

hard material matters



Multi-function tools EcoCut & ProfileMaster

EN



CERATIZIT – secrets of success

Secrets of success

- CERATIZIT is your partner for exceptional hard material solutions. Hard materials and tools from CERATIZIT - our solutions to complex problems are an integral part of our customers' success. Our products guarantee: economy - long life - speed! And it is precisely this combination which gives our business partners a direct competitive advantage.
- Premier performance is only possible through a total appreciation of the requirements of our business partners. A performance achieved through flexible thinking and continuous dialogue with our customers. A pioneering spirit and a deep understanding of powder metallurgy characterize the history of CERATIZIT. One of the attributes of our company philosophy is the search for perfection: target oriented - sustainably - passionately!
- Intensive research and development activities, taking into account the precise requirements and working processes of the customer, are today's investment for the solutions of tomorrow - and beyond.

Corporate values

- 1 The views and focus of our business partners matter
- 2 Innovative and flexible thinking matters
- 3 Communication matters
- 4 Employee development matters
- 5 Professionalism matters
- 6 Our environment matters



Tailored cutting tool solutions

- Cutting materials, coatings, inserts, tooling systems and machining solutions - all this is included in the cutting tool division at CERATIZIT.
- Worldwide well-known companies process advanced materials applying cutting tool products from CERATIZIT: from the automotive industry to the aerospace industry, mechanical engineering and tool construction to the oil industry.
- The basis of these long-term business relations is the faith of the customers in the extensive know-how of the carbide specialists.

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EcoCut / ProfileMaster

Benefits



Reduction of:

- Reduced tool changing times
- Reduced pre-setting and set-up times
- Less programming effort



Masterfinish effect

- Excellent surface finish
- Reduced machining times



Drill a range of diameters



Problem solver in case of insufficient tool storage capacity



Reduced tool acquisition costs



Reduced stock-keeping costs



Produces a flat bottom hole

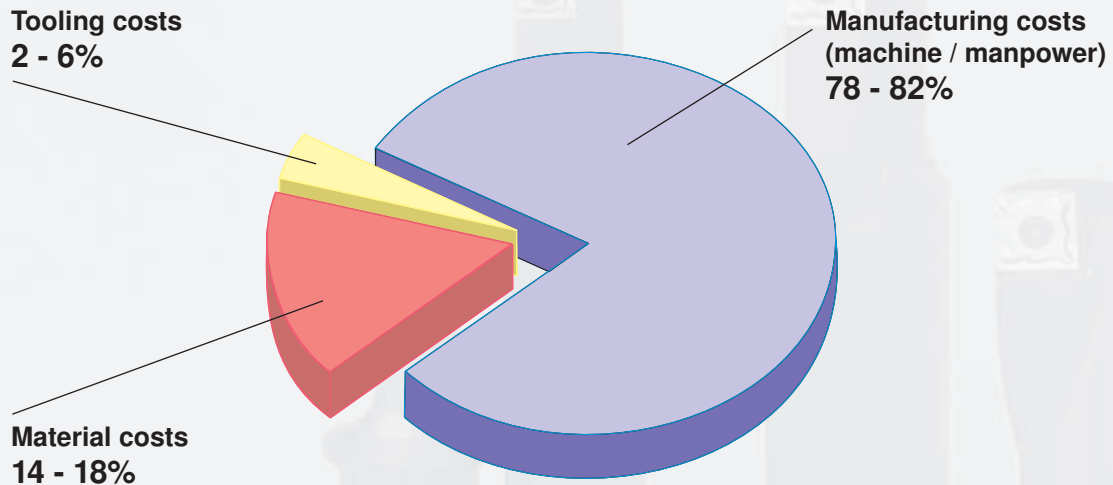


EcoCut / ProfileMaster

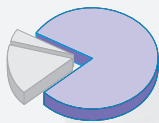
Productivity

Turn the cost screw together with CERATIZIT

Break-down of work piece costs



Increase in productivity (parts produced per time unit):



Due to improved utilization of the available machine capacity considerable cost reduction per work piece becomes possible. In this context CERATIZIT EcoCut makes a decisive contribution through:

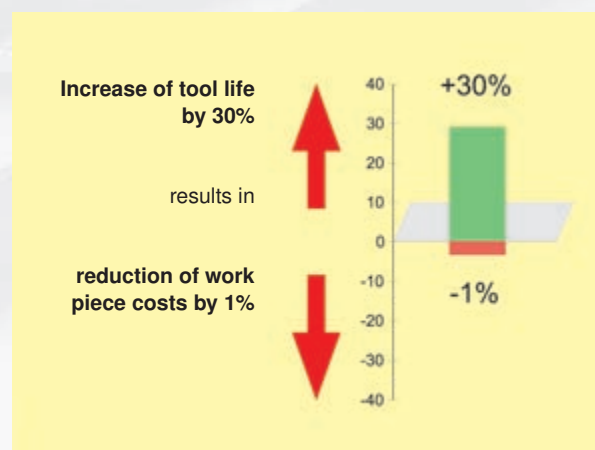
- Fewer tool changes
- Increased v_c
- Increased f
- Increased a_p



Increased tool life:



As the average tool costs amount to only 2 - 6% of the work piece costs, prolonging tool life typically can only reduce total costs minimally.

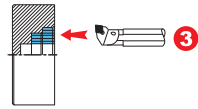
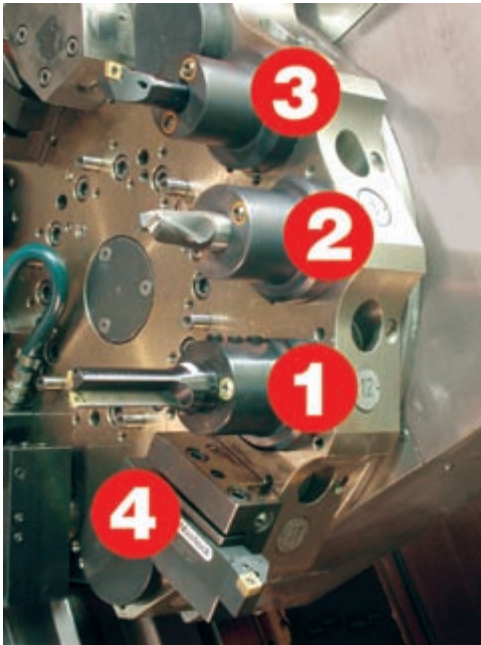


EcoCut

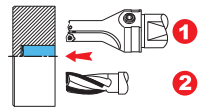
Four machining operations with only one tool



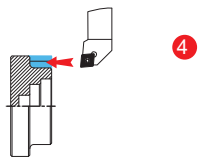
Conventional



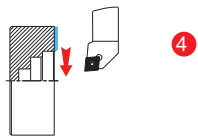
Boring applications



Drilling into solid material with flat bottom holes



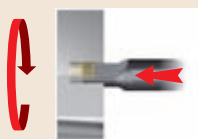
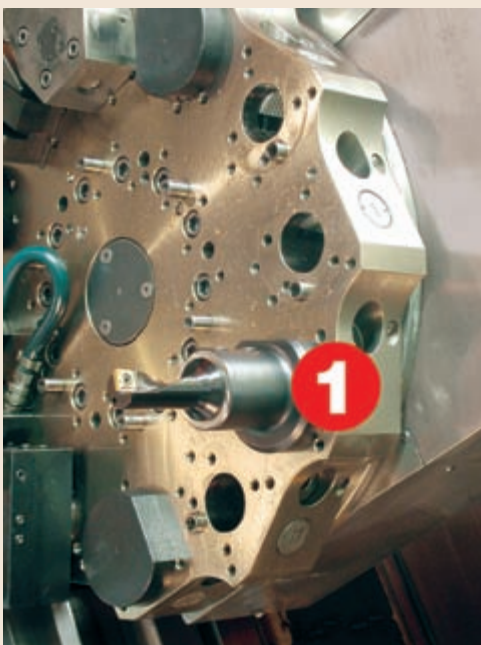
External turning applications



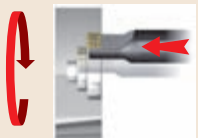
Turning of face profiles



EcoCut



Drilling into solid material with flat bottom holes



Boring applications



Turning of face profiles



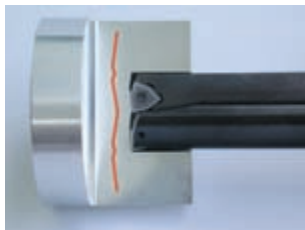
External turning applications

 Reverse direction of rotation

EcoCut / ProfileMaster

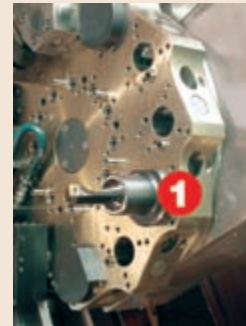
Benefits

Conventional



EcoCut

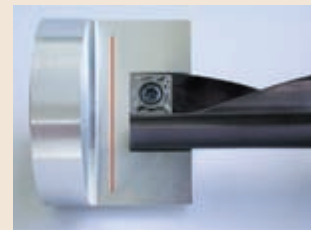
Problem solver for
insufficient tool storage



Less programming effort



Produces a flat bottom hole



Reduced stock-keeping
costs for tools and indexable
inserts



Considerable cost savings
concerning tool acquisition

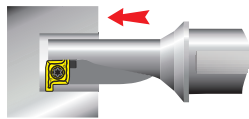
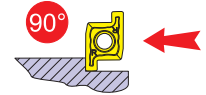
Shorter set-up times
Reduced pre-setting times



ProfileMaster

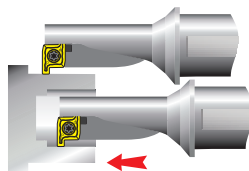
Machining methods

Machining methods - radial application 90°



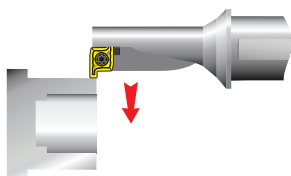
1

Drilling into solid material with flat bottom holes



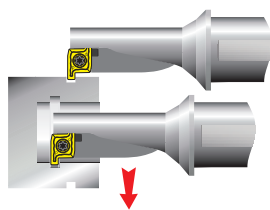
2

Boring applications



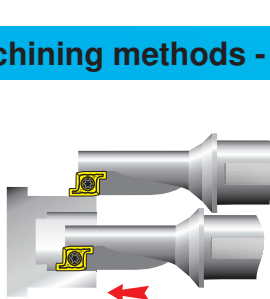
3

External turning applications



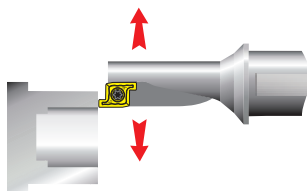
4

Internal turning applications



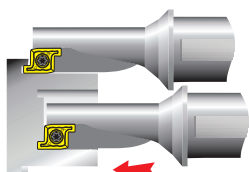
5

Turning of face profiles



6

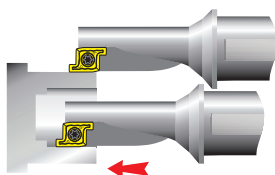
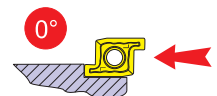
External radial grooving



7

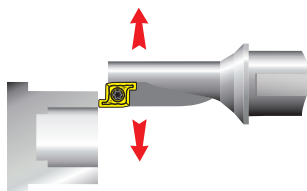
Internal radial grooving

Machining methods - radial application 0°



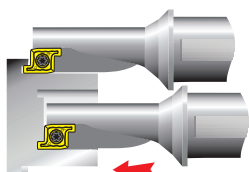
1

External turning applications



2

Boring applications



3

Turning of face profiles



4

External radial grooving



5

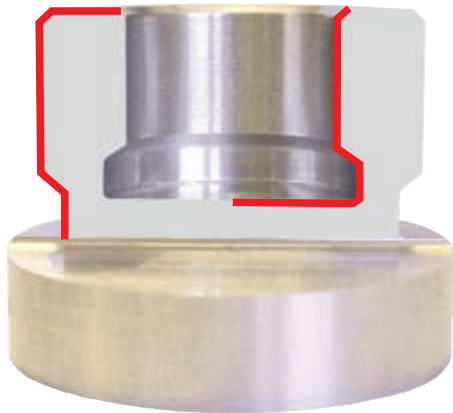
Internal radial grooving



When changing from internal to external machining, reverse direction of rotation

ProfileMaster

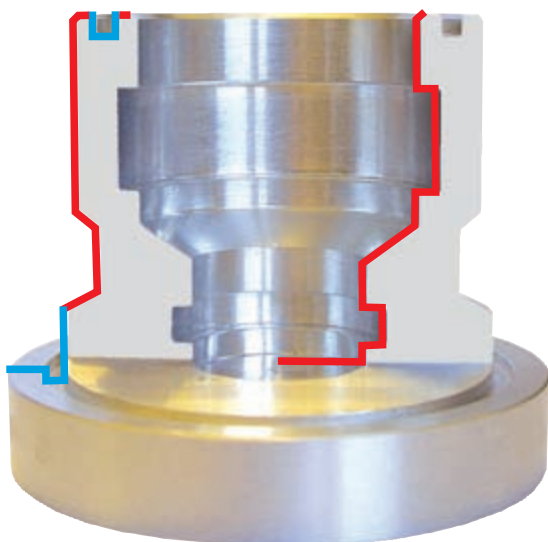
ProfileMaster from CERATIZIT provides the comprehensive solution



right-hand tool



right-hand insert



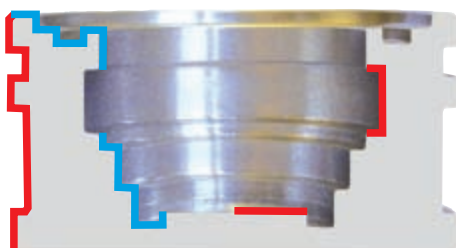
right-hand tool



left-hand insert



right-hand insert



left-hand tool

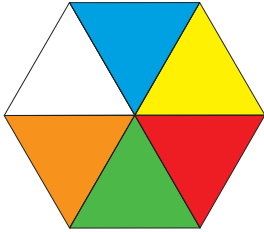
right-hand tool



right-hand insert

MasterGuide

Material



Based on VDI 3323 CERATIZIT's MasterGuide divides materials into six main groups. Each is given a colour, according to the system partly adopted in ISO 513.

Blue: steel

Machining, cementation, tempered and constructional steels

Yellow: stainless steel

Ferritic Cr-steels, austenitic CrNi-steels, martensitic Cr-steels, duplex steels

Red: cast iron

Cast iron, grey cast iron, tempered iron, spheroidal cast iron, CGI, sintered iron

Green: non ferrous metals and non metals

Al wrought and Al cast alloys, copper, copper alloys, non metal materials

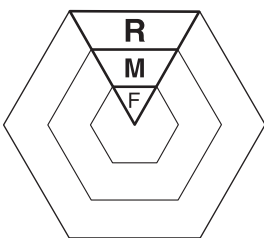
Orange: heat resistant alloys / titanium

Ni/Co-base alloys, Ti alloys

White: hard materials

Hardened steels (≥ 45 HRC), chilled castings, hard cast irons

Machining application type



Each coloured segment is divided into three sections, and each section indicates the relevant machining application type:

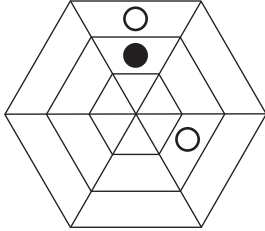
R = rough machining

M = medium machining

F = fine machining



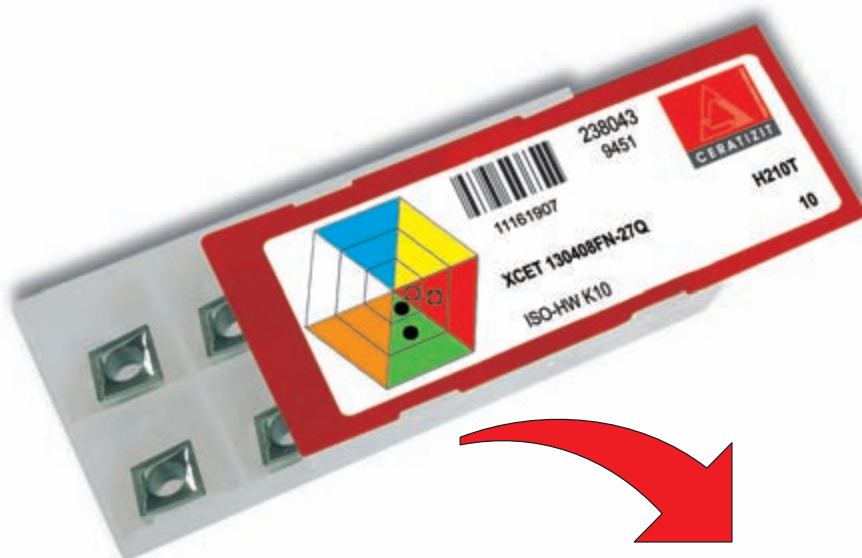
Application



The ideal application area for the insert is indicated by a black circle. Extended applications are indicated by an open circle. The CERATIZIT MasterGuide provides you with an easily understandable structure for choosing a product and enables you to reduce grade and geometry stocks.

- Main application
- Extended application

The right indexable insert at a glance



Main application:

Medium and fine machining of non ferrous metals and non-metallic materials.

Extended application:

Medium and fine machining of cast iron.



Grade overview

Grade designation	Standard designation	Cutting material	Application range										A	R	F	N	S	H		
													Steel	Stainless	Cast iron	Non ferrous metals	Heat resistant	Hard materials		
			01	05	10	15	20	25	30	35	40	45	50							
CTC1425	HC-P25	C																		
	HC-M20	C																		
	HC-K15	C																		
CTC1435	HC-P35	C																		
	HC-M30	C																		
	HC-K20	C																		
CTP2440	HC-P40	P																		
	HC-M35	P																		
	HC-K25	P																		
H210T	HW-M10	W																		
	HW-K10	W																		
H216T	HW-K15	W																		
			01	05	10	15	20	25	30	35	40	45	50	● Main application ○ Extended application						

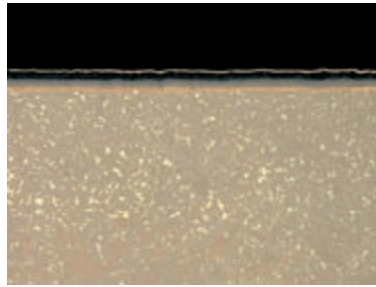
Grade designation	Standard designation	Cutting material	Application range								A	R	F	N	S	H				
			01	05	10	15	20	25	30	35	40	45	50	Steel	Stainless	Cast iron	Non ferrous metals	Heat resistant	Hard materials	
CM45	HC-P45	P																		
	HC-M40	P																		
	HC-K25	P																		
TSM30	HW-K30	W																		
			01	05	10	15	20	25	30	35	40	45	50	● Main application					○ Extended application	

Grade description

Steel

CTC1425

HC-P25
HC-M20
HC-K15



Composition:

Co 7.0%; composite carbides 8.0%; WC rest

Grain size:

1 - 2 μm

Hardness:

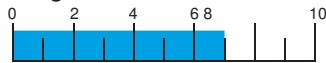
HV 1450

Coating specification:

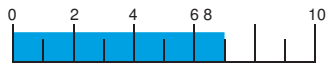
CVD

TiN + Ti (C,N) + Ti (N,B) + Al_2O_3 + Ti (C,N,B);
6 μm

Toughness

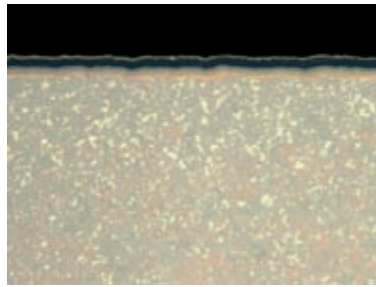
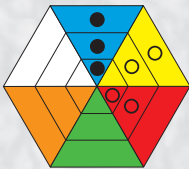


Wear resistance



CTC1435

HC-P35
HC-M30
HC-K20



Composition:

Co 9.5%; composite carbides 6.5%; WC rest

Grain size:

1 - 2 μm

Hardness:

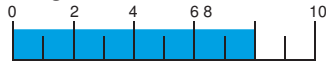
HV 1400

Coating specification:

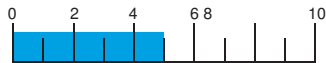
CVD

TiN + Ti (C,N) + Ti (N,B) + Al_2O_3 + Ti (C,N,B);
6 μm

Toughness

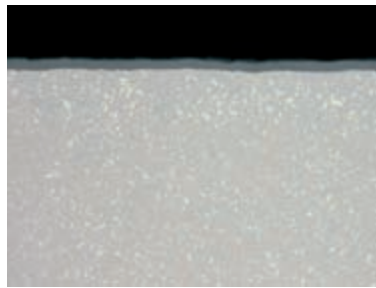
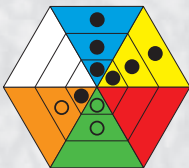


Wear resistance



CTP2440

HC-P40
HC-M35
HC-K25



Composition:

Co 9.5%; composite carbides 6.5%; WC rest

Grain size:

1 - 2 μm

Hardness:

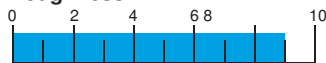
HV 1400

Coating specification:

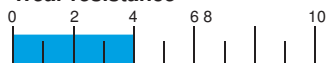
PVD

TiAlN; 3 - 5 μm

Toughness



Wear resistance



Grade description

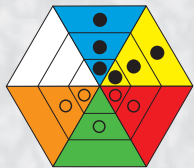
Steel / stainless steel

CM45

HC-P45

HC-M40

HC-K25



Composition:

Co 10.0%; WC rest

Grain size:

0.7 μm (submicron grade)

Hardness:

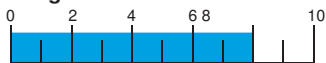
HV 1600

Coating specification:

PVD

TiAlN; 2 - 4 μm

Toughness



Wear resistance

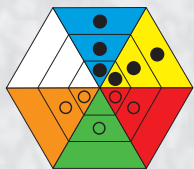


CM45

HC-P45

HC-M40

HC-K25



Composition:

Co 10.0%; WC rest

Grain size:

0.7 μm (submicron grade)

Hardness:

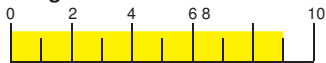
HV 1600

Coating specification:

PVD

TiAlN; 2 - 4 μm

Toughness



Wear resistance

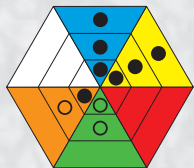


CTP2440

HC-P40

HC-M35

HC-K25



Composition:

Co 9.5%; composite carbides 6.5%; WC rest

Grain size:

1 - 2 μm

Hardness:

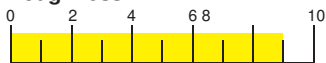
HV 1400

Coating specification:

PVD

TiAlN; 3 - 5 μm

Toughness



Wear resistance

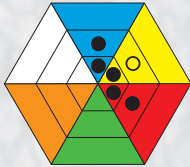


Grade description

Cast iron, non ferrous metals and non metal

CTC1425

HC-P25
HC-M20
HC-K15



Composition:

Co 7.0%; composite carbides 8.0%; WC rest

Grain size:

1 - 2 μm

Hardness:

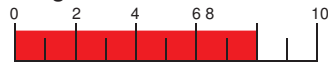
HV 1450

Coating specification:

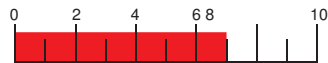
CVD

TiN + Ti (C,N) + Ti (N,B) + Al_2O_3 + Ti (C,N,B);
6 μm

Toughness

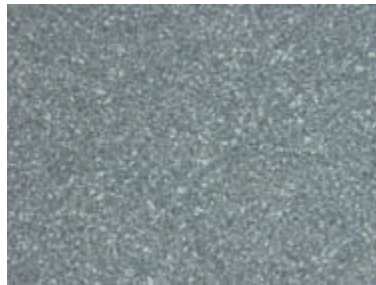
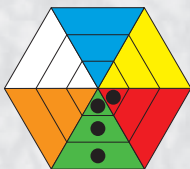


Wear resistance



H216T

HW-K15



Composition:

Co 6.0%; WC rest

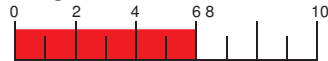
Grain size:

1 μm

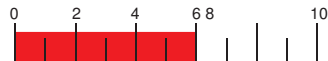
Hardness:

HV 1630

Toughness



Wear resistance

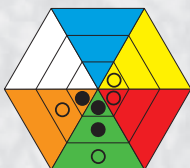


Properties, application:

- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

H210T

HW-M10
HW-K10



Composition:

Co 6.0%; WC rest

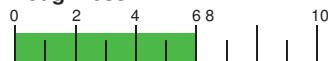
Grain size:

0.8 μm (submicron grade)

Hardness:

HV 1850

Toughness



Wear resistance



Properties, application:

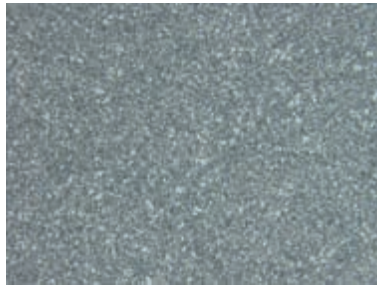
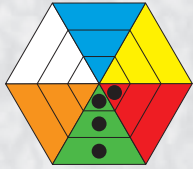
- Ideal for heat resistant alloys, titanium, refractory metals (W, Mo), aluminium and glass & carbon fibre reinforced plastics
- Low tendency to adhesion

Grade description

Non ferrous metals and non metal, heat resistant alloys, titanium

H216T

HW-K15



Composition:

Co 6.0%; WC rest

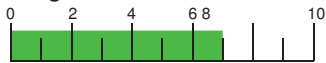
Grain size:

1 μm

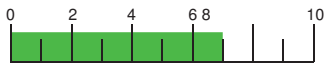
Hardness:

HV 1630

Toughness



Wear resistance

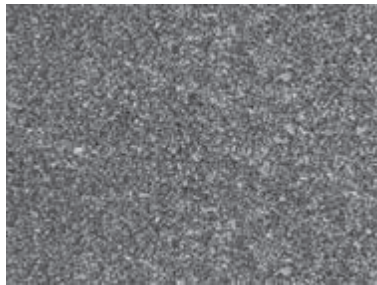
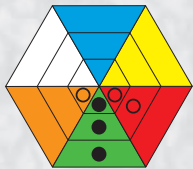


Properties, application:

- Optimally suitable for aluminium
- High wear resistance
- High heat resistance
- Low tendency to adhesion

TSM30

HW-K30



Composition:

Co 10.0%; WC rest

Grain size:

0.7 μm

Hardness:

HV 1550

Toughness



Wear resistance



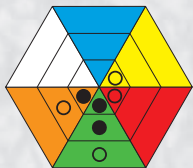
Properties, application:

- Optimally suitable for aluminium
- High wear resistance
- Good toughness

H210T

HW-M10

HW-K10



Composition:

Co 6.0%; WC rest

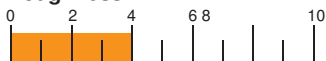
Grain size:

0.8 μm (submicron grade)

Hardness:

HV 1850

Toughness



Wear resistance



Properties, application:

- Ideal for heat resistant alloys, titanium, refractory metals (W, Mo), aluminium and glass & carbon fibre reinforced plastics
- Low tendency to adhesion

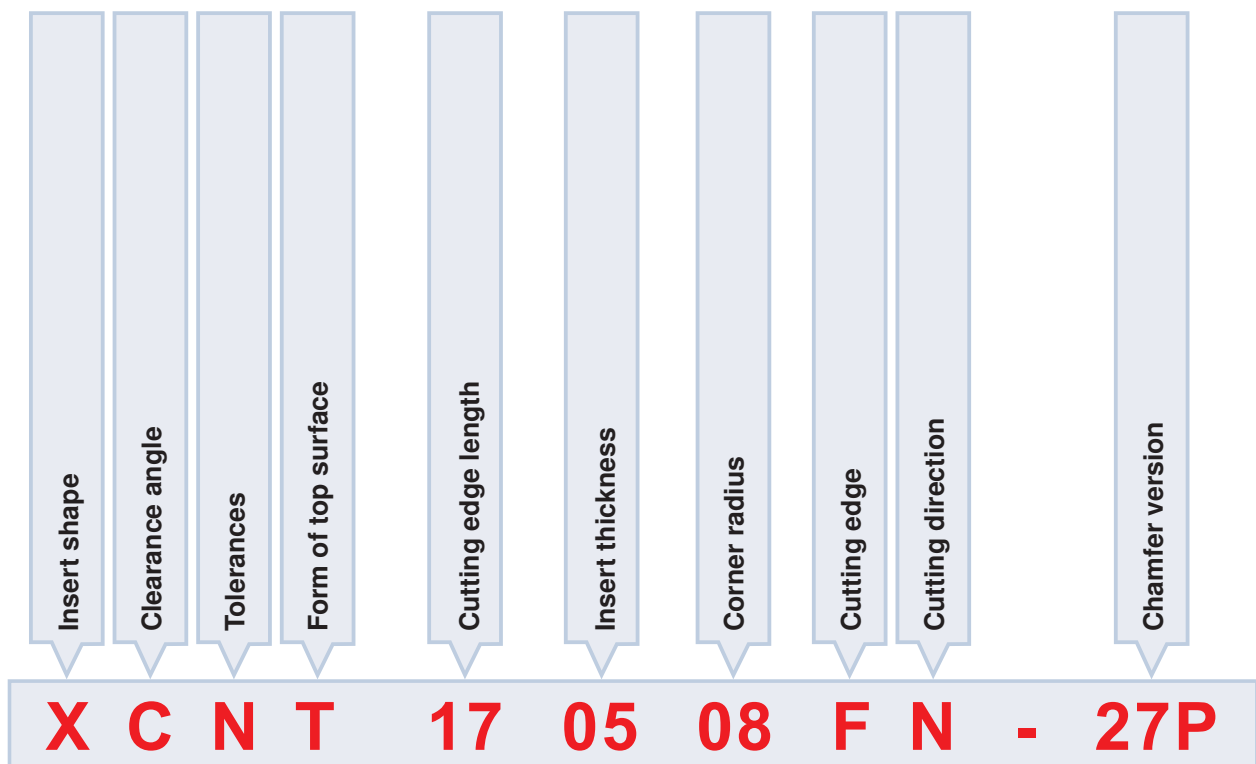




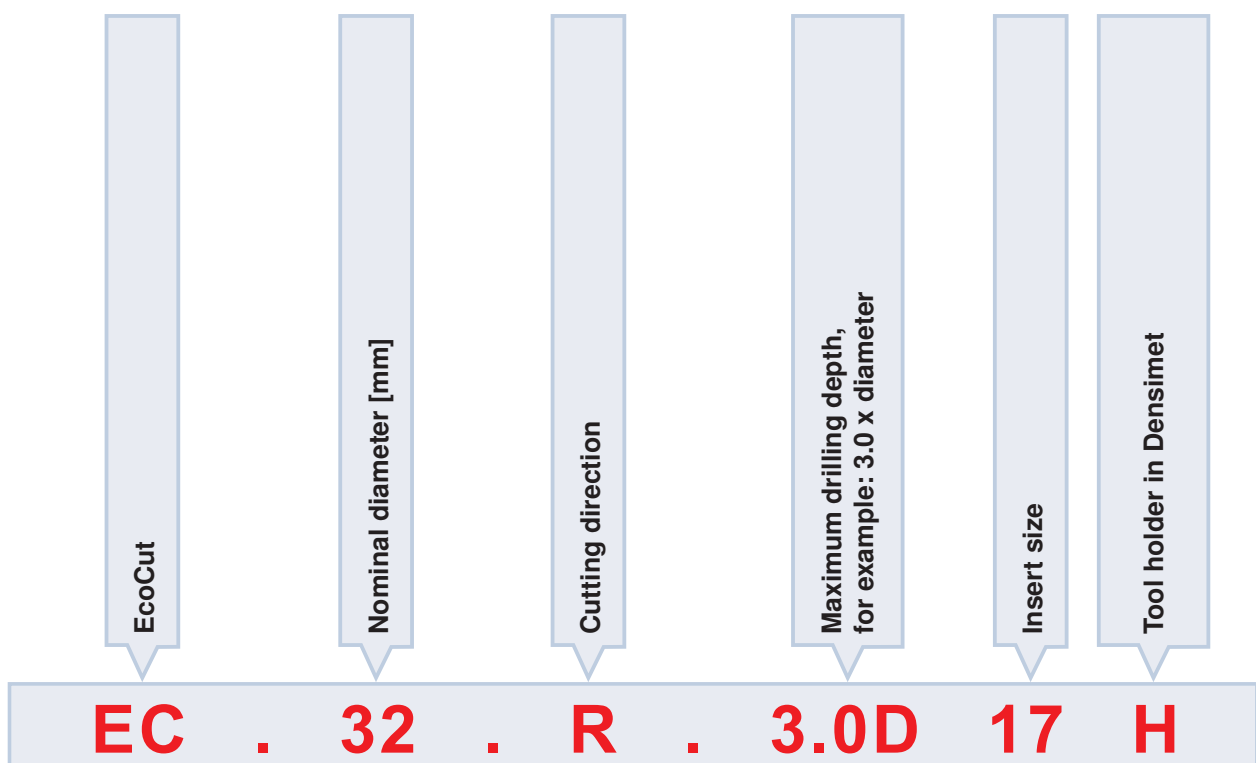
EcoCut

Designation systems

Inserts

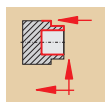


Tools



EcoCut

XCET 04



-27P



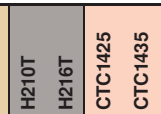
ER-EL



-27Q

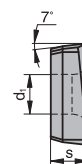
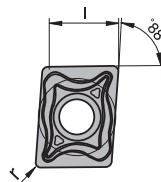


-M50Q

(l) [mm]	Type, description												
			r [mm]	l [mm]	s [mm]	d _i [mm]							
04	XCET 040102FR-27P	R		●				0.20	4.00	1.80	2.10		
	XCET 040102FR-27Q		●										
	XCNT 040102ER				●	●	●						
	XCET 040102FL-27P	L		●									
	XCET 040102FL-27Q		●										
	XCNT 040102EL				●	●	●						
	XCET 040104FR-27P	R		●				0.40					
	XCET 040104FR-27Q		●										
	XCNT 040104ER				●	●	●						
	XCNT 040104ER-M50Q	L				●							
	XCET 040104FL-27P			●									
	XCET 040104FL-27Q		●										
	XCNT 040104EL				●	●	●						
	XCNT 040104EL-M50Q					●							



Steel			●	●	●	●
Stainless	●	●	●	●	●	●
Cast iron	●	●	●	●	●	●
Non ferrous metals	●	●	●	●	●	●
Heat resistant	●	●	●	●	●	●
Hard materials						



- Main application
- Extended application
- International CERATIZIT range, for present availability see price list

Ordering example: 10 pieces XCET 040102FR-27P H216T



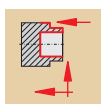
42-43



29

EcoCut

XCET 05-07



-27P



EN



-27Q

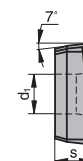
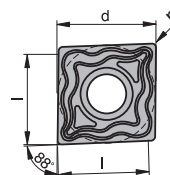


-M50Q

(l) [mm]	Type, description		H210T	H216T	CTC1425	CTC1435	CTP2440								
									d [mm]	l [mm]	s [mm]	r [mm]	d ₁ [mm]		
05	XCET 050202FN-27P	N		●					5.80	5.00	2.10	0.20	2.25		
	XCET 050202FN-27Q		●												
	XCNT 050202EN				●	●	●	0.40							
	XCET 050204FN-27P			●											
	XCET 050204FN-27Q		●												
	XCNT 050204EN				●	●	●								
XCNT 050204EN-M50Q					●		0.40								
06	XCET 060202FN-27P			●						6.50	6.00	2.38	0.20	2.50	
	XCET 060202FN-27Q		●												
	XCNT 060202EN				●	●			●				0.40		
	XCET 060204FN-27P			●											
	XCET 060204FN-27Q		●												
	XCNT 060204EN				●	●	●								
XCNT 060204EN-M50Q					●		0.40								
07	XCET 070304FN-27P			●						7.60	7.00	3.18	2.80		
	XCET 070304FN-27Q		●												
	XCNT 070304EN				●	●			●						
	XCNT 070304EN-M50Q					●									



Steel	●	●	●	●	●
Stainless	○	○	○	○	○
Cast iron	●	●	●	●	●
Non ferrous metals	●	●	●	●	●
Heat resistant	●	●	●	●	●
Hard materials					



- Main application
- Extended application
- International CERATIZIT range, for present availability see price list

Ordering example: 10 pieces XCET 050202FN-27P H216T



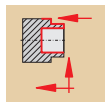
42-43



29-30

EcoCut

XCET 08-10



-27P



EN



-27Q

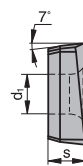
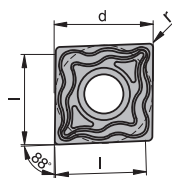


-M50Q

(l) [mm]	Type, description	L N R 	H210T	H216T	CTC1425	CTC1435	CTP2440	d [mm]	l [mm]	s [mm]	r [mm]	d ₁ [mm]
08	XCET 080304FN-27P	N		●				8.50	8.00	3.18	0.40	3.40
	XCET 080304FN-27Q		●									
	XCNT 080304EN				●	●	●					
	XCNT 080304EN-M50Q				●							
09	XCET 09T304FN-27P			●				9.60	9.00	3.97	0.40	3.40
	XCET 09T304FN-27Q		●									
	XCNT 09T304EN				●	●	●					
	XCNT 09T304EN-M50Q				●							
10	XCET 10T304FN-27P			●				10.60	10.00	3.97	0.40	4.40
	XCET 10T304FN-27Q		●									
	XCNT 10T304EN				●	●	●					
	XCNT 10T304EN-M50Q				●							
	XCET 10T308FN-27P			●							0.80	4.40
	XCET 10T308FN-27Q		●									
	XCNT 10T308EN				●	●	●					
	XCNT 10T308EN-M50Q				●							



Steel							
Stainless	●	●	●	●	●	●	●
Cast iron	●	●	●	●	●	●	●
Non ferrous metals	●	●	●	●	●	●	●
Heat resistant	●	●	●	●	●	●	●
Hard materials							



- Main application
- Extended application
- International CERATIZIT range, for present availability see price list

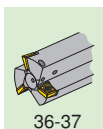
Ordering example: 10 pieces XCET 080304FN-27P H216T



42-43



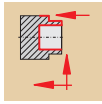
30-32



36-37

EcoCut

XCET 13-17



-27P



EN



-27Q

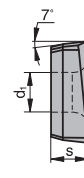
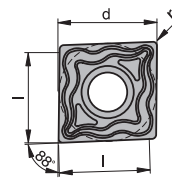


-M50Q

(l) [mm]	Type, description		H210T	H216T	CTC1425	CTC1435	CTP2440						
									d [mm]	l [mm]	s [mm]	r [mm]	d _i [mm]
13	XCET 130404FN-27P	N		●					13.50	12.50	4.76	0.40	5.30
	XCET 130404FN-27Q		●										
	XCNT 130404EN				●	●	●						
	XCNT 130404EN-M50Q				●								
	XCET 130408FN-27P			●				0.80					
	XCET 130408FN-27Q		●										
	XCNT 130408EN				●	●	●						
	XCNT 130408EN-M50Q				●								
17	XCET 170508FN-27P	N		●				17.50	16.00	5.56	0.80	5.30	
	XCET 170508FN-27Q		●										
	XCNT 170508EN				●	●	●						
	XCNT 170508EN-M50Q				●								



Steel	●	●	●	●	●
Stainless	○	○	○	○	○
Cast iron	●	●	●	●	●
Non ferrous metals	○	○	○	○	○
Heat resistant	○	○	○	○	○
Hard materials	○	○	○	○	○



- Main application
- Extended application
- International CERATIZIT range, for present availability see price list

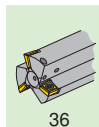
Ordering example: 10 pieces XCET 130404FN-27P H216T



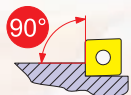
42-43



31-35

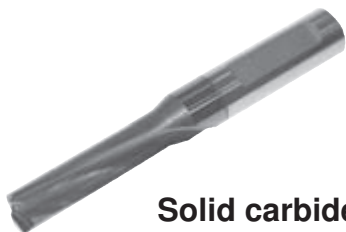
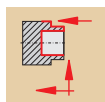


36

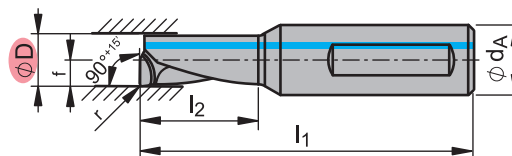


EcoCut Mini

ECM Ø 4 - 5 mm



Solid carbide



D [mm]	Type, description												
									d _A [mm]	l ₁ [mm]	l ₂ [mm]	f [mm]	r [mm]
4	EC 04R-2.25D	R							6	35	9	2	0.2
	EC 04R-2.25D-27									41	16		
	EC 04R-4.00D									35	9		
	EC 04R-4.00D-27									41	16		
	EC 04L-2.25D	L								35	9	2.5	
	EC 04L-2.25D-27									41	16		
	EC 04L-4.00D									37	11.25		
	EC 04L-4.00D-27									45	20		
5	EC 05R-2.25D	R							6	37	11.25	2.5	0.2
	EC 05R-2.25D-27									45	20		
	EC 05R-4.00D									37	11.25		
	EC 05R-4.00D-27									45	20		
	EC 05L-2.25D	L								37	11.25	2.5	
	EC 05L-2.25D-27									45	20		
	EC 05L-4.00D									37	11.25		
	EC 05L-4.00D-27									45	20		



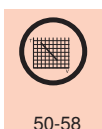
Steel	●	●	●	●	●	●	●	●	●
Stainless	●	●	●	●	●	●	●	●	●
Cast iron	○	○	○	○	○	○	○	○	○
Non ferrous metals	●	●	●	●	●	●	●	●	●
Heat resistant	○	○	○	○	○	○	○	○	○
Hard materials									

- Uncoated
- Coated
- Main application

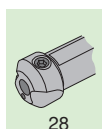
Ordering example: 10 pieces EC 04R-2.25D CM45



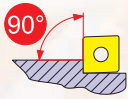
42-43



50-58

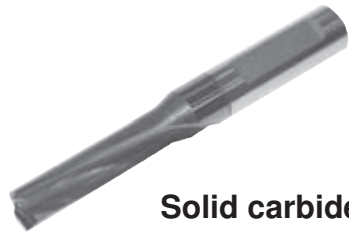
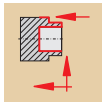


28

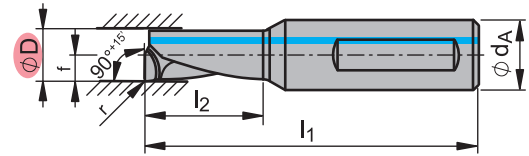


EcoCut Mini

ECM Ø 6 - 7 mm



Solid carbide



D [mm]	Type, description	L R 	TSM30	CM45										
										d _A [mm]	l ₁ [mm]	l ₂ [mm]	f [mm]	r [mm]
6	EC 06R-2.25D	R		●					8	38	13.5	3	0.2	
	EC 06R-2.25D-27		●							49	24			
	EC 06R-4.00D			●						38	13.5			
	EC 06R-4.00D-27		●					49		24				
	EC 06L-2.25D	L		●						38	13.5			
	EC 06L-2.25D-27		●					49		24				
	EC 06L-4.00D			●										
	EC 06L-4.00D-27		●											
7	EC 07R-2.25D	R		●					8	42	15.75	3.5		
	EC 07R-2.25D-27		●							53	28			
	EC 07R-4.00D			●						42	15.75			
	EC 07R-4.00D-27		●					53		28				
	EC 07L-2.25D	L		●										
	EC 07L-2.25D-27		●											
	EC 07L-4.00D			●										
	EC 07L-4.00D-27		●											



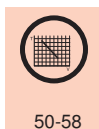
Steel	●	●	●	●	●	●
Stainless	●	●	●	●	●	●
Cast iron	○	○	○	○	○	○
Non ferrous metals	●	○	●	●	●	●
Heat resistant	○	○	○	○	○	○
Hard materials						

- Uncoated
- Coated
- Main application

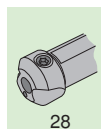
Ordering example: 10 pieces EC 06R-2.25D CM45



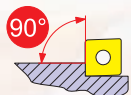
42-43



50-58

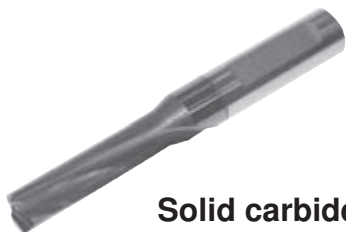
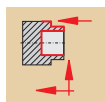


28

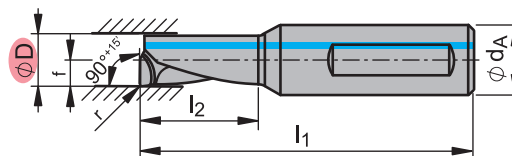


EcoCut Mini

ECM Ø 8 mm



Solid carbide



D [mm]	Type, description												
									d _A [mm]	l ₁ [mm]	l ₂ [mm]	f [mm]	r [mm]
8	EC 08R-2.25D	R							8	45	18	4	0.2
	EC 08R-2.25D-27												
	EC 08R-4.00D												
	EC 08R-4.00D-27												
	EC 08L-2.25D	L								45	18		
	EC 08L-2.25D-27									57	32		
	EC 08L-4.00D												
	EC 08L-4.00D-27												



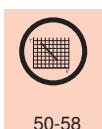
Steel	●	●	●	●	●	●
Stainless	●	●	●	●	●	●
Cast iron	○	○	○	○	○	○
Non ferrous metals	●	○	○	○	○	○
Heat resistant	○	○	○	○	○	○
Hard materials						

- Uncoated
- Coated
- Main application

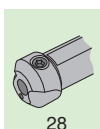
Ordering example: 10 pieces EC 08R-2.25D CM45



42-43



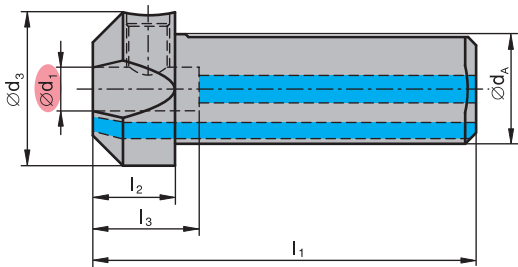
50-58



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EcoCut Mini

Adapters



d ₁ [mm]	Type, description	d _A [mm]	d ₃ [mm]	l ₁ [mm]	l ₂ [mm]	l ₃ [mm]
6	EC-ADX20-06	20	25	65	14	18
8	EC-ADX20-08					

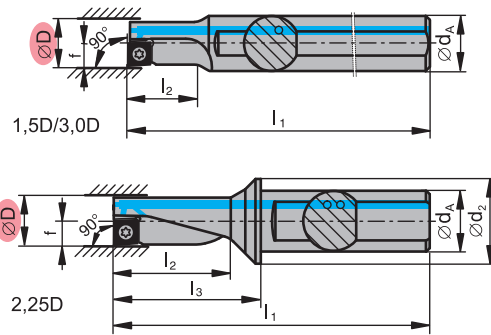
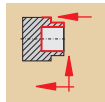
Ordering example: 1 piece EC-ADX20-06

d ₁ [mm]	 1 piece		
6	7897990/M8X1X8 DIN913		
8	7897990/M8X1X8 DIN913		



EcoCut Classic

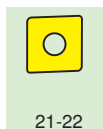
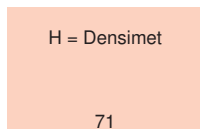
EC Ø 8 - 12 mm



D [mm]	Type, description	L R	d _A [mm]	d ₂ [mm]	l ₁ [mm]	l ₂ [mm]	l ₃ [mm]	f [mm]	
8	EC 08R-1.5D 04	R	12		80	12		4	XC.. 0401..
	EC 08R-2.25D 04		10	12	60	18	22.0		
	EC 08R-3.0D 04 H		12		80	24			
	EC 08L-1.5D 04	L	12		80	12			
	EC 08L-2.25D 04		10	12	60	18	22.0		
	EC 08L-3.0D 04 H		12		80	24			
10	EC 10R-1.5D 05	R	12		90	15		5	XC.. 0502..
	EC 10R-2.25D 05		12	16	69.5	22.5	27.5		
	EC 10R-3.0D 05 H		12		85	30			
	EC 10L-1.5D 05	L	12		90	15			
	EC 10L-2.25D 05		12	16	69.5	22.5	27.5		
	EC 10L-3.0D 05 H		12		85	30			
12	EC 12R-1.5D 06	R	16		100	18		6	XC.. 0602..
	EC 12R-2.25D 06		16	20	78	27	33.0		
	EC 12R-3.0D 06 H		16		95	36			
	EC 12L-1.5D 06	L	16		100	18			
	EC 12L-2.25D 06		16	20	78	27	33.0		
	EC 12L-3.0D 06 H		16		95	36			

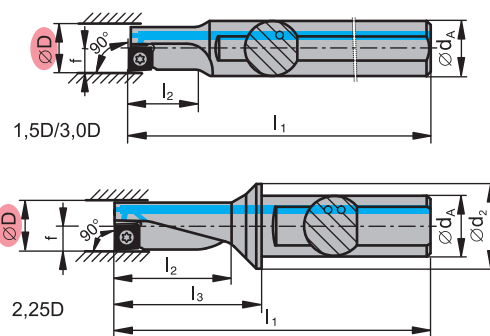
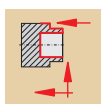
Ordering example: 1 piece EC 08R-1.5D 04

	D [mm]	10 pieces	1 piece	
XC.. 0401..	8	7815108/M1,8X3,4/T06	7883305/TORX T06	
XC.. 0502..	10	7815110/M2,0X4,0/T06	7883305/TORX T06	
XC.. 0602..	12	7722113/M2,2X5/T07	7724105/TORX T07	



EcoCut Classic

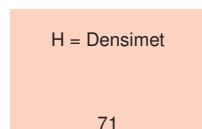
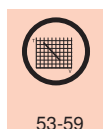
EC Ø 14 - 18 mm



D [mm]	Type, description		d _A [mm]	d ₂ [mm]	l ₁ [mm]	l ₂ [mm]	l ₃ [mm]	f [mm]	
14	EC 14R-1.5D 07	R	16		110	21		7	XC.. 0703..
	EC 14R-2.25D 07			20	83.5	31.5	38.5		
	EC 14R-3.0D 07 H				100	42			
	EC 14L-1.5D 07	L			110	21			
	EC 14L-2.25D 07			20	83.5	31.5	38.5		
	EC 14L-3.0D 07 H				100	42			
16	EC 16R-1.5D 08	R	20		125	24		8	XC.. 0803..
	EC 16R-2.25D 08			25	94	36	44.0		
	EC 16R-3.0D 08 H				110	48			
	EC 16L-1.5D 08	L			125	24			
	EC 16L-2.25D 08			25	94	36	44.0		
	EC 16L-3.0D 08 H				110	48			
18	EC 18R-1.5D 09	R	25		135	27		9	XC.. 09T3..
	EC 18R-2.25D 09			32	109.5	40.5	53.5		
	EC 18R-3.0D 09 H				125	54			
	EC 18L-1.5D 09	L			135	27			
	EC 18L-2.25D 09			32	109.5	40.5	53.5		
	EC 18L-3.0D 09 H				125	54			

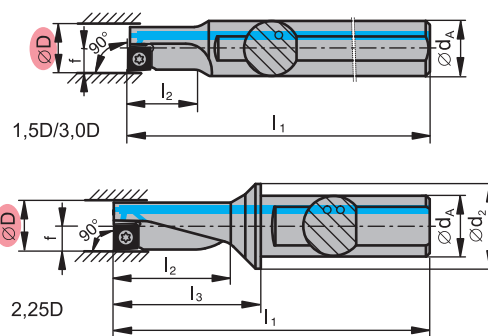
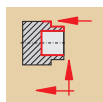
Ordering example: 1 piece EC 14R-1.5D 07

	D [mm]			
		10 pieces	1 piece	
XC.. 0703..	14	7815101/M2,5X6,0/T08	7724106/TORX T08	
XC.. 0803..	16	7883203/M3,0X7,3/T08	7724106/TORX T08	
XC.. 09T3..	18	7883203/M3,0X7,3/T08	7724106/TORX T08	



EcoCut Classic

EC Ø 20 - 32 mm



D [mm]	Type, description		d _A [mm]	d ₂ [mm]	l ₁ [mm]	l ₂ [mm]	l ₃ [mm]	f [mm]	
20	EC 20R-1.5D 10	R	25		150	30		10	XC.. 10T3..
	EC 20R-2.25D 10			32	111	45	55.0		
	EC 20R-3.0D 10 H				130	60			
	EC 20L-1.5D 10	L			150	30			
	EC 20L-2.25D 10			32	111	45	55.0		
	EC 20L-3.0D 10 H				130	60			
25	EC 25R-1.5D 13	R	32		180	37.5		12.5	XC.. 1304..
	EC 25R-2.25D 13			40	129	56.5	69.0		
	EC 25R-3.0D 13 H				150	75			
	EC 25L-1.5D 13	L			180	37.5			
	EC 25L-2.25D 13			40	129	56.5	69.0		
	EC 25L-3.0D 13 H				150	75			
32	EC 32R-1.5D 17	R	40		200	48		16	XC.. 1705..
	EC 32R-2.25D 17			50	158	72	88.0		
	EC 32R-3.0D 17 H				185	96			
	EC 32L-1.5D 17	L			200	48			
	EC 32L-2.25D 17			50	158	72	88.0		
	EC 32L-3.0D 17 H				185	96			

Ordering example: 1 piece EC 20R-1.5D 10

	D [mm]	10 pieces	1 piece	
XC.. 10T3..	20	7883209/M3,5X8,6/T15	7724103/TORX T15	
XC.. 1304..	25	7822114/M4,5X10,5/T20	7724104/TORX T20	
XC.. 1705..	32	7822114/M4,5X10,5/T20	7724104/TORX T20	



42-43



53-59

H = Densimet

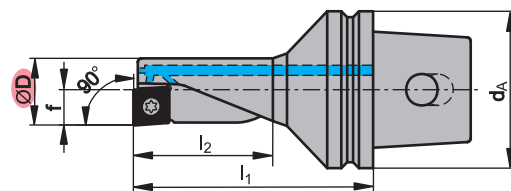
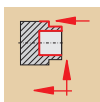
71



23-24

EcoCut Classic UTS

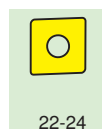
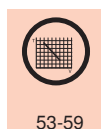
EC Ø 16 - 32 mm



D [mm]	Type, description	L R	d _A [mm]	l ₁ [mm]	l ₂ [mm]	f [mm]	
16	UT40-EC 16R-2.25D 08	R	40	60	36	8	XC.. 0803..
	UT50-EC 16R-2.25D 08		50	70	36		
	UT40-EC 16L-2.25D 08	L	40	60	36		
18	UT40-EC 18L-2.25D 09	L	40	65	40.5	9	XC.. 09T3..
20	UT40-EC 20R-2.25D 10	R	40	70	45	10	XC.. 10T3..
	UT50-EC 20R-2.25D 10		50	80	45		
	UT40-EC 20L-2.25D 10	L	40	70	45		
	UT50-EC 20L-2.25D 10		50	80	45		
25	UT40-EC 25R-2.25D 13	R	40	80	56.5	12.5	XC.. 1304..
	UT50-EC 25R-2.25D 13		50	90	56.5		
	UT63-EC 25R-2.25D 13		63	95	56.5		
	UT40-EC 25L-2.25D 13	L	40	80	56.5		
	UT50-EC 25L-2.25D 13		50	90	56.5		
32	UT40-EC 32R-2.25D 17	R	40	95	72	16	XC.. 1705..
	UT50-EC 32R-2.25D 17		50	100	72		
	UT63-EC 32R-2.25D 17		63	105	72		
	UT40-EC 32L-2.25D 17	L	40	95	72		
	UT50-EC 32L-2.25D 17		50	100	72		
	UT63-EC 32L-2.25D 17		63	105	72		

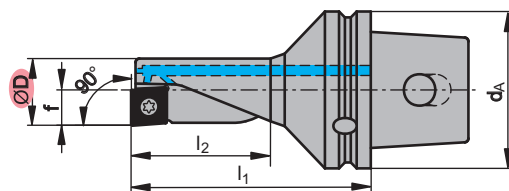
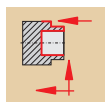
Ordering example: 1 piece UT40-EC 16R-2.25D 08

	D [mm]	10 pieces	1 piece	
XC.. 0803..	16	7883203/M3,0X7,3/T08	7724106/TORX T08	
XC.. 09T3..	18	7883203/M3,0X7,3/T08	7724106/TORX T08	
XC.. 10T3..	20	7883209/M3,5X8,6/T15	7724103/TORX T15	
XC.. 1304..	25	7822114/M4,5X10,5/T20	7724104/TORX T20	
XC.. 1705..	32	7822114/M4,5X10,5/T20	7724104/TORX T20	



EcoCut Classic UTS MIY

EC Ø 25 - 32 mm for Mazak Integrex



D [mm]	Type, description	L R 	d _A [mm]	l ₁ [mm]	l ₂ [mm]	f [mm]	
25	UT63-EC 25R-2.25D 13-MIY	R	63	95	56.5	12.5	XC.. 1304..
	UT63-EC 25L-2.25D 13-MIY	L					
32	UT63-EC 32R-2.25D 17-MIY	R	63	105	72	16	XC.. 1705..
	UT63-EC 32L-2.25D 17-MIY	L					

Ordering example: 1 piece UT63-EC 25R-2.25D 13-MIY

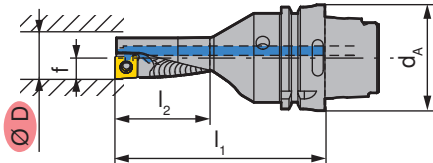
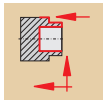
	D [mm]	 10 pieces	 1 piece	
XC.. 1304..	25	7822114/M4,5X10,5/T20	7724104/TORX T20	
XC.. 1705..	32	7822114/M4,5X10,5/T20	7724104/TORX T20	





EcoCut Classic HSK-T

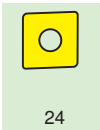
ECC Ø 25 - 32 mm



D [mm]	Type, description	L R 	d _A [mm]	l ₁ [mm]	l ₂ [mm]	f [mm]	
25	HSK-T63-EC-25R-2.25D 13	R	63	125	56.5	12.5	XC.. 1304..
	HSK-T63-EC-25L-2.25D 13	L					
32	HSK-T63-EC-32R-2.25D 17	R	72	16	72	16	XC.. 1705..
	HSK-T63-EC-32L-2.25D 17	L					

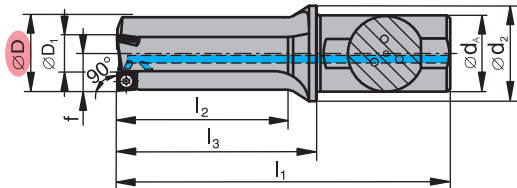
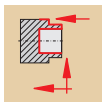
Ordering example: 1 piece HSK-T63-EC-25R-2.25D 13

	D [mm]	 10 pieces	 1 piece	
XC.. 1304..	25	7822114/M4,5X10,5/T20	7724104/TORX T20	
XC.. 1705..	32	7822114/M4,5X10,5/T20	7724104/TORX T20	



EcoCut Rebore

ECR Ø 40 - 60 mm



D [mm]	Type, description	L R 	D ₁ [mm]	d _A [mm]	d ₂ [mm]	l ₁ [mm]	l ₂ [mm]	l ₃ [mm]	f [mm]	
40	ECR 4020R03-2.25D 10	R	20	40	50	175	90	105.0	20	XC.. 10T3..
	ECR 4020L03-2.25D 10	L			70	232	135	162.0	30	
60	ECR 6032R03-2.25D 17	R	32	40	70	232	135	162.0	30	XC.. 1705..
	ECR 6032L03-2.25D 17	L			70	232	135	162.0	30	

Ordering example: 1 piece ECR 4020R03-2.25D 10



Initial bore necessary!

	D [mm]	 10 pieces	 1 piece	
XC.. 10T3..	40	7883209/M3,5X8,6/T15	7724103/TORX T15	
XC.. 1705..	60	7822114/M4,5X10,5/T20	7724104/TORX T20	



42-43



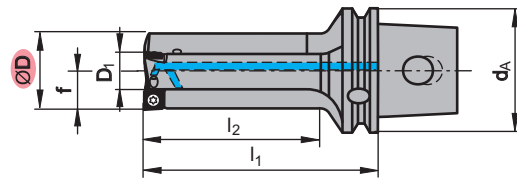
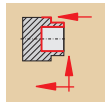
56-57



23-24

EcoCut Rebore UTS MIY

ECR Ø 40 mm for Mazak Integrex



D [mm]	Type, description	L R	D ₁ [mm]	d _A [mm]	l ₁ [mm]	l ₂ [mm]	f [mm]	
40	UT63-ECR40R3-2.25D-MIY	R	20	63	120	90	20	XC.. 10T3..

Ordering example: 1 piece UT63-ECR40R3-2.25D-MIY



Initial bore necessary!

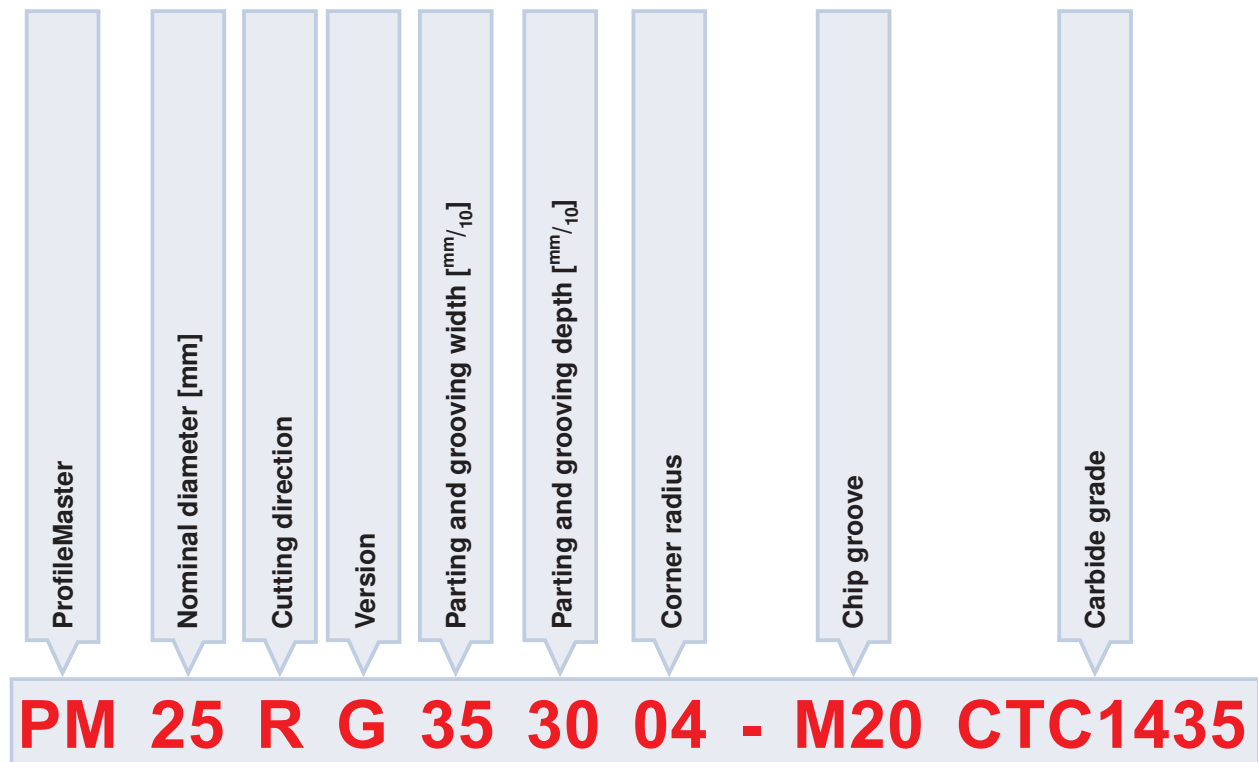
	D [mm]			
XC.. 10T3..	40	10 pieces 7883209/M3,5X8,6/T15	1 piece 7724103/TORX T15	



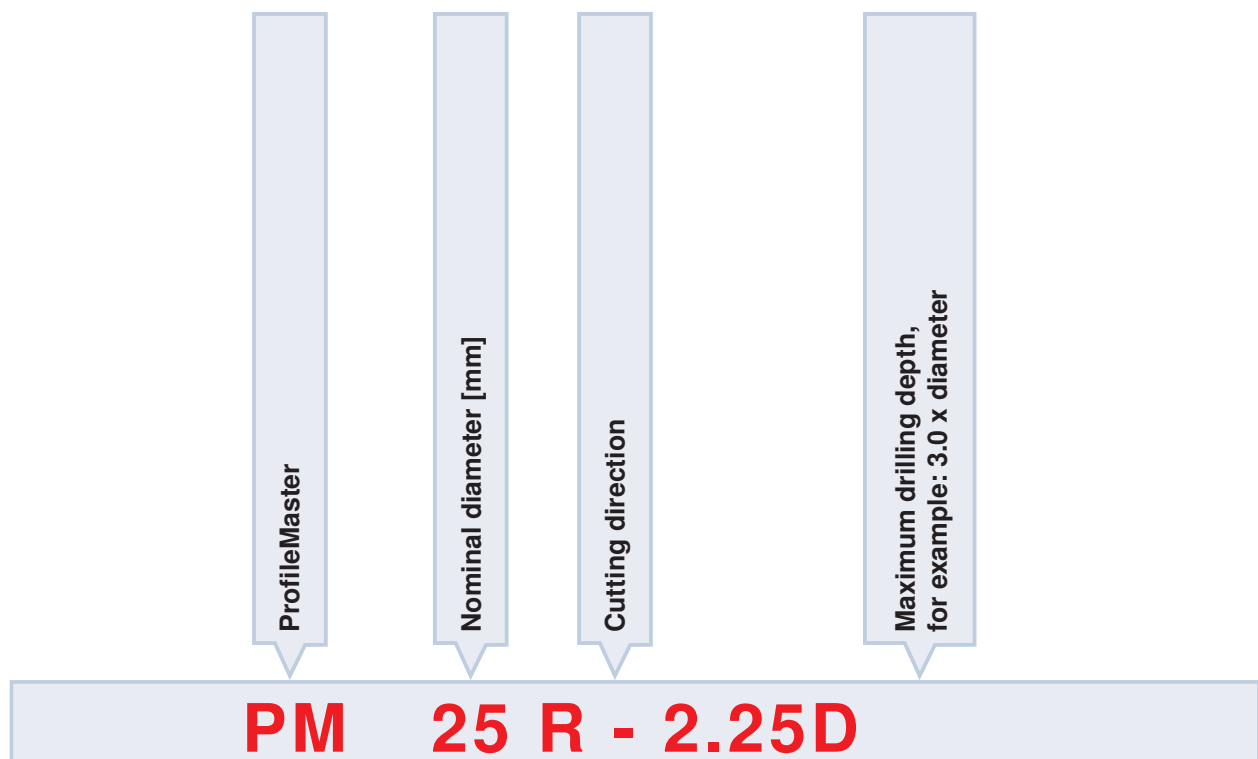
ProfileMaster

Designation systems

Inserts

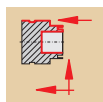


Tools



ProfileMaster

PM Ø 10 - 32 mm



-M20

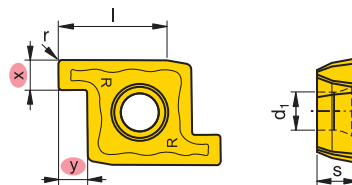
Size	Type, description	LNR	CTC1435	CTP2440		x [mm]	y [mm]	l [mm]	s [mm]	d ₁ [mm]	r [mm]
10	PM 10RG 201504-M20	R	●	●		2.00	1.50	5.00	2.10	2.10	0.40
	PM 10LG 201504-M20	L	●	●							
12	PM 12RG 201804-M20	R	●	●		2.50	1.80	6.00	2.30	2.50	
	PM 12LG 201804-M20	L	●	●							
16	PM 16RG 252004-M20	R	●	●		3.00	2.00	8.00	2.80	3.40	
	PM 16LG 252004-M20	L	●	●							
20	PM 20RG 302504-M20	R	●	●		3.50	2.50	10.00	3.80	4.10	
	PM 20LG 302504-M20	L	●	●							
25	PM 25RG 353004-M20	R	●	●		4.00	3.00	12.50	4.50	4.40	
	PM 25LG 353004-M20	L	●	●							
32	PM 32RG 404004-M20	R	●	●		4.00	4.00	16.00	5.50	6.00	
	PM 32LG 404004-M20	L	●	●							



Steel	●	●	●	●
Stainless	○	●	●	●
Cast iron	○	●	●	●
Non ferrous metals	○	○	○	○
Heat resistant	○	○	○	○
Hard materials	○	○	○	○

- Main application
- Extended application
- International CERATIZIT range, for present availability see price list

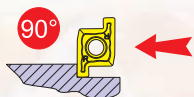
Ordering example: 10 pieces PM 10RG 201504-M20 CTP2440



42-43

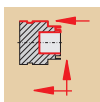


40-41

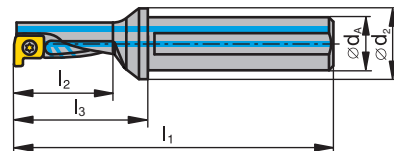
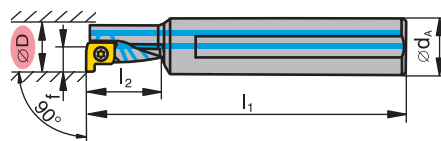


ProfileMaster

PM Ø 10 - 32 mm



90°

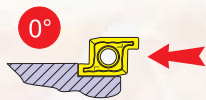


		L R							
D [mm]	Type, description		d _A [mm]	d ₂ [mm]	l ₁ [mm]	l ₂ [mm]	l ₃ [mm]	f [mm]	
10	PM 10R-1.5D	R	12		80	15		5	PM 10..
	PM 10R-2.25D			16	72.4	22.5	30.4		
	PM 10L-1.5D	L			80	15			
	PM 10L-2.25D			16	72.4	22.5	30.4		
12	PM 12R-1.5D	R	16		90	18		6	PM 12..
	PM 12R-2.25D			20	78	27	33.0		
	PM 12L-1.5D	L			90	18			
	PM 12L-2.25D			20	78	27	33.0		
16	PM 16R-1.5D	R	20		125	24		8	PM 16..
	PM 16R-2.25D			25	96.5	36	46.5		
	PM 16L-1.5D	L			125	24			
	PM 16L-2.25D			25	96.5	36	46.5		
20	PM 20R-1.5D	R	25		150	30		10	PM 20..
	PM 20R-2.25D			32	111	45	55.0		
	PM 20L-1.5D	L			150	30			
	PM 20L-2.25D			32	111	45	55.0		
25	PM 25R-1.5D	R	32		180	37.5		12.5	PM 25..
	PM 25R-2.25D			40	132.6	56.3	72.6		
	PM 25L-1.5D	L			180	37.5			
	PM 25L-2.25D			40	132.6	56.3	72.6		
32	PM 32R-1.5D	R	40		200	48		16	PM 32..
	PM 32R-2.25D			50	158	72	88.0		
	PM 32L-1.5D	L			200	48			
	PM 32L-2.25D			50	158	72	88.0		

Ordering example: 1 piece PM 10R-1.5D

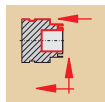
	d _A [mm]			
PM 10..	12	10001230/M1,8X3,8/T06	7883305/TORX T06	
PM 12..	16	7883215/M2,2X4,0/T07	7724105/TORX T07	
PM 16..	20	7883214/M3,0X5,7/T08	7724106/TORX T08	
PM 20..	25	7722111/M3,5X7,2/T15	7724103/TORX T15	
PM 25..	32	7883209/M3,5X8,6/T15	7724103/TORX T15	
PM 32..	40	10001785/M5,0X10,8/T20	7724104/TORX T20	



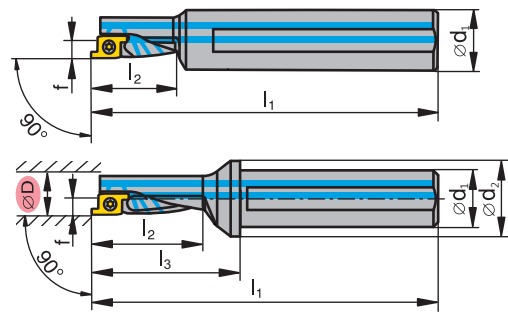


ProfileMaster

PM Ø 16 - 32 mm



0°

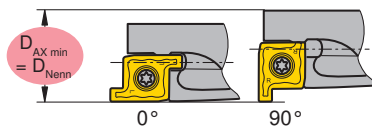


		L R							
D [mm]	Type, description		d _A [mm]	d ₂ [mm]	l ₁ [mm]	l ₃ [mm]	l ₂ [mm]	f [mm]	
16	PM 16R-1.5D	R	20		127.3		26.3	5.70	PM 16..
	PM 16R-2.25D			25	98.8	48.8	38.3		
	PM 16L-1.5D	L			127.3		26.3		
	PM 16L-2.25D			25	98.8	48.8	38.3		
20	PM 20R-1.5D	R	25		152.8		32.8	7.20	PM 20..
	PM 20R-2.25D			32	113.8	57.8	47.8		
	PM 20L-1.5D	L			152.8		32.8		
	PM 20L-2.25D			32	113.8	57.8	47.8		
25	PM 25R-1.5D	R	32		183.3		40.8	9.20	PM 25..
	PM 25R-2.25D			40	135.9	75.9	59.6		
	PM 25L-1.5D	L			183.3		40.8		
	PM 25L-2.25D			40	135.9	75.9	59.6		
32	PM 32R-1.5D	R	40		204.3		52.3	11.70	PM 32..
	PM 32R-2.25D			50	162.3	92.3	76.3		
	PM 32L-1.5D	L			204.3		52.3		
	PM 32L-2.25D			50	162.3	92.3	76.3		

Ordering example: 1 piece PM 16R-1.5D



Not suitable for drilling!



Details see page
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	d _A [mm]			
PM 16..	20	7883214/M3,0X5,7/T08	7724106/TORX T08	
PM 20..	25	7722111/M3,5X7,2/T15	7724103/TORX T15	
PM 25..	32	7883209/M3,5X8,6/T15	7724103/TORX T15	
PM 32..	40	10001785/M5,0X10,8/T20	7724104/TORX T20	



42-43



39

Cutting data

Grades, material

Work piece material		Type of treatment / alloy		VDI 3323 group	Hardness HB
A	Non alloyed steel	annealed	$\leq 0,15\% \text{ C}$	1	125
		annealed	$0,15\% - 0,45\% \text{ C}$	2	150 - 250
		tempered	$\geq 0,45\% \text{ C}$	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	$< 12\% \text{ Si}$	23	80
		hardened	$< 12\% \text{ Si}$	24	90
		non hardened	$> 12\% \text{ Si}$	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	–
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	29	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm ²	35	–
	Titanium alloys		pure titanium	36	R _m 440*
			alpha + beta alloys	37	R _m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

Cutting data

Grades, material

Uncoated carbide			Coated carbide			
H210T	H216T/H10T	TSM30	CTC1425	CTC1435	CTP2440	CM45
v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]
—	—	—	150 - 300	140 - 280	120 - 250	60 - 230
—	—	—	120 - 220	100 - 200	80 - 180	60 - 160
—	—	—	100 - 200	80 - 180	60 - 150	50 - 130
—	—	—	120 - 220	100 - 200	80 - 180	60 - 160
—	—	—	100 - 180	80 - 160	60 - 150	50 - 130
—	—	—	80 - 150	70 - 140	60 - 120	50 - 100
—	—	—	110 - 190	100 - 180	80 - 160	60 - 140
—	—	—	70 - 150	60 - 140	50 - 120	40 - 100
—	—	—	110 - 220	100 - 200	50 - 200	40 - 200
—	—	—	100 - 180	80 - 150	50 - 150	40 - 150
—	—	—	120 - 220	100 - 200	50 - 200	40 - 200
—	—	—	100 - 200	100 - 180	50 - 180	40 - 180
—	—	—	—	—	50 - 100	40 - 100
—	—	—	—	—	50 - 80	40 - 80
140 - 200	120 - 160	80 - 140	130 - 280	120 - 250	—	100 - 180
100 - 160	90 - 140	60 - 120	130 - 280	120 - 250	—	80 - 160
160 - 200	130 - 170	90 - 150	120 - 280	110 - 250	—	100 - 180
110 - 150	90 - 130	60 - 110	120 - 280	110 - 250	—	80 - 160
160 - 220	140 - 200	100 - 180	110 - 280	100 - 250	—	100 - 200
140 - 180	120 - 160	80 - 140	110 - 280	100 - 250	—	90 - 160
120 - 3000	100 - 2500	80 - 2000	—	—	80 - 2000	80 - 2000
120 - 2500	100 - 2000	80 - 1500	—	—	80 - 1500	80 - 1500
120 - 2000	100 - 1500	80 - 1500	—	—	80 - 1500	80 - 1500
120 - 1800	100 - 1500	80 - 1300	—	—	80 - 1300	80 - 1300
120 - 1000	100 - 800	80 - 600	—	—	80 - 600	80 - 600
120 - 800	100 - 600	80 - 400	—	—	80 - 400	80 - 400
120 - 800	100 - 600	80 - 400	—	—	80 - 400	80 - 400
120 - 600	100 - 400	80 - 300	—	—	80 - 300	80 - 300
120 - 400	100 - 300	80 - 200	—	—	80 - 200	80 - 200
90 - 220	80 - 180	60 - 160	—	—	60 - 160	60 - 160
80 - 200	60 - 150	50 - 140	—	—	50 - 140	50 - 140
120 - 300	100 - 250	80 - 200	—	—	80 - 200	80 - 200
35 - 50	30 - 45	25 - 40	—	—	20 - 50	20 - 50
25 - 40	20 - 35	20 - 30	—	—	20 - 40	20 - 40
25 - 40	20 - 35	20 - 30	—	—	15 - 20	15 - 20
20 - 30	18 - 30	15 - 25	—	—	10 - 20	10 - 20
15 - 25	15 - 25	15 - 25	—	—	10 - 20	10 - 20
80 - 140	60 - 120	30 - 100	—	—	50 - 120	50 - 120
40 - 100	30 - 80	25 - 60	—	—	30 - 50	30 - 50
—	—	—	—	—	—	—
—	—	—	—	—	—	—
—	—	—	—	—	—	—
—	—	—	—	—	—	—

Type of problem							
Type of wear				Work piece problems		Swarf control	
Edge chipping	Built-up edge	Flank wear	Plastic deformation	Vibration	Surface quality	Chip too long (tangled swarf)	Chip too short (fragmented chip)
	↑	↓	↓	↓ ↑	↓ ↑	↓	
↓		~	↓	↓ ↑	↓	↑	↓
↑		↑	↑	↓	↑		
↓		↑	↑				
~				~	~		
~				~	~		
~				~	↓		
~		~		~	~		
	●	●	●		●	●	

Corrective measures	
Cutting speed	Cutting values
Feed rate	
Corner radius	Selection of inserts
Cutting material	
Clamping of tool	General criteria
Clamping of work piece	
Overhang	
Tip height	
Cooling lubricant	

↑ raise, increase, large influence

↑ raise, increase low influence

↓ avoid, reduce large influence

↓ avoid, reduce low influence

~ check, optimize

● use

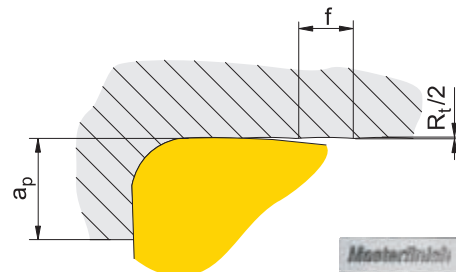
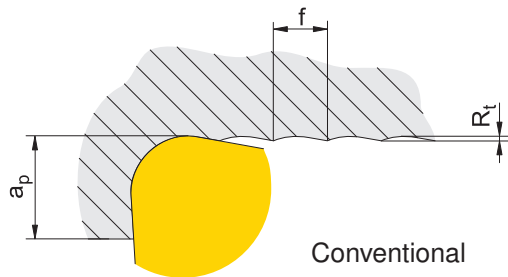
EcoCut / ProfileMaster

Masterfinish

Operating principle / benefit

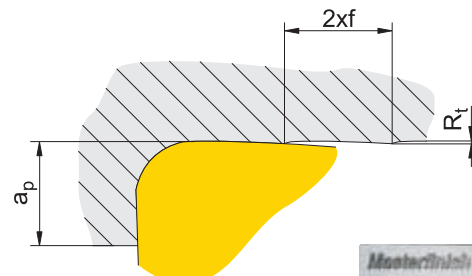
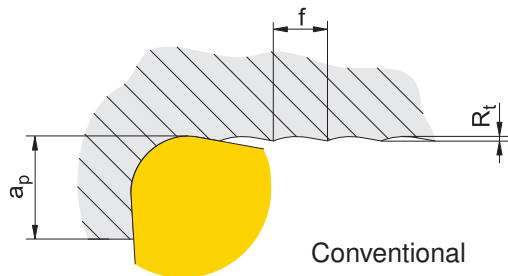
Improved surface finish

With the same feed rate an insert with 'Masterfinish' cutting edge reaches a roughness value R_a which is many times higher than the one of a conventional insert.



Shorter machining time

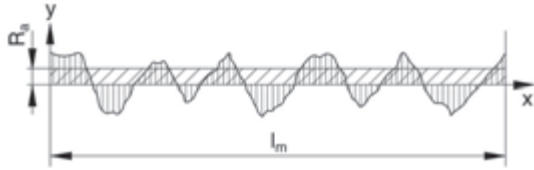
If you want to reach the same R_a -value as with a standard insert, a twice as high feed rate can be applied for the insert with 'Masterfinish' cutting edge (= shorter production time per component!).



EcoCut / ProfileMaster

Surface quality

ISO-DIN measured surface roughness

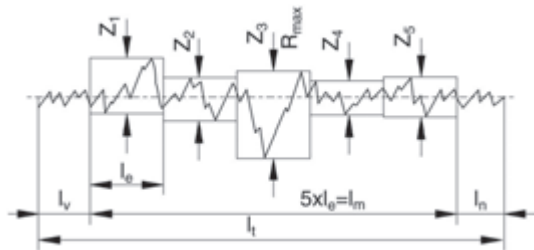


Average roughness value R_a (DIN 4768)

This is defined as the arithmetical mean of the absolute sums of the roughness profile R within the entire measured length l_m .

Average roughness depth R_z (DIN 4768)

This is defined as the average value resulting from the single roughness depths of five successive single measured lengths l_e .

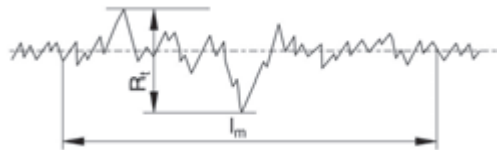


Single surface roughness depth $Z_1 \dots Z_5$

This is the vertical distance between the highest and the lowest point of the roughness profile R within a single measured length l_e .

Maximum surface roughness depth R_t (DIN 4768/1)

This is the distance between the elevation and depression of the line within the measured length (reference distance) of profile filtered according to DIN 4768 sheet 1.



Surface quality according to manufacturing method

Surface symbol according to ISO 1302	new	0,025	0,05	0,1	0,2	0,4	0,8	1,6	3,2	6,3	12,5	25	50
Surface symbol according to ISO 3141	until now	▽▽▽▽					▽▽▽		▽▽		▽		
Roughness index		N 1	N 2	N 3	N 4	N 5	N 6	N 7	N 8	N 9	N 10	N 11	N 12
Arithmetic mean value R_a [μm]		0,025	0,05	0,1	0,2	0,4	0,8	1,6	3,2	6,3	12,5	25	50
Surface roughness depth R_z [μm]		0,25	0,63	1	1,6	2,5	4-6,3	10	16-25	40	63	100	160
Longitudinal turning Face turning													
Longitudinal turning Face turning	MasterFinish												
Longitudinal grinding Surface grinding													

☐ $\hat{=}$ Surface roughness (produced through special methods)

☐ $\hat{=}$ Surface roughness (produced through normal workshop methods)

☐ $\hat{=}$ Surface roughness (produced through rough machining methods)

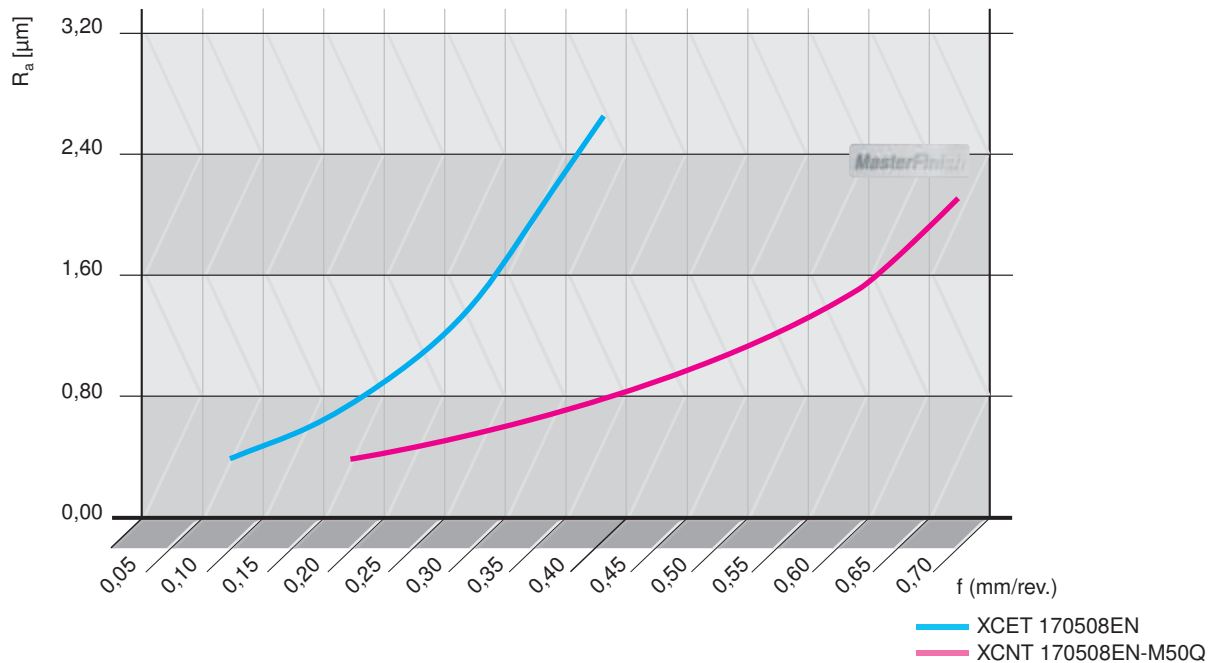
EcoCut / ProfileMaster

Surface finish / feed rate

EcoCut

Material: Ck60 (1.1221)
Tool: EC 32L-2.25D 17

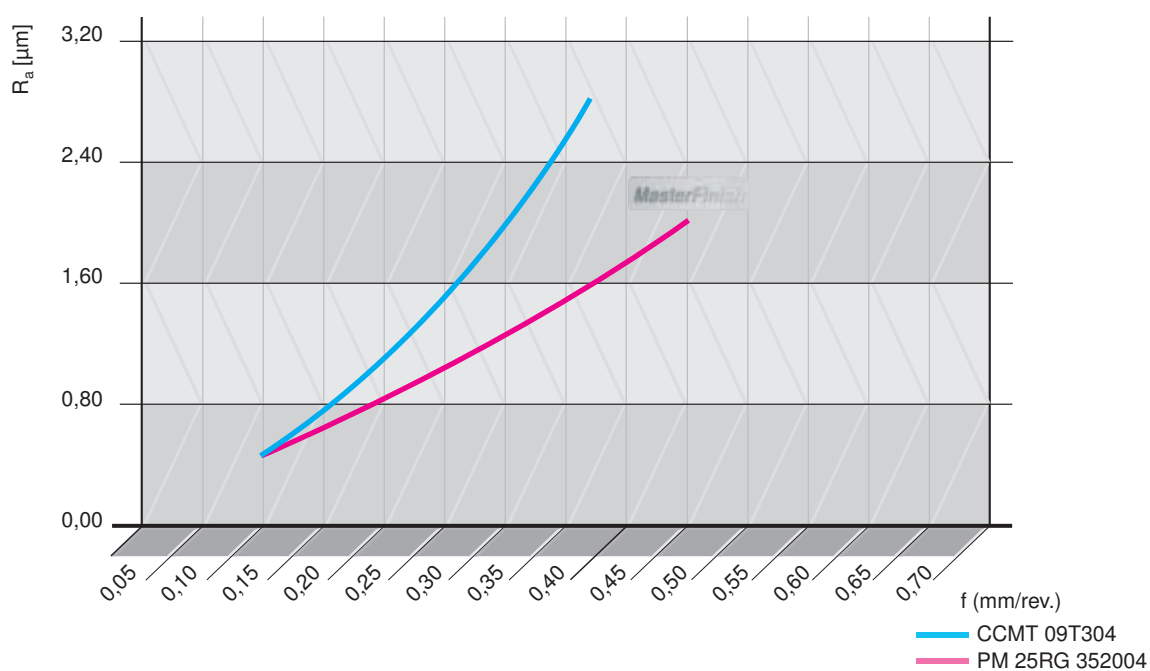
$v_c = 150$ m/min
 $a_p = 1$ mm
 $r = 0,8$ mm



ProfileMaster

Material: Ck60 (1.1221)
with a standard boring bar and ProfileMaster

$v_c = 150$ m/min
 $a_p = 1$ mm



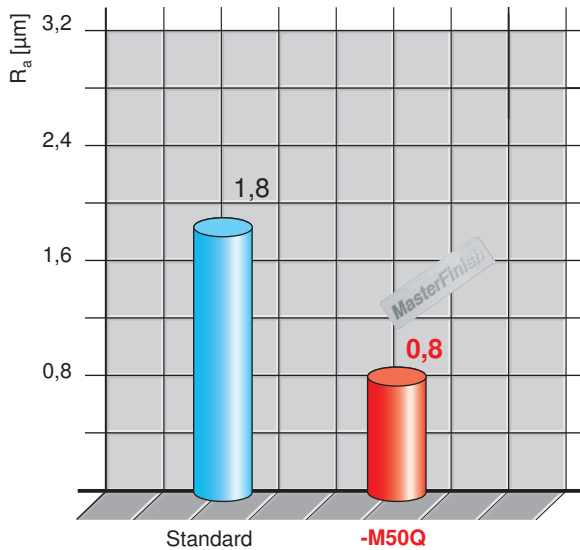
EcoCut

Surface finish / feed rate

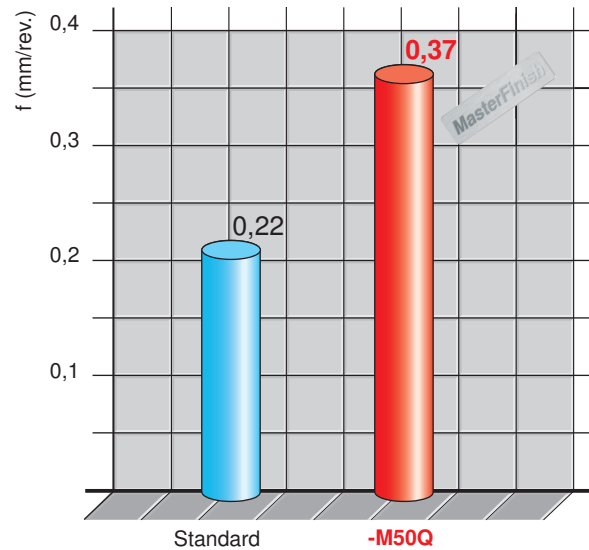
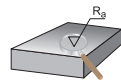
R = 0.4 mm corner radius / steel



To achieve $f = 0.25 \text{ mm}$



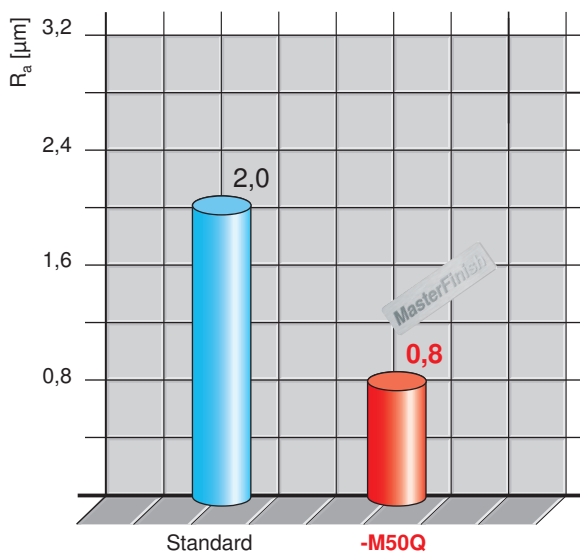
To achieve $R_a = 1.6 \text{ } \mu\text{m}$



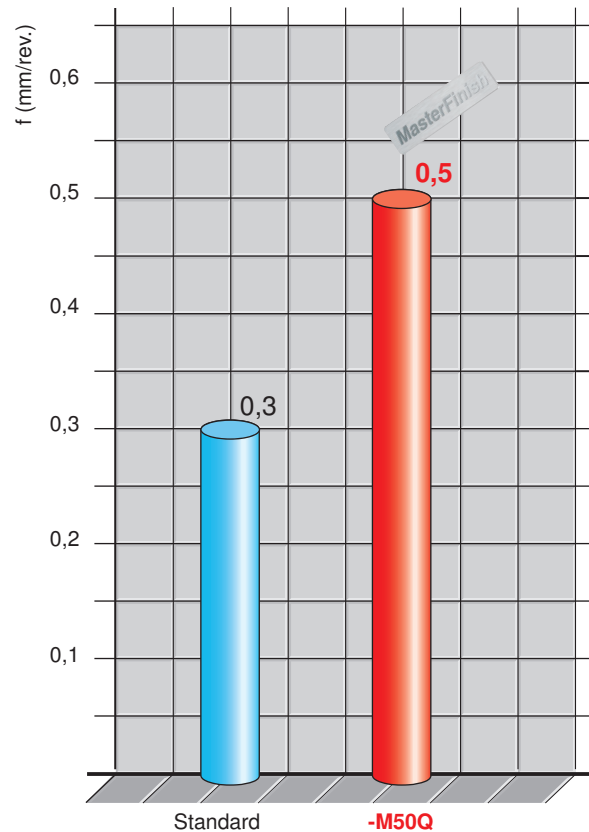
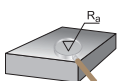
R = 0.8 mm corner radius / steel



To achieve $f = 0.35 \text{ mm}$



To achieve $R_a = 1.6 \text{ } \mu\text{m}$



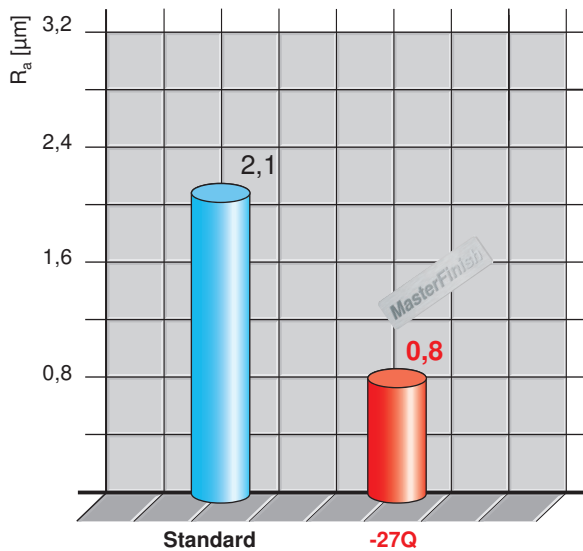
EcoCut

Surface finish / feed rate

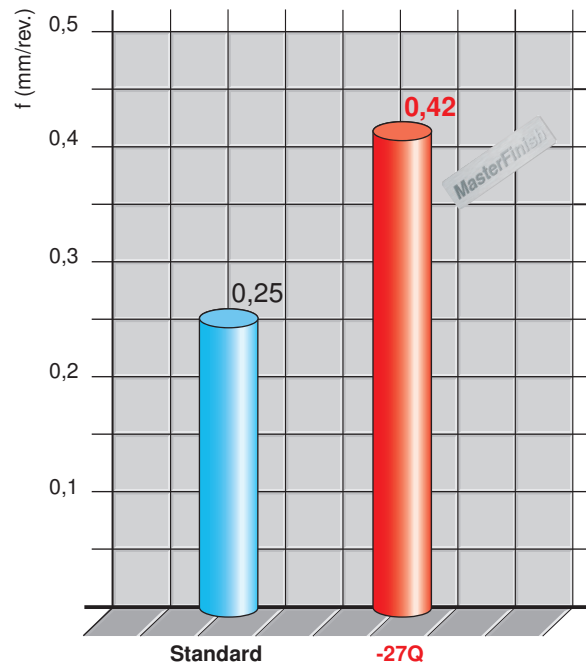
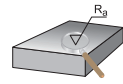
R = 0.4 mm corner radius / aluminium



To achieve $f = 0.25 \text{ mm}$



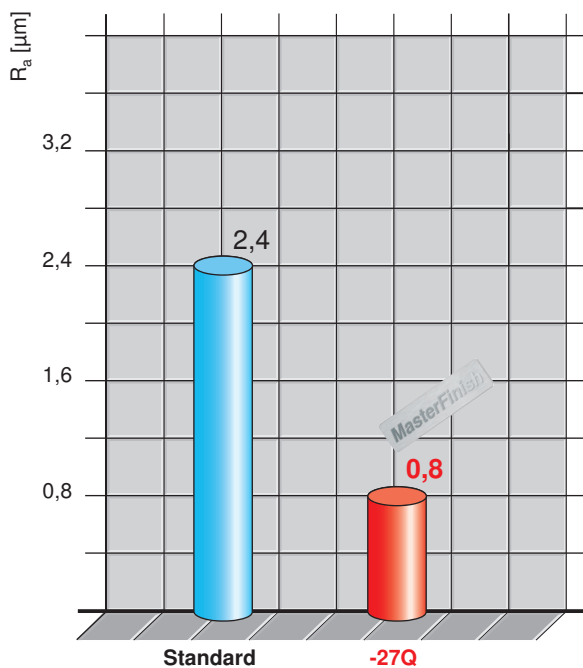
To achieve $R_a = 1.6 \mu\text{m}$



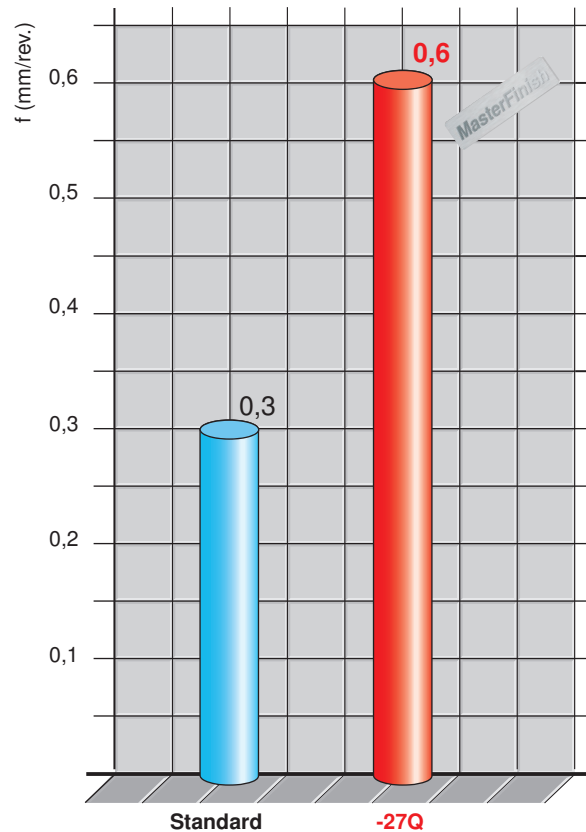
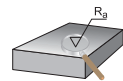
R = 0.8 mm corner radius / aluminium



To achieve $f = 0.45 \text{ mm}$



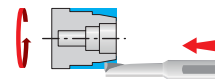
To achieve $R_a = 1.6 \mu\text{m}$



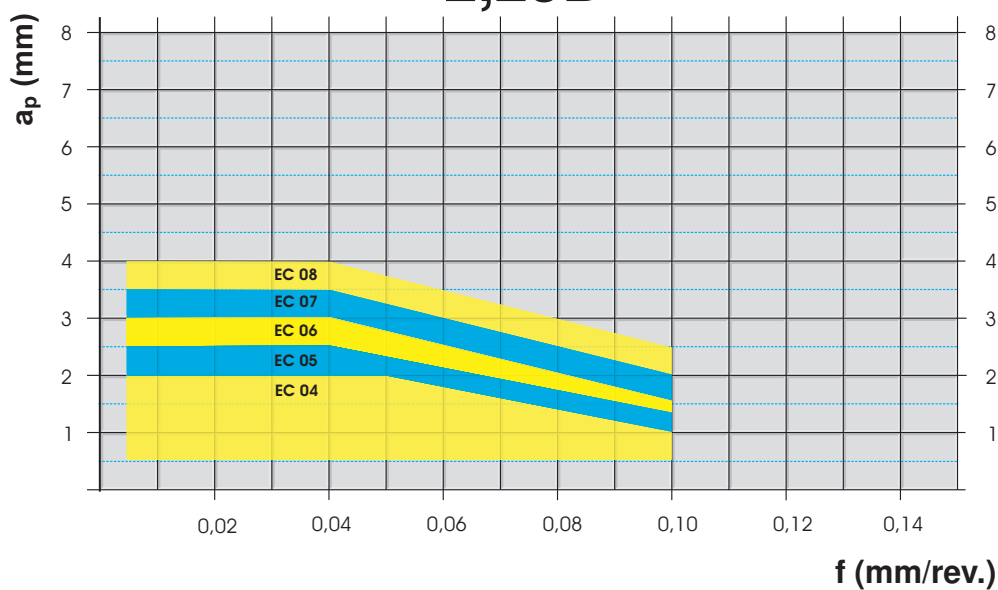
EcoCut Mini

Depth of cut / feed rate

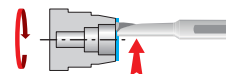
Longitudinal turning



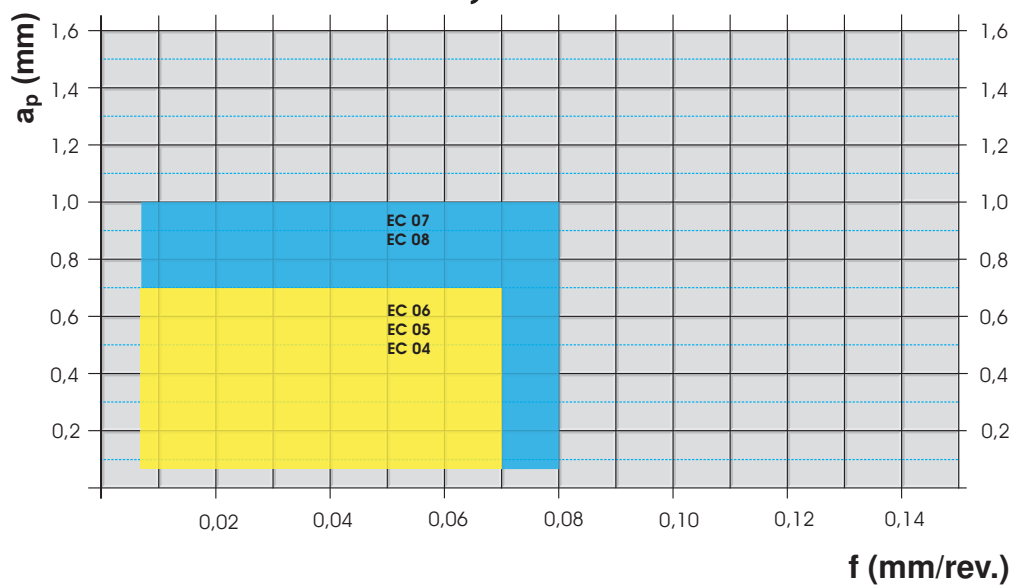
2,25D



Face turning



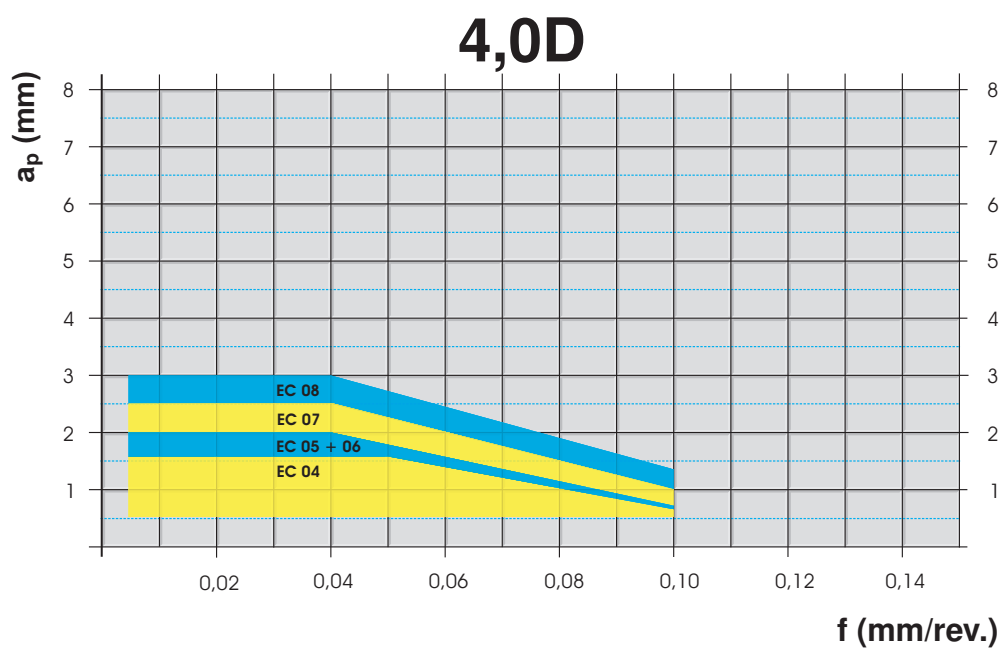
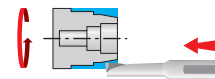
2,25D



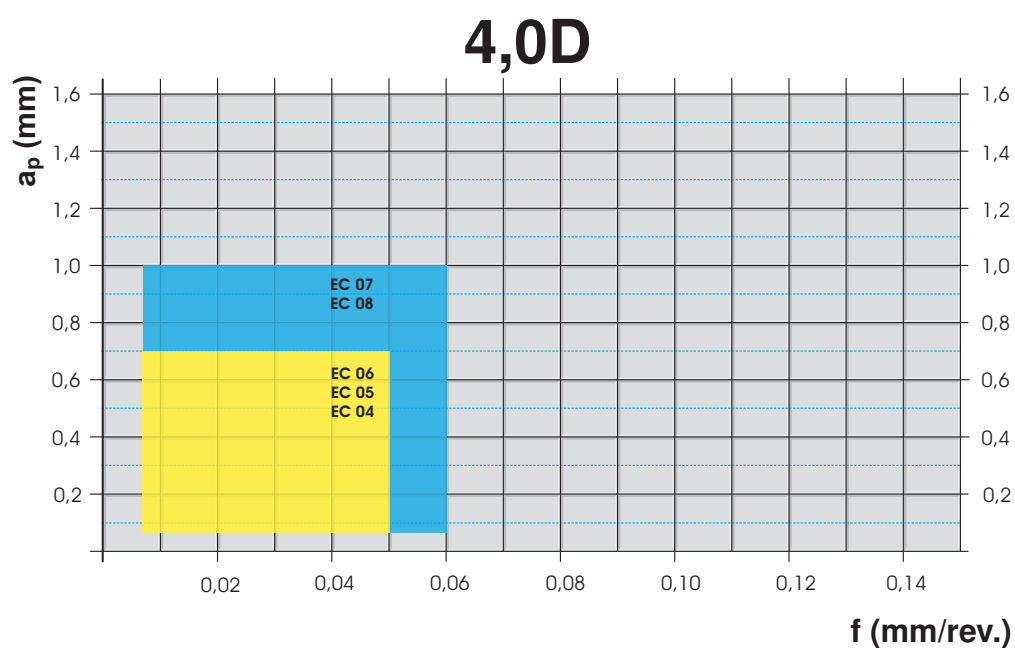
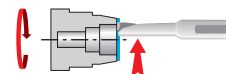
EcoCut Mini

Depth of cut / feed rate

Longitudinal turning



Face turning

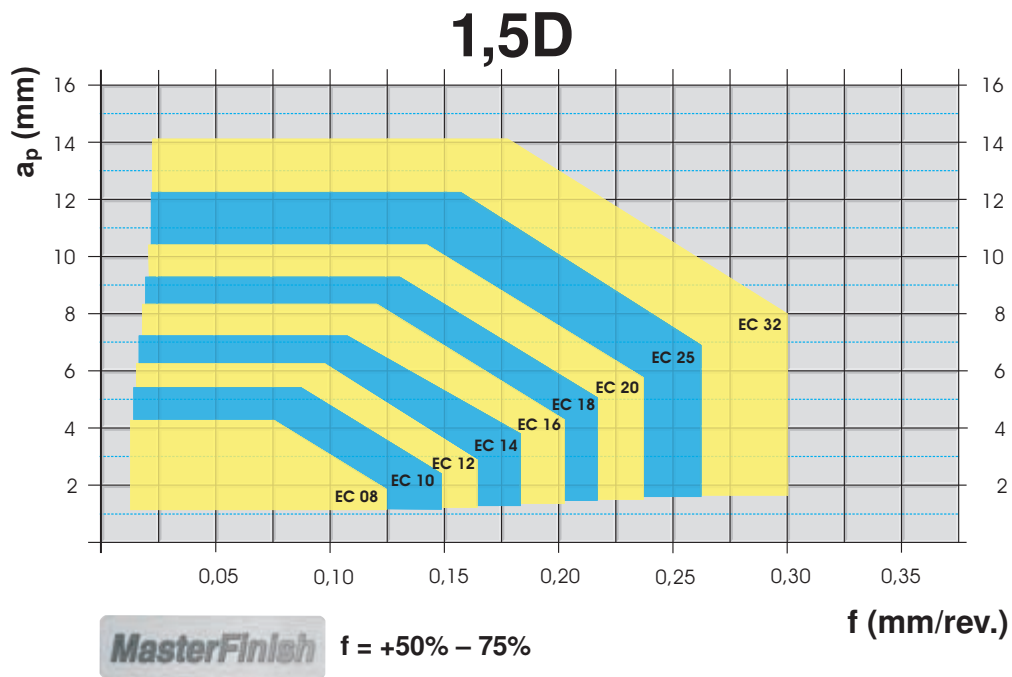




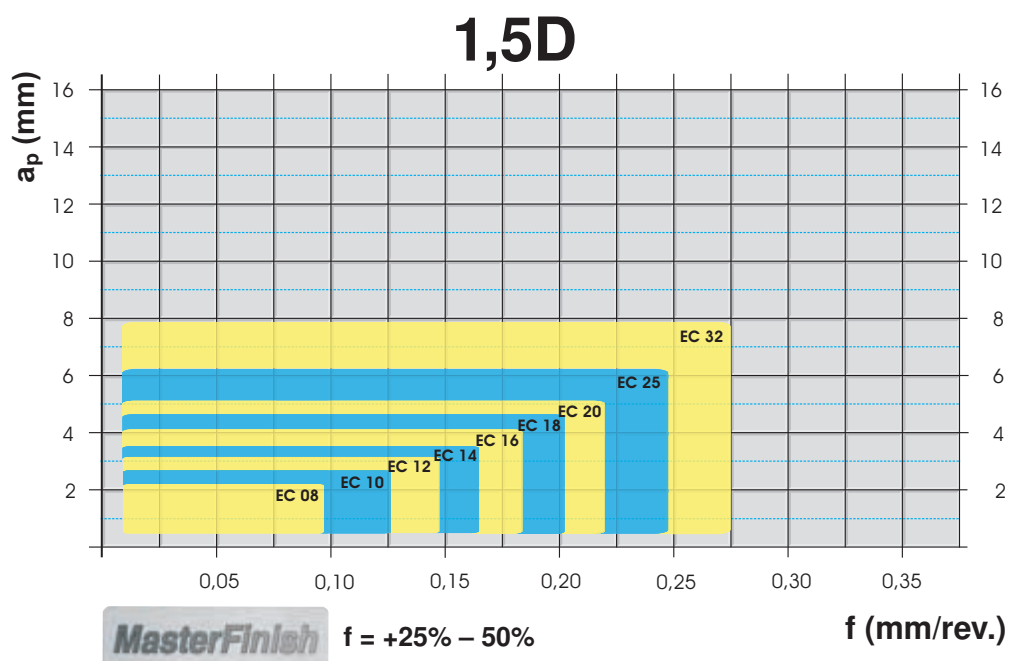
EcoCut Classic

Depth of cut / feed rate

Longitudinal turning



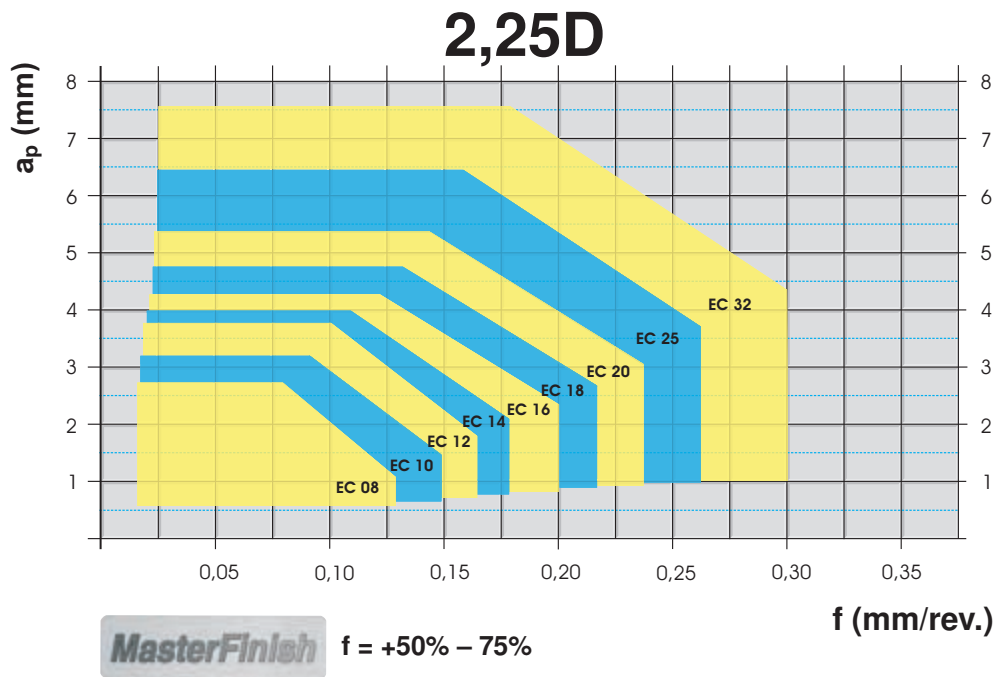
Face turning



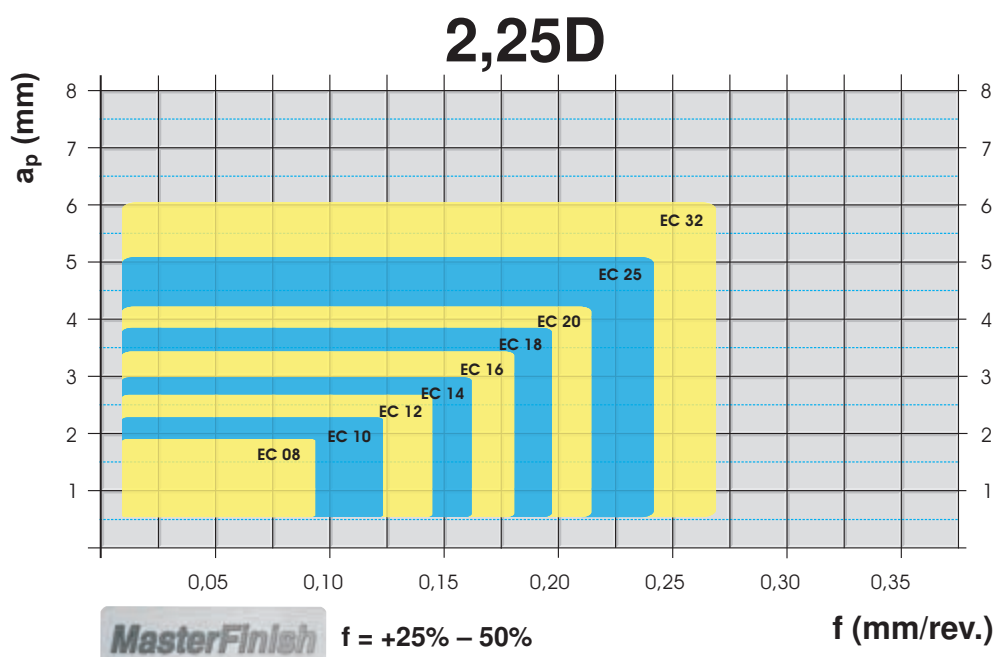
EcoCut Classic

Depth of cut / feed rate

Longitudinal turning



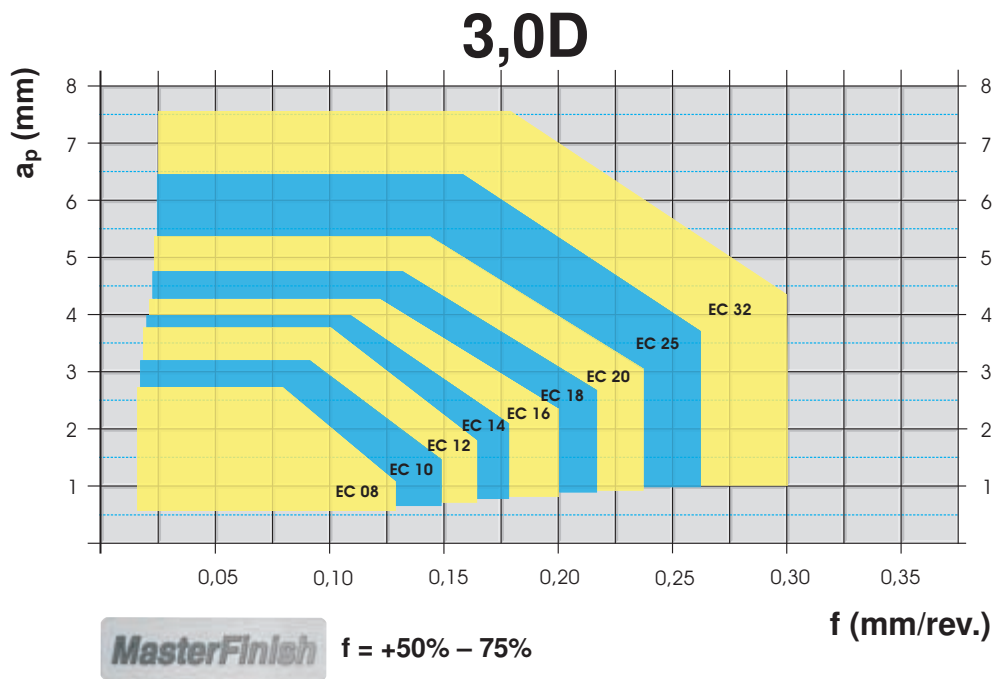
Face turning



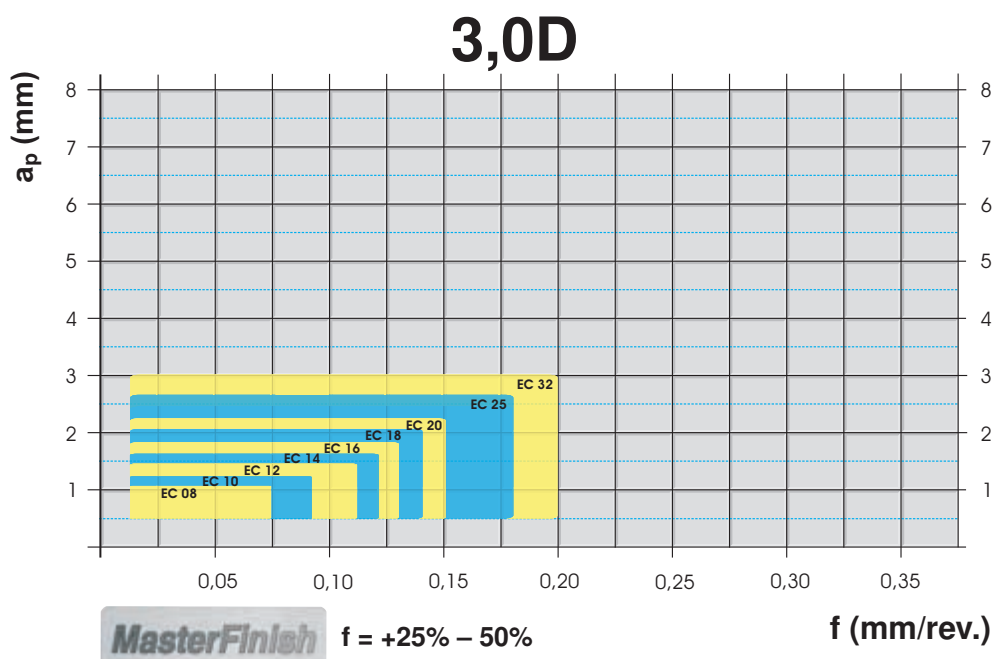
EcoCut Classic

Depth of cut / feed rate

Longitudinal turning



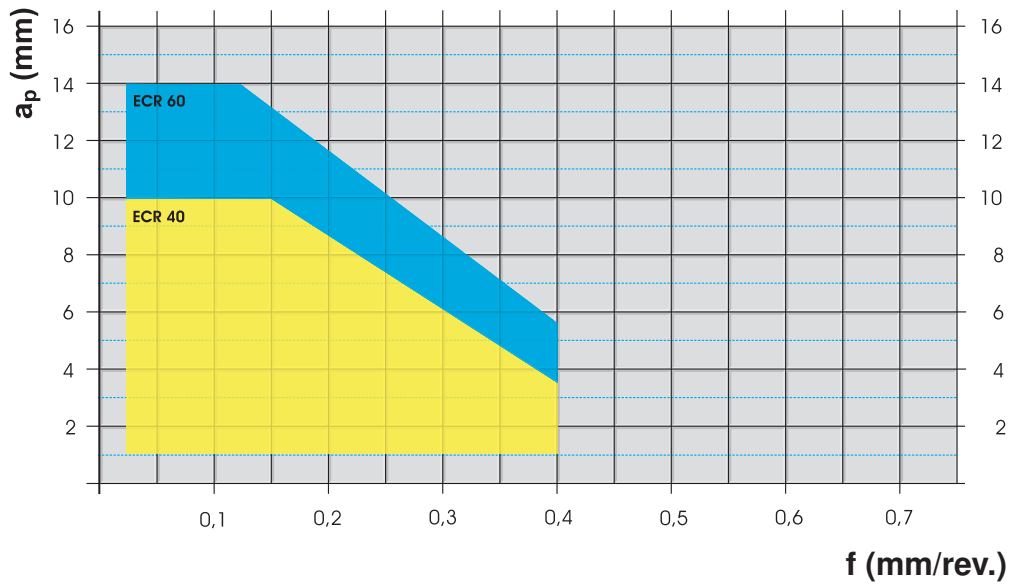
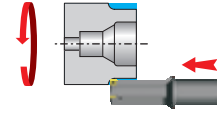
Face turning



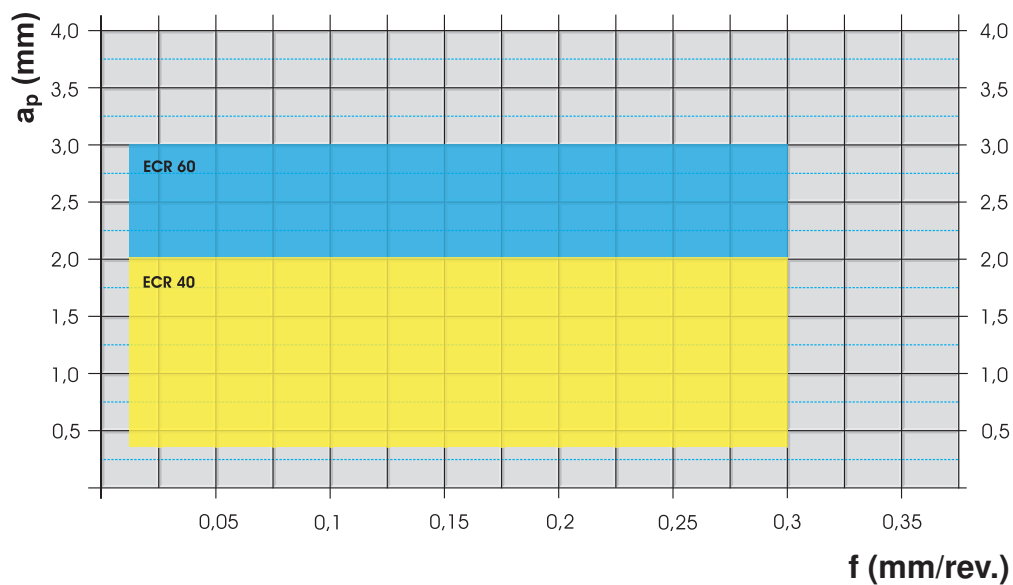
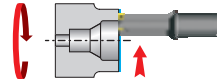
EcoCut Rebore

Depth of cut / feed rate

Longitudinal turning



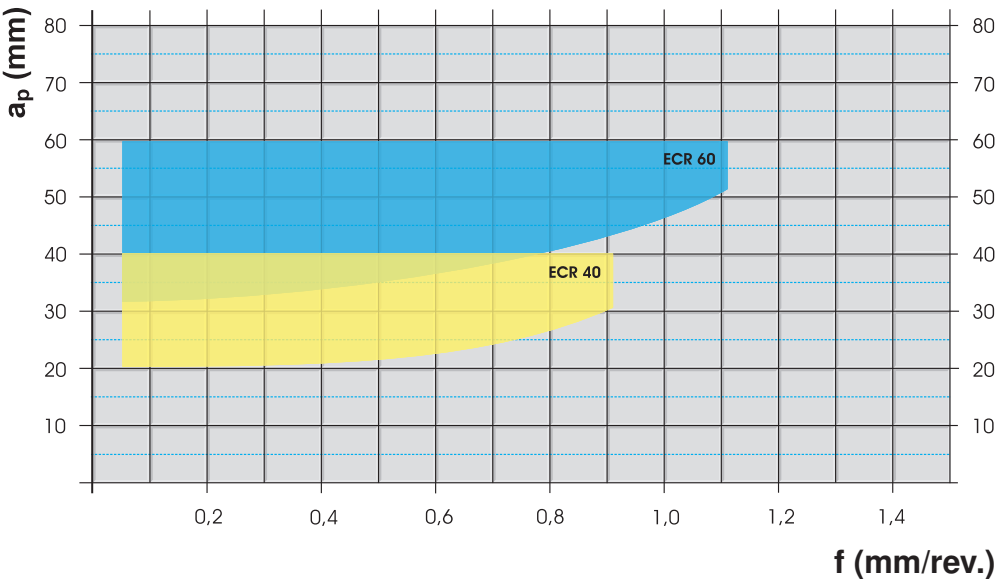
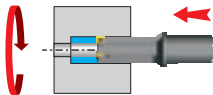
Face turning



EcoCut Rebore

Depth of cut / feed rate

Counterboring

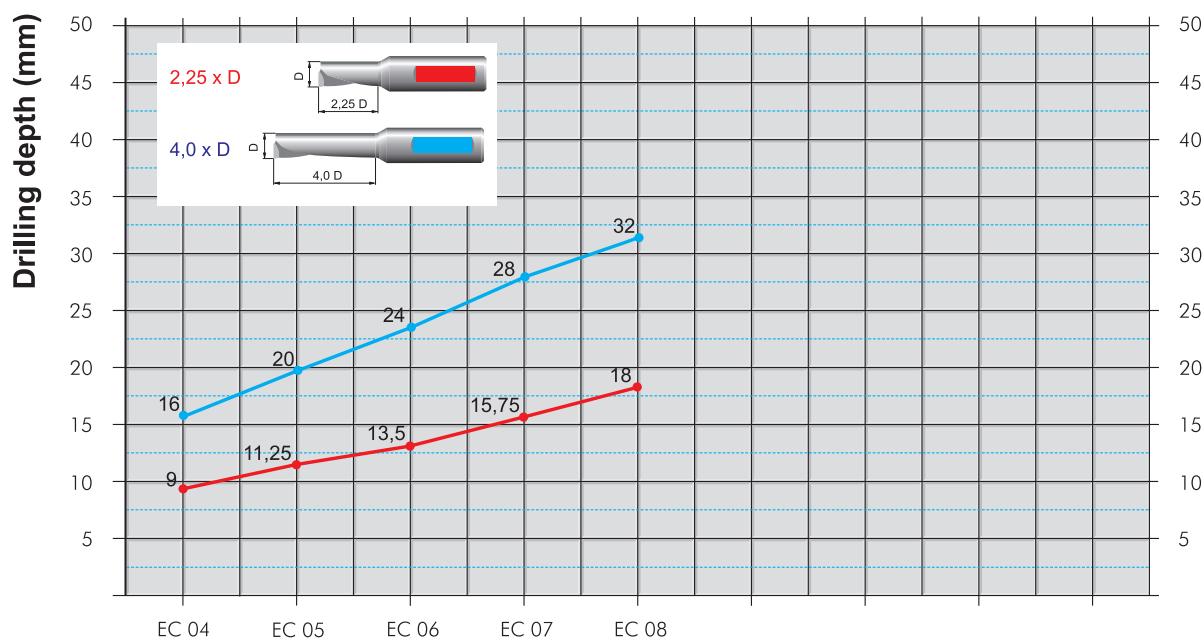


Tools	Initial bore
Ø 40 mm	Ø min = 20 mm
Ø 60 mm	Ø min = 32 mm

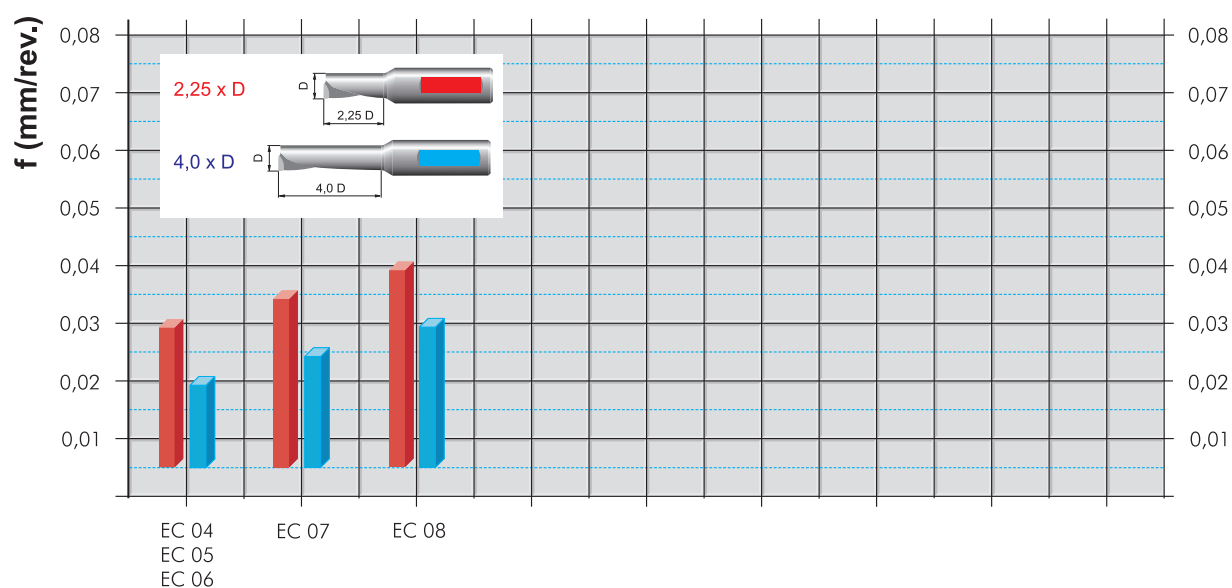
EcoCut Mini

Drilling depth / feed rate

Drilling depth



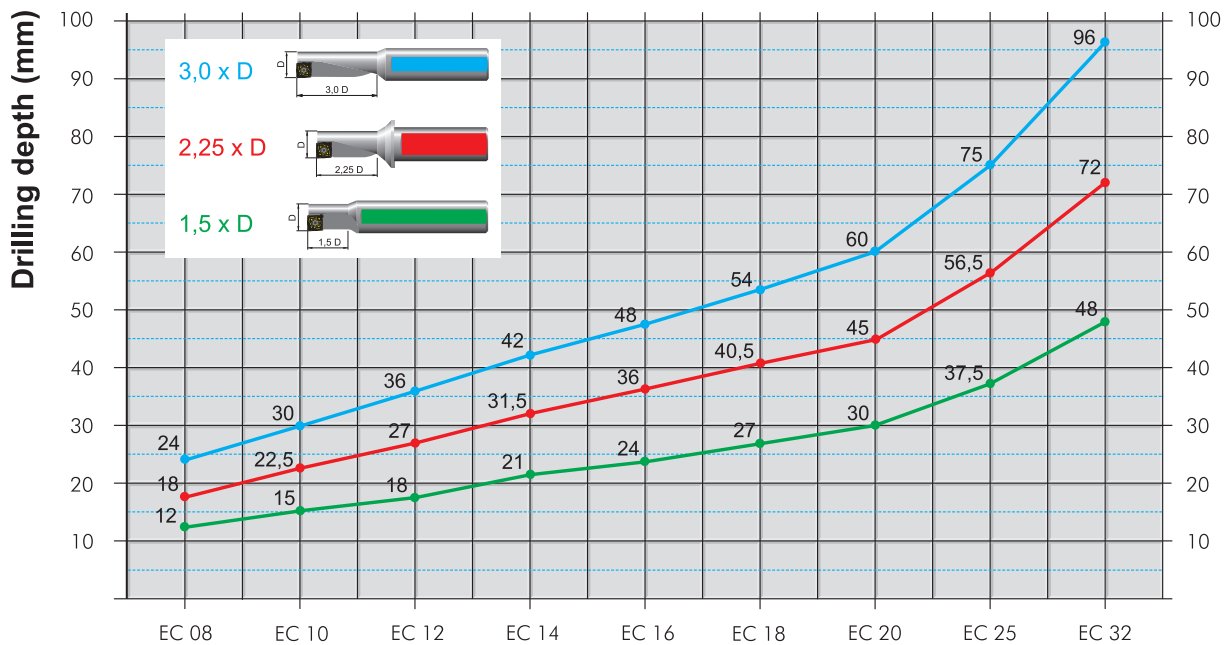
Drilling feed rate



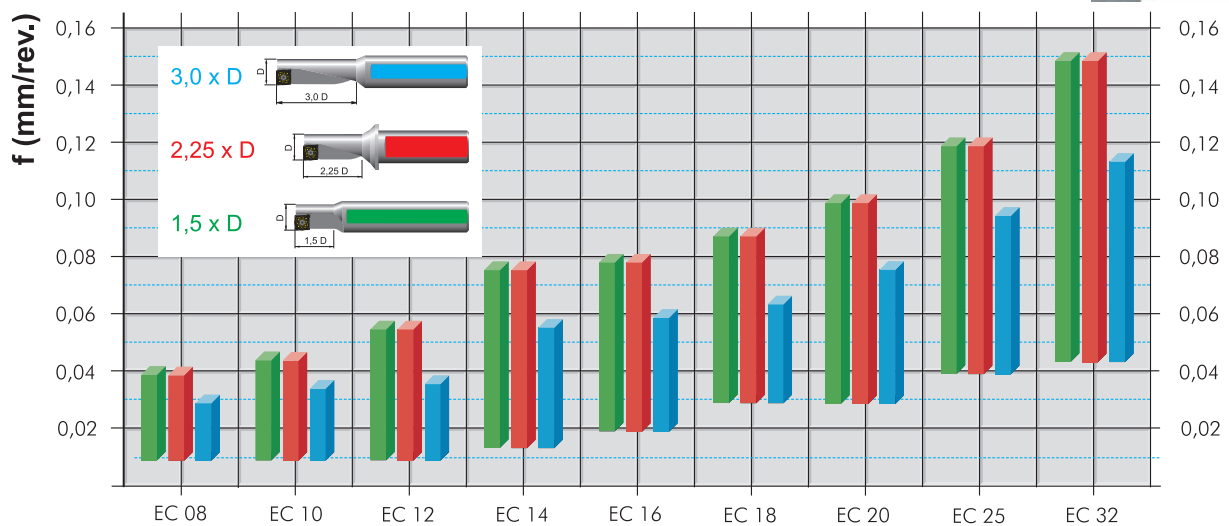
EcoCut Classic

Drilling depth / feed rate

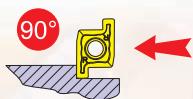
Drilling depth



Drilling feed rate



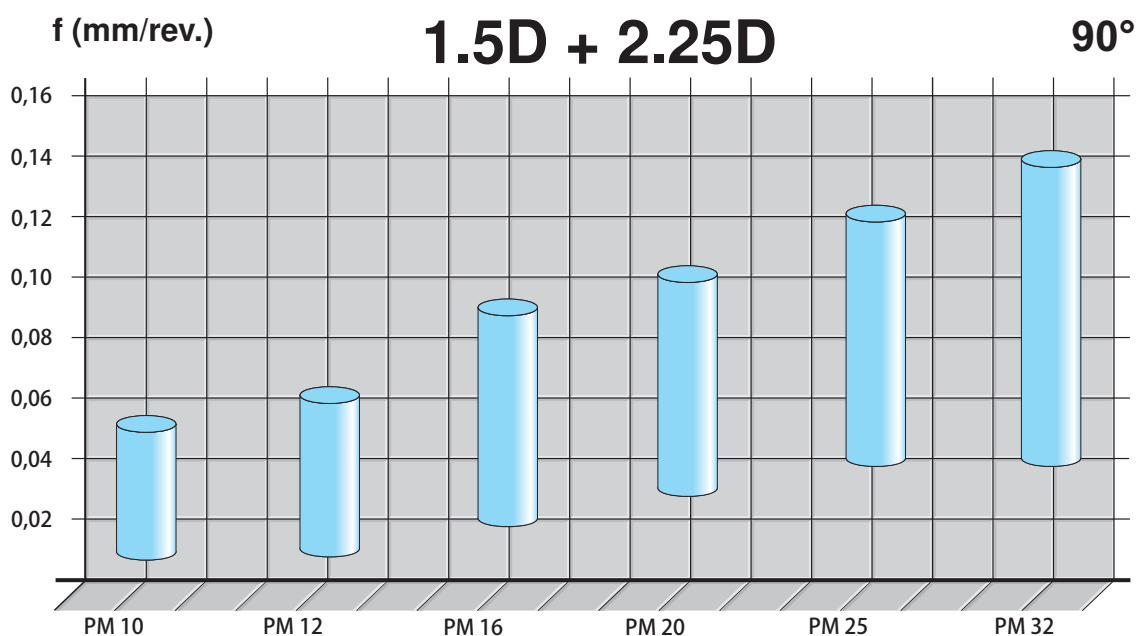
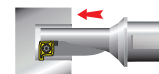
MasterFinish $f = +20\% - 30\%$



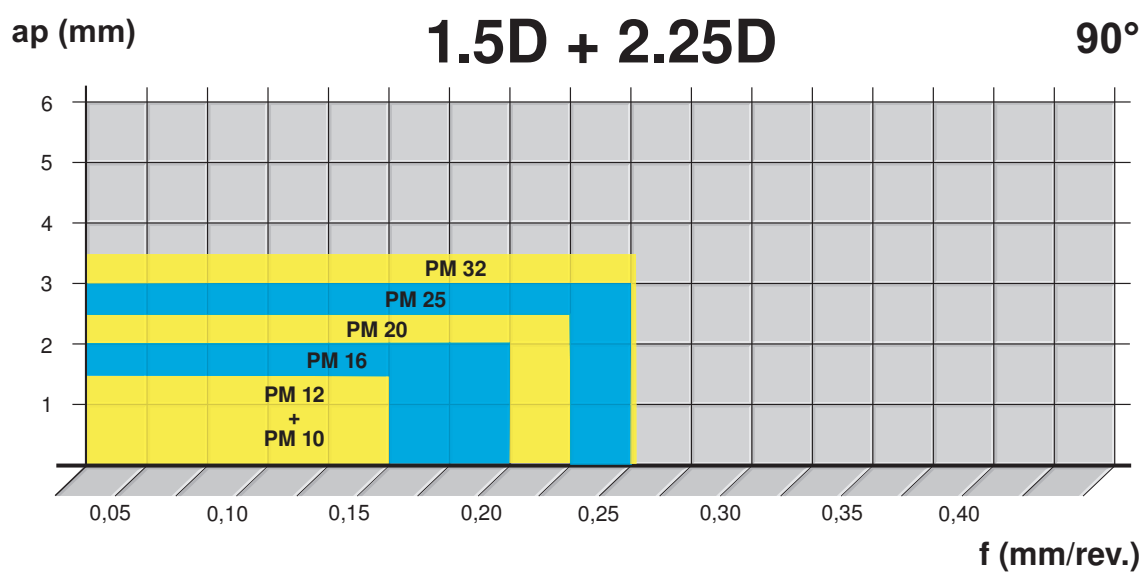
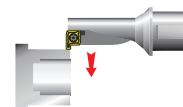
ProfileMaster

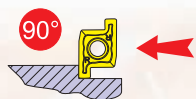
Depth of cut / feed rate

Drilling



Face turning

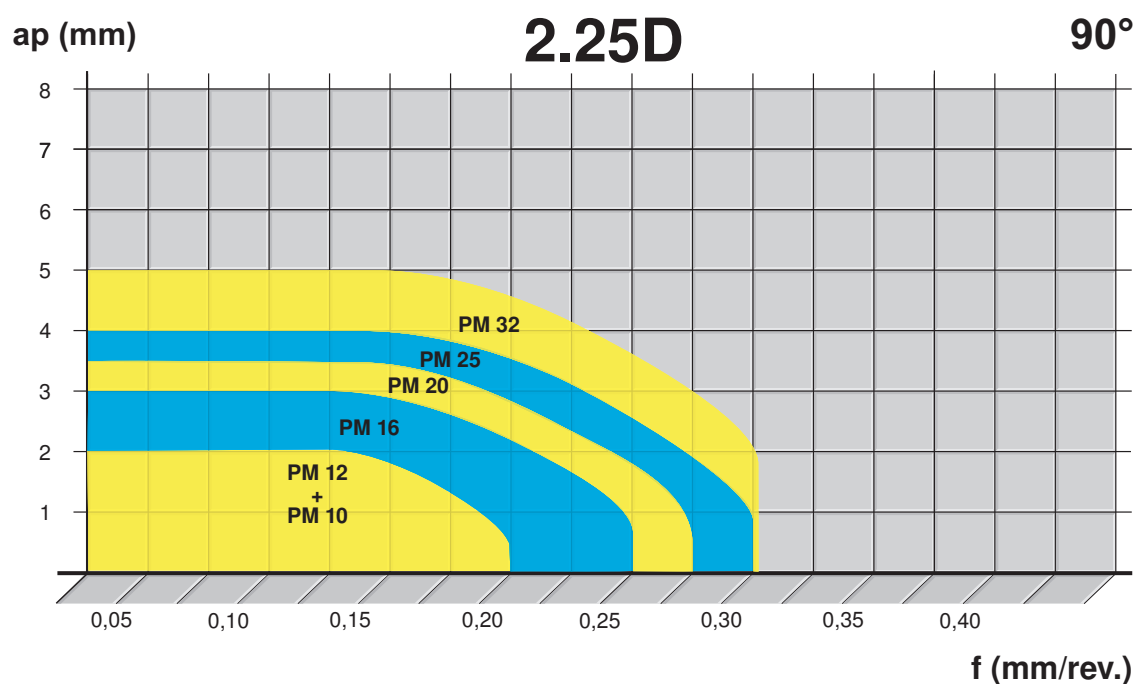
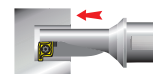
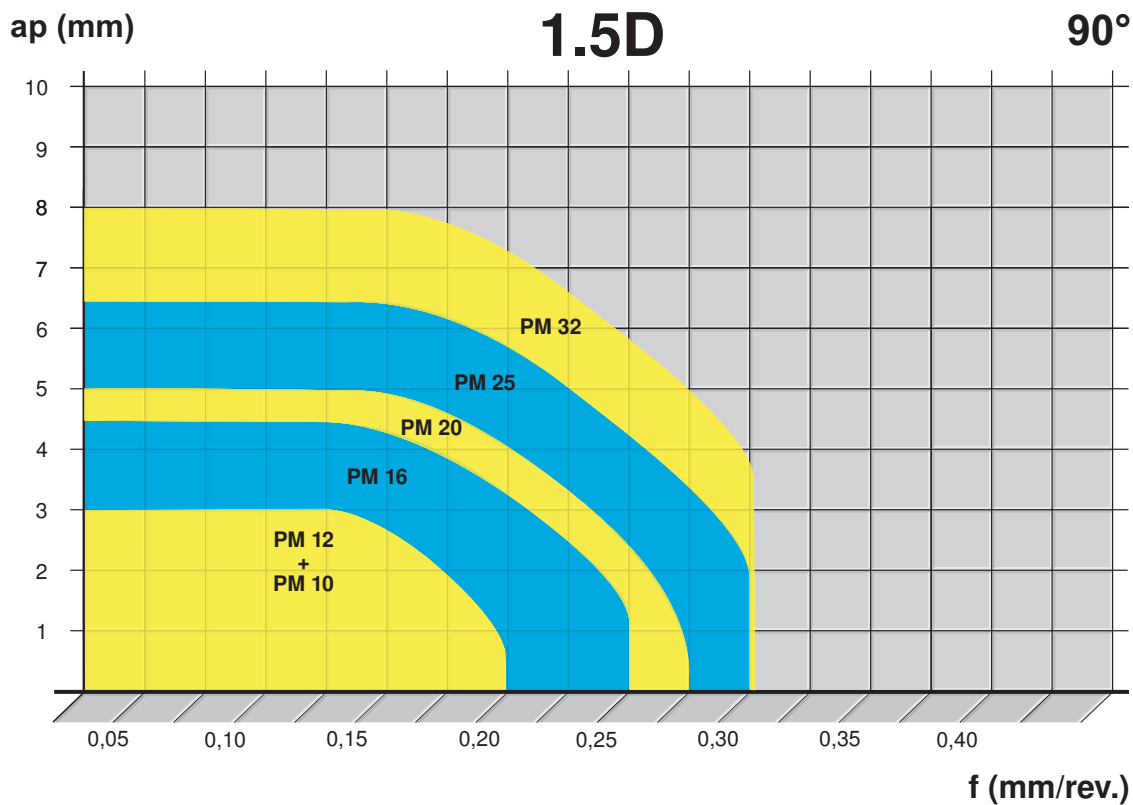
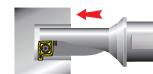


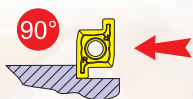


ProfileMaster

Depth of cut / feed rate

Longitudinal turning

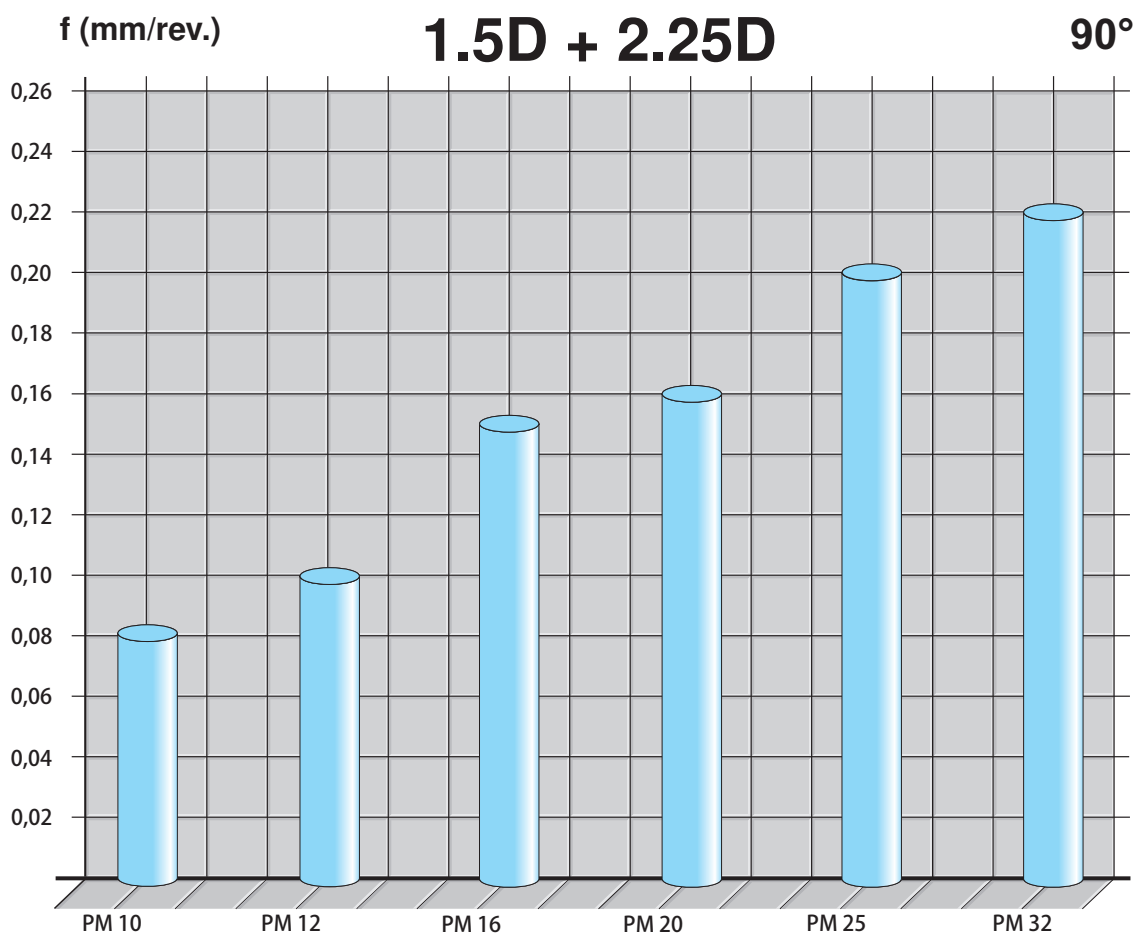
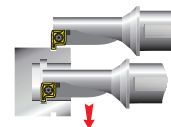




ProfileMaster

Feed rate

Radial grooving - internal + external

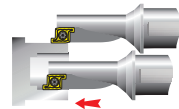




ProfileMaster

Depth of cut / feed rate

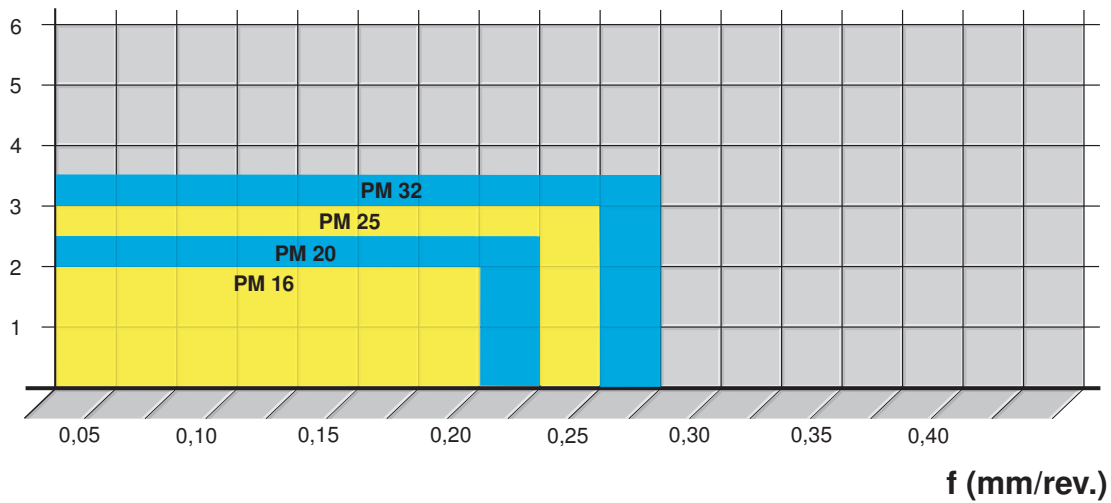
Longitudinal turning



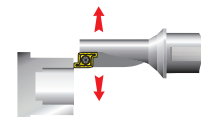
ap (mm)

1.5D + 2.25D

0°



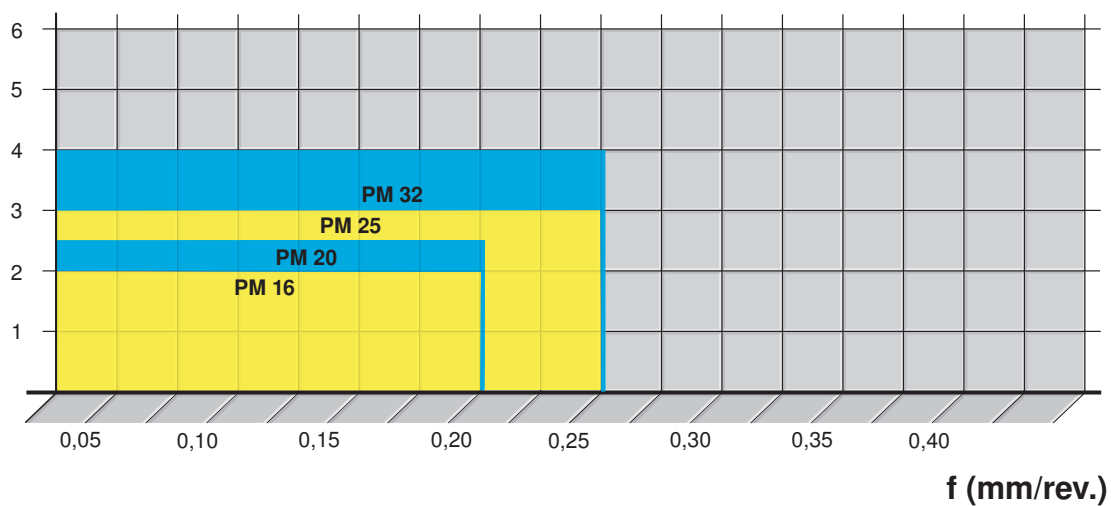
Face turning



ap (mm)

1.5D + 2.25D

0°

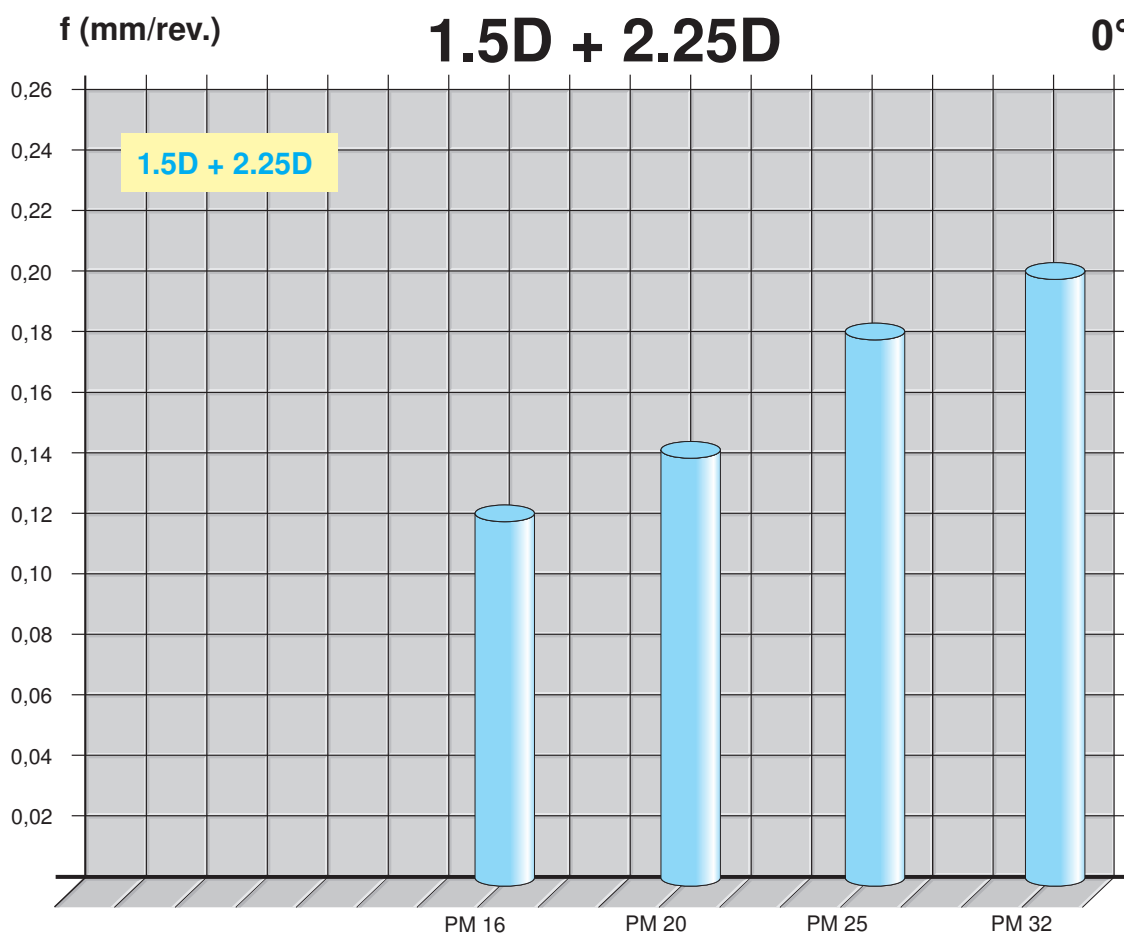
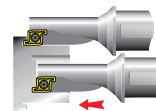




ProfileMaster

Feed rate

Axial grooving - internal + external



With PM 10 and PM 12 axial grooving is not possible.

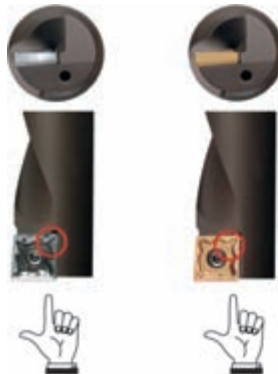


EcoCut Application

Mounting of the insert



For tools $\varnothing$ 8 mm right-hand or left-hand inserts are required. From $\varnothing$ 10-32 mm neutral inserts are utilized.



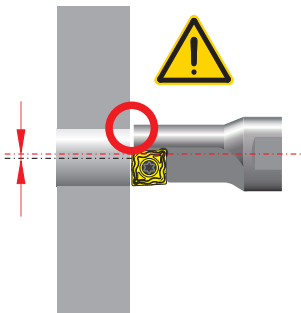
Left-hand tool



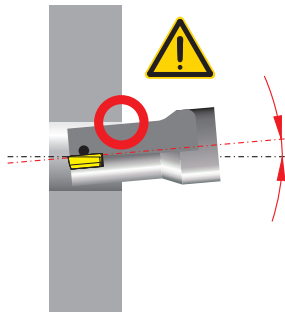
Right-hand tool

Axial displacement of the machine

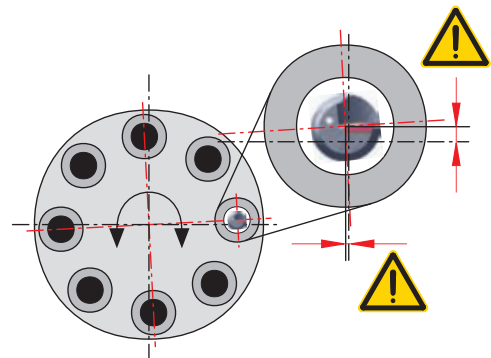
Displacement in x-direction



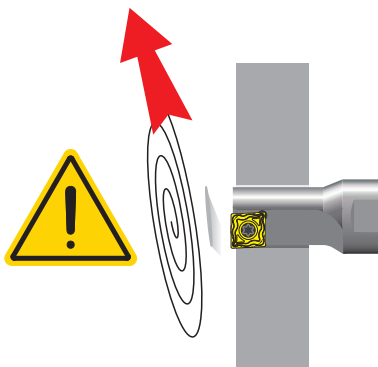
Angular error



Turret position error



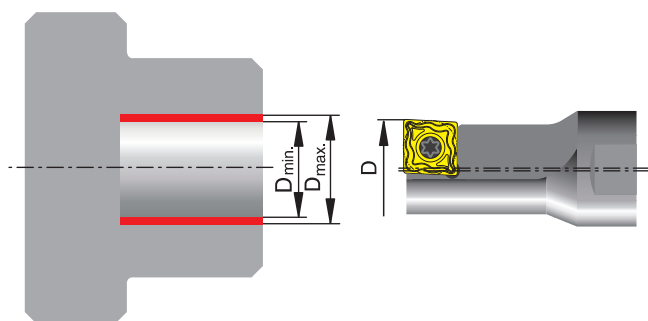
Through hole



With through holes a **sharp-edged disk** is created as tool break-out occurs. Safety measures are necessary.

EcoCut Application

Off-centre drilling



Due to the special construction of EcoCut tools and inserts off-centre drilling is possible. Thus desired deviations from the tool's nominal diameter can be obtained (see table below).

Type of tool	Nominal tool D (mm)	Work piece bore diameter	
		D _{min} (mm)	D _{max} (mm)
EC 04 L/R - 2.25D	4	3,90	4,20
EC 05 L/R - 2.25D	5	4,90	5,20
EC 06 L/R - 2.25D	6	5,90	6,20
EC 07 L/R - 2.25D	7	6,90	7,20
EC 08 L/R - 2.25D	8	7,90	8,20
EC 08 L/R - ... 04	8	7,85	8,30
EC 10 L/R - ... 05	10	9,85	10,50
EC 12 L/R - ... 06	12	11,85	12,50
EC 14 L/R - ... 07	14	13,85	14,50
EC 16 L/R - ... 08	16	15,85	16,50
EC 18 L/R - ... 09	18	17,85	18,50
EC 20 L/R - ... 10	20	19,80	20,50
EC 25 L/R - ... 13	25	24,80	25,80
EC 32 L/R - ... 17	32	31,80	33,00

 Solid carbide

EcoCut Application

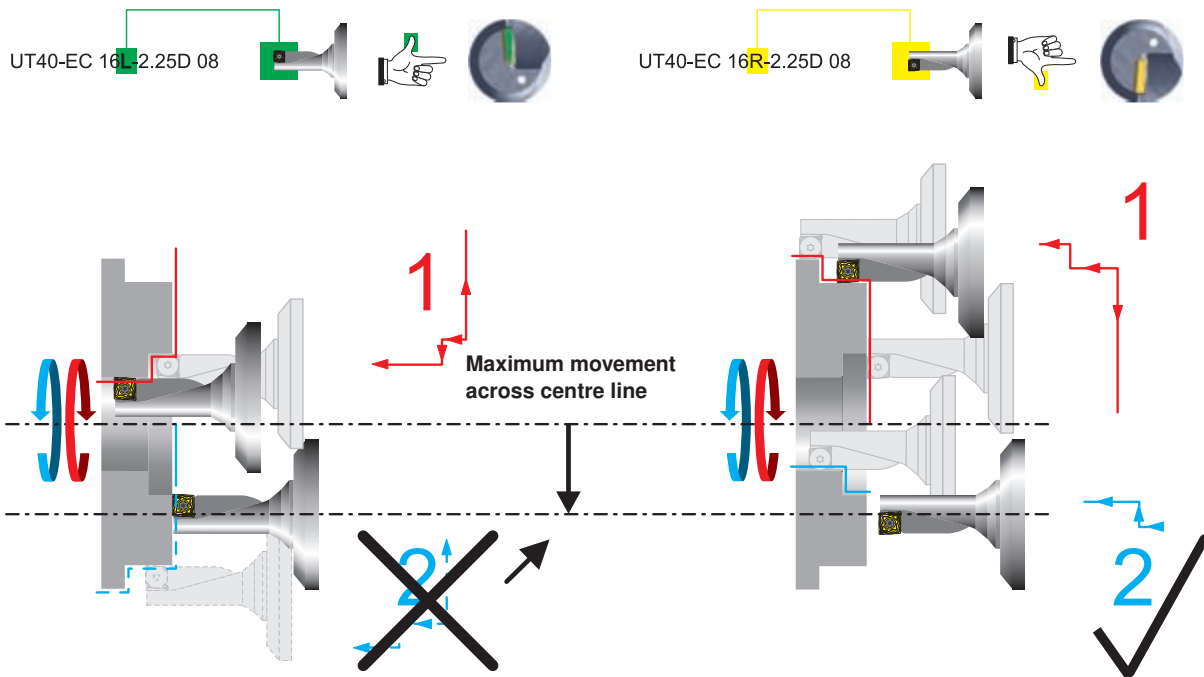
Machining across centre line

Situation:

In case of insufficient movement of the machine across the centre line the external diameter can not be machined with the same tool.

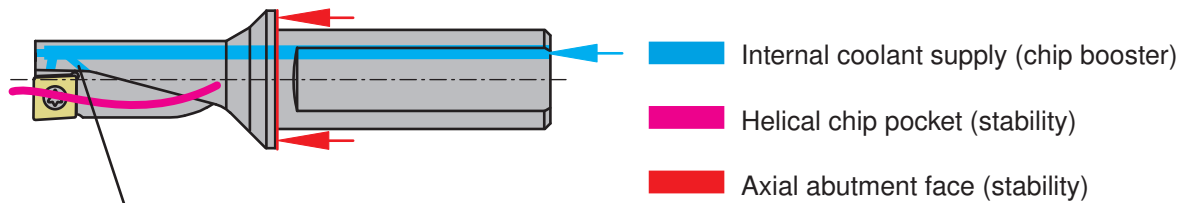
Solution:

Use a right-hand EcoCut tool.

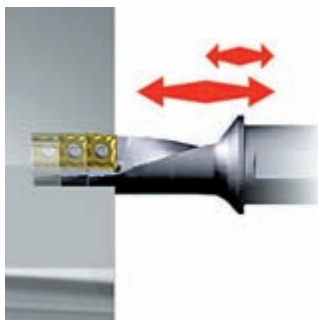


EcoCut Application

Chip booster / coolant pressure

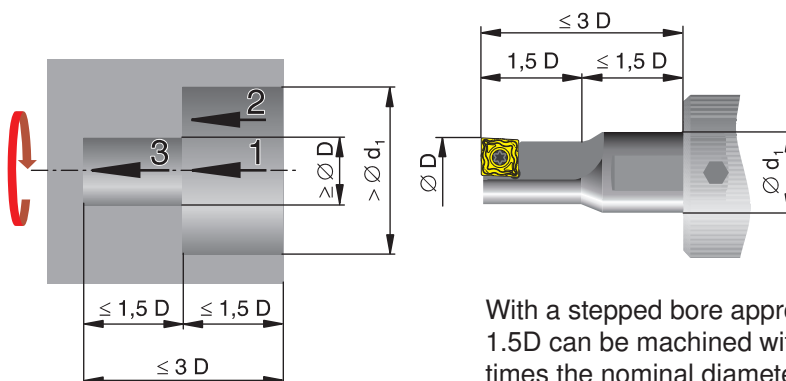


EcoCut offers an innovative detail solution for **range 2.25D**, namely additional bidirectional coolant supply for better chip evacuation. An additional **backwards directed coolant stream** improves chip transportation from the flute area. A minimum coolant pressure of 1.5-3 bar (optimum 5-7 bar) is required.



If the necessary coolant pressure is not available, it can be advantageous to interrupt the cutting action in order to clear the bore.

Deep bores up to 3xD



With a stepped bore approach EcoCut tools EC.. 1.5D can be machined with holes of up to three times the nominal diameter (see picture). Operation sequences 1, 2 and 3 respectively should be followed.

EcoCut Application

Material:

Machining steel 9SMn20

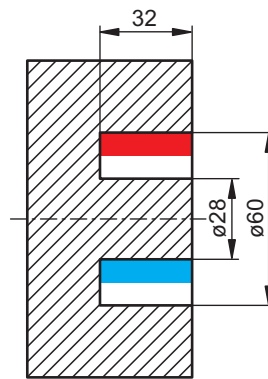
Insert:

XCNT080304EN GM40

Cutting data:

$n = 1500 \text{ min}^{-1}$

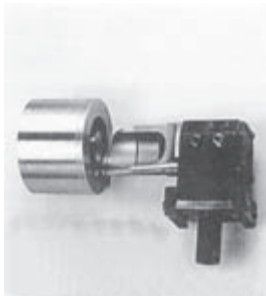
$f = 0.05 \text{ mm/rev.}$



EC16L-2,25D08
 $v_c = 283 \text{ m/min}$



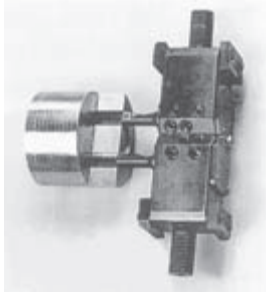
EC16R-2,25D08
 $v_c = 132 \text{ m/min}$



Special tool

Machining time:

120 s

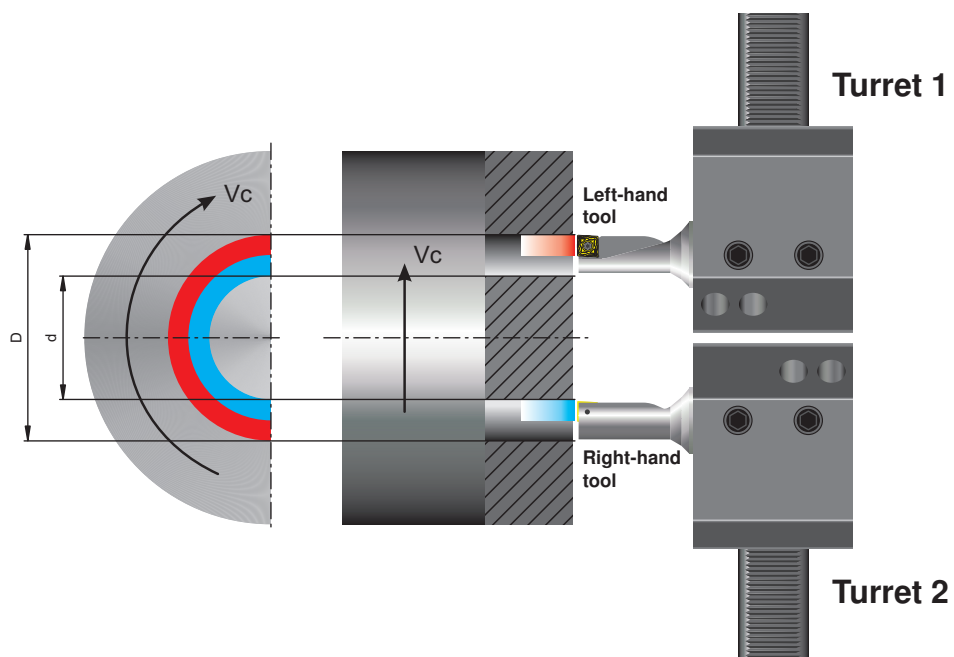


CERATIZIT EcoCut

Machining time:

20 s

Time saving: 83%



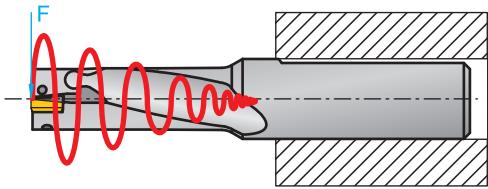
EcoCut Densimet

The advantages of DENSIMET compared to steel

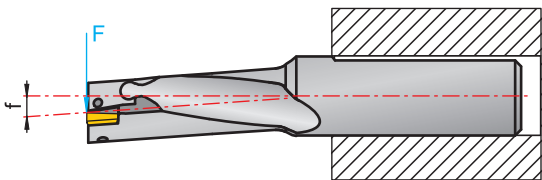
The new generation of our EcoCut 3.0D series with the new designation offers maximized performance. The tools are classified with the new designation **EC .. R/L-3.0D .. H** and have particularly been developed for bigger drilling depths and maximum precision requirements. The material used here is DENSIMET, a PLANSEE tungsten heavy metal alloy. The high modulus of elasticity as well as its density give this alloy very good vibration-damping properties. The result is highest precision, excellent surface quality and improved tool life.

Material	Modulus of elasticity (N/mm ²)	Density (g/mm ³)
Steel	210 000	7,85
DENSIMET	360 000	17,50

Vibration-damping

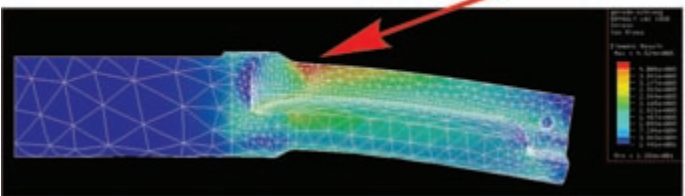


40% lower deflection than steel



The new chip flute design

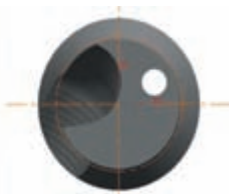
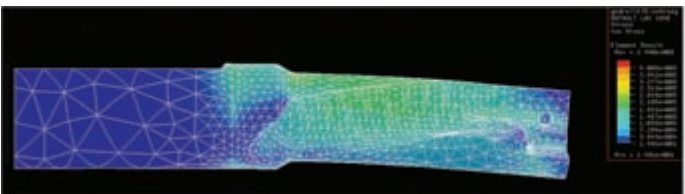
Version with straight chip flute



Maximum tension



Version with helical chip flute



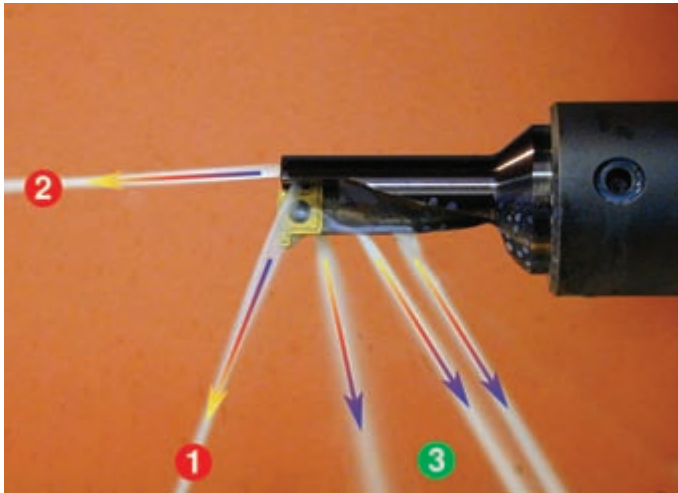
Up to 50% reduced tensions in the tool through Finite Element Modelling (FEM), optimized chip pocket design

ProfileMaster

Coolant supply, Masterfinish effect

Coolant supply

ProfileMaster is equipped with a unique coolant and chip removal system.



- 1 Cooling of the inserts
- 2 General coolant stream
- 3 Chipboosters prevent chips from getting stuck between tool and work piece

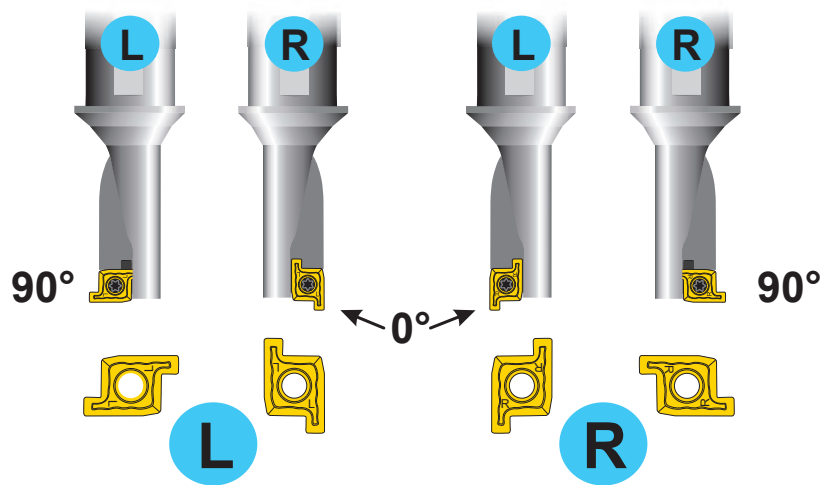


In order to guarantee efficient chip evacuation from a hole, a minimum coolant pressure of 3 - 6 bar (optimum 7 - 10 bar) is required.

ProfileMaster

Application

Mounting of the insert

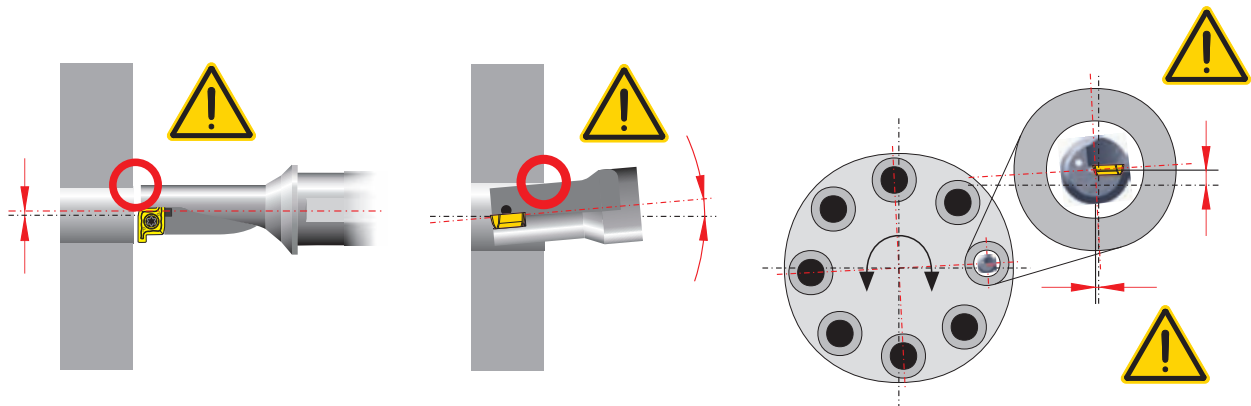


Axial displacement of the machine

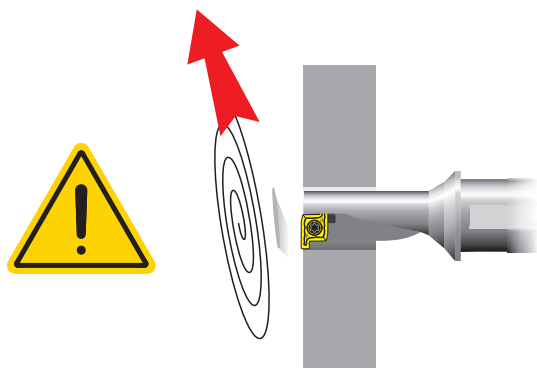
Displacement in x-direction

Angular error

Turret position error



Through hole

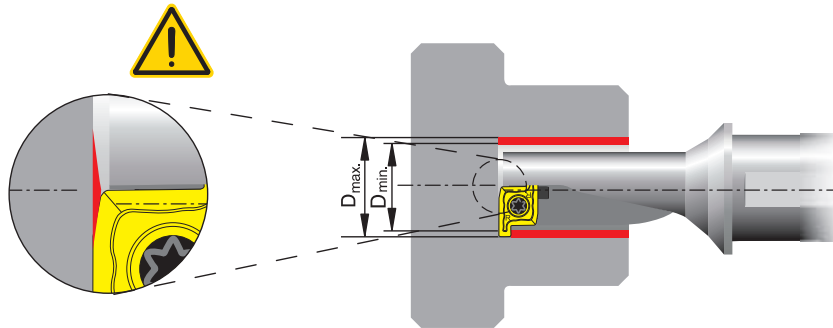


With through holes a **sharp-edged disk** as tool break-out occurs.
Safety measures are necessary.

ProfileMaster

Application

Off-centre drilling



Due to the special construction of ProfileMaster tools and inserts off-centre drilling is possible. Thus desired deviations from the tool's nominal diameter can be obtained (see table below).

Type of tool	Nominal tool diameter D (mm)	Drilling diameter (work piece)	
		D_{min} (mm)	D_{max} (mm)
PM 10R/L ...	10	9,85	12
PM 12R/L ...	12	11,85	15
PM 16R/L ...	16	15,85	19
PM 20R/L ...	20	19,80	24
PM 25R/L ...	25	24,80	29
PM 32R/L ...	32	31,80	38

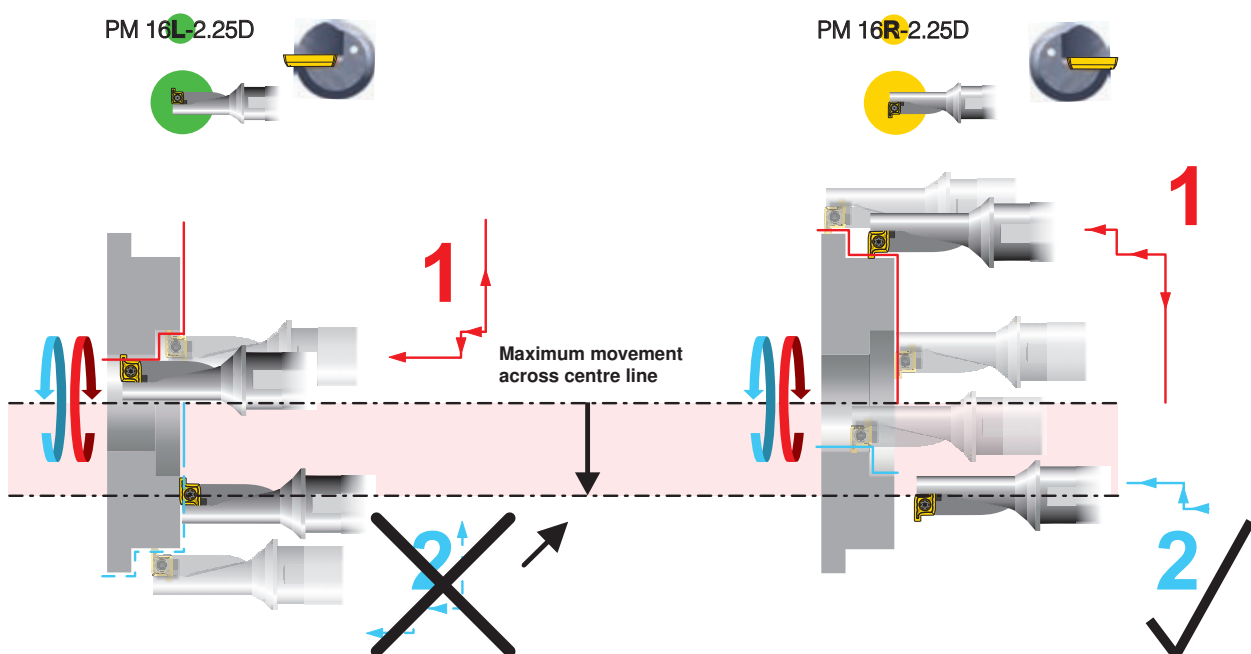
Machining across centre line

Situation:

In case of insufficient movement of the machine across the centre line the external diameter can not be machined with the same tool.

Solution:

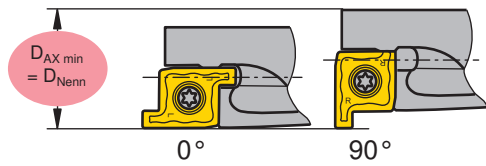
Use a right-hand ProfileMaster tool.



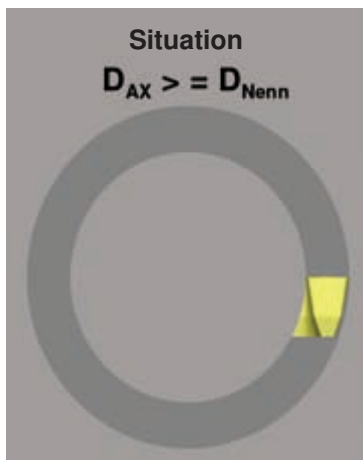
ProfileMaster

Application

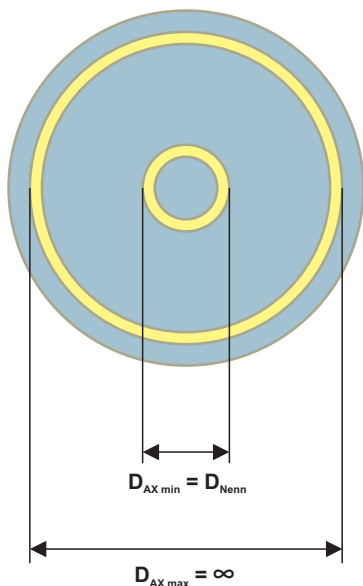
Axial grooving - axial application 0°



D_{Nenn}	D_{AXmin}	D_{AXmax}
16	16	∞
20	20	∞
25	25	∞
32	32	∞

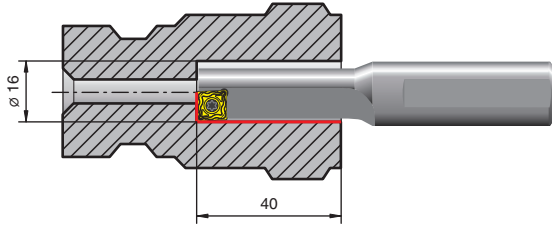


If the first cut is carried out with a diameter which is smaller than the nominal tool diameter D_{Nenn} (90° application), collision will result.



EcoCut

Machining examples



Criterion:

- > Deep hole with 90° shoulder applying only one tool

Result:

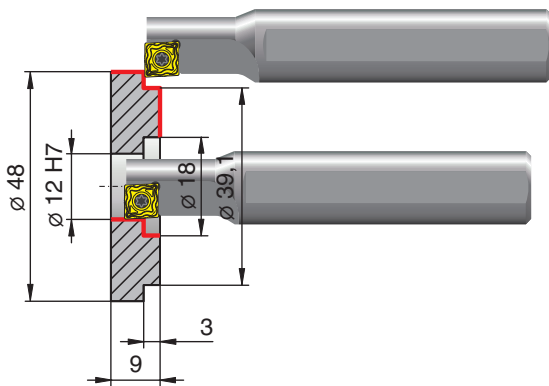
- > Machining time reduced by 50% compared to original machining method

Technical data:

Work piece: bush
Material: Sae 1045
Tensile strength: 730 - 900 N/mm²
Tool: EC 16L-3.0D 08 H
Insert: XCNT 080304EN GM40
Competitor: 2 tools

Cutting data:

- > Drilling
 $v_c = 176$ m/min
 $f = 0.06$ mm
 $a_p = \varnothing 16$ mm



Criteria:

- > Increase in productivity
- > Fewer tools in the turret
- > Reduction of tooling costs

Result:

- > 1 tool instead of 3
- > Machining time reduced by 45%
- > 2 additional tools in the turret

Technical data:

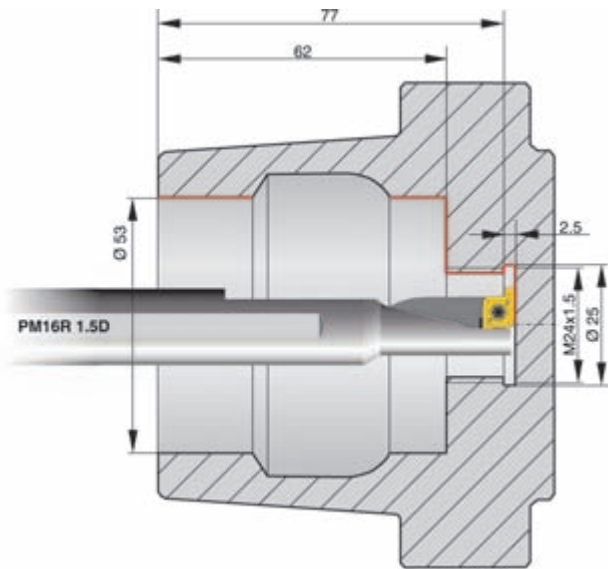
Work piece: flange
Material: 16 MnCr5 / 1.7131
Tool: EC 12L-1.5D 06
Insert: XCNT 060204EN GM40
Competitor: 3 tools

Cutting data:

- > Drilling
 $v_c = 150$ m/min
 $f = 0.03$ mm
- > Boring
 $v_c = 150$ m/min
 $f = 0.1$ mm
- > Face turning
 $v_c = 200$ m/min
 $f = 0.1$ mm
- > External turning
 $v_c = 150$ m/min
 $f = 0.1$ mm

ProfileMaster

Machining examples



Criteria:

- > Problems due to lack of turret positions
- > Optimization of machining time

Result:

- > Only 1 tool instead of 2
- > 1 free turret position

Technical data:

Work piece: HSK100 adapter
 Material: 1.2343 / X38 CrMoV 5 1
 Tensile strength: approx. 1100 N/mm²
 Tool: PM 16R-1.5D
 Insert: PM 16RG 252004-M20
 CTP2440
 Competitor: 2 tools

Cutting parameters:

$v_c = 150$ m/min
 $f = 0.15$ mm
 $a_p = 1$ mm



Criteria

- > Increase in productivity
- > 1 free turret position

Result:

- > Machining time reduced by 50%
- > Enhanced groove quality

Technical data:

Work piece: piston
 Material: 1.756 / 35SPb20+C
 Tool: PM 16R-1.5D
 Insert: PM 16RG 252004-M20
 CTC1435
 Competitor: 2 tools

Cutting parameters:

CERATIZIT	Competitor
$v_c = 105$ m/min	$v_c = 105$ m/min
$a_p = 0.3-5.0$ mm	$a_p = 0.3-5.0$ mm
$f = 0.03$ mm	$f = 0.1$ mm
Turning 0.15	0.1
Grooving 0.06	0.06

Lined area for writing or drawing.

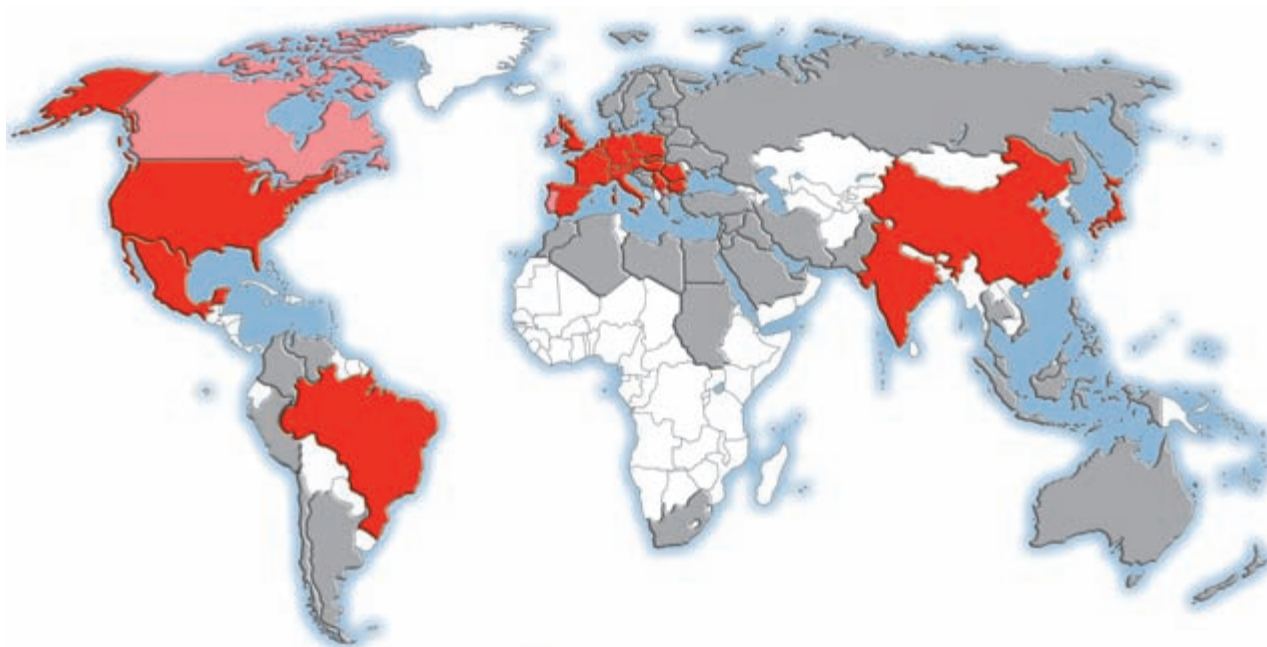
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CERATIZIT worldwide

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