HM	
	Orta Medium	PS1 PS2		GP TP	SM	MP T-20	MP	HQ GK	MV	UM PMC	F2 M3	SU SC	PC FM	PS	FP6 MM4 FM6 RK4			
			ST	KD5	KM	19	MF GM -C	C25	No C/B	No C/B MP	PR UR XR	M5	MU	MT	PM	RP4 RM4 RK6	HR	
	Paslanmaz Çelik ve HRSA Stainless Steel and HRSA	PF2	UF	PS	PF	11 UF LF	VP1	CF GF GQ	FJ (G-class) FM LM	MF MM MMC	F1 MF2	FC FM	FG	PSF PSS	FM4 NM4	NF		
			PS1		GS MM	SM M3M	MF	VL	MQ MF	MM No C/B	MR XR SMC	M3 M5	LB, SI	SA	PS PM	RM4		
Dökme Demir Cast Iron	PS2 ST		GP TP	17	LF	MP	HQ	MK	KF, KM	M3	MU	PC	CM	FK6	HM HR			
				19	MF UF	C25	GK	No C/B	KR	M5	No C/B	MT	No C/B	MK4 RK6				
N	Alüminyum Aluminium	AL	NC2	AL	AS AF	HP LF	AK AR	AH	AZ FS	AL	AL	AW AG AY	FL	AL	PM2	LC LH		
	Yüksek Hassasiyette Tornalama (Tolerance group)	R/L	F H		LF RF XL	GH	KF KM	FSF USF J A3	F SR SS SM	K F UM	UX	FY FX FZ	GF FF GW	JS J10, JRP JPP	-			

Tornalama Turning

Kesme Hızı Cutting Speed (m/min)	$V_c = \frac{D_m \times \pi \times n}{1000}$
Devir Hızı Rotation Speed (Rev/min)	$n = \frac{V_c \times 1000}{D_m \times \pi}$
Talaş Kaldırma Oranı Chip Removal Rate (cm ³ /min)	$Q = V_c \times a_p \times f_n$
Kesme Süresi Cutting Time (min)	$T_c = \frac{l_m}{f_n \times n}$
Yüzey Kalitesi Surface Roughness (µm)	$R_{max} = \frac{f_n^2}{r_\epsilon} \times 125$

Frezeleme Milling

Kesme Hızı Cutting Speed (m/min)	$V_c = \frac{n \times \pi \times D}{1000}$
Devir Hızı Rotation Speed (Rev/min)	$n = \frac{V_c \times 1000}{\pi \times D}$
Tablo İlerlemesi Table Feed (mm/min)	$V_f = n \times z_c \times f_z$
Kesme Faaliyeti Cutting Output (cm ³ /min)	$Q = \frac{a_e \times a_p \times V_f}{1000}$
Diş başı ilerleme Feed per Tooth (mm/min)	$f_z = \frac{V_f}{n \times z_c}$

Sembol Symbol	Tanımlamalar Designation	Birim Unit
D_m	İşleme Çapı Machining Diameter	mm
f_n	Devir Başı İşleme Feed per Revolution	mm/rev
l_m	İşleme Boyu Machining Length	mm
n	Devir Rotation	rev/min
Q	Talaş Kaldırma Oranı Chip removal rate	cm ³ /min
A_{max}	paso miktarı x ilerleme d.o.c x feed	mm ²
r_ϵ	Uç Radyüsü Nose Radius	mm
T_c	Kesme Zamanı Cutting Time	min
R_{max}	Yüzey Kalitesi Surface Roughness	µm

Sembol Symbol	Tanımlamalar Designation	Birim Unit
V_c	Kesme Hızı Cutting Speed	m/min
a_p	Paso Miktarı Depth of cut (d.o.c)	mm
a_e	Radyal Kesme Derinliği (Kesim Genişliği) Radial depth of cut (width of cut)	mm
D	Freze Çapı Cutter Diameter	mm
f_z	Freze Çapı Feed Per Tooth	mm/tooth
Z_c	Etkili Diş Sayısı Effective number of teeth	pcs
V_f	Tablo İlerlemesi Table Feed	mm/min
Z_n	Toplam Diş Sayısı Total number of teeth	pcs

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Wheel face roughing

CNGN120412 (PCBN)
Göbek Dış Çapı Kaba İşleme
Wheel out dia roughing

VNGA160408 (PCBN)
Dip Köşeye Kanal Açma (Kaba)
Escape grooving(rough)

CNGN120412 (PCBN)
Üst Dik Balata Yüzeyi
Kaba İşleme
Upper disc pad roughing

CNGN120412 (PCBN)
Göbek İç Alını Kaba İşleme
Hub face roughing

CNGA120412 (PCBN)
İç Çap Kaba İşleme
Inner dia roughing

PCBN GX, 6W
Kanal İşleme (Kaba)
Grooving(rough)

CNGA120412 (PCBN)
Disk Balata Yüzeyi Finiş
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Disc pad finishing



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