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**Innovation Is
Our Tool**

SWISS  QUALITY

URMA RX large





BRAND-NEW

**Büyük, daha büyük, RX Large.
Büyük ölçüler için yüksek
performanslı raybalama.**

Big, Bigger, RX Large.

High performance reaming for
big sizes.

Enerji Endüstrisi

Energy Industry



Gereksinimler

- Hassasiyet
- Proses güvenilirliği
- Düşük Maliyet
- Üretkenlik
- Kolay kullanım

Örnek Saha Raporları

- Bağlantı milleri
- Planet dişli taşıyıcı (otomatik vites)
- Kardan eklem parçaları
- Kam ve krank yatakları
- Silindir yuvaları

Örnek "Planet Taşıyıcı" Uygulaması

Malzeme: EN-GJS 4000

Requirements

- Precision
- Process reliability
- Simple handling
- Productivity

Example of a "Planet Carrier" Application

Material: EN-GJS 400



Application Data

vc	125	m/min
fz	0.20	mm
z	12	
vf	530	mm/min
ap	0.15	mm
Ø	180 N6	mm
L	2x120	mm
XS	650	mm

Makine Yapım Endüstrisi

Machine Building Industry



Gereksinimler

- Hassasiyet
- Yüksek esneklik
- Proses güvenilirliği
- Düşük Maliyet
- Kolay kullanım

Örnek Saha Raporları

- İniş takımı parçaları
- Türbin parçaları
- Kalıp parçaları (bağlantı parçaları)
- Kanatçıklar (gövde parçaları)
- Genel havacılık parçaları

Örnek "Pompa Muhafazası" Uygulaması

Malzeme: GG25

Requirements

- Precision
- Process reliability
- Low costs
- Simple handling

Example of a "Pump Housing" Application

Material: GG25

Application Data

vc	100	m/min
fz	0.15	mm
z	12	
vf	353	mm/min
ap	0.15	mm
Ø	162 H8	mm
L	300	mm
Ra	1.2	µm
XS	350	mm



Ø 139.801 – 200.200 mm

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Ø 139.801 - 200.200 mm

Your Advantages



Anahtar noktalar

- Raybalama aralığı Ø 139.801 – 200,2mm
- Çok güvenilir RX teknolojisine dayalı yüksek hassasiyet ve kolay kullanım
- yüksek performanslı kesim sayesinde önemli tasarruf
- Kesici uç teknolojisi ile birlikte modülerlik sayesinde yüksek esneklik
- Fazla efor harcamadan ayarlama,
- Aşınmış raybalama kafalarının hızlı ve kolay yenilenmesi
- Dünya çapında uygulama desteği ve süreç garantisi

Key Points

- Reaming range Ø 139.801 – 200.2 mm
- High precision and easy handling based on the very reliable RX-technology
- Significant savings thanks to high-performance cutting
- High flexibility due to modularity in combination with insert technology
- No adjustment efforts for the customer
- Quick and easy reconditioning of worn-out reaming heads
- Worldwide application support and process guarantee



Sistem

- Sistem-Ölçüsü başına 10 mm'lik kullanılabilir Ø aralığı
- Stok kesici uçlar nedeniyle kısa teslimat süresi

Kullanım

- Raybalama kafasının hızlı ve kolay değiştirilmesi
- Çalışma hatalarını minimuma indirir

Hassasiyet

- Raybalama kafasının her değişikliğinde en yüksek konumlandırma doğruluğu (<4 µm)
- Hassas deliklerin güvenilir şekilde işlenmesi

Esneklik

- Farklı bir geometriye ve/veya kaplamaya geçiş kolaylaştırıldı
- Standart bileşenlerle takım uzunluğunun kolay ayarlanması
- Ara ölçüler ve her türlü tolerans için ekstra ücret yok

Kesici Uç

- En iyi performans ve takım ömrü için en yeni kesme malzemeleri ve kaplamalar
- Uygulamaya özel ek geometriler mevcuttur
- Patentli kesici uç teknolojisi

Tasarruf

- Maksimum proses güvenilirliğini korurken yüksek ilerleme hızları ile artan üretkenlik
- Kolay ve hızlı raybalama kafası değişimi - ek ayar gerekmez
- Minimum makine duruş süresi

Sürdürülebilirli

- Karbür oranı minimuma indirildi
- Raybalama kafasının sınırsız yenilenmesi
- Lehimleme yoluyla çevre kirliliği olmaz

The System

- Useable Ø-range of 10 mm per system-size
- Short delivery time due to stock inserts

The Handling

- Quick and easy changing of reaming head
- Reduces operating errors to the minimum

The Precision

- Highest positioning accuracy by every change of reaming head (<4 µm)
- Reliable machining of precise bores

The Flexibility

- Change to a different geometry and/or coating made easy
- Easy adaption of tool length with standard components
- Intermediate sizes and any type of tolerances without surcharge

The Insert

- Latest cutting materials and coatings for best performance and tool life
- Additional application-dedicated geometries available
- Patent pending of insert-technology

The Savings

- Increased productivity through high feed rates while maintaining a maximum of process reliability
- Easy and quick reaming head change – no additional adjustments needed
- Minimized machine down time

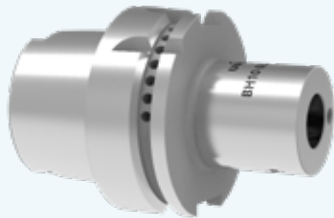
The Sustainability

- Carbide rate reduced to a minimum
- Unlimited reconditioning of reaming head
- No environmental contamination through brazing

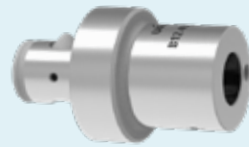
Ø 139.801 - 200.200 mm

URMA Reaming RX large

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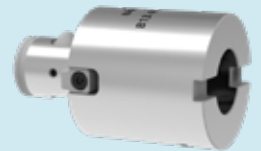


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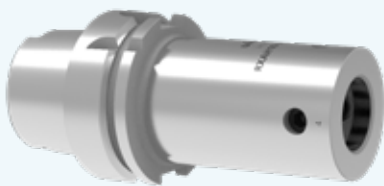
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Page 20



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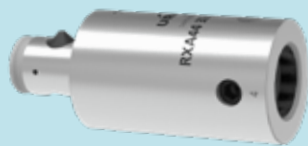
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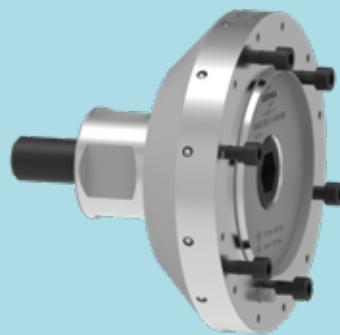
Ø 139.801 - 200.200 mm

Ø 139.801 - 200.200 mm

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Ø 139.801 - 200.200 mm

Kesici Uçlar

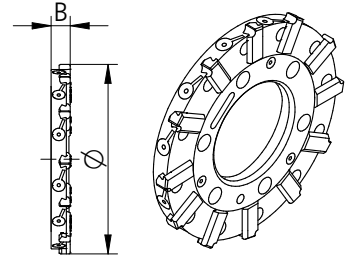
Inserts



Düz kanallı kesici uçlar (RXEG)

Straight Fluted Reaming Heads (RXEG)

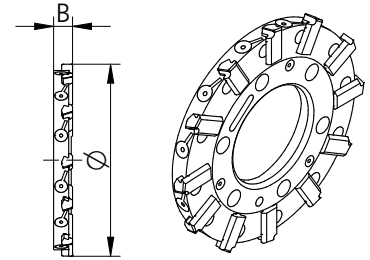
System Size	Ø-Range	B	z	MB	VE	Order Number	Stock
RX 150	139.801 - 149.800	15	12	1	1	RXEG...	▲
RX 160	149.801 - 159.800	15	12	1	1	For order	▲
RX 170	159.801 - 169.800	15	12	1	1	example see	▲
RX 180	169.801 - 179.800	15	12	1	1	page 15	▲
RX 190	179.801 - 189.800	15	12	1	1		▲
RX 200	189.801 - 200.200	15	12	1	1		▲



Sol helis kanallı kesici uçlar (RXEL)

Left Helical Fluted Reaming Heads (RXEL)

System Size	Ø-Range	B	z	MB	VE	Order Number	Stock
RX 150	139.801 - 149.800	15	12	1	1	RXEL...	▲
RX 160	149.801 - 159.800	15	12	1	1	For order	▲
RX 170	159.801 - 169.800	15	12	1	1	example see	▲
RX 180	169.801 - 179.800	15	12	1	1	page 15	▲
RX 190	179.801 - 189.800	15	12	1	1		▲
RX 200	189.801 - 200.200	15	12	1	1		▲



z Kesme ağız sayısı
MB Minimum sipariş adedi
VE Paketleme adedi

z Number of teeth
MB Minimum order quantity
VE Packaging quantity

● Stokta
On stock

▲ Kısa sürede tedarik
Short-term availability

○ Talep üzerine
Availability on request

Tüm boyutlar milimetredir
All dimensions in mm

RX Large Stok Listesi

Stock List RX large



Düz Kanallı Kesici Uçlar (RXEG)

Straight Fluted Inserts (RXEG)

Ø	URMA Order Number	Stock	
139.801 - 200.200	RXEGxxx.xxxQ-A06 E612R1	▲	Malzemeye özel geometriler ve kesme verileri için bkz. sayfa 36 For Material-specific geometries and cutting data see page 36
	RXEGxxx.xxxQ-G16 E612R1	▲	
	RXEGxxx.xxxQ-C16 E612R1	▲	
	RXEGxxx.xxxQ-A06U2 E612R1	▲	
	RXEGxxx.xxxQ-G16U2 E612R1	▲	
	RXEGxxx.xxxQ-C16U2 E612R1	▲	
	RXEGxxx.xxxQ-A01U3 E614R2	▲	
	RXEGxxx.xxxQ-C11U3 E614R2	▲	
	RXEGxxx.xxxQ-C16 E621C	▲	

Sol Helis Kanallı Kesici Uçlar (RXEL)

Left Helical Fluted Inserts (RXEL)

Ø	URMA Order Number	Stock	
139.801 - 200.200	RXELxxx.xxxQ-C16 E612R1	▲	Malzemeye özel geometriler ve kesme verileri için bkz. sayfa 36 For Material-specific geometries and cutting data see page 36
	RXELxxx.xxxQ-B06 E612R1	▲	
	RXELxxx.xxxQ-C16U2 E612R1	▲	
	RXELxxx.xxxQ-B06U2 E612R1	▲	
	RXELxxx.xxxQ-C16 E621C	▲	
	RXELxxx.xxxQ-A06 E612R1	▲	

● **Stokta**
On stock

▲ **Kısa sürede tedarik**
Short-term availability

○ **Talep üzerine**
Availability on request

● **Tüm boyutlar milimetredir**
All dimensions in mm

Kesici Uç Ölçü Tanımı

Explanation of Insert Size

Delik toleransı spesifikasyonlarına sahip talepler için raybalama kafası çapı URMA standardı tarafından tanımlanır. Çapa ve tolerans aralığına bağlı olarak, raybalama kafası çapı, toplam delik tolerans aralığının %65 ila %80'i arasında olacaktır.

URMA standardı tarafından belirtilen çap, her zaman hedef boyut boyutu (Q-insert) olarak gösterilir.

Örnek 1: ISO delik toleranslı istek

Çap: **160H7**

URMA standardına göre hedef boyut çapı:

Çap: **160.033mm**

Raybalama kafası parça numarası:

RXEL160.033Q-A01 E612R1

Örnek 2: Delik toleranslı istek

Çap: **185 +0.030 -0.015mm**

URMA standardına göre hedef boyut çapı:

Çap: **185.021mm**

Raybalama kafası parça numarası:

RXEG185.021Q-C01 E614R2

Örnek 3: Raybalama kafası hedef boyutu ile istek

Çap: **193.158mm**

URMA standardına göre hedef boyut çapı:

Çap: **193.158mm**

Raybalama kafası parça numarası:

RXEL193.158Q-B06 E612R1

Raybalama kafası üretim toleransı her zaman +/- 0.003 mm'dir.

For requests with specifications of bore tolerance, the reaming head diameter is defined by the URMA standard. Depending on the diameter and the tolerance range, the reaming head diameter will be within 65% to 80% of the total bore tolerance range.

The diameter specified by the URMA standard is always shown as a target size dimension (Q-insert).

Example 1: Request with ISO bore tolerance

Diameter: **160H7**

Target size diameter according to URMA standard:

Diameter: **160.033mm**

Reaming head part number:

RXEL160.033Q-A01 E612R1

Example 2: Request with bore tolerance

Diameter: **185 +0.030 -0.015mm**

Target size diameter according URMA standard:

Diameter: **185.021mm**

Reaming head part number:

RXEG185.021Q-C01 E614R2

Example 3: Request with reaming head target size

Diameter: **193.158mm**

Target size diameter according URMA-standard:

Diameter: **193.158mm**

Reaming head part number:

RXEL193.158Q-B06 E612R1

The reaming head manufacturing tolerance is always +/-0.003mm

Sipariş Örneği

Order Example

Kesici uç çapı

Insert diameter

Hedef ölçü (Q-Uç)

Target size (Q-Insert)

Example	Sipariş Örneği
	Order example RXEG 156.020Q -A01 U3 E614R2

RXE **RX medium sistem kodlaması**
RX large
system designation

G **Kanal formu**
(G = düz; L = sol helis)
Flute form (G = straight;
L = left-hand helix)

Diameter	156.020 Hedef ölçü (mm) Insert diameter (mm)
	Q Hedef ölçü kodu Code for target size insert

A01 **Kesme geometrisi**
Cutting geometry

Option	U3 Kenar hazırlığı Edge preparation
--------	--

E6 **Kesici malzemesi**
detaylar için sayfa 31
Cutting material
For details see page 31

14R **Kaplama**
detaylar için sayfa 31
Coating
For details see page 31

2 **1 = ince kaplama**
2 = kalın kaplama
1 = thin coating
2 = thick coating

Kenar Hazırlığı (Nano Finiş)

Edge preparation (nano finishing)

U2 **Orta Kenar - Hazırlığı**
Medium
edge-preparation

U3 **Büyük Kenar - Hazırlığı**
Large
edge-preparation

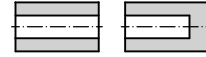
U_ **Diğer Kenar - Hazırlıkları**
Talep doğrultusunda
Other edge-preparations
on request

Ø 139.801 - 200.200 mm



Kesici Uç Tutucular

Insert Holders



System Size	Ø-Range	L	D	d	kg	Order Number "G"	Stock
RX 150 / RX 160	139.801 - 159.800	50	115	40	2.639	RXKG150 115 40 050	●
RX 170 / RX 180	159.801 - 179.800	50	135	40	3.410	RXKG170 135 40 050	●
RX 190 / RX 200	179.801 - 200.200	50	155	40	4.526	RXKG190 155 40 050	●

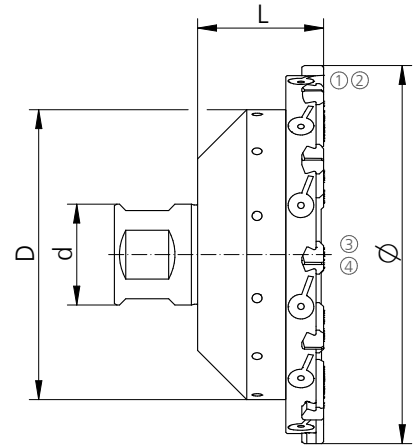
Teslimata dahil : 1 set yedek civata ve 1 Torx® anahtar (Tork anahtarını tavsiye edilir, sayfa 27)

Scope of delivery: 1 set of replacement screws and 1 hex allen key (torque wrench is recommended, page 27)

Kullanım ve montaj detayları, "sayfa 48 +50"

See pages 48 + 50 for details on assembly and handling

RXKG = açık delikler için
RXKB = kör delikler için



Yedek parçalar

Spare Parts

System Size	①	②	③	④
RX 150 / RX 160	C00 22 07	G00 02 05	C00 24 34	G00 02 16
RX 170 / RX 180	C00 22 07	G00 02 05	C00 24 34	G00 02 16
RX 190 / RX 200	C00 22 07	G00 02 05	C00 24 34	G00 02 16

● **Stokta**
On stock

▲ **Kısa sürede tedarik**
Short-term availability

○ **Talep üzerine**
Availability on request

● **Tüm boyutlar milimetredir**
All dimensions in mm

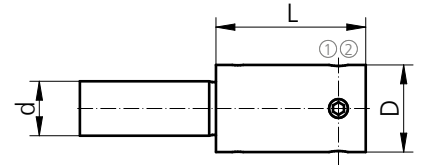
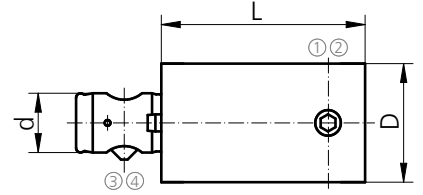
Ø 139.801 - 200.200 mm



Şaft Tutucular (kompanzasyon özellikli)

Shanks (With Integrated Compensation Device)

System Size	Ø-Range	L	D	MCM	kg	Order Number	Stock
RX 150 - RX 200	139.801 - 200.200	100	76	B 63	2.5	RXA101 76 BM63 100	●
		160	76	B 63	3.9	RXA101 76 BM63 160	●
		100	76	WD 40	2.8	RXA101 76 ZS40 100	▲
		160	76	WD 40	4.2	RXA101 76 ZS40 160	▲



Tutucu sistem tanımı

Definition of Clamping Holder

BM = URMA Beta-Modül (modüler)
WD = DIN 1835-B* weldon

BM = URMA Beta Module (modular)
WD = Weldon DIN 1835-B (on request)

URMA Eşleşme Kodlarının Kullanılması

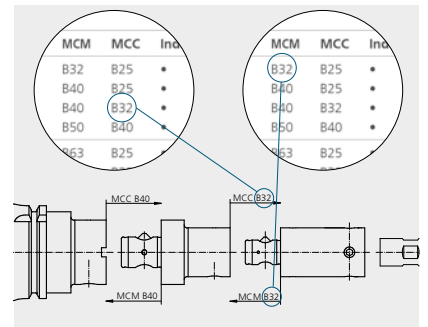
Handling of URMA Match Codes

MCC kesici kenardan başlayan kodlama
MCM tezgah tarafından başlayan kodlama

MCC Match code towards cutting edges
MCM Match code towards machine

MCC ve MCM, takımı monte etmek için farklı kupaşları gösterir kodlardır. Bu eşleşme kodları birbirleriyle uyuşmak zorundadır.

MCC and MCM show the different couplings to mount the tool components. These match codes have to correspond.



Yedek parçalar

Spare Parts

System Size	①	②	③	④
RX 150 - RX 200	C00 90 16 (4x)	G00 02 08	Z00 63 21	Z00 63 23

Ø 139.801 - 200.200 mm

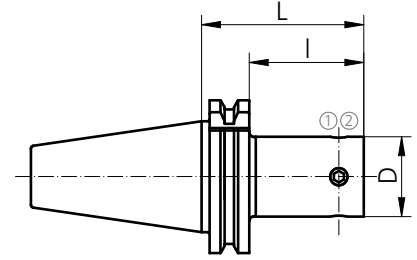


Adaptörler (kompanzasyon özellikli)

Adaptors (With Integrated Compensation Device)

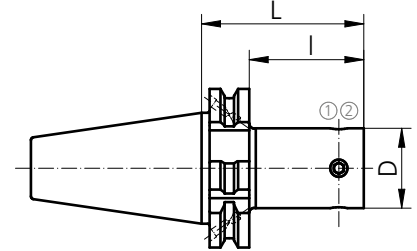
DIN 69871-AD

System Size	Size	L	I	D	kg	Order Number	Stock
RX 150 - RX 200	SK 40	95	76	76	2.2	RXAD10 40A 101 095	●
RX 150 - RX 200	SK 50	95	76	76	4.6	RXAD10 50A 101 095	●



DIN 69871-B

System Size	Size	L	I	D	kg	Order Number	Stock
RX 150 - RX 200	SK 40	95	76	76	2.2	RXAD10 40B 101 095	●
RX 150 - RX 200	SK 50	95	76	76	4.6	RXAD10 50B 101 095	●



Yedek parçalar

Spare Parts

System Size	①	②
RX 150 - RX 200	 C00 90 16 (4x)	 G00 02 08

Ø 139.801 - 200.200 mm

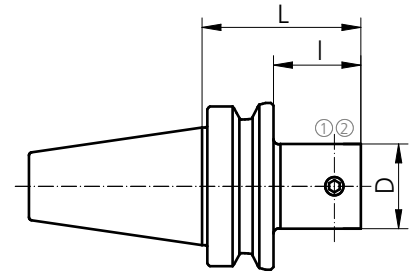


Adaptörler (kompanzasyon özellikli)

Adaptors (With Integrated Compensation Device)

MAS-BT JIS 6339-AD

System Size	Size	L	I	D	kg	Order Number	Stock
RX 150 - RX 200	BT 40	95	-	76	2.5	RXAT10 40A 101 095	●
RX 150 - RX 200	BT 50	95	57	76	5.1	RXAT10 50A 101 095	●

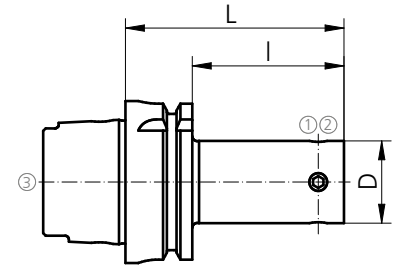


DIN 69893-HSK-A

System Size	Size	L	I	D	kg	Order Number	Stock
RX 150 - RX 200	HSK 63	120	94	76	2.4	RXAH10 63A 101 120*	●
RX 150 - RX 200	HSK 100	130	101	76	5	RXAH10 100A 101 130*	●



* Soğutma tüpü dahil değildir

* Coolant tube is not included




Yedek parçalar

Spare Parts

System Size	①	②
RX 150 - RX 200	 C00 90 16 (4x)	 G00 02 08

Soğutma sıvısı tüpü

Coolant Tube

Size	③
63	 H00 63 01
100	H00 100 01

Ø 139.801 - 200.200 mm



Beta-Modül uzatmalar

Extensions Beta Module

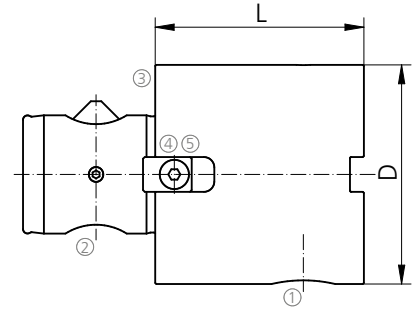
Beta-Beta uzatmalar

Extensions Beta-Beta

Beta	L	D	MCM	MCC	kg	Order Number	Stock
63	60	63	B63	B63	1.3	B13 63 63 060	●
63	125	63	B63	B63	2.9	B13 63 63 125	●
80	80	80	B80	B80	2.9	B13 80 80 080	●
80	160	80	B80	B80	6	B13 80 80 160	●
100	80	100	B100	B100	4.9	B13 100 100 080	●
100	180	100	B100	B100	10.9	B13 100 100 180	●

MCM / MCC = "Eşleştirme Kodu" Detaylar için sayfa 17 bakınız

MCM / MCC = For "match code" description see page 17



Yedek parçalar

Spare Parts

Beta	①	②	③	④	⑤
63	Z00 63 24	Z00 63 21	Z00 63 23	Z00 63 25	C00 22 05
80	Z00 80 24	Z00 80 21	Z00 80 23	Z00 80 25	C00 22 07
100	Z00 100 24	Z00 100 21	Z00 100 23	Z00 100 25	C00 22 71

● **Stokta**
On stock

▲ **Kısa sürede tedarik**
Short-term availability

○ **Talep üzerine**
Availability on request

● **Tüm boyutlar milimetredir**
All dimensions in mm

Ø 139.801 - 200.200 mm



Beta-Modül çap düşürücüler

Reducers Beta Module

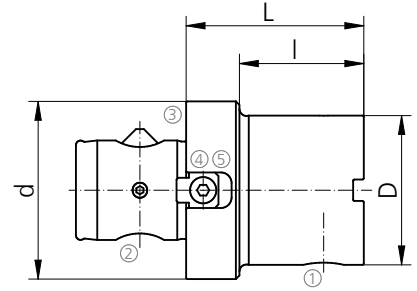
Beta-Beta çap düşürücüler

Reducers Beta-Beta

Beta 1	Beta 2	L	l	D	d	MCM	MCC	kg	Order Number	Stock
80	63	60	35	63	80	B80	B63	2.4	B12 80 63 060	●
100	63	60	35	63	100	B100	B63	3.3	B12 100 63 060	●
100	80	75	50	80	100	B100	B80	3.5	B12 100 80 075	●

MCM / MCC = "Eşleştirme Kodu" Detaylar için sayfa 17 bakınız

MCM / MCC = For "match code" description see page 17



Yedek parçalar

Spare Parts

Beta	①	②	③	④	⑤
63	Z00 63 24	Z00 63 21	Z00 63 23	Z00 63 25	C00 22 05
80	Z00 80 24	Z00 80 21	Z00 80 23	Z00 80 25	C00 22 07
100	Z00 100 24	Z00 100 21	Z00 100 23	Z00 100 25	C00 22 71

● **Stokta**
On stock

▲ **Kısa sürede tedarik**
Short-term availability

○ **Talep üzerine**
Availability on request

● **Tüm boyutlar milimetredir**
All dimensions in mm

Ø 139.801 - 200.200 mm

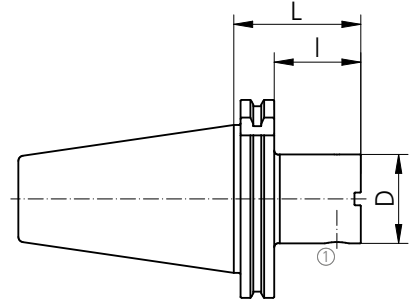


Beta-Modül sistem adaptörleri

System Holders Beta Module

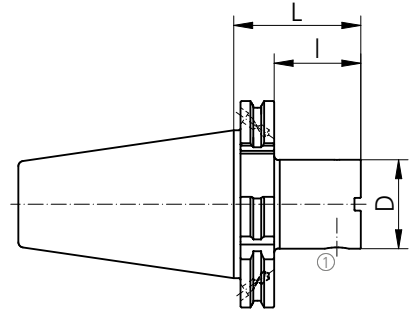
DIN 69871-AD

Size	Beta	L	I	D	MCC	kg	Order Number	Stock
SK 50	63	60	41	63	B63	3.3	BD10 50A 63 060	●
SK 50	80	70	51	80	B80	4.0	BD10 50A 80 070	●
SK 50	100	115	96	100	B100	6.9	BD10 50A 100 115	●



DIN 69871-B

Size	Beta	L	I	D	MCC	kg	Order Number	Stock
SK 50	63	60	41	63	B63	3.3	BD10 50B 63 060	●
SK 50	100	115	96	100	B100	6.9	BD10 50B 100 115	●



MCM / MCC = "Eşleştirme Kodu" Detaylar için sayfa 17 bakınız

MCM / MCC = For "match code" description see page 17

Yedek parçalar

Spare Parts

Beta	①
63	Z00 63 24
80	Z00 80 24
100	Z00 100 24

● **Stokta**
On stock

▲ **Kısa sürede tedarik**
Short-term availability

○ **Talep üzerine**
Availability on request

● **Tüm boyutlar milimetredir**
All dimensions in mm

Ø 139.801 - 200.200 mm

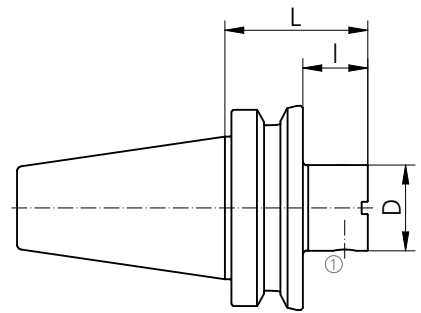


Beta-Modül sistem adaptörleri

System Holders Beta Module

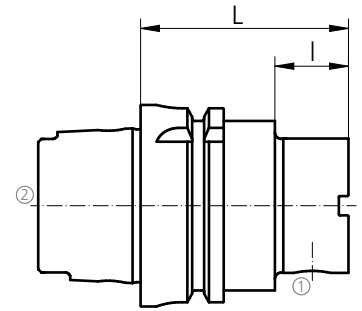
MAS-BT JIS 6339-AD

Size	Beta	L	I	D	MCC	kg	Order Number	Stock
BT 50	63	80	42	63	B63	4.3	BT10 50A 63 080	●
BT 50	80	100	62	80	B80	5.5	BT10 50A 80 100	●
BT 50	100	110	72	100	B100	7.0	BT10 50A 100 110	●



DIN 69893-HSK-A

Size	Beta	L	I	D	MCC	kg	Order Number	Stock
HSK 100	63	80	35	63	B63	4.3	BH10 100A 63 080*	●
HSK 100	80	90	45	80	B80	5.5	BH10 100A 80 090*	●
HSK 100	100	100	55	100	B100	7.0	BH10 100A 100 100*	●



* Soğutma tüpü dahil değildir

* Coolant tube is not included

MCM / MCC = For "match code" description see page 17

MCM / MCC = "Eşleştirme Kodu" Detaylar için sayfa 17 ye bakınız

Yedek parçalar

Spare Parts

Beta	①
63	Z00 63 24
80	Z00 80 24
100	Z00 100 24

Soğutma sıvısı tüpü

Coolant Tube

Size	②
63	H00 63 01
100	H00 100 01

Ø 139.801 - 200.200 mm

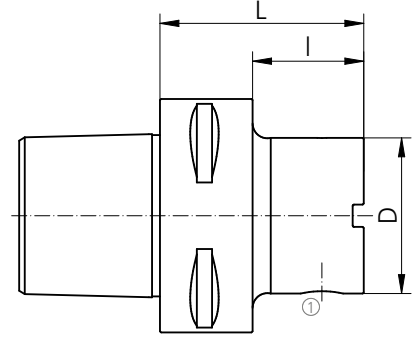


Beta-Modül sistem adaptörleri

System Holders Beta Module

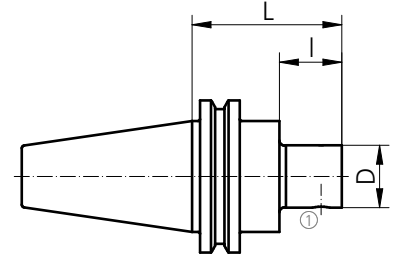
ISO 26623-1-PSC

Size	Beta	L	I	D	MCC	kg	Order Number	Stock
PSC 63	63	65	40	63	B63	1.5	C10 63 63 065	●



ASME B5.50-CAT-AD

Size	Beta	L	I	D	MCC	kg	Order Number	Stock
CAT 50	63	65	30	63	B63	3.0	C6U4-B063	○
CAT 50	80	75	40	80	B80	3.3	C6U4-B080	○
CAT 50	100	125	106	100	B100	4.5	C6U4-B100	○



MCM / MCC = "Eşleştirme Kodu" Detaylar için sayfa 17 ye bakınız

MCM / MCC = For "match code" description see page 17

Yedek parçalar

Spare Parts

Beta	①
63	Z00 63 24
80	Z00 80 24
100	Z00 100 24

● **Stokta**
On stock

▲ **Kısa sürede tedarik**
Short-term availability

○ **Talep üzerine**
Availability on request

● **Tüm boyutlar milimetredir**
All dimensions in mm

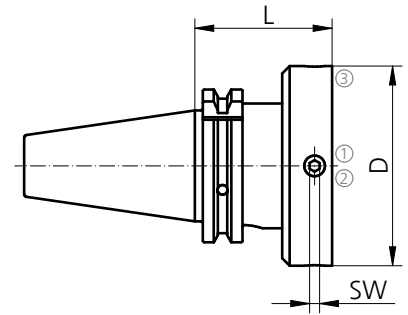


Modül Adaptör

Module Holders

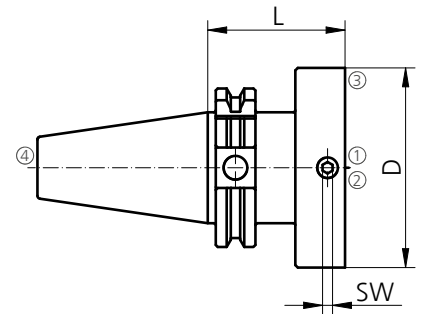
DIN 69871-AD/B

Size	L	D	SW	Order Number	Stock
SK 50	60	100	5	AD10 50AB 100 060	●
SK 50	60	117	5	AD10 50AB 117 060	●
SK 50	60	140	5	AD10 50AB 140 060	○



ASME B5.50-CAT-AD/B*

Size	L	D	SW	Order Number	Stock
CAT 50	60	100	5	AC10 50AB 100 060	●
CAT 50	60	117	5	AC10 50AB 117 060	●
CAT 50	60	140	5	AC10 50AB 140 060	○



* CAT = metrik dış çekme saplaması tutma topuzu içerir

* CAT = metrical pull-stud thread incl. retention knob

Yedek parçalar

Spare Parts

D	①	②
100	C00 03 28	G00 02 06
117	C00 03 28	G00 02 06
140	C00 03 28	G00 02 06

Aksesuarlar

Accessories

D	③	④
40		C97 40 00
50		C97 50 00
100	C00 22 15	
117	C00 22 15	
140	C00 22 64	

● **Stokta**
On stock

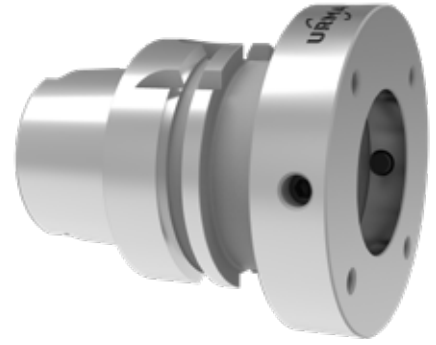
▲ **Kısa sürede tedarik**
Short-term availability

○ **Talep üzerine**
Availability on request

Tüm boyutlar milimetredir
All dimensions in mm

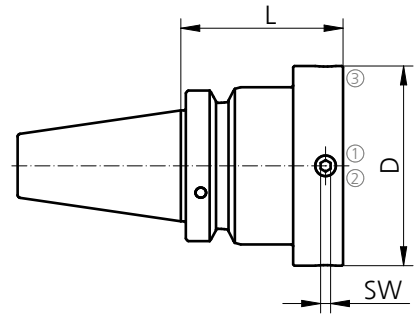
Modül Adaptör

Module Holders



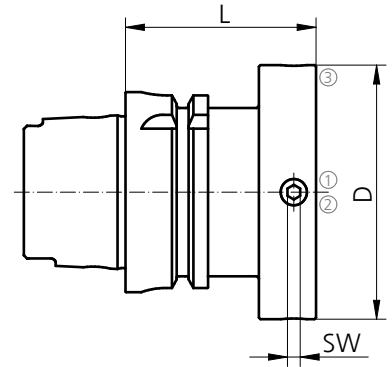
MAS-BT JIS 6339-AD/B

Size	L	D	SW	Order Number	Stock
BT 50	70	100	5	AT10 50AB 100 070	●
BT 50	80	117	5	AT10 50AB 117 080	●
BT 50	80	140	5	AT10 50AB 140 080	○



DIN 69893-HSK-A

Size	L	D	SW	Order Number	Stock
HSK 63	65	100	5	AH10 63A 100 065*	●
HSK 100	55	80	4	AH10 100A 80 055*	●
HSK 100	65	100	5	AH10 100A 100 065*	●
HSK 100	65	117	5	AH10 100A 117 065*	●
HSK 100	75	140	5	AH10 100A 140 075*	○



* Soğutma tüpü dahil değildir

* Coolant tube is not included

Yedek parçalar

Spare Parts

D	①	②
100	C00 03 28	G00 02 06
117	C00 03 28	G00 02 06
140	C00 03 28	G00 02 06

Aksesuarlar

Accessories

D	③
100	C00 22 15
117	C00 22 15
140	C00 22 64

Soğutma sıvısı tüpü

Coolant Tube

Size	④
100	H00 100 01

● Stokta
On stock

▲ Kısa sürede tedarik
Short-term availability

○ Talep üzerine
Availability on request

Tüm boyutlar milimetredir
All dimensions in mm

Aksesuarlar

Accessories

Torx® raybalama başlıkları için tork anahtar seti

Torque Wrench for Reaming Heads

System Size	Torque	Order Number	Stock
RX 150 - RX 200	4 - 20Nm	G00 40 20	▲
	40 - 200Nm	G00 40 40	▲



Altıgen soket

Hex Bit Socket

System Size	Size	Order Number	Stock
RX 150 - RX 200	SW4	G00 40 41	▲
	SW14	G00 40 42	▲



Ölçüm aleti

Measuring Device

Type	Description	Order Number	Stock
Twin T10	Elektronik ölçüm aleti, pil dahil Electronic measuring instrument, batteries incl.	04430013	○
LRC 6, AA	Pil (3 adet) Batteries (3 pieces)	04768002	○
GT 31	Prob tutucu Lever probe	03210802	○
MGA	Miknatıslı ayar kolu Magnetic articulated arm	01639022	○



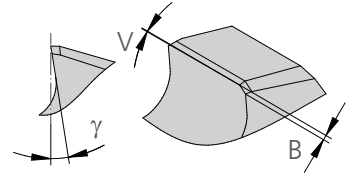
Twin T10

MGA

URMA Reaming RX Large Technology Guide

Kesici Geometriler

Cutting Geometries



vf	Geo	RXG	RXL	Bore type	fz mm	Ra μm	Zyl.	Pos	FC	MD
	A0	▲		▲ (K1-K8)*	REFERENCE VALUE					
	B0	□	▲	▲	↗	👍	👎	👎	↗	↗
	C0	▲		▲ (K1-K8)*	↗	👍	👎	👎	↗	↗
	C1	▲	▲	▲ (K1-K8)*	↗	👍	👎	👎	↗	↗
	G0	▲	□	▲ (K1-K8)*	↘	👎	👍	👍	↘	↘
	G1	▲	□	▲ (K1-K8)*	↘	=	👍	👍	↘	↘

Geo	γ	B	V	W	ap mm	Ra μm	Zyl.	FC	MD	
__ 1	STANDARD GEOMETRY (REFERENCE VALUE)									
__ 2	=	=	↘	=	=	=	=	↗	↗	=
__ 3	=	↘	=	=	↘	=	=	=	=	↘
__ 4	=	=	=	↘	=	👍	=	↘	↘	=
__ 5	=	=	=	↗	=	=	=	↗	↗	=
__ 6	=	=	↗	=	=	=	=	↘	↘	=
__ 7	↗	=	↗	=	=	=	=	↘	↘	=
__ 8	=	↗	=	=	↗	=	=	=	=	↗

Tanımlamalar ve temel formüller için sayfa 56

See page 56 for definitions and basic formulas

B = Pah boyutu	▲ = Önerilen
V = Koniklik	■ = Uygulanabilir
W = Kenar genişliği	□ = Mümkün
FC = Kesme kuvveti	↗ = Daha yüksek değer
MD = Tork	↘ = Daha düşük değer
γ = Radyal boşluk açısı	👍 = Daha iyi
vf = ilerleme yönü	👎 = Daha kötü

* Malzeme grupları için sayfa 32 e bakınız

* See page 32 for material group

B = Chamfer length	▲ = Recommended
V = Back taper	■ = Applicable
W = Margin width	□ = Possible
FC = Cutting force	↗ = Higher value
MD = Torque	↘ = Lower value
γ = Radial rake angle	👍 = Improved
vf = Feed direction	👎 = Worse

Kesici Malzemeler genel bakış

Cutting Materials Overview

SEE PAGE 32 FOR MATERIAL DETAILS

İş Malzemesi Workpiece Material	ISO Material Code	URMA Material Code	Kesici Malzeme Cutting Materials		Kaplama Coating													
			URMA Code	E6	00	01P ₋	05P ₋	07R ₋	08P ₋	12R ₋	14R ₋	17B ₋	18B ₋	10C	21C			
			HM / Carbide	Uncoated	TiN	AlTiN	TiAlN + AlCrN	AlCrN	AlCrN	AlCrN	AlCrN	TiSiN	DLC	DLC				
					Coating Thickness: 1 = Thin / 2 = Thick													
					1	2	1	1	2	1	2	1	1	2	1	1		
P	P1		▲	□	□							▲	■		□	□		
	P2		▲	□	□							▲	■		□	□		
	P3		▲	□	□							▲	■		□	□		
	P4		▲	□	□							▲	■		□	□		
	P5		▲	□	□							▲	■		□	□		
	P6		▲	□	□							▲	■		□	□		
	P7		▲	□	□							▲	■		□	□		
M	M1		▲	□	□							▲	■		□	□		
	M2		▲	□	□							▲	■		□	□		
	M3		▲	□	□							▲	■		□	□		
	M4		▲	□	□							▲	■		□	□		
	M5		▲	□	□							▲	■		□	□		
	M6		▲	□	□							▲	■		□	□		
K	K1		▲	□		□	□				□		■	▲	□	□		
	K2		▲	□		□	□				□		■	▲	□	□		
	K3		▲	□		□	□				□		■	▲	□	□		
	K4		▲	□		□	□				□		■	▲	□	□		
	K5		▲	□	□		□	□	□	□			■	▲	□	□		
	K6		▲	□	□		□	□	□	□			■	▲	□	□		
	K7		▲	□	□		□	□	□	□		▲	■	□	□	□		
	K8		▲	□	□		□	□	□	□		▲	■	□	□	□		
N	N1		▲	□													▲	
	N2		▲	□													▲	□
	N3		▲	□														▲
	N4		▲	□														▲
	N5		▲	□													□	▲
	N6		▲	□														▲
S	S1		▲	□	□							▲	■		□	□		
	S2		▲	□	□							▲	■		□	□		
	S3		▲	□	□							▲	■		□	□		
	S4		▲	□	□							▲	■		□	□		
	S11		▲	□	□							▲	■		□	□		
	S12		▲	□	□							▲	■		□	□		
	S13		▲	□	□							▲	■		□	□		
	S14		▲	□	□							▲	■		□	□		
H	H1		▲	□	□			▲				■	□		□	□		
	H2		▲	□	□			▲				■	□		□	□		
	H3		▲	□	□			▲				■	□		□	□		
SM	SM1		▲	□	□							▲	■		□	□		
	SM2		▲	□	□							▲	■		□	□		
	SM3		▲	□	□							▲	■		□	□		
O	O1		▲	□													▲	
	O2		▲	□													▲	
	O3		▲	□														▲
	O4		▲	□														▲

- ▲ = Önerilen ▲ = Recommended
 ■ = Uygulanabilir ■ = Applicable
 □ = Mümkün □ = Possible
 ○ = Talep Doğrultusunda ○ = On request

Malzeme Karşılaştırma Tablosu

Material Comparison Table

Çelik Steel

ISO	UMC	Tanım	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	Örnek Example
P	P1	Serbest kesim çelikleri	Free-cutting steels	< 600	< 180	1600	0.18	1.0715	11SMn30
	P2	Düşük alaşımlı ferritik çelikler C < 0,25%, genel yapısal kaynak çelikleri	Low-alloy ferritic steels, C < 0.25%wt, low-alloy general structural steels	< 700	< 210	1700	0.18	1.0038	S235JRG2
	P3	Ferritik / perlitik çelikler C < 0,25%, genel yapısal kaynak çelikleri	Ferritic and ferritic / pearlitic steels, C < 0.25%wt, weldable general structural steels, case-hardening steels	< 800	< 240	1800	0.21	1.7131	16MnCr5
	P4	Isıl işlemlili çelikler yapı çelikleri C > 0,25%	Heat-treatable steels, construction steels C > 0.25%	< 1000	< 300	1800	0.23	1.1191 1.7225	C45E 42CrMo4
	P5	Sertleştirilmiş çelikler C > 0,67%, yay ve rulman çelikleri	Through-hardening steels, C > 0.67%wt, spring and bearing steels	700 - 1100	210 - 325	1700	0.27	1.1274 1.2067	C100S 100Cr6
	P6	Alaşımlı takım çelikleri	Alloyed tool steels	700 - 1200	210 - 350	2200	0.25	1.2601	X165CrMoV12
	P7	Yüksek alaşımlı çelikler yüksek hız çelikleri (HSS)	High alloyed tool steels, high speed steels (HSS)	> 900	> 260	2300	0.25	1.2083 1.2344	X42Cr13 X40CrMoV5-1

Dupleks ve östenitik paslanmaz çelik

Stainless Austenitic Steel and Duplex

ISO	UMC	Tanım	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	Örnek Example
M	M1	Ferritik & Martensitik paslanmaz çelikler	Ferritic & martensitic stainless steels	500 - 900	150 - 260	1700	0.22	1.4005 1.4512 1.4021	X12CrS13 X5CrTi12 X20Cr13
	M2	İşlemesi çok zor olmayan serbest – kesim östenitik paslanmaz çelikler	Free-cutting austenitic stainless steels, less difficult machinable	500 - 900	150 - 260	1700	0.22	1.4305	X8CrNiS18 9
	M3	Düşük alaşımlı östenitik paslanmaz çelikler	Low-alloy austenitic stainless steels			2000	0.2	1.4301	X5CrNi18 10
	M4	Orta alaşımlı östenitik paslanmaz çelikler	Alloyed austenitic stainless steels			2100	0.2	1.4435	X2CrNiMo18 14 3
	M5	Yüksek alaşımlı paslanmaz çelikler (östenitik&dupleks)	High-alloy austenitic and duplex stainless steels			2300	0.2	1.4462 1.4548	X2CrNiMoN22 5 3 X5CrNiCuNb17 4 4
	M6	Östenitik, dupleks ve süper dupleks, işlemesi zor paslanmaz çelikler	Austenite, duplex and super duplex, very difficult to machine	700 - 1000	210 - 300	2300	0.2	1.4410	X2CrNiMoN25 7 4

Malzeme Karşılaştırma Tablosu

Material Comparison Table

Döküm

Cast Irons

ISO	UMC	Tanım	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	Örnek Example
K	K1	Gri döküm demir	Grey cast irons	< 300	< 90	1100	0.25	0.6025	EN-GJL-250 (GG25)
	K2	Gri döküm demir	Grey cast irons	> 300	> 90	1300	0.27	0.6035	EN-GJL-350 (GG35)
	K3	Nodüler dökme demir Dövme dökme demir	Ductil cast irons, Malleable cast irons	< 500	< 150	900	0.25	0.7040	EN-GJS-400-15 (GGG40)
	K4	Nodüler dökme demir Dövme dökme demir	Ductil cast irons, Malleable cast irons	< 800	< 210	1400	0.28	0.7060	EN-GJS-600-3 (GGG60)
	K5	östemperlenmiş sünek dökme demir (ADI)	Austempered ductile irons	< 1100	< 325	1500	0.32		EN-GJS-1000-5
	K6	Kompakt Grafit dökme demir	Compactet graphite irons	300 - 500	90 - 150				EN-GJV-400
	K7	Östenitik lamelli dökme demir	Austenitic lamellar cast irons	< 400				0.6655	GGL-NiCuCr 15 6 2
	K8	Östenitik, Sfero, grafit ve sünek dökme demir	Austenitic spheroidal graphite and ductil iron	300 - 600	90 - 180			0.7673	EN-GJSA- XNiMn23-4

Demir İçermeyen Metaller

Non-Ferrous Metals

ISO	UMC	Tanım	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	Örnek Example
N	N1	Dövme alaşımlı alüminyum Si < 2%	Aluminum wrought alloy with Si < 2%	< 300	< 150	600	0.23	3.3535	AlMg3
	N2	Alüminyum alaşımları Si < 7%	Aluminum alloys, Si < 7%	< 400	< 120	700	0.25	3.2152	AlSi6Cu4
	N3	Alüminyum alaşımları 8% < Si < 15% ve magnezyum alaşımları	Aluminum alloys 8% < Si < 15% and alloys Magnesium	< 400	< 120	700	0.25	3.2163	AlSi9Cu3 AlSi12
	N4	Alüminyum alaşımları Si > 15%	Aluminum alloys, Si > 15%	> 400	> 120	800	0.25		AlSi17Cu4Mg
	N5	Bakır alaşımları kolay işlenebilir	Copper alloys, good machinability	< 700	< 210	800	0.2	2.0401 2.1090	CuZn39Pb3 CuSn7Zn4Pb7-C
	N6	Bakır alaşımları işleme daha zor alaşımlar	Copper alloys, more difficult machinability	> 500	> 150	1000	0.25	2.0966	CuAl10Ni5Fe4

Malzeme Karşılaştırma Tablosu

Material Comparison Table

Süper alaşımlar

Superalloys

ISO	UMC	Tanım	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	Örnek Example
S	S1	Demir bazlı süperalaşımlar	Iron based superalloys	< 800	< 240	2400	0.23	2.4858	NiCr21Mo (Alloy 825)
	S2	Demir bazlı süperalaşımlar	Iron based superalloys	> 800	> 240	2600	0.23	1.4980	X6NiCrTi-MoVB25-15-2 (Alloy A-286)
	S3	Kobalt bazlı süperalaşımlar	Cobalt based superalloys	600 - 1200		2800	0.23	2.4979	CoCr28MoNi (Stellite 21)
	S4	Nikel bazlı süperalaşımlar	Nickel based superalloys	700 - 1500		3100	0.23	2.4668	NiCr19NbMo (Inconel 718)

Titanyum Alaşımları

Titanium Alloys

ISO	UMC	Tanım	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	Örnek Example
S	S11	Düşük alaşımlı titanyum (α)	Titanium, low alloyed (α)	< 800	< 240	1300	0.22	3.7025 3.7035 3.7055	Ti1 (Grade 1) Ti2 (Grade 2) Ti3 (Grade 3)
	S12	Orta alaşımlı titanyum (nahe $\alpha + \beta$)	Titanium, medium alloyed (close to $\alpha + \beta$)	< 1100	< 325	1500	0.22		Ti6Al2Sn 4Zr2Mo0.1Si
	S13	Yüksek alaşımlı titanyum ($\alpha + \beta$)	Titanium, high alloyed ($\alpha + \beta$)	900 - 1200	265 - 355	1500	0.22	3.7165	TiAl6V4 (Grade 5)
	S14	Yüksek alaşımlı titanyum (β)	Titanium, high alloyed (β)	> 1200	> 355	1700	0.22		Ti10V2Fe3Al Ti5Al5Mo5V3Cr

Sertleştirilmiş Çelikler

Hardened Steels

ISO	UMC	Tanım	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	Örnek Example
H	H1	Sert kabuklu çelikler, ısıt işlemleri çelikler, rulman çelikleri, takım çelikleri	Case hardening steels, heat-treatable steels, bearing steels, tool steels	1450 - 1800	< 520	3300	0.22		HRC 45 - 52
	H2	Sert kabuklu çelikler, ısıt işlemleri çelikler, rulman çelikleri, takım çelikleri	Case hardening steels, heat-treatable steels, bearing steels, tool steels	1800 - 2100	520 - 600	4100	0.22		HRC 53 - 57
	H3	Sert kabuklu çelikler, ısıt işlemleri çelikler, rulman çelikleri, takım çelikleri, yüksek hız çelikleri (HSS)	Case hardening steels, heat-treatable steels, bearing steels, tool steels, high-speed steels	> 2100	> 600	4700	0.22		HRC 58 - 62

Malzeme Karşılaştırma Tablosu

Material Comparison Table

Toz-Metal Teknolojili Malzemeler

Powder Metallurgical Materials

ISO	UMC	Tanım	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	Örnek Example
SM	SM1	Düşük alaşımlı sinterli malzemeler	Low alloyed sintered materials	200 - 450	< 135				Sint-D11 / C11
	SM2	Orta alaşımlı sinterli malzemeler Ni < 7%	Medium alloyed sintered materials with Ni < 7%	400 - 600	120 - 180				Sint-D31 / C31
	SM3	Yüksek alaşımlı sinterli malzemeler Cr und Ni > 7%	High alloyed sintered materials with Cr and Ni > 7%	400 - 600	120 - 180				Sint-D40 / C40 (AISI 316)

Kompozit Malzemeler

Composite Materials

ISO	UMC	Tanım	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	Örnek Example
O	O1	Termoplastik polimerler	Thermoplastic polymers			150	0.26		Polyamid 6 (PA 6) Polyoxymethylen (POM)
	O2	Termoset plastikler	Thermosetting plastics			150	0.26		Epoxyharze (EP)
	O3	cam elyafı ile güçlendirilmiş plastik < 50%	Reinforced plastics with < 50% glass fibers			300	0.26		Polyamid 6 mit 30% GF (PA 6 GF30)
	O4	Cam elyafı, karbon fiber ve aramid takviyeli plastikler	Glass fiber-, carbon fiber- and aramid reinforced plastics			300	0.26		GFK CFK

Kesme Verisi RX large

Cutting Data RX large



Açık Delik
Through Bore



ISO	UMC	AC	Type	Geometry	Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200
P	P1	1	RXEL	B06	E612R1	●	120-150-180	0.18-0.25-0.35	0.08-0.10-0.20
		2	RXEL	B06	E612R1	●	100-130-150	0.18-0.22-0.30	
		3	RXEL	C16	E612R1	●	70-100-130	0.12-0.16-0.20	
	P2	1	RXEL	B06	E612R1	●	120-150-180	0.18-0.25-0.35	0.08-0.10-0.20
		2	RXEL	B06	E612R1	●	100-130-150	0.18-0.22-0.30	
		3	RXEL	C16	E612R1	●	70-100-130	0.12-0.16-0.20	
	P3	1	RXEL	B06	E612R1	●	110-140-160	0.18-0.25-0.35	0.08-0.10-0.20
		2	RXEL	B06	E612R1	●	90-120-140	0.18-0.22-0.30	
		3	RXEL	C16	E612R1	●	70-100-120	0.12-0.16-0.20	
	P4	1	RXEL	B06	E612R1	●	110-140-160	0.18-0.22-0.30	0.08-0.10-0.15
		2	RXEL	B06	E612R1	●	90-120-140	0.16-0.20-0.28	
		3	RXEL	C16	E612R1	●	70-100-120	0.10-0.14-0.18	
	P5	1	RXEL	B06	E612R1	●	100-130-150	0.15-0.20-0.25	0.08-0.10-0.15
		2	RXEL	C16	E612R1	●	80-110-130	0.15-0.18-0.22	
		3	RXEL	A06	E612R1	●	70-100-120	0.10-0.14-0.18	
	P6	1	RXEL	C16	E612R1	●	50-80-100	0.10-0.14-0.16	0.05-0.10-0.12
		2	RXEL	A06	E612R1	●	40-70-90	0.08-0.10-0.12	
		3	RXEL	A06	E612R1	●	25-50-70	0.06-0.08-0.12	
	P7	1	RXEL	A06	E612R1	●	15-25-40	0.08-0.10-0.12	0.05-0.10-0.12
		2	RXEL	A06	E612R1	●	15-20-30	0.06-0.08-0.12	
		3	RXEL	A06	E612R1	●	15-20-30	0.06-0.08-0.10	
M	M1	1	RXEL	B06	E612R1	●	50-80-100	0.15-0.20-0.25	0.08-0.10-0.15
		2	RXEL	B06	E612R1	●	40-70-90	0.15-0.18-0.22	
		3	RXEL	C16	E612R1	●	25-50-70	0.12-0.14-0.18	
	M2	1	RXEL	B06	E612R1	●	50-80-100	0.15-0.20-0.25	0.05-0.10-0.12
		2	RXEL	B06	E612R1	●	40-70-90	0.15-0.18-0.22	
		3	RXEL	C16	E612R1	●	25-50-70	0.12-0.14-0.18	
	M3	1	RXEL	B06	E612R1	●	40-60-80	0.10-0.14-0.16	0.05-0.10-0.12
		2	RXEL	B06	E612R1	●	40-60-80	0.08-0.10-0.12	
		3	RXEL	C16	E612R1	●	25-40-70	0.06-0.08-0.12	
	M4	1	RXEL	C16	E612R1	●	25-40-60	0.08-0.10-0.14	0.05-0.10-0.12
		2	RXEL	A06	E612R1	●	20-35-55	0.08-0.10-0.14	
		3	RXEL	A06	E612R1	●	20-30-50	0.08-0.10-0.14	
	M5	1	RXEL	A06	E612R1	●	15-25-35	0.05-0.08-0.12	0.05-0.10-0.12
		2	RXEL	A06	E612R1	●	15-25-35	0.05-0.08-0.12	
		3	RXEL	A06	E612R1	●	10-18-30	0.05-0.08-0.12	
	M6	1	RXEL	A06	E612R1	●	15-20-30	0.05-0.08-0.12	0.05-0.10-0.12
		2	RXEL	A06	E612R1	●	15-20-30	0.05-0.08-0.12	
		3	RXEL	A06	E612R1	●	10-18-30	0.05-0.08-0.12	



AC Uygulama Koşulları

1 En Uygun Koşullar

- Kararlı Bağlama, Tezgah ve/veya İş Parçası
- Takım projeksiyon boyu < 3xD
- Garantilenmiş en iyi talaş boşaltma
- İçten su verme basıncı > 20 bar

2 Uygun Koşullar

- Hafifçe kararsız bağlama, tezgah ve/veya iş parçası
- Takım projeksiyon boyu < 6xD
- Uygun olmayan talaş boşaltma
- İçten soğutma var

3 Zor koşullar

- Kararsız bağlama, tezgah ve/veya iş parçası
- Takım projeksiyon boyu < 8xD
- Kritik talaş boşaltma
- İçten soğutma var



AC Application Conditions

1 Optimal conditions

- Stable fixture, machine and/or workpiece
- Tool projection length < 3xD
- Optimal chip removal guaranteed
- Internal coolant supply > 20 bar

2 Suboptimal conditions

- Slightly unstable fixture, machine and/or workpiece
- Tool projection length < 6xD
- No optimal chip removal guaranteed
- Internal coolant supply available

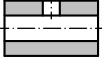
3 Difficult conditions

- Unstable fixture, machine and/or workpiece
- Tool projection length < 8xD
- Critical chip evacuation
- Internal coolant supply available

● **Stokta**
On stock

▲ **Kısa sürede tedarik**
Short-term availability

SEE PAGE 32 FOR MATERIAL DETAILS



Darbeli Açık Delik
Through Bore With Interruption



AC	Type	Geometry	Grade	Stock	Vc	fz Full Cut	fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200
4	RXEL	C16	E612R1	●	120-150-180	0.16-0.20-0.25	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.08-0.10-0.20
5	RXEL	C16U2	E612R1	●	100-130-150	0.12-0.18-0.22		
6	RXEG	A06U2	E612R1	●	70-100-130	0.10-0.15-0.20		
4	RXEL	C16	E612R1	●	120-150-180	0.16-0.20-0.25		0.08-0.10-0.20
5	RXEL	C16U2	E612R1	●	100-130-150	0.12-0.18-0.22		
6	RXEG	A06U2	E612R1	●	70-100-130	0.10-0.15-0.20		
4	RXEL	C16	E612R1	●	110-140-160	0.16-0.20-0.25		0.08-0.10-0.20
5	RXEL	C16U2	E612R1	●	90-120-140	0.12-0.18-0.22		
6	RXEG	A06U2	E612R1	●	70-100-120	0.10-0.15-0.20		
4	RXEL	C16	E612R1	●	110-140-160	0.15-0.18-0.22		0.08-0.10-0.15
5	RXEL	C16U2	E612R1	●	90-120-140	0.12-0.16-0.22		
6	RXEG	A06U2	E612R1	●	70-100-120	0.10-0.12-0.18		
4	RXEL	A06	E612R1	●	100-130-150	0.15-0.18-0.22		0.08-0.10-0.15
5	RXEL	A06	E612R1	●	80-110-130	0.12-0.16-0.22		
6	RXEG	A06U2	E612R1	●	70-100-120	0.10-0.12-0.18		
4	RXEL	A06	E612R1	●	50-80-100	0.08-0.10-0.12		0.05-0.10-0.12
5	RXEL	A06	E612R1	●	40-70-90	0.06-0.08-0.12		
6	RXEG	A06U2	E612R1	●	25-50-70	0.04-0.08-0.10		
4	RXEL	A06	E612R1	●	15-25-40	0.06-0.08-0.12	0.05-0.10-0.12	
5	RXEL	A06	E612R1	●	15-20-30	0.06-0.08-0.12		
6	RXEG	A06U2	E612R1	●	15-20-30	0.04-0.08-0.10		
4	RXEL	C16	E612R1	●	50-80-100	0.14-0.16-0.22	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.08-0.10-0.15
5	RXEL	A06	E612R1	●	40-70-90	0.12-0.15-0.20		
6	RXEG	A06	E612R1	●	25-50-70	0.10-0.14-0.18		
4	RXEL	C16	E612R1	●	50-80-100	0.14-0.16-0.22		0.05-0.10-0.12
5	RXEL	A06	E612R1	●	40-70-90	0.12-0.15-0.20		
6	RXEG	A06	E612R1	●	25-50-70	0.10-0.14-0.18		
4	RXEL	C16	E612R1	●	40-60-80	0.10-0.12-0.16		0.05-0.10-0.12
5	RXEL	A06	E612R1	●	40-60-80	0.08-0.10-0.12		
6	RXEG	A06	E612R1	●	25-40-70	0.06-0.08-0.12		
4	RXEL	A06	E612R1	●	25-40-60	0.08-0.10-0.14		0.05-0.10-0.12
5	RXEL	A06	E612R1	●	20-35-55	0.08-0.10-0.14		
6	RXEG	A06	E612R1	●	20-30-50	0.08-0.10-0.14		
4	RXEL	A06	E612R1	●	15-25-35	0.08-0.10-0.12		0.05-0.10-0.12
5	RXEL	A06	E612R1	●	15-25-35	0.05-0.08-0.12		
6	RXEG	A06	E612R1	●	10-18-30	0.05-0.08-0.12		
4	RXEL	A06	E612R1	●	15-20-30	0.08-0.10-0.12		0.05-0.10-0.12
5	RXEL	A06	E612R1	●	15-20-30	0.05-0.08-0.12		
6	RXEG	A06	E612R1	●	10-18-30	0.05-0.08-0.12		



AC Uygulama Koşulları

- 4 En Uygun Koşullar
- Kararlı Bağlama, Tezgah ve/veya İş Parçası
 - Takım projeksiyon boyu < 3xD
 - Garantilenmiş en iyi talaş boşaltma
 - Hafifçe simetrik ve asimmetrik kesinti (< % 10)
 - İçten su verme basıncı > 20 bar

- 5 Uygun Koşullar
- Hafifçe kararsız bağla ma, tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 6xD
 - Uygun olmayan talaş boşaltma
 - Orta derece simetrik kesintiler (< 30%)
 - İçten soğutma var

- 6 Zor koşullar
- Kararsız bağlama, tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 8xD
 - Uygun olmayan talaş boşaltma
 - Orta derecede simetrik kesintiler (< 30%)
 - İçten soğutma var



AC Application Conditions

- 4 Optimal conditions
- Stable fixture, machine and/or workpiece
 - Tool projection length < 3xD
 - Optimal chip removal guaranteed
 - Slightly symmetrical and asymmetrical interruption (< 10%)

- 5 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
 - Tool projection length < 6xD
 - No optimal chip removal guaranteed
 - Medium symmetrical interruptions (< 30%)

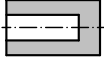
- 6 Difficult conditions
- Unstable fixture, machine and/or workpiece
 - Tool projection length < 8xD
 - No optimal chip removal guaranteed
 - Medium symmetrical interruptions (< 30%)

● **Stokta**
On stock

▲ **Kısa sürede tedarik**
Short-term availability

Kesme Verisi RX large

Cutting Data RX large



Kör delik
Blind Hole



ISO	UMC	AC	Type	Geometry	Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200	
P	P1	1	RXEG	A06	E612R1	●	120-150-180	0.16-0.20-0.25	0.08-0.10-0.15	
		2	RXEG	A06	E612R1	●	100-130-150	0.12-0.18-0.22		
		3	RXEG	G16	E612R1	●	70-100-130	0.08-0.12-0.18		
	P2	1	RXEG	A06	E612R1	●	120-150-180	0.16-0.20-0.25	0.08-0.10-0.15	
		2	RXEG	A06	E612R1	●	100-130-150	0.12-0.18-0.22		
		3	RXEG	G16	E612R1	●	70-100-130	0.08-0.12-0.18		
	P3	1	RXEG	A06	E612R1	●	110-140-160	0.16-0.20-0.25	0.08-0.10-0.15	
		2	RXEG	A06	E612R1	●	90-120-140	0.12-0.18-0.22		
		3	RXEG	G16	E612R1	●	70-100-120	0.08-0.12-0.18		
	P4	1	RXEG	A06	E612R1	●	110-140-160	0.15-0.18-0.22	0.08-0.10-0.15	
		2	RXEG	A06	E612R1	●	90-120-140	0.12-0.16-0.22		
		3	RXEG	G16	E612R1	●	70-100-120	0.08-0.12-0.18		
	P5	1	RXEG	A06	E612R1	●	100-120-140	0.14-0.18-0.20	0.05-0.10-0.12	
		2	RXEG	G16	E612R1	●	80-110-130	0.12-0.16-0.20		
		3	RXEG	G16	E612R1	●	70-100-120	0.08-0.12-0.18		
	P6	1	RXEG	A06	E612R1	●	50-80-100	0.10-0.15-0.18	0.05-0.10-0.12	
		2	RXEG	G16	E612R1	●	40-70-90	0.08-0.12-0.16		
		3	RXEG	G16	E612R1	●	25-50-70	0.06-0.08-0.12		
	P7	1	RXEG	A06	E612R1	●	15-25-40	0.08-0.12-0.16	0.05-0.10-0.12	
		2	RXEG	G16	E612R1	●	15-20-30	0.06-0.08-0.12		
		3	RXEG	G16	E612R1	●	15-20-30	0.06-0.08-0.12		
	M	M1	1	RXEG	A06	E612R1	●	50-80-100	0.12-0.15-0.20	0.08-0.10-0.15
			2	RXEG	A06	E612R1	●	40-70-90	0.12-0.15-0.20	
			3	RXEG	G16	E612R1	●	25-50-70	0.10-0.14-0.18	
M2		1	RXEG	A06	E612R1	●	50-80-100	0.12-0.15-0.20	0.05-0.10-0.12	
		2	RXEG	A06	E612R1	●	40-70-90	0.12-0.15-0.20		
		3	RXEG	G16	E612R1	●	25-50-70	0.10-0.14-0.18		
M3		1	RXEG	A06	E612R1	●	40-60-80	0.10-0.12-0.16	0.05-0.10-0.12	
		2	RXEG	A06	E612R1	●	40-60-80	0.08-0.10-0.12		
		3	RXEG	G16	E612R1	●	25-40-70	0.06-0.08-0.12		
M4		1	RXEG	A06	E612R1	●	25-40-60	0.08-0.10-0.14	0.05-0.10-0.12	
		2	RXEG	A06	E612R1	●	20-35-55	0.08-0.10-0.14		
		3	RXEG	G16	E612R1	●	20-30-50	0.08-0.10-0.14		
M5		1	RXEG	A06	E612R1	●	15-25-35	0.05-0.08-0.12	0.05-0.10-0.12	
		2	RXEG	A06	E612R1	●	15-25-35	0.05-0.08-0.12		
		3	RXEG	G16	E612R1	●	15-25-35	0.05-0.08-0.12		
M6		1	RXEG	A06	E612R1	●	15-20-30	0.05-0.08-0.12	0.05-0.10-0.12	
		2	RXEG	A06	E612R1	●	15-20-30	0.05-0.08-0.12		
		3	RXEG	G16	E612R1	●	15-20-30	0.05-0.08-0.12		



AC Uygulama Koşulları

- En Uygun Koşullar
 - Kararlı Bağlama, Tezgah ve/veya İş Parçası
 - Takım projeksiyon boyu < 3xD
 - Garantilenmiş en iyi talaş boşaltma
 - İçten su verme basıncı > 20 bar

- Uygun Koşullar
 - Hafifçe kararsız bağlama, tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 6xD
 - Uygun olmayan talaş boşaltma
 - İçten soğutma var

- Zor koşullar
 - Kararsız bağlama, tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 8xD
 - Kritik talaş boşaltma
 - İçten soğutma var



AC Application Conditions

- Optimal conditions
 - Stable fixture, machine and/or workpiece
 - Tool projection length < 3xD
 - Optimal chip removal guaranteed
 - Internal coolant supply > 20 bar

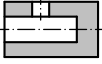
- Suboptimal conditions
 - Slightly unstable fixture, machine and/or workpiece
 - Tool projection length < 6xD
 - No optimal chip removal guaranteed
 - Internal coolant supply available

- Difficult conditions
 - Unstable fixture, machine and/or workpiece
 - Tool projection length < 8xD
 - Critical chip evacuation
 - Internal coolant supply available

● **Stokta**
On stock

▲ **Kısa sürede tedarik**
Short-term availability

SEE PAGE 32 FOR MATERIAL DETAILS



Darbeli Kör Delik
Blind Hole With Interruption



AC	Type	Geometry	Grade	Stock	Vc	fz Full Cut	fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200
4	RXEG	A06	E612R1	●	120-150-180	0.16-0.20-0.25	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.08-0.10-0.15
5	RXEG	A06U2	E612R1	●	100-130-150	0.12-0.18-0.22		
6	RXEG	G16U2	E612R1	●	70-100-130	0.08-0.12-0.18		
4	RXEG	A06	E612R1	●	120-150-180	0.16-0.20-0.25		0.08-0.10-0.15
5	RXEG	A06U2	E612R1	●	100-130-150	0.12-0.18-0.22		
6	RXEG	G16U2	E612R1	●	70-100-130	0.08-0.12-0.18		
4	RXEG	A06	E612R1	●	110-140-160	0.16-0.20-0.25		0.08-0.10-0.15
5	RXEG	A06U2	E612R1	●	90-120-140	0.12-0.18-0.22		
6	RXEG	G16U2	E612R1	●	70-100-120	0.08-0.12-0.18		
4	RXEG	A06	E612R1	●	110-140-160	0.15-0.18-0.22		0.08-0.10-0.15
5	RXEG	A06U2	E612R1	●	90-120-140	0.12-0.16-0.22		
6	RXEG	G16U2	E612R1	●	70-100-120	0.08-0.12-0.18		
4	RXEG	A06	E612R1	●	100-120-140	0.14-0.18-0.20		0.05-0.10-0.12
5	RXEG	G16U2	E612R1	●	80-110-130	0.12-0.16-0.20		
6	RXEG	G16U2	E612R1	●	70-100-120	0.08-0.12-0.18		
4	RXEG	A06U2	E612R1	●	50-80-100	0.10-0.15-0.18		0.05-0.10-0.12
5	RXEG	G16U2	E612R1	●	40-70-90	0.08-0.12-0.16		
6	RXEG	G16U2	E612R1	●	25-50-70	0.06-0.08-0.12		
4	RXEG	A06U2	E612R1	●	15-25-40	0.08-0.12-0.16	0.05-0.10-0.12	
5	RXEG	G16U2	E612R1	●	15-20-30	0.06-0.08-0.12		
6	RXEG	G16U2	E612R1	●	15-20-30	0.06-0.08-0.12		
4	RXEG	A06	E612R1	●	50-80-100	0.12-0.15-0.20	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.08-0.10-0.15
5	RXEG	A06	E612R1	●	40-70-90	0.10-0.14-0.18		
6	RXEG	G16	E612R1	●	25-50-70	0.10-0.14-0.18		
4	RXEG	A06	E612R1	●	50-80-100	0.12-0.15-0.20		0.05-0.10-0.12
5	RXEG	A06	E612R1	●	40-70-90	0.10-0.14-0.18		
6	RXEG	G16	E612R1	●	25-50-70	0.10-0.14-0.18		
4	RXEG	A06	E612R1	●	40-60-80	0.10-0.12-0.16		0.05-0.10-0.12
5	RXEG	A06	E612R1	●	40-60-80	0.06-0.08-0.12		
6	RXEG	G16	E612R1	●	25-40-70	0.06-0.08-0.12		
4	RXEG	A06	E612R1	●	25-40-60	0.08-0.10-0.14		0.05-0.10-0.12
5	RXEG	G16	E612R1	●	20-35-55	0.08-0.10-0.14		
6	RXEG	G16	E612R1	●	20-30-50	0.08-0.10-0.14		
4	RXEG	A06	E612R1	●	15-25-35	0.05-0.08-0.12		0.05-0.10-0.12
5	RXEG	G16	E612R1	●	15-25-35	0.05-0.08-0.12		
6	RXEG	G16	E612R1	●	15-25-35	0.05-0.08-0.12		
4	RXEG	A06	E612R1	●	15-20-30	0.05-0.08-0.12		0.05-0.10-0.12
5	RXEG	G16	E612R1	●	15-20-30	0.05-0.08-0.12		
6	RXEG	G16	E612R1	●	15-20-30	0.05-0.08-0.12		



AC Uygulama Koşulları

- 4 En Uygun Koşullar
- Kararlı Bağlama, Tezgah ve/veya İş Parçası
 - Takım projeksiyon boyu < 5xD
 - Garantilenmiş en iyi talaş boşaltma
 - Hafifçe simetrik ve asimetrik kesinti (< % 10)
 - İçten su verme basıncı > 20 bar

- 5 Uygun Koşullar
- Hafifçe kararsız bağlama, tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 7xD
 - Uygun olmayan talaş boşaltma
 - Orta derecede simetrik kesintiler (< 30%)
 - İçten soğutma var

- 6 Zor koşullar
- Kararsız bağlama, tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 9xD
 - Uygun olmayan talaş boşaltma
 - Orta derecede simetrik kesintiler (< 30%)
 - İçten soğutma var



AC Application Conditions

- 4 Optimal conditions
- Stable fixture, machine and/or workpiece
 - Tool projection length < 5xD
 - Optimal chip removal guaranteed
 - Slightly symmetrical and asymmetrical interruption (< 10%)

- 5 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
 - Tool projection length < 7xD
 - No optimal chip removal guaranteed
 - Medium symmetrical interruptions (< 30%)

- 6 Difficult conditions
- Unstable fixture, machine and/or workpiece
 - Tool projection length < 9xD
 - No optimal chip removal guaranteed
 - Medium symmetrical interruptions (< 30%)

● **Stokta**
On stock

▲ **Kısa sürede tedarik**
Short-term availability

Kesme Verisi RX large

Cutting Data RX large



Açık Delik
Through Bore



ISO	UMC	AC	Type	Geometry	Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200
K	K1	1	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20	
	K2	1	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20	
	K3	1	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20	
	K4	1	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20	
	K5	1	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20	
		3	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18	
	K6	1	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20	
		3	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18	
	K7	1	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16	0.05-0.10-0.15
		2	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14	
		3	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12	
	K8	1	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16	0.05-0.10-0.15
		2	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14	
		3	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12	

N	N1	1	RXEL	C16	E621C	●	180-250-320	0.18-0.25-0.35	0.08-0.10-0.15
		2	RXEL	C16	E621C	●	160-220-280	0.18-0.22-0.30	
		3	RXEL	C16	E621C	●	140-180-220	0.15-0.18-0.22	
	N2	1	RXEL	C16	E621C	●	180-250-320	0.18-0.25-0.35	0.08-0.10-0.15
		2	RXEL	C16	E621C	●	160-220-280	0.18-0.22-0.30	
		3	RXEL	C16	E621C	●	140-180-220	0.15-0.18-0.22	
	N3	1	RXEL	C16	E621C	●	180-250-320	0.18-0.25-0.35	0.05-0.10-0.15
		2	RXEL	C16	E621C	●	160-220-280	0.18-0.22-0.30	
		3	RXEL	C16	E621C	●	140-180-220	0.12-0.16-0.20	
	N4	1	RXEL	C16	E621C	●	140-180-220	0.18-0.22-0.30	0.05-0.10-0.15
		2	RXEL	C16	E621C	●	140-180-220	0.16-0.20-0.28	
		3	RXEL	C16	E621C	●	140-160-200	0.12-0.16-0.20	
	N5	1	RXEL	C16	E621C	●	140-180-220	0.16-0.20-0.28	0.05-0.10-0.15
		2	RXEL	C16	E621C	●	140-160-200	0.16-0.20-0.28	
		3	RXEL	C16	E621C	●	120-140-180	0.12-0.16-0.20	
	N6	1	RXEL	C16	E621C	●	50-70-100	0.12-0.18-0.25	0.05-0.10-0.15
		2	RXEL	C16	E621C	●	50-70-100	0.12-0.16-0.22	
		3	RXEL	C16	E621C	●	40-60-80	0.12-0.16-0.22	

**AC Uygulama Koşulları**

- 1 En Uygun Koşullar
 - Kararlı Bağlama, Tezgah ve/veya İş Parçası
 - Takım projeksiyon boyu < 3xD
 - Garantilenmiş en iyi talaş boşaltma
 - İçten su verme basıncı > 20 bar

- 2 Uygun Koşullar
 - Hafifçe kararsız bağlama tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 6xD
 - Uygun olmayan talaş boşaltma
 - İçten soğutma var

- 3 Zor koşullar
 - Kararsız bağlama, tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 8xD
 - Kritik talaş boşaltma
 - İçten soğutma var

**AC Application Conditions**

- 1 Optimal conditions
 - Stable fixture, machine and/or workpiece
 - Tool projection length < 3xD
 - Optimal chip removal guaranteed
 - Internal coolant supply > 20 bar

- 2 Suboptimal conditions
 - Slightly unstable fixture, machine and/or workpiece
 - Tool projection length < 6xD
 - No optimal chip removal guaranteed
 - Internal coolant supply available

- 3 Difficult conditions
 - Unstable fixture, machine and/or workpiece
 - Tool projection length < 8xD
 - Critical chip evacuation
 - Internal coolant supply available

● Stokta

▲ Kısa sürede tedarik

SEE PAGE 33 FOR MATERIAL DETAILS



Darbeli Açık Delik
Through Bore With Interruption



AC	Type	Geometry	Grade	Stock	Vc	fz Full Cut	fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200
4	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.10-0.15-0.25
5	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30		
5	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30		
5	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30		
5	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25		
5	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20		
6	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18		
4	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25		
5	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20		
6	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18		
4	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16		
5	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14		
6	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12		
4	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16		
5	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14		
6	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12		
4	RXEL	C16	E621C	●	180-250-320	0.18-0.22-0.30	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.08-0.10-0.15
5	RXEL	C16	E621C	●	160-220-280	0.16-0.20-0.28		
6	RXEL	C16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEL	C16	E621C	●	180-250-320	0.18-0.22-0.30		
5	RXEL	C16	E621C	●	160-220-280	0.16-0.20-0.28		
6	RXEL	C16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEL	C16	E621C	●	180-250-320	0.18-0.22-0.30		
5	RXEL	C16	E621C	●	160-220-280	0.16-0.20-0.28		
6	RXEL	C16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEL	C16	E621C	●	140-180-220	0.18-0.22-0.30		
5	RXEL	C16	E621C	●	140-180-220	0.16-0.20-0.28		
6	RXEL	C16	E621C	●	140-160-200	0.12-0.16-0.20		
4	RXEL	C16	E621C	●	140-180-220	0.16-0.20-0.28		
5	RXEL	C16	E621C	●	140-160-200	0.16-0.20-0.28		
6	RXEG	G16	E621C	●	120-140-180	0.12-0.16-0.20		
4	RXEL	C16	E621C	●	50-70-100	0.12-0.18-0.25		
5	RXEL	C16	E621C	●	50-70-100	0.12-0.16-0.22		
6	RXEG	G16	E621C	●	40-60-80	0.10-0.14-0.20		



AC Uygulama Koşulları

- 4 En Uygun Koşullar
- Kararlı Bağlama, Tezgah ve/Veya İş Parçası
 - Takım projeksiyon boyu < 5xD
 - Garantilenmiş en iyi talaş boşaltma
 - Hafifçe simetrik ve asimmetrik kesinti (< % 10)
 - İçten su verme basıncı > 20 bar

- 5 Uygun Koşullar
- Hafifçe kararlı bağlama, tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 7xD
 - Uygun olmayan talaş boşaltma
 - Ortalama simetrik kesintiler (< 30%)
 - İçten soğutma var

- 6 Zor koşullar
- Kararsız bağlama, tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 9xD
 - Uygun olmayan talaş boşaltma
 - Ortalama simetrik kesintiler (< 30%)
 - İçten soğutma var



AC Application Conditions

- 4 Optimal conditions
- Stable fixture, machine and/or workpiece
 - Tool projection length < 5xD
 - Optimal chip removal guaranteed
 - Slightly symmetrical and asymmetrical interruption (< 10%)

- 5 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
 - Tool projection length < 7xD
 - No optimal chip removal guaranteed
 - Medium symmetrical interruptions (< 30%)

- 6 Difficult conditions
- Unstable fixture, machine and/or workpiece
 - Tool projection length < 9xD
 - No optimal chip removal guaranteed
 - Medium symmetrical interruptions (< 30%)

● Stokta

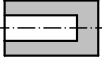
On stock

▲ Kısa sürede tedarik

Short-term availability

Kesme Verisi RX large

Cutting Data RX large



Kör delik
Blind Hole



ISO	UMC	AC	Type	Geometry	Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200
K	K1	1	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20	
	K2	1	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20	
	K3	1	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20	
	K4	1	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20	
	K5	1	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20	
		3	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18	
	K6	1	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20	
		3	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18	
	K7	1	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16	0.05-0.10-0.15
		2	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14	
		3	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12	
	K8	1	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16	0.05-0.10-0.15
		2	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14	
		3	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12	
N	N1	1	RXEG	G16	E621C	●	180-250-320	0.18-0.22-0.30	0.08-0.10-0.15
		2	RXEG	G16	E621C	●	160-220-280	0.16-0.20-0.28	
		3	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20	
	N2	1	RXEG	G16	E621C	●	180-250-320	0.18-0.22-0.30	0.08-0.10-0.15
		2	RXEG	G16	E621C	●	160-220-280	0.16-0.20-0.28	
		3	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20	
	N3	1	RXEG	G16	E621C	●	180-250-320	0.18-0.22-0.30	0.05-0.10-0.15
		2	RXEG	G16	E621C	●	160-220-280	0.16-0.20-0.28	
		3	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20	
	N4	1	RXEG	G16	E621C	●	140-180-220	0.18-0.22-0.30	0.05-0.10-0.15
		2	RXEG	G16	E621C	●	140-180-220	0.16-0.20-0.28	
		3	RXEG	G16	E621C	●	140-160-200	0.12-0.16-0.20	
	N5	1	RXEG	G16	E621C	●	140-180-220	0.16-0.20-0.28	0.05-0.10-0.15
		2	RXEG	G16	E621C	●	140-160-200	0.16-0.20-0.28	
		3	RXEG	G16	E621C	●	120-140-180	0.12-0.16-0.20	
	N6	1	RXEG	G16	E621C	●	50-70-100	0.12-0.18-0.25	0.05-0.10-0.12
		2	RXEG	G16	E621C	●	50-70-100	0.12-0.16-0.22	
		3	RXEG	G16	E621C	●	40-60-80	0.10-0.14-0.20	



AC Uygulama Koşulları

- 1 En Uygun Koşullar
- Kararlı Bağlama, Tezgah ve/veya İş Parçası
- Takım projeksiyon boyu < 3xD
- Garantilenmiş en iyi talaş boşaltma
- İçten su verme basıncı > 20 bar

- 2 Uygun Koşullar
- Hafifçe kararsız bağlama, tezgah ve/veya iş parçası
- Takım projeksiyon boyu < 6xD
- Uygun olmayan talaş boşaltma
- İçten soğutma var

- 3 Zor koşullar
- Kararsız bağlama, tezgah ve/veya iş parçası
- Takım projeksiyon boyu < 8xD
- Kritik talaş boşaltma
- İçten soğutma var



AC Application Conditions

- 1 Optimal conditions
- Stable fixture, machine and/or workpiece
- Tool projection length < 3xD
- Optimal chip removal guaranteed
- Internal coolant supply > 20 bar

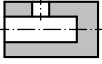
- 2 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
- Tool projection length < 6xD
- No optimal chip removal guaranteed
- Internal coolant supply available

- 3 Difficult conditions
- Unstable fixture, machine and/or workpiece
- Tool projection length < 8xD
- Critical chip evacuation
- Internal coolant supply available

● Stokta

▲ Kısa sürede tedarik

SEE PAGE 33 FOR MATERIAL DETAILS



Darbeli Kör Delik
Blind Hole With Interruption



AC	Type	Geometry	Grade	Stock	Vc	fz Full Cut	fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200
4	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.10-0.15-0.25
5	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30		
5	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30		
5	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30		
5	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25		
5	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20		
6	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18		
4	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25		
5	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20		
6	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18		
4	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16		
5	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14		
6	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12		
4	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16		
5	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14		
6	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12		
4	RXEG	G16	E621C	●	180-250-320	0.18-0.25-0.35	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.08-0.10-0.15
5	RXEG	G16	E621C	●	160-220-280	0.18-0.22-0.30		
6	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEG	G16	E621C	●	180-250-320	0.18-0.25-0.35		
5	RXEG	G16	E621C	●	160-220-280	0.18-0.22-0.30		
6	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEG	G16	E621C	●	180-250-320	0.18-0.25-0.35		
5	RXEG	G16	E621C	●	160-220-280	0.18-0.22-0.30		
6	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEG	G16	E621C	●	140-180-220	0.18-0.22-0.30		
5	RXEG	G16	E621C	●	140-180-220	0.16-0.20-0.28		
6	RXEG	G16	E621C	●	140-160-200	0.12-0.16-0.20		
4	RXEG	G16	E621C	●	140-180-220	0.16-0.20-0.28		
5	RXEG	G16	E621C	●	140-160-200	0.16-0.20-0.28		
6	RXEG	G16	E621C	●	120-140-180	0.12-0.16-0.20		
4	RXEG	G16	E621C	●	50-70-100	0.12-0.18-0.25		
5	RXEG	G16	E621C	●	50-70-100	0.12-0.16-0.22		
6	RXEG	G16	E621C	●	40-60-80	0.10-0.14-0.20		



AC Uygulama Koşulları

- 4 En Uygun Koşullar
- Kararlı Bağlama, Tezgah ve/veya İş Parçası
 - Takım projeksiyon boyu < 5xD
 - Garantılanmış en iyi talaş boşaltma
 - Hafifçe simetrik ve asimmetrik kesinti (< % 10)
 - İçten su verme basıncı > 20 bar

- 5 Uygun Koşullar
- Hafifçe kararsız bağla ma, tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 7xD
 - Uygun olmayan talaş boşaltma
 - Ortalama simetrik kesintiler (< 30%)
 - İçten soğutma var

- 6 Zor koşullar
- Kararsız bağlama, tezgah ve/veya iş parçası
 - Takım projeksiyon boyu < 9xD
 - Uygun olmayan talaş boşaltma
 - Ortalama simetrik kesintiler (< 30%)
 - İçten soğutma var



AC Application Conditions

- 4 Optimal conditions
- Stable fixture, machine and/or workpiece
 - Tool projection length < 5xD
 - Optimal chip removal guaranteed
 - Slightly symmetrical and asymmetrical interruption (< 10%)

- 5 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
 - Tool projection length < 7xD
 - No optimal chip removal guaranteed
 - Medium symmetrical interruptions (< 30%)

- 6 Difficult conditions
- Unstable fixture, machine and/or workpiece
 - Tool projection length < 9xD
 - No optimal chip removal guaranteed
 - Medium symmetrical interruptions (< 30%)

● **Stokta**

On stock

▲ **Kısa sürede tedarik**

Short-term availability

Kesme Verisi RX large

Cutting Data RX large



Açık Delik
Through Bore



ISO	UMC	AC	Type	Geometry	Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200	
S	S1	1	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14	0.05-0.10-0.12	
		2	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14		
		3	RXEL	A06	E612R1	●	15-25-35	0.06-0.10-0.14		
	S2	1	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.12	0.05-0.10-0.12	
		2	RXEL	A06	E612R1	●	20-30-45	0.05-0.08-0.12		
		3	RXEL	A06	E612R1	●	15-25-35	0.05-0.08-0.12		
	S3	1	RXEL	A06	E612R1	●	15-20-35	0.06-0.10-0.12	0.05-0.08-0.10	
		2	RXEL	A06	E612R1	●	10-18-30	0.05-0.08-0.10		
		3	RXEL	A06	E612R1	●	8-15-25	0.05-0.08-0.10		
	S4	1	RXEL	A06	E612R1	●	12-18-25	0.05-0.08-0.10	0.05-0.08-0.10	
		2	RXEL	A06	E612R1	●	8-15-20	0.05-0.08-0.10		
		3	RXEL	A06	E612R1	●	5-12-20	0.05-0.08-0.10		
	S	S11	1	RXEL	A06	E612R1	●	20-40-60	0.06-0.10-0.14	0.05-0.10-0.12
			2	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14	
			3	RXEL	A06	E612R1	●	15-25-30	0.06-0.10-0.14	
		S12	1	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14	0.05-0.10-0.12
			2	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.14	
			3	RXEL	A06	E612R1	●	15-25-30	0.06-0.10-0.14	
		S13	1	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.14	0.05-0.10-0.12
			2	RXEL	A06	E612R1	●	15-25-30	0.05-0.08-0.10	
			3	RXEL	A06	E612R1	●	10-18-30	0.05-0.08-0.10	
		S14	1	RXEL	A06	E612R1	●	15-20-30	0.05-0.08-0.10	0.05-0.08-0.10
			2	RXEL	A06	E612R1	●	10-18-25	0.05-0.08-0.10	
			3	RXEL	A06	E612R1	●	8-15-20	0.05-0.08-0.10	
H	H1	1	RXEG	A06	E612R1	●	15-25-30	0.04-0.06-0.08	0.05-0.08-0.10	
		2	RXEG	A06	E612R1	●	10-18-25	0.04-0.06-0.08		
		3	RXEG	A06	E612R1	●	8-15-20	0.04-0.06-0.08		
	H2	1	RXEG	A06	E607R1	▲	10-18-25	0.04-0.06-0.08	0.05-0.08-0.10	
		2	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08		
		3	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08		
	H3	1	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07	0.05-0.08-0.10	
		2	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07		
		3	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07		
SM	SM1	1	RXEL	B06	E612R1	●	120-150-180	0.18-0.25-0.35	0.08-0.10-0.20	
		2	RXEL	B06	E612R1	●	100-130-150	0.18-0.22-0.30		
		3	RXEL	C16	E612R1	●	70-100-130	0.12-0.16-0.20		
	SM2	1	RXEL	B06	E612R1	●	110-140-160	0.18-0.22-0.30	0.08-0.10-0.20	
		2	RXEL	B06	E612R1	●	90-120-140	0.15-0.20-0.25		
		3	RXEL	C16	E612R1	●	70-100-120	0.12-0.15-0.20		
	SM3	1	RXEL	A06	E612R1	●	40-60-80	0.10-0.14-0.18	0.05-0.10-0.12	
		2	RXEL	A06	E612R1	●	40-60-80	0.08-0.12-0.16		
		3	RXEL	A06	E612R1	●	25-40-70	0.06-0.10-0.14		
O	O1	1	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20	0.08-0.10-0.20	
		2	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20		
		3	RXEL	C16	E610C	▲	40-60-80	0.10-0.13-0.16		
	O2	1	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20	0.08-0.10-0.20	
		2	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20		
		3	RXEL	C16	E610C	▲	40-60-80	0.10-0.13-0.16		
	O3	1	RXEL	C16	E621C	●	40-50-60	0.10-0.15-0.20	0.08-0.10-0.20	
		2	RXEL	C16	E621C	●	40-50-60	0.10-0.15-0.20		
		3	RXEL	C16	E621C	●	40-50-60	0.10-0.13-0.16		
	O4	1	RXEL	C16	E621C	●	30-50-60	0.05-0.08-0.10	0.08-0.10-0.20	
		2	RXEL	C16	E621C	●	30-50-60	0.05-0.08-0.10		
		3	RXEL	C16	E621C	●	30-50-60	0.05-0.08-0.10		

SEE PAGE 34/35 FOR MATERIAL DETAILS



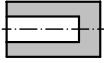
Darbeli Açık Delik
Through Bore With Interruption



AC	Type	Geometry	Grade	Stock	Vc	fz Full Cut	fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200		
4	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.05-0.10-0.12		
5	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14				
6	RXEG	A06U2	E612R1	●	15-25-35	0.06-0.10-0.14				
4	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.12				
5	RXEL	A06	E612R1	●	20-30-45	0.05-0.08-0.12				
6	RXEG	A06U2	E612R1	●	15-25-35	0.05-0.08-0.12				
4	RXEL	A06	E612R1	●	15-20-35	0.06-0.10-0.12		0.05-0.08-0.10		
5	RXEL	A06	E612R1	●	10-18-30	0.05-0.08-0.10				
6	RXEG	A06U2	E612R1	●	8-15-25	0.05-0.08-0.10				
4	RXEL	A06	E612R1	●	12-18-25	0.05-0.08-0.10				
5	RXEL	A06	E612R1	●	8-15-20	0.05-0.08-0.10				
6	RXEG	A06U2	E612R1	●	5-12-20	0.05-0.08-0.10				
4	RXEL	A06	E612R1	●	20-40-60	0.06-0.10-0.14		Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.05-0.10-0.12	
5	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14				
6	RXEG	A06U2	E612R1	●	15-25-30	0.06-0.10-0.14				
4	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14				
5	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.14				
6	RXEG	A06U2	E612R1	●	15-25-30	0.06-0.10-0.14				
4	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.14	0.05-0.10-0.12			
5	RXEL	A06	E612R1	●	15-25-30	0.05-0.08-0.10				
6	RXEG	A06U2	E612R1	●	10-18-30	0.05-0.08-0.10				
4	RXEL	A06	E612R1	●	15-20-30	0.05-0.08-0.10				
5	RXEL	A06	E612R1	●	10-18-25	0.05-0.08-0.10				
6	RXEG	A06U2	E612R1	●	8-15-20	0.05-0.08-0.10				
4	RXEG	A06	E612R1	●	15-25-30	0.04-0.06-0.08	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%		0.05-0.08-0.10	
5	RXEG	A06	E612R1	●	10-18-25	0.04-0.06-0.08				
6	RXEG	A06	E612R1	●	8-15-20	0.04-0.06-0.08				
4	RXEG	A06	E607R1	▲	10-18-25	0.04-0.06-0.08				
5	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08				
6	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08				
4	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07		0.05-0.08-0.10		
5	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07				
6	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07				
4	RXEL	C16	E612R1	●	120-150-180	0.18-0.22-0.30			Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.08-0.10-0.20
5	RXEL	C16U2	E612R1	●	100-130-150	0.15-0.20-0.25				
6	RXEG	A06U2	E612R1	●	70-100-130	0.12-0.16-0.20				
4	RXEL	C16	E612R1	●	110-140-160	0.15-0.20-0.25				
5	RXEL	C16U2	E612R1	●	90-120-140	0.12-0.18-0.22				
6	RXEG	A06U2	E612R1	●	70-100-120	0.12-0.15-0.20				
4	RXEL	A06	E612R1	●	40-60-80	0.10-0.14-0.18		0.05-0.10-0.12		
5	RXEL	A06	E612R1	●	40-60-80	0.08-0.12-0.16				
6	RXEG	A06	E612R1	●	25-40-70	0.06-0.10-0.14				
4	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%			0.08-0.10-0.20
5	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20				
6	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16				
4	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20				
5	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20				
6	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16				
4	RXEL	C16	E621C	●	40-50-60	0.10-0.15-0.20		0.08-0.10-0.20		
5	RXEL	C16	E621C	●	40-50-60	0.10-0.15-0.20				
6	RXEG	G16	E621C	●	40-50-60	0.10-0.13-0.16				
4	RXEL	C16	E621C	●	30-50-60	0.05-0.08-0.10			0.08-0.10-0.20	
5	RXEL	C16	E621C	●	30-50-60	0.05-0.08-0.10				
6	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10				

Kesme Verisi RX large

Cutting Data RX large

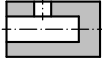


Kör delik
Blind Hole



ISO	UMC	AC	Type	Geometry	Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200	
S	S1	1	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14	0.05-0.10-0.12	
		2	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14		
		3	RXEG	A06	E612R1	●	15-25-35	0.06-0.10-0.14		
	S2	1	RXEG	A06	E612R1	●	20-30-45	0.06-0.10-0.12	0.05-0.10-0.12	
		2	RXEG	A06	E612R1	●	20-30-45	0.05-0.08-0.12		
		3	RXEG	A06	E612R1	●	15-25-35	0.05-0.08-0.12		
	S3	1	RXEG	A06	E612R1	●	15-20-35	0.06-0.10-0.12	0.05-0.08-0.10	
		2	RXEG	A06	E612R1	●	10-18-30	0.05-0.08-0.10		
		3	RXEG	A06	E612R1	●	8-15-25	0.05-0.08-0.10		
	S4	1	RXEG	A06	E612R1	●	12-18-25	0.05-0.08-0.10	0.05-0.08-0.10	
		2	RXEG	A06	E612R1	●	8-15-20	0.05-0.08-0.10		
		3	RXEG	A06	E612R1	●	5-12-20	0.05-0.08-0.10		
	S	S11	1	RXEG	A06	E612R1	●	20-40-60	0.06-0.10-0.14	0.05-0.10-0.12
			2	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14	
			3	RXEG	A06	E612R1	●	15-25-30	0.06-0.10-0.14	
		S12	1	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14	0.05-0.10-0.12
			2	RXEG	A06	E612R1	●	20-30-45	0.06-0.10-0.14	
			3	RXEG	A06	E612R1	●	15-25-30	0.06-0.10-0.14	
		S13	1	RXEG	A06	E612R1	●	20-30-45	0.06-0.10-0.14	0.05-0.10-0.12
			2	RXEG	A06	E612R1	●	15-25-30	0.05-0.08-0.10	
			3	RXEG	A06	E612R1	●	10-18-30	0.05-0.08-0.10	
		S14	1	RXEG	A06	E612R1	●	15-20-30	0.05-0.08-0.10	0.05-0.08-0.10
			2	RXEG	A06	E612R1	●	10-18-25	0.05-0.08-0.10	
			3	RXEG	A06	E612R1	●	8-15-20	0.05-0.08-0.10	
H	H1	1	RXEG	A06	E612R1	●	15-25-30	0.04-0.06-0.08	0.05-0.08-0.10	
		2	RXEG	G16	E612R1	●	10-18-25	0.04-0.06-0.08		
		3	RXEG	G16	E612R1	●	8-15-20	0.04-0.06-0.08		
	H2	1	RXEG	A06	E607R1	▲	10-18-25	0.04-0.06-0.08	0.05-0.08-0.10	
		2	RXEG	G16	E607R1	▲	8-15-20	0.04-0.06-0.08		
		3	RXEG	G16	E607R1	▲	8-15-20	0.04-0.06-0.08		
	H3	1	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07	0.05-0.08-0.10	
		2	RXEG	G16	E607R1	▲	8-10-15	0.03-0.05-0.07		
		3	RXEG	G16	E607R1	▲	8-10-15	0.03-0.05-0.07		
SM	SM1	1	RXEG	A06	E612R1	●	120-150-180	0.18-0.22-0.30	0.08-0.10-0.20	
		2	RXEG	A06	E612R1	●	100-130-150	0.15-0.20-0.25		
		3	RXEG	G16	E612R1	●	70-100-130	0.10-0.16-0.20		
	SM2	1	RXEG	A06	E612R1	●	110-140-160	0.15-0.20-0.25	0.08-0.10-0.20	
		2	RXEG	A06	E612R1	●	90-120-140	0.12-0.18-0.22		
		3	RXEG	G16	E612R1	●	70-100-120	0.10-0.15-0.20		
	SM3	1	RXEG	A06	E612R1	●	40-60-80	0.10-0.12-0.16	0.05-0.10-0.12	
		2	RXEG	A06	E612R1	●	40-60-80	0.08-0.10-0.12		
		3	RXEG	G16	E612R1	●	25-40-70	0.06-0.08-0.12		
O	O1	1	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20	0.08-0.10-0.20	
		2	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20		
		3	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16		
	O2	1	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20	0.08-0.10-0.20	
		2	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20		
		3	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16		
	O3	1	RXEG	G16	E621C	●	40-50-60	0.10-0.15-0.20	0.08-0.10-0.20	
		2	RXEG	G16	E621C	●	40-50-60	0.10-0.15-0.20		
		3	RXEG	G16	E621C	●	40-50-60	0.10-0.13-0.16		
	O4	1	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10	0.08-0.10-0.20	
		2	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10		
		3	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10		

SEE PAGE 34/35 FOR MATERIAL DETAILS



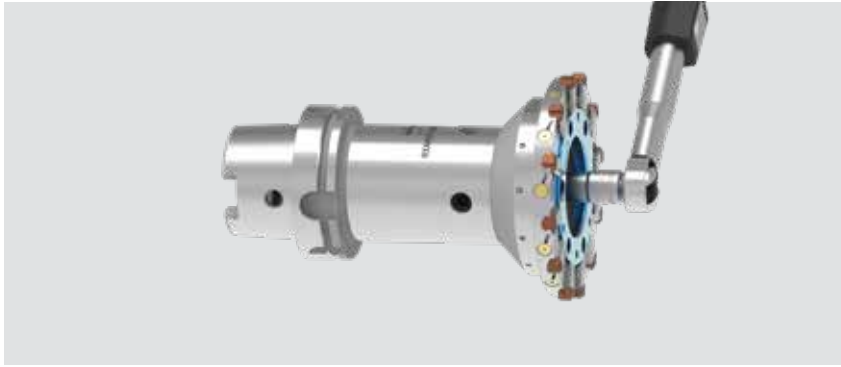
Darbeli Kör Delik
Blind Hole With Interruption



AC	Type	Geometry	Grade	Stock	Vc	fz Full Cut	fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200	
4	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.05-0.10-0.12	
5	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14			
6	RXEG	A06U2	E612R1	●	15-25-35	0.06-0.10-0.14			
4	RXEG	A06	E612R1	●	20-30-45	0.06-0.10-0.12		0.05-0.10-0.12	
5	RXEG	A06	E612R1	●	20-30-45	0.05-0.08-0.12			
6	RXEG	A06U2	E612R1	●	15-25-35	0.05-0.08-0.12			
4	RXEG	A06	E612R1	●	15-20-35	0.06-0.10-0.12		0.05-0.08-0.10	
5	RXEG	A06	E612R1	●	10-18-30	0.05-0.08-0.10			
6	RXEG	A06U2	E612R1	●	8-15-25	0.05-0.08-0.10			
4	RXEG	A06	E612R1	●	12-18-25	0.05-0.08-0.10		0.05-0.08-0.10	
5	RXEG	A06	E612R1	●	8-15-20	0.05-0.08-0.10			
6	RXEG	A06U2	E612R1	●	5-12-20	0.05-0.08-0.10			
4	RXEG	A06	E612R1	●	20-40-60	0.06-0.10-0.14		Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.05-0.10-0.12
5	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14			
6	RXEG	A06U2	E612R1	●	15-25-30	0.06-0.10-0.14			
4	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14			0.05-0.10-0.12
5	RXEG	A06	E612R1	●	20-30-45	0.06-0.10-0.14			
6	RXEG	A06U2	E612R1	●	15-25-30	0.06-0.10-0.14			
4	RXEG	A06	E612R1	●	20-30-45	0.06-0.10-0.14	0.05-0.10-0.12		
5	RXEG	A06	E612R1	●	15-25-30	0.05-0.08-0.10			
6	RXEG	A06U2	E612R1	●	10-18-30	0.05-0.08-0.10			
4	RXEG	A06	E612R1	●	15-20-30	0.05-0.08-0.10	0.05-0.08-0.10		
5	RXEG	A06	E612R1	●	10-18-25	0.05-0.08-0.10			
6	RXEG	A06U2	E612R1	●	8-15-20	0.05-0.08-0.10			
4	RXEG	A06	E612R1	●	15-25-30	0.04-0.06-0.08	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.05-0.08-0.10	
5	RXEG	A06	E612R1	●	10-18-25	0.04-0.06-0.08			
6	RXEG	A06	E612R1	●	8-15-20	0.04-0.06-0.08			
4	RXEG	A06	E607R1	▲	10-18-25	0.04-0.06-0.08		0.05-0.08-0.10	
5	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08			
6	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08			
4	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07	0.05-0.08-0.10		
5	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07			
6	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07			
4	RXEG	A06	E612R1	●	140-180-220	0.18-0.22-0.30	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.08-0.10-0.20	
5	RXEG	A06	E612R1	●	110-140-170	0.15-0.20-0.25			
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.16-0.20			
4	RXEG	A06	E612R1	●	120-140-160	0.15-0.20-0.25		0.08-0.10-0.20	
5	RXEG	A06U2	E612R1	●	100-120-150	0.12-0.18-0.22			
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20			
4	RXEG	A06	E612R1	●	40-60-80	0.10-0.14-0.18	0.08-0.10-0.20		
5	RXEG	A06U2	E612R1	●	40-60-80	0.08-0.12-0.16			
6	RXEG	G16U2	E612R1	●	25-40-70	0.06-0.10-0.14			
4	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20	Dolu kesmedeki fz %30 - %50 düşürülür reduce fz full cut 30 - 50%	0.08-0.10-0.20	
5	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20			
6	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16			
4	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20		0.08-0.10-0.20	
5	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20			
6	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16			
4	RXEG	G16	E621C	●	40-50-60	0.10-0.15-0.20		0.08-0.10-0.20	
5	RXEG	G16	E621C	●	40-50-60	0.10-0.15-0.20			
6	RXEG	G16	E621C	●	40-50-60	0.10-0.13-0.16			
4	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10		0.08-0.10-0.20	
5	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10			
6	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10			

Kullanım

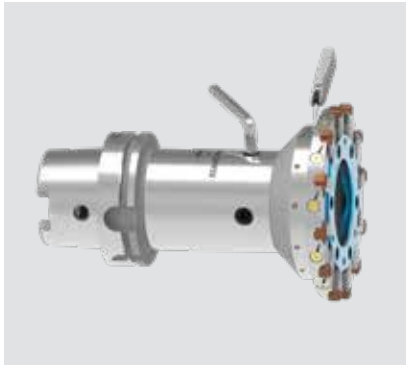
Handling



1

Takımı monte et

Assemble the tool.



2

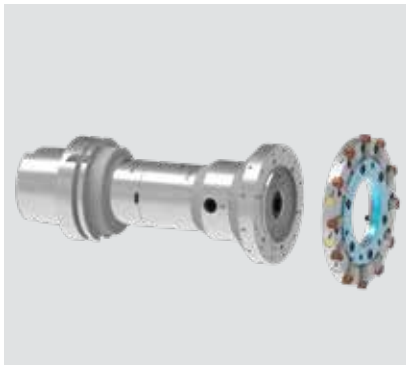
Tezgahta salgı ayarı

Run-out adjustment in the machine.

Kullanımdaki takım

Tool in use.

3



4

Takım ömrü bitiminde rayba kafasını sök

After tool life ends disassemble used reaming head.

Yeni rayba kafasını monte et

Assemble new reaming head.

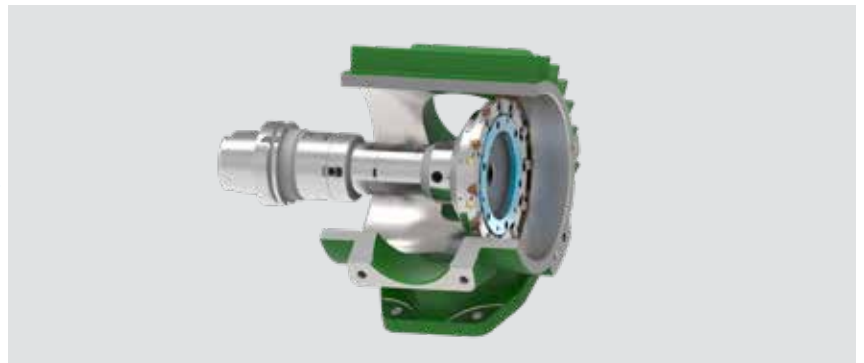
5



6

İşlemeye devam et

Continue machining.



Yenileme Sürümleri

Reconditioning Versions

1

Kullanılan takım. Takım ömrü sona erdikten sonra raybalama kafası URMA ortağına iade edilebilir.

Tool in use. After tool life ends, the reaming head can be returned to the URMA partner.

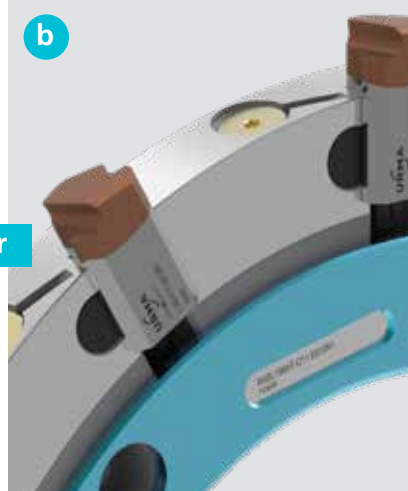


a



or

b



2

a) Raybalama kafası aynı boyut ve geometriye göre yeniden düzenlenebilir.

b) Raybalama kafası başka bir boyuta ve/veya geometriye göre yeniden düzenlenebilir.

a) Reaming head can be reconditioned to same size and geometry.

b) Reaming head can be reconditioned to other size and/or geometry.

3

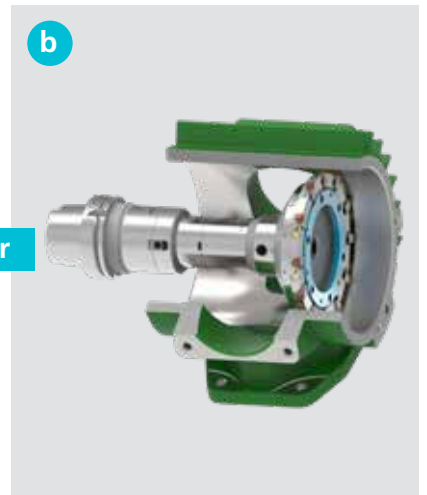
a) Takımı aynı delikte kullanın.
b) Takımı farklı bir delikte kullanın.

a) Use tool in the same bore.
b) Use tool in a different bore.

a

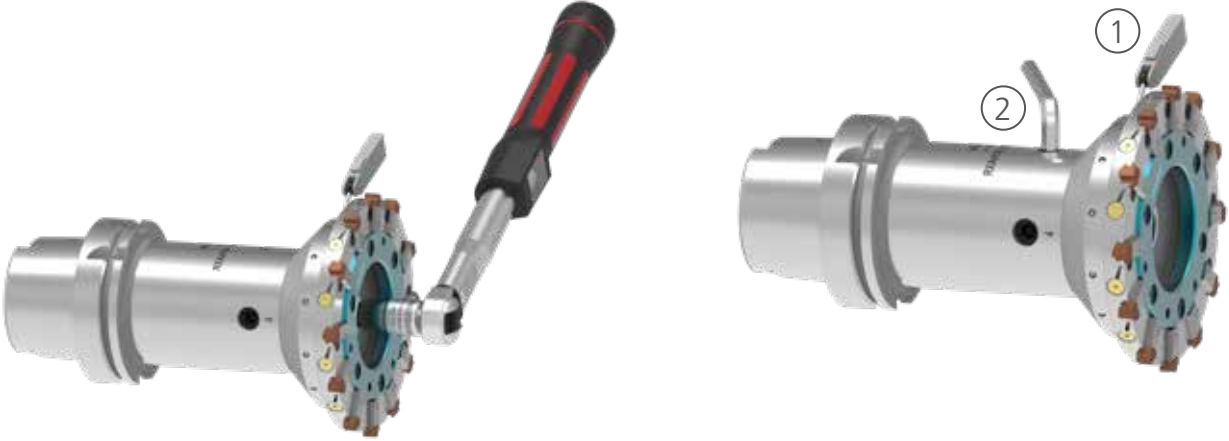


b



Entegre kompanzasyon ünitesi silindirik şaftlı tutucular için talimatlar

Instruction for Shanks With Integrated Compensation Device



Yöntem:

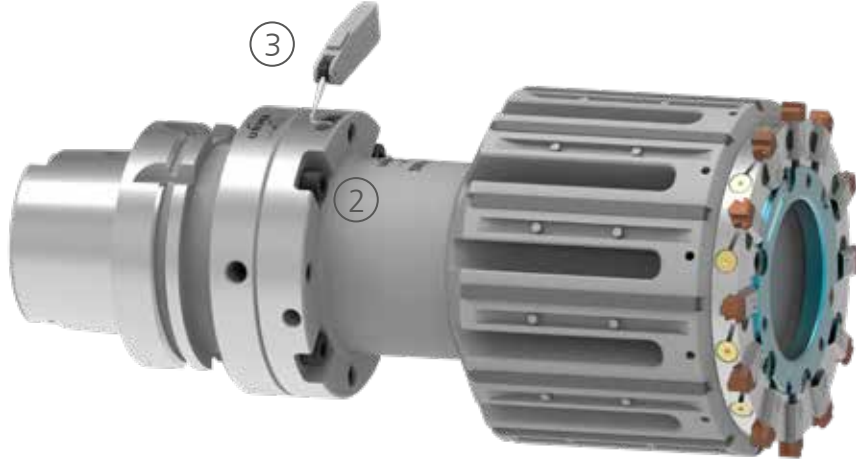
1. Merkezi sıkıştırma vidasını 70 Nm / 52 ft-lbs ile sabitleyin.
2. Takımı tezgah miline yükleyin.
3. İndikatörü (1 μm / 0,0001 inç çözünürlükle) şaft üzerindeki işaretli salgı alanı ①'e ayarlayın.
4. İki ayar vidasının 2 ekseninin salgısını ölçün. Ayar vidalarını kullanarak toplam salgı hatasının yarı değerini telafi edin. Dört aks noktasındaki salgıyı kontrol edin ve gerekirse ayarı tekrarlayın. Çapı < 0,005 mm olan salgıyı göz önünde bulundurarak, tam oturmeyen tüm vidaları sıkın.
5. Merkezi sıkıştırma vidasını 160 Nm / 118 ft-lbs ile sıkın.
6. Salgıyı tekrar kontrol edin ve gerekirse yeniden ayarlayın.

Procedure:

1. Secure central clamping screw with 70Nm / 52 ft-lbs.
2. Load the tool into the machine spindle.
3. Set the indicator (with 1 μm / 0,0001 inch resolution) on the marked run-out area ① on the shank.
4. Measure run-out of the two adjustment screw ② axes. Compensate half value of the total run-out error by using the adjustment screws. Check run-out on all four axle points and repeat the adjustment if necessary. Tighten all screws that do not fit tightly, considering the run-out < 0,005 mm in diameter.
5. Tighten the central clamping screw with 160Nm / 118 ft-lbs.
6. Check the run-out again and re-adjust if necessary.

Kompanzasyon modüllü özel takımlar için talimatlar

Instruction for Compensation Module With Special Tools



Kompanzasyon modülü, örneğin yataklı takımların salgısını ayarlamak için kullanılır. Hem eksen hem de açı hataları düzeltilebilir.

The compensation module is used, for example, to adjust the run-out of guide pad tools. Axis as well as angle errors can be adjusted.

Takımı Hazırlama:

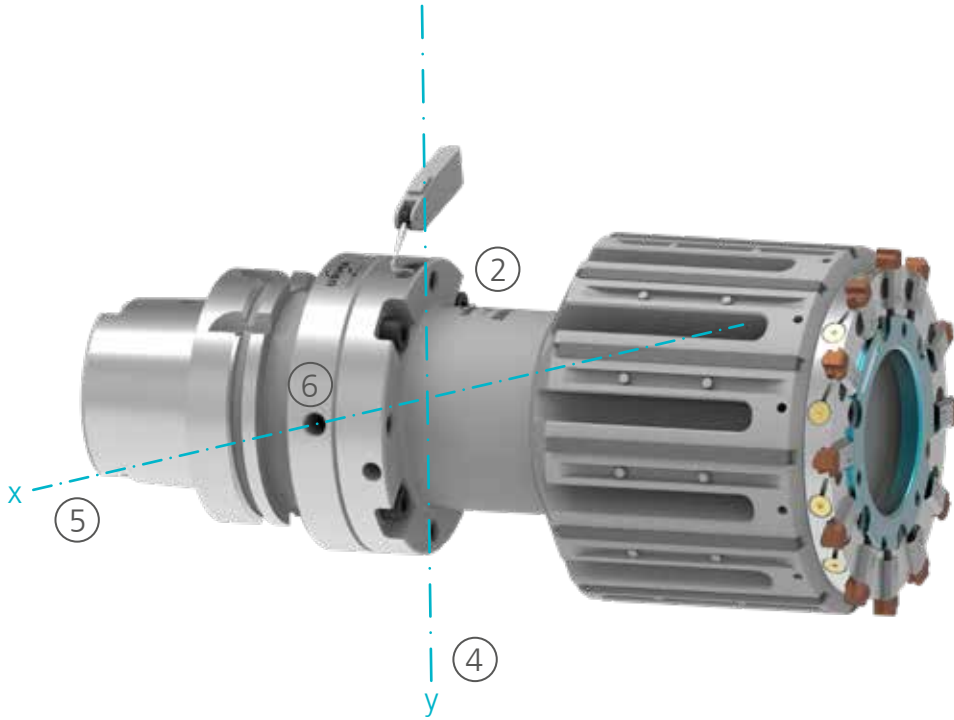
1. Montajdan önce, yan yüzeydeki baskı disklerinden hiçbirinin dışarı çıkmaması sağlanmalıdır.
2. Takımı telafi modülüne monte edin, sıkma vidalarını (2) biraz sıkın (örn. Vidayı yüzeye temas edinceye kadar sıkın, sonra ¼ kadar gevşetin).
3. Takımı, tezgahın iş miline yükleyin.
4. Göstergiyi (1 µm / 0,0001 inç çözünürlükle) takım flanş çapında ayarlayın (3).

Prepare the Tool:

1. Before assembling, it must be ensured that none of the pressure pad discs on the face side stick out.
2. Assemble the tool on the compensation module, tightening the clamping screws (2) slightly (i.e. tighten the screw until it has contact to the face, then tighten ¼ turn).
3. Load the tool into the machine spindle.
4. Set the indicator (with 1 µm / 0,0001 inch resolution) on the tool flange diameter (3).

Takımın radyal hizalanması - Adım 1:

Radial alignment of the tool - Step 1:



- 5.** Radyal ayar vidalarını ⑥ kullanarak flanş modülünü $2 \mu\text{m}$ / $0,0001$ inç ile hizalayın.
- İki karşıt radyal ayar vidası ⑥ ile salgı hatasını kontrol edin (1. ayar eksenini ⑤)
 - İlgili ayar vidasını kullanarak eksenin değer farkını yarıya kadar düzeltin. Ayar vidasını daha sonra gevşetin.
 - Göstergeyi "0" değerine ayarlayın
 - Takımı 180° döndürerek "0" değerini kontrol edin ve gerekirse düzeltin (bkz. "b").
 2. ayarlama eksenini ④ için aynı hizalama prosedürünü kullanın
 - Gerekirse ilk eksenini ⑤ yeniden ayarlayın



Ayarlama işleminin tamamlanmasından sonra tüm ayar vidaları ⑥ sıkılmalıdır.

- 6.** Sabitleme vidalarını ② sıkın.

- 7.** Flanş modülünün salgısını tekrar kontrol edin
→ en fazla. $3 \mu\text{m}$ / $0,0001$ inç

- 5.** Align the flange module in $2 \mu\text{m}$ / $0,0001$ inch by using the radial adjustment screws ⑥.
- Check run-out error with two opposing radial adjustment screws ⑥ (1st adjustment axis ⑤).
 - Correct the value difference of the axis by half, using the corresponding adjusting screw. Loosen the adjusting screw afterwards.
 - Set indicator to "0" value.
 - Check the "0" value by turning the tool to 180° and correct if necessary (see "b").
 - Use the same alignment procedure for the second adjustment axis ④.
 - If necessary readjust the first axis ⑤.



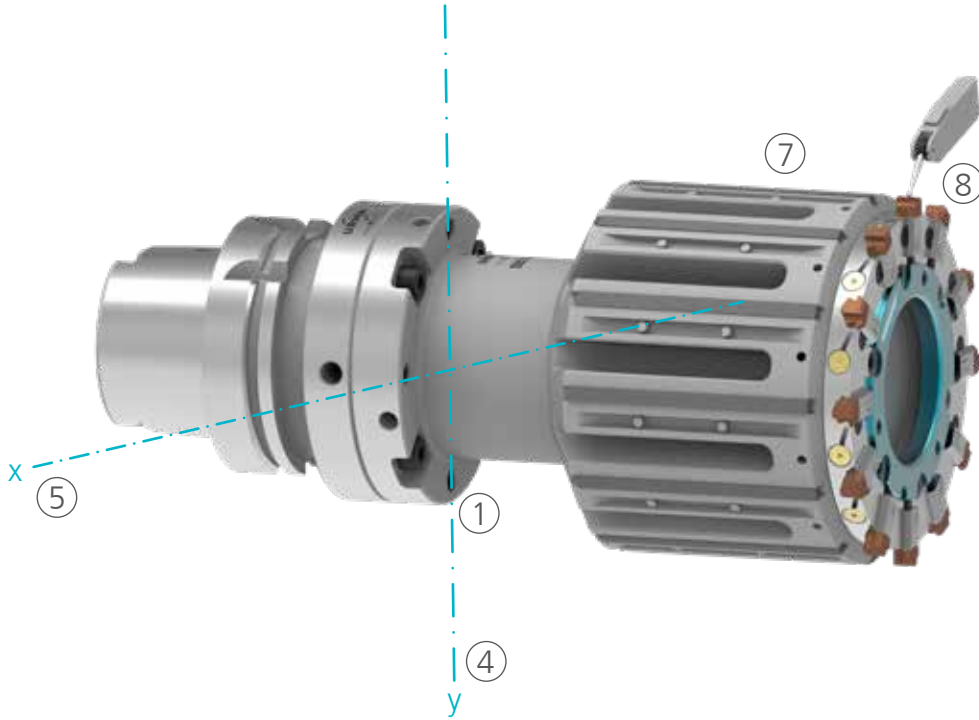
All adjustment screws ⑥ must be tightened after completion of the adjustment process.

- 6.** Tighten the clamping screws ②.

- 7.** Check the run-out of the flange module again
→ max. $3 \mu\text{m}$ / $0,0001$ inch.

Takımın radyal hizalanması - Adım 2:

Aligning the tool angle - Step 2:

**8. Göstergeyi ön kısma ayarlayın ⑧:**

- kesme kenarı üzerinde veya salgı göstergesi ucu ile (Sipariş numarası "URMA Raybalama" kataloğunda bulunabilir)
- şaftta RX-koniği üzerine (arayüz)
- rehber yatak üzerine

9. Eksenel ayarlama vidalarını ① kullanarak açılma hatasını 2 µm'ye ayarlayın ("5b'den f e kadar anlatıldığı gibi ilerleyin").**8. Set the indicator in front ⑧:**

- on cutting edge or run-out indicating insert (order number can be found in the "URMA Reaming" catalogue).
- on RX-taper of the shank (interface).
- on guide pads.

9. Set the angular error to 2 µm by using the axial adjusting screws ① (proceed as described in "point 5 b. to f.").

Açılma hatasını ayarlamak için eksen başına maksimum bir ① ayar vidası (0 ve 90°) kullanılması önerilir.

- Rehber yatakları üzerinde konsantrikliği kontrol edin ⑦
→ en fazla. 3 µm / 0,0001 inç



It is recommended to use max. one adjustment screw ① per axis (0 and 90°) to adjust the angular error.

- Check the alignment on the guide pads ⑦
→ max. 3 µm / 0,0001 inch.

Raybalama problemlerine pratik çözümler

Troubleshooting Machining Centres

	Delik Ölçüsü Büyük Hole too large				Delik Konik Tapered hole				Delik Yüzeyinde İzler Hole shows chatter marks	
	Titreşim Vibration	Salgı Hatası Run-out error	Kenar Yığılması Built-up edges	Radyal Pasa (ap) Radial depth of cut	Bağlama deformasyonu Deformation by clamping	Düzensiz malzeme kalınlığı Uneven material thickness	Tezgah Machine	Talaş Akışı Chip flow	Titreşim Vibration	Salgı Hatası Run-out error
Kesme Verisi Cutting Data										
İlerleme (fz) Feed (fz)	↑		↓					↑/↓	↑	
İş mili hızı (dk⁻¹) Spindle speed (min ⁻¹)	↓		↑						↓	
Radyal derinlik ap Radial depth of cut	↑		↑	↓		⚠		↓	↑	
Takım Tool										
Pah açısı Chamfer angle	↑					↑			↑	
Salgı Run out	⚠	⚠								⚠
Bağlantıyı Kontrol Et Check the connection	⚠	⚠								⚠
Aşınmayı Kontrol Et / Ucu Değiştir Check the wear / change the insert			⚠						⚠	
Yüzer Tutucu Floating chuck										•/⚠
Çapı düşürülmüş tutucu Diameter reduced holder										•/⚠
Kompanzeli Mandren Compensation chuck		•/⚠								•/⚠
İş Parçası Workpiece										
İş parçası fişür Workpiece fixture	⚠				⚠/↓				⚠	
Bağlama basıncı Clamping pressure	⚠				⚠/↓				⚠	
Tezgah Machine										
Soğutma Sıvısı Karışımı Coolant mixture	↑		↑					⚠	↑	
İş Mili Açık Hatası Angle-error of spindle							⚠			
Eksen Açık Hatası Angle-error of axis							⚠			
Çubuk Besleyicide Titreşim Vibrations from bar-feeder										
İşleme Machining										
Talaş Akışı Chip flow				⚠				⚠		
Soğutma Sıvısı Basıncı Coolant pressure	⚠/↓		⚠					↑	⚠/↓	
Geometri Sebebiyle Radyal Baskı Radial pressure from geometry	↓		⚠	⚠		↓			↓	
Girişte İş Mili Hızı Spindle speed on entry	↓		⚠				⚠		↓	
Giriş - Çıkış İlerlemeleri Feed in feed out										

Devreye Alma: Eğer mümkünse her seferde sadece bir değişiklik yapınız

Handling: If possible, apply only one modification at once.

↑ Artırma, geliştirme
Increase, improve

↓ Azaltma, eksiltme
Reduce, decrease

⚠ Kontrol, uygun hale getirme
Check, optimize






• Uygulama
Apply

Yüzey Kalitesi Memnuniyetsizliği (ölçülebilir) Surface quality unsatisfactory (measurable)					Yüzey Kalitesi Memnuniyetsizliği (görsel) Surface quality unsatisfactory (optically)					Geri Çekilme İzleri Retraction marks			Delik Ölçüsü Küçük yada Şekil Bozukluğu Hole too small or shape defect				
Titreşim Vibration	Kenar Yığılması Built-up edges	Salgı hatası Run-out error	Kesme geomet- risi Cutting geometry	Tezgah Machine	İlerleme oranı Feed rate	Salgı hatası Run-out error	Kesme geomet- risi Cutting geometry	Tezgah Machine	Kenar Yığılması Built-up edges	Radyal Malzeme Baskısı Radial compression of material	Radyal Baskı Bağlama Sebebiyle Radial compression through clamping	Takım Aşınması Tool wear	Radyal Malzeme Baskısı Radial compression of material	Radyal Baskı bağlama Sebebiyle Radial compression through clamping	Radyal Kesme Derinliği ap Radial depth of cut		
↑	↓								↓								
↓	↑								↑								
										↓/↑			↑	↓	↑		
↑			↓				↑			↑			↑	↑			
		⚠				⚠			⚠								
		⚠															
⚠	⚠		⚠						⚠	⚠		⚠	⚠				
		•/⚠				•/⚠			•/⚠	•/⚠							
		•/⚠				•/⚠			•/⚠	•/⚠							
		•/⚠				•/⚠			•/⚠								
⚠								⚠			⚠/↓		⚠/↓	⚠/↓			
⚠								⚠			⚠/↓		⚠/↓	⚠/↓			
↑	↑							↑	↑	↓			↓				
				⚠				⚠									
				⚠				⚠									
			⚠										⚠		⚠		
⚠	⚠							⚠				⚠					
↓						⚠		⚠	↓			↓	↓				
↓																	
					•					•			•				

Tanımlamalar ve temel formüller

Definitions and Basic Formulas

Tanım	Designation
a_p Kesme derinliği	Depth of cut [mm]
n Devir	Speed [min^{-1}]
D/d Delik çapı	Bore diameter [mm]
v_c Kesme hızı	Cutting speed [m/min]
v_f İlerleme	Feed rate [mm/min]
f Devir başı ilerleme	Feed per rotation [mm]
f_z Ağız başı ilerleme	Feed per tooth [mm]
z Ağız sayısı	Number of cutting edges
l_f İlerleme boyu	Feed distance [mm]
R_a Ortalama yüzey kalitesi	Arithmetic centre line average value [μm]
R_t Çukurlar ve tepeler arası yükseklik	Peak-to-valley height [μm]
R_z Çukurlar ve tepeler arası yükseklik ortalaması	Average peak-to-valley height [μm]
R_m Çekme mukavemeti	Tensile strength [N/mm^2]
t_c İşleme süresi	Machining time [min]
γ Radyal boşluk açısı	Radial rake angle [Degrees]
ϵ Apex açısı	Apex angle [Degrees]
h Talaş kalınlığı	Chip thickness [mm]
m_c Malzeme sabiti	Material constant
$k_{c1.1}$ Ana değer kesme kuvveti	Main value cutting force [N/mm^2]
k_c Özel kesme kuvveti	Specific cutting force [N/mm^2]
F_c Kesme kuvveti	Cutting force [N]
b Talaş genişliği	Chip width [mm]
P_c Gerekli tahrik gücü	Necessary drive power [kW]
η Verimlilik derecesi	Degree of efficiency
M_d Tork	Torque [Nm]

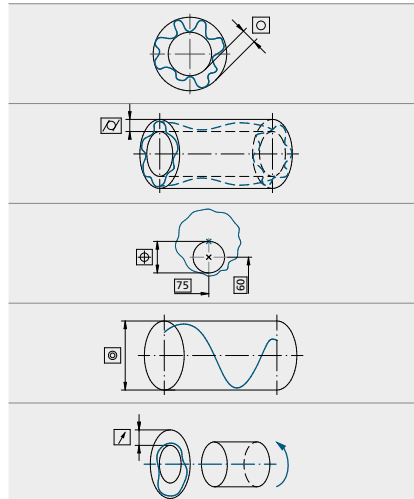
 Dairesellik	Circularity
 Silindiriklik	Cylindricity
 Pozisyon	Position
 Konsantriklik	Concentricity
 Dairesel salgı	Circular runout

Kesme Hızı Cutting speed	$v_c = \frac{\pi \cdot d \cdot n}{1000}$	m/min	Devir Speed	$n = \frac{v_c \cdot 1000}{\pi \cdot d}$	min^{-1}
İlerlem/dk Feed rate	$v_f = f \cdot n$ $v_f = f_z \cdot z \cdot n$	mm/min	İşleme süresi Machining time	$t_c = \frac{l_f}{f \cdot n}$	min
Kesme kuvvet (kesme kenarı başına) Cutting force (per cutting edge)	$F_c = b \cdot h \cdot k_c$	N	Güç gereksinimi Power requirement	$P_c = \frac{b \cdot h \cdot k_c \cdot v_c \cdot z}{60 \cdot 10^3 \cdot \eta}$	kW

Spanungsbreite / Chip width

a_p	h
0.05	0.07
0.08	0.11
0.10	0.14
0.15	0.21
0.20	0.28
0.25	0.35

	R_a	R_z
N8	1.6 - 3.2	8.4 - 15
N7	0.8 - 1.6	4.0 - 8.4
N6	0.4 - 0.8	2.2 - 4.0
N5	0.2 - 0.4	1.6 - 2.8
N4	0.1 - 0.2	1.0 - 2.8
N3	0.05 - 0.1	0.8 - 1.1



Spesifik kesme kuvveti Specific cutting force	$k_c = \frac{k_{c1.1}}{h^{m_c}}$	N
Tork Torque	$M_d = \frac{(D^2 - d^2) \cdot f \cdot k_c}{8 \cdot 10^3}$	Nm

İşleme Analizi

Machining Study

Gönderen * Sender		Number	
Firma Company		URMA Distribütörü URMA distributor	
Adres Address		Kontakt Contact	
Tezgah Machine-tool			
Tezgah tipi Machine type and manufacturer			
Yatay * Horizontal <input type="checkbox"/>	Dikey * Vertical <input type="checkbox"/>	Döner takım * Tool rotating <input type="checkbox"/>	
Fener mili koniği * Spindle holder	Size	Execution	Max. tool weight kg
DIN 69893-HSK <input type="checkbox"/>	20 <input type="checkbox"/> 25 <input type="checkbox"/>	A <input type="checkbox"/>	
DIN 69871 <input type="checkbox"/>	30 <input type="checkbox"/> 32 <input type="checkbox"/>	B <input type="checkbox"/>	
MAS-BT <input type="checkbox"/>	40 <input type="checkbox"/> 50 <input type="checkbox"/>	C <input type="checkbox"/>	
DIN 1835 Silindir Sap Cylinder shank DIN 1835 <input type="checkbox"/>	63 <input type="checkbox"/> 80 <input type="checkbox"/>	D <input type="checkbox"/>	
DIN 69880 VDI <input type="checkbox"/>	100 <input type="checkbox"/> <input type="checkbox"/>	E <input type="checkbox"/>	
<input type="checkbox"/>			
Kesme Sıvısı Lubricant			
Yağ * Oil <input type="checkbox"/>	MMS * 1) MLS 1) <input type="checkbox"/>	Emülsiyon * Emulsion <input type="checkbox"/>	Karışım oranı Ratio of mixture
İçten su verme * Internal coolant supply <input type="checkbox"/>		Sıvı basıncı * Coolant pressure (bar)	
İş Parçası Workpiece			
Tanımı Designation	Malzeme no * Material number	Isıl işlem * Treatment condition (hardness)	
İşleme Gereklilikleri Machining requirements			
Delik Ø * Bore ø	İşleme boyu * Bore length	Ön delik Ø * Pre-machining ø	
Tolerans * Tolerance	Kesişen çaplar Interfering contours mm	Ön delik metodu * Method of pre-machining	
Ek tolerans gerekleri Additional tolerance requirements	○ ⊙ ∩ ⊕	Kapalı delik * Blind Hole <input type="checkbox"/>	
Yüzey kalitesi (µm) * Surface quality (µm)	R _a <input type="checkbox"/> R _z <input type="checkbox"/> R _t <input type="checkbox"/>	Darbeli işleme * Cutting interruption <input type="checkbox"/>	
Tarih * Date	Ek: Çizim * Attachement: your application sketch		

* Gerekli alanlar
Mandatory fields

1) Minimum yağlama sistemi (yağ buharı)
Minimal lubrication system (mist coolant)

Fax +41 62 889 20 28
customerservice@urma.ch

Ø 7.600 - 13.100 mm	RX small
Ø 11.900 - 140.600 mm	RX medium
Ø 139.801 - 200.200 mm	RX large



URMA RX Rayba Portföyü

URMA RX Reamer Portfolio

Rx Esasları

- Delik başına daha düşük maliyetler
- Çok çeşitli kaliteler ve geometriler
- Düşük ayar çabaları

Süreç Güvenilirliği

- Sabit hassasiyet
- Uzun takım ömrü

Raybalama Kesme Uçlarını Değiştirme

- Kolay kullanım
- Maksimum konumlandırma doğruluğu

RX Facts

- Lower costs per bore
- Wide variety of grades and geometries
- Low adjustment efforts

Process Reliability

- Constant precision
- Long tool life

Changing Reaming Inserts

- Easy handling
- Maximum positioning accuracy

URMA Tools

Drilling, Boring & Reaming





URMA AG WERKZEUGFABRIK

Obermatt 3
CH-5102 Rapperswil
Switzerland
T +41 62 889 20 20
F +41 62 889 20 28
info@urma.ch
www.urma.ch

Subsidiaries

URMA GmbH
Eisenbahnstraße 37
D-77815 Bühl
+49 7223 911 170
info@urma-gmbh.de

URMA Trading (Shanghai) Co. Ltd.
Room 511, Hua Nan Mansion
1988 Dongfang Road
Pudong New District
CN-200125 Shanghai
+86 (21) 6109 6216
info@urmachina.com

Iraupen URMA
Poligono Belartza
ES-20018 Donostia-San Sebastian
Spain
+34 943 667 036
info@iraupen.es

License Manufacturer

Command Tooling Systems, LLC
13931 Sunfish Lake Blvd.
Ramsey MN, 55303 USA
+1 800 328 2197
support@commandtool.com

Paul Horn GmbH
Horn-Straße 1
D-72072 Tübingen
+49 (0) 7071 7004 0
info@phorn.de

Sumitomo Electric Ind., Ltd.
1-1-1, Koyakita,
Itami-shi, Hyogo 664-0016
Japan
+81 72 772 4535
info@sumitomotool.com