

hard material matters



**Multi-function tools  
EcoCut & ProfileMaster**

EN





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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

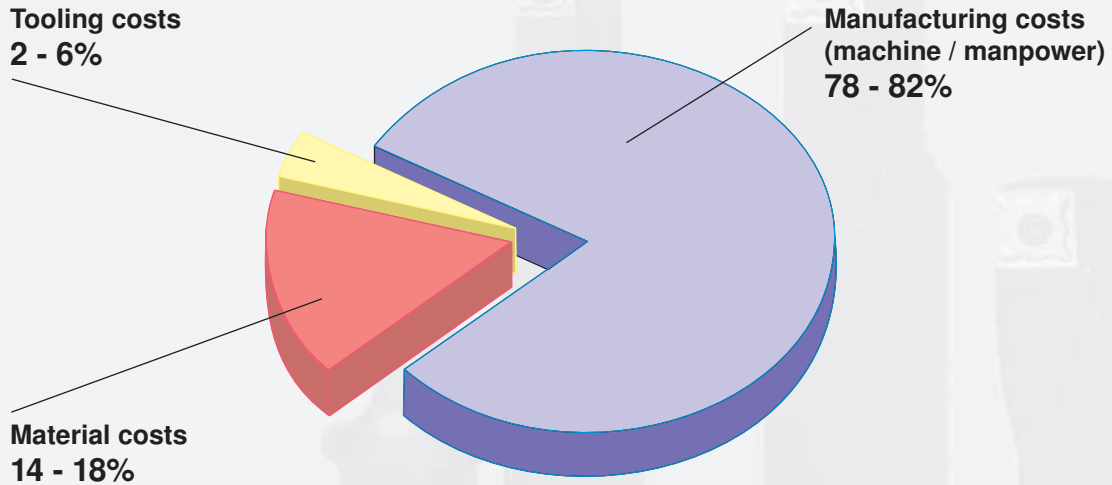
- ✓ Produces a flat bottom hole



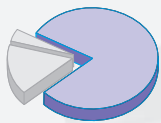
# EcoCut / ProfileMaster Productivity

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:

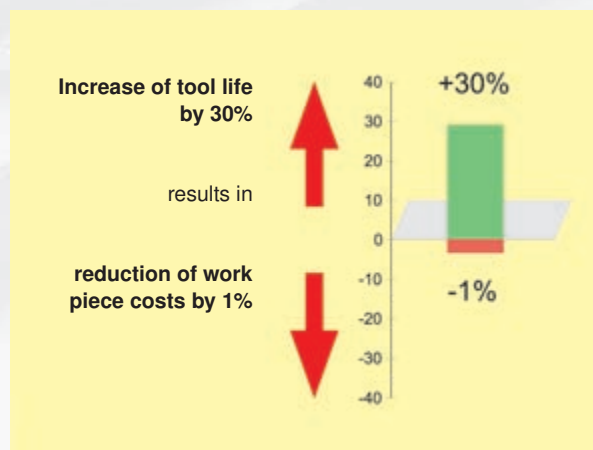
- Fewer tool changes
- Increased  $v_c$
- Increased  $f$
- Increased  $a_p$



## 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.

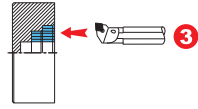
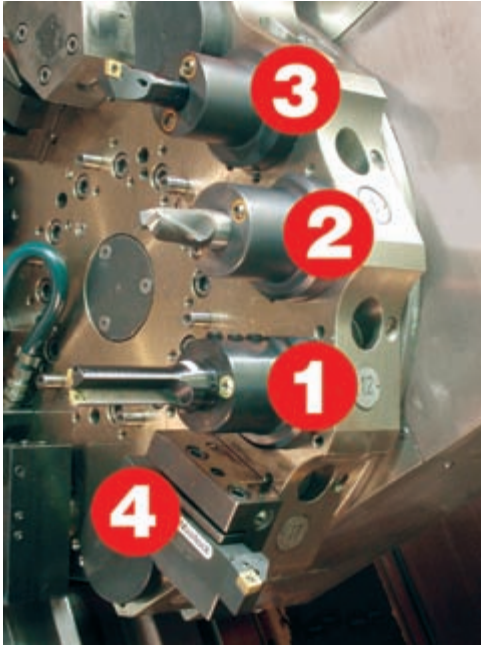


# EcoCut

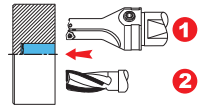
## Four machining operations with only one tool



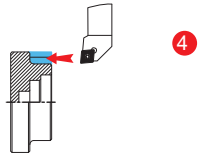
### Conventional



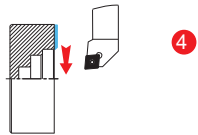
3 Boring applications



1 Drilling into solid material with flat bottom holes



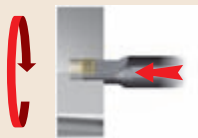
4 External turning applications



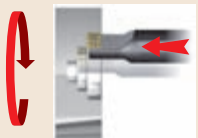
4 Turning of face profiles



### EcoCut



Drilling into solid material with flat bottom holes



Boring applications



Turning of face profiles



External turning applications

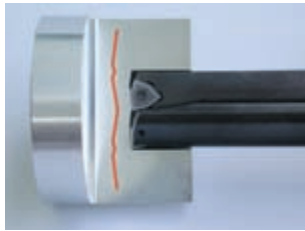


Reverse direction of rotation

# EcoCut / ProfileMaster

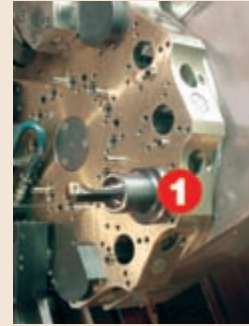
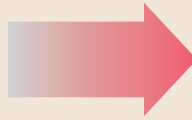
## Benefits

### Conventional



### EcoCut

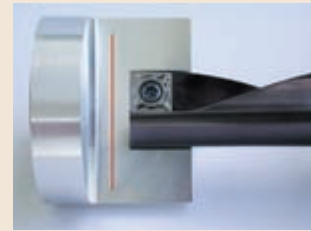
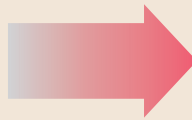
Problem solver for insufficient tool storage



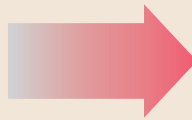
Less programming effort



Produces a flat bottom hole



Reduced stock-keeping costs for tools and indexable inserts



Considerable cost savings concerning tool acquisition

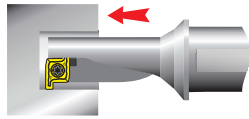
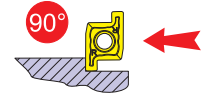
Shorter set-up times  
Reduced pre-setting times



# ProfileMaster

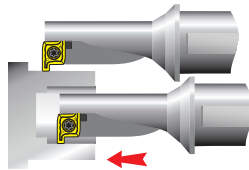
## Machining methods

### Machining methods - radial application 90°



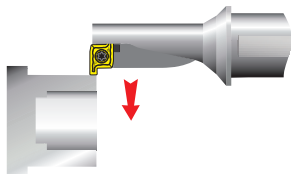
1

Drilling into solid material with flat bottom holes



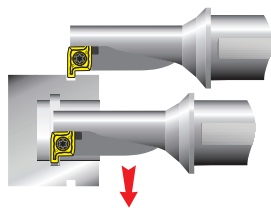
2

Boring applications



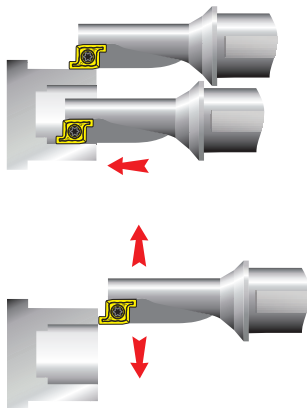
3

External turning applications



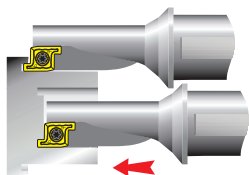
4

Internal turning applications



5

Turning of face profiles



6

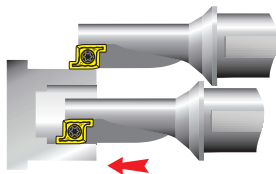
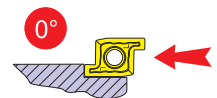
External radial grooving



7

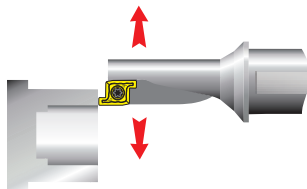
Internal radial grooving

### Machining methods - radial application 0°



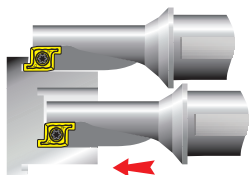
1

External turning applications



2

Boring applications



3

Turning of face profiles



4

External radial grooving



5

Internal radial grooving

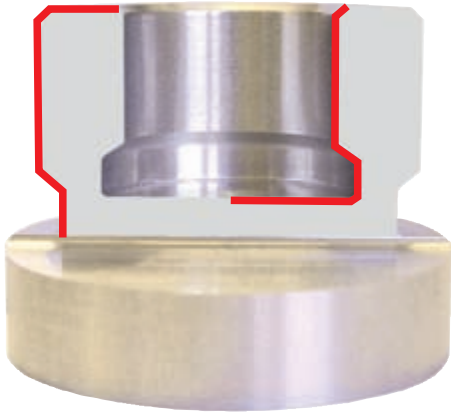


When changing from internal to external machining, reverse direction of rotation



# ProfileMaster

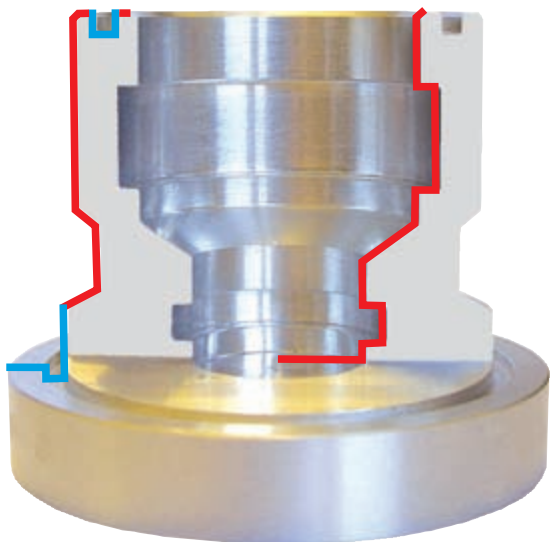
ProfileMaster from CERATIZIT provides the comprehensive solution



right-hand tool



right-hand insert



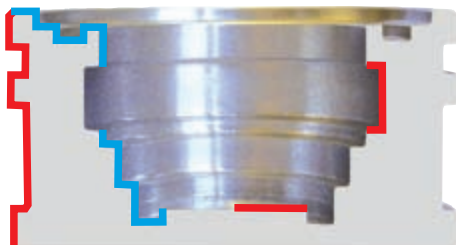
right-hand tool



left-hand insert



right-hand insert



left-hand tool

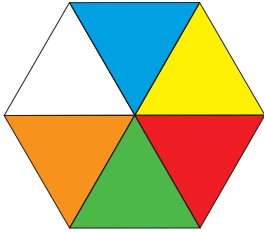
right-hand tool



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

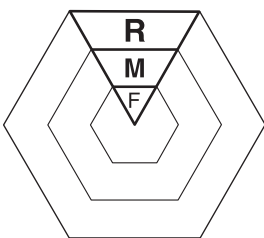
### Orange: heat resistant alloys / titanium

Ni/Co-base alloys, Ti alloys

### White: hard materials

Hardened steels ( $\geq 45$  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:

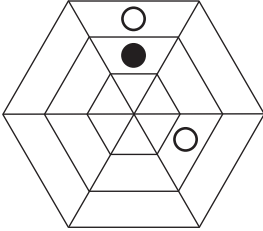
**R = rough machining**

**M = medium machining**

**F = fine machining**



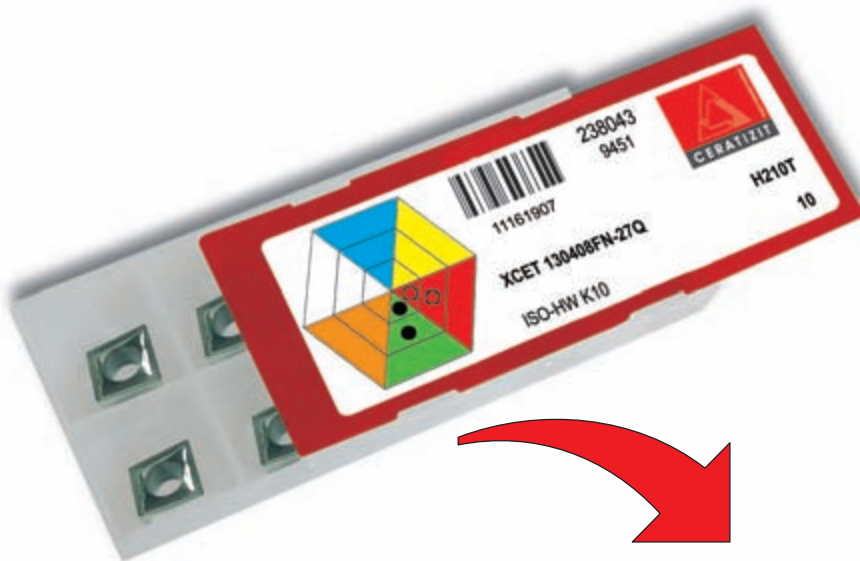
## Application



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

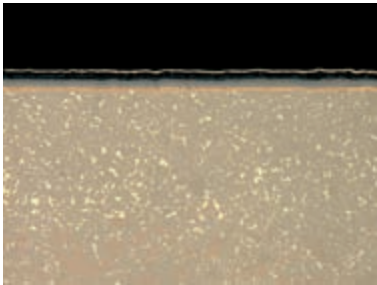
Grade designation	Standard designation	Cutting material	Application range								A	R	F	N	S	H						
											Steel	Stainless	Cast iron	Non ferrous metals	Heat resistant	Hard materials						
			01	05	10	15	20	25	30	35	40	45	50									
<b>CTC1425</b>	HC-P25	C															●	○	●	○	○	
	HC-M20	C						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

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									
<b>CM45</b>	HC-P45	P															●	○	○	○	○	
	HC-M40	P															○	○	○	○	○	
	HC-K25	P															○	○	○	○	○	
<b>TSM30</b>	HW-K30	W															○	○	○	○	○	
			01	05	10	15	20	25	30	35	40	45	50	●	Main application							
			01	05	10	15	20	25	30	35	40	45	50	○	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  $\mu\text{m}$

**Hardness:**  
 HV 1450

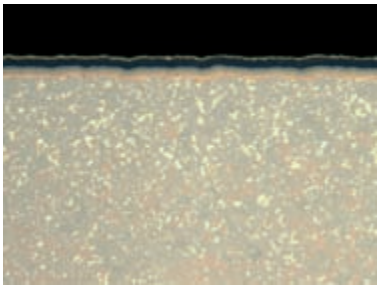
**Coating specification:**  
 CVD  
 TiN + Ti (C,N) + Ti (N,B) + Al<sub>2</sub>O<sub>3</sub> + Ti (C,N,B);  
 6  $\mu\text{m}$

**Toughness**  
 0 2 4 6 8 10

**Wear resistance**  
 0 2 4 6 8 10



**CTC1435**  
 HC-P35  
 HC-M30  
 HC-K20



**Composition:**  
 Co 9.5%; composite carbides 6.5%; WC rest


**Grain size:**  
 1 - 2  $\mu\text{m}$

**Hardness:**  
 HV 1400


**Coating specification:**  
 CVD  
 TiN + Ti (C,N) + Ti (N,B) + Al<sub>2</sub>O<sub>3</sub> + Ti (C,N,B);  
 6  $\mu\text{m}$

**Toughness**  
 0 2 4 6 8 10

**Wear resistance**  
 0 2 4 6 8 10



**CTP2440**  
 HC-P40  
 HC-M35  
 HC-K25



**Composition:**  
 Co 9.5%; composite carbides 6.5%; WC rest

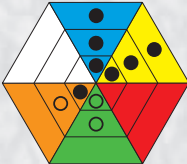
**Grain size:**  
 1 - 2  $\mu\text{m}$

**Hardness:**  
 HV 1400

**Coating specification:**  
 PVD  
 TiAlN; 3 - 5  $\mu\text{m}$

**Toughness**  
 0 2 4 6 8 10

**Wear resistance**  
 0 2 4 6 8 10



# Grade description

## Steel / stainless steel

### CM45

HC-P45  
HC-M40  
HC-K25

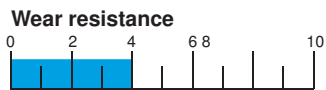
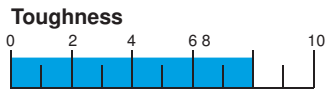


**Composition:**  
Co 10.0%; WC rest

**Grain size:**  
0.7  $\mu\text{m}$  (submicron grade)

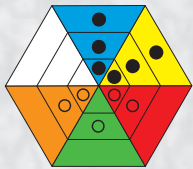
**Hardness:**  
HV 1600

**Coating specification:**  
PVD  
TiAlN; 2 - 4  $\mu\text{m}$



### CM45

HC-P45  
HC-M40  
HC-K25

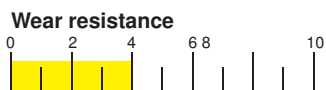
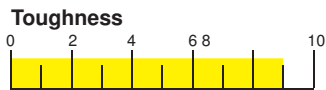


**Composition:**  
Co 10.0%; WC rest

**Grain size:**  
0.7  $\mu\text{m}$  (submicron grade)

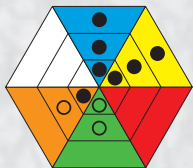
**Hardness:**  
HV 1600

**Coating specification:**  
PVD  
TiAlN; 2 - 4  $\mu\text{m}$



### CTP2440

HC-P40  
HC-M35  
HC-K25

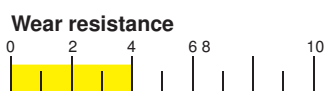
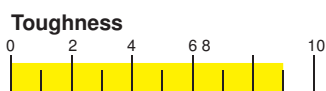


**Composition:**  
Co 9.5%; composite carbides 6.5%; WC rest

**Grain size:**  
1 - 2  $\mu\text{m}$

**Hardness:**  
HV 1400

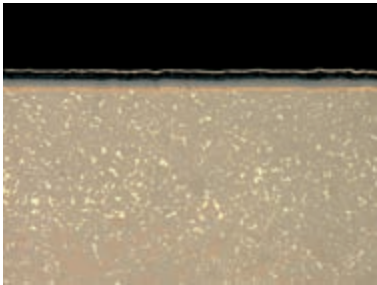
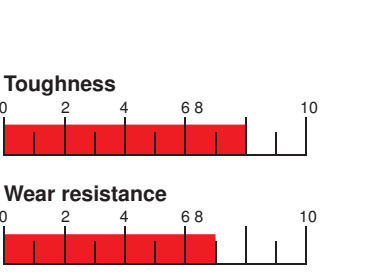
**Coating specification:**  
PVD  
TiAlN; 3 - 5  $\mu\text{m}$



# 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

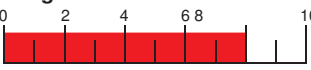
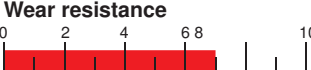
**Grain size:**  
 1 - 2  $\mu\text{m}$

**Hardness:**  
 HV 1450

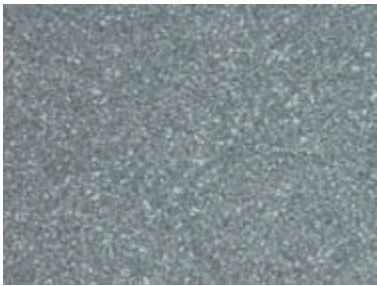
**Coating specification:**  
 CVD  
 TiN + Ti (C,N) + Ti (N,B) + Al<sub>2</sub>O<sub>3</sub> + Ti (C,N,B);  
 6  $\mu\text{m}$

**Toughness**  
 0 2 4 6 8 10

**Wear resistance**  
 0 2 4 6 8 10

**H216T**  
 HW-K15



**Composition:**  
 Co 6.0%; WC rest

**Grain size:**  
 1  $\mu\text{m}$

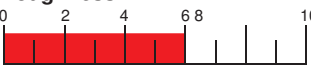
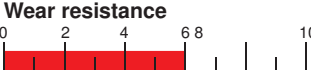
**Hardness:**  
 HV 1630

**Properties, application:**


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

**Toughness**  
 0 2 4 6 8 10

**Wear resistance**  
 0 2 4 6 8 10

**H210T**  
 HW-M10  
 HW-K10



**Composition:**  
 Co 6.0%; WC rest

**Grain size:**  
 0.8  $\mu\text{m}$  (submicron grade)

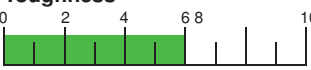
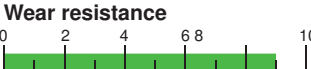
**Hardness:**  
 HV 1850

**Properties, application:**

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

**Toughness**  
 0 2 4 6 8 10

**Wear resistance**  
 0 2 4 6 8 10

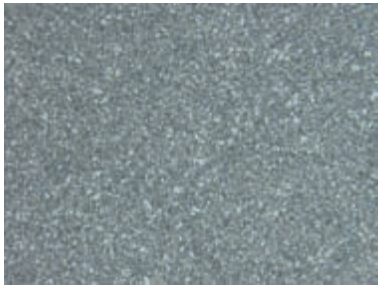
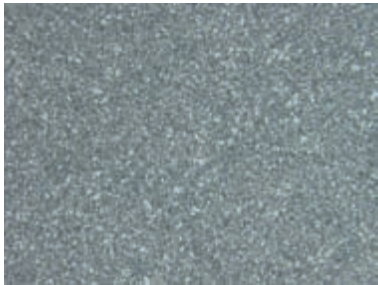





# Grade description

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

**H216T**  
HW-K15

**Composition:**  
Co 6.0%; WC rest

**Grain size:**  
1  $\mu\text{m}$

**Hardness:**  
HV 1630

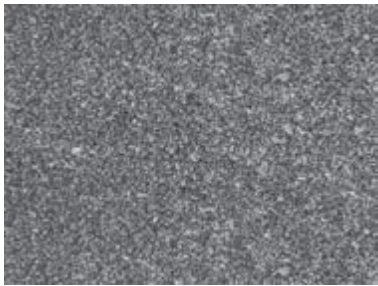
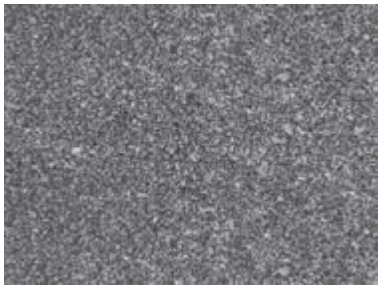
**Toughness**  
0 2 4 6.8 10

**Wear resistance**  
0 2 4 6.8 10

**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  $\mu\text{m}$

**Hardness:**  
HV 1550



**Toughness**  
0 2 4 6.8 10

**Wear resistance**  
0 2 4 6.8 10

**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  $\mu\text{m}$  (submicron grade)

**Hardness:**  
HV 1850

**Toughness**  
0 2 4 6.8 10

**Wear resistance**  
0 2 4 6.8 10

**Properties, application:**

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

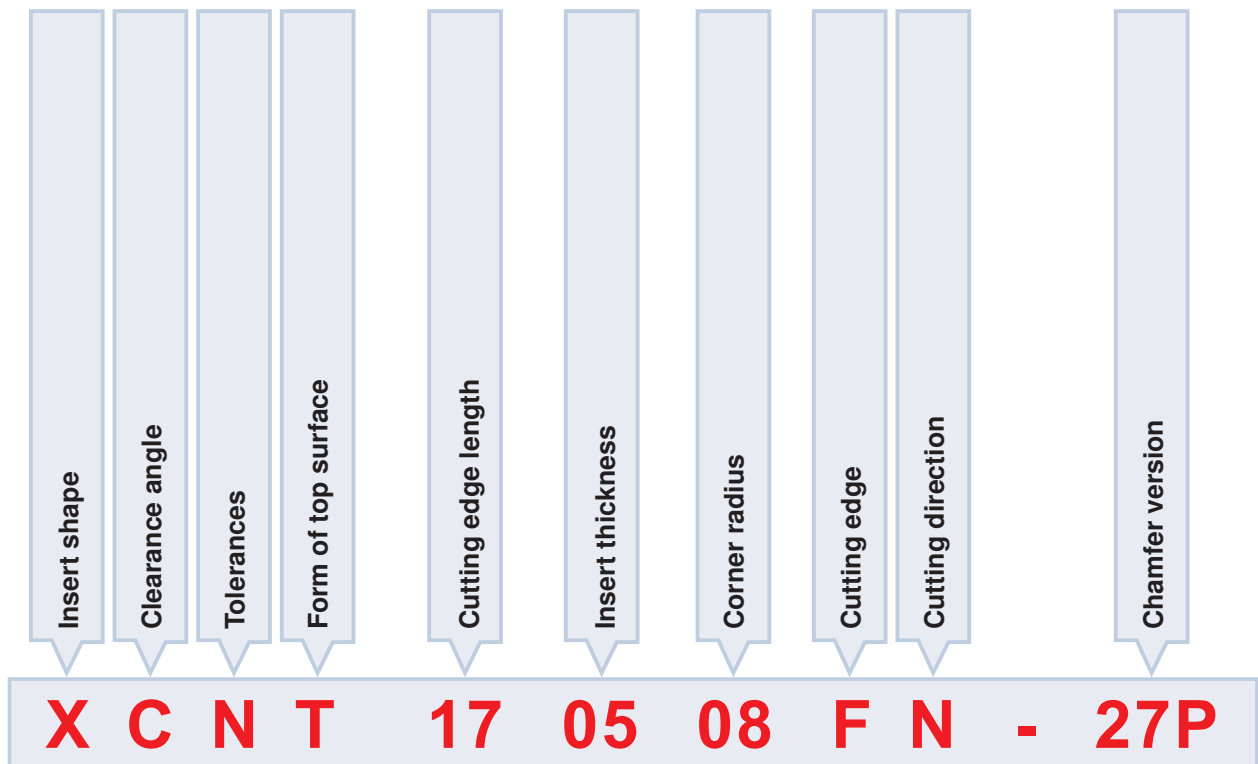




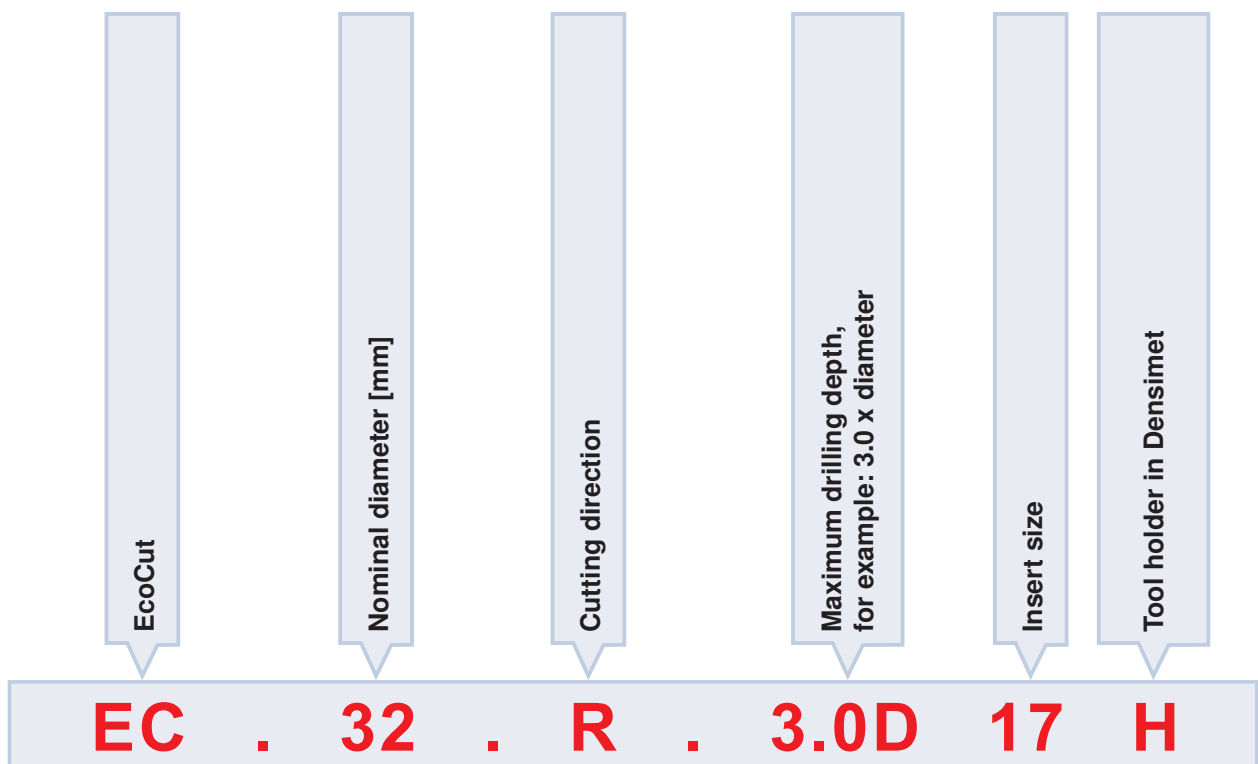
# EcoCut

## Designation systems

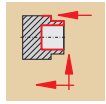
### Inserts



### Tools



# EcoCut XCET 04



-27P



ER-EL



-27Q

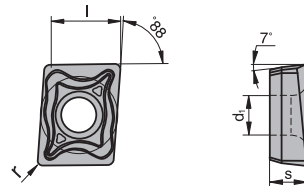


-M50Q

(l) [mm]	Type, description	L N R 					r [mm]	l [mm]	s [mm]	d <sub>1</sub> [mm]
			H210T	H216T	CTC1425	CTC1435				
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				●					
	XCET 040104FL-27P	L		●						
	XCET 040104FL-27Q		●							
	XCNT 040104EL				●	●	●			
	XCNT 040104EL-M50Q					●				



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



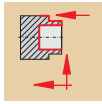
- Main application
- Extended application
- International CERATIZIT range, for present availability see price list

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



# EcoCut

## XCET 05-07



-27P



EN



-27Q



-M50Q

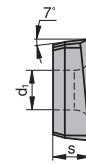
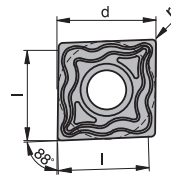
(l) [mm]	Type, description	L N R						d [mm]	l [mm]	s [mm]	r [mm]	d <sub>1</sub> [mm]	
			H210T	H216T	CTC1425	CTC1435	CTP2440						
05	XCET 050202FN-27P	N		●				5.80	5.00	2.10	0.20	2.25	
	XCET 050202FN-27Q		●										
	XCNT 050202EN				●	●	●						
	XCET 050204FN-27P			●									
	XCET 050204FN-27Q	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

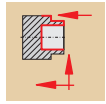


42-43



29-30

# EcoCut XCET 08-10



-27P



EN



-27Q

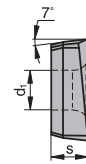
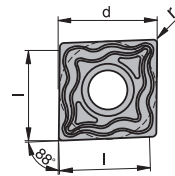


-M50Q

(l) [mm]	Type, description	L N R 						d [mm]	l [mm]	s [mm]	r [mm]	d <sub>1</sub> [mm]		
			H210T	H216T	CTC1425	CTC1435	CTP2440							
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	0.80	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
Steel	●	●	●	●	●	●
Stainless	○	○	○	○	○	○
Cast iron	○	○	○	○	○	○
Non ferrous metals	○	○	○	○	○	○
Heat resistant	○	○	○	○	○	○
Hard materials	○	○	○	○	○	○

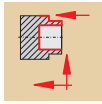


- Main application
- Extended application
- International CERATIZIT range, for present availability see price list

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



# EcoCut XCET 13-17



-27P



EN



-27Q

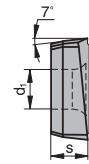
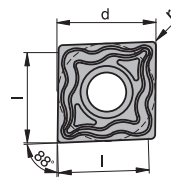


-M50Q

(l) [mm]	Type, description	L N R 						d [mm]	l [mm]	s [mm]	r [mm]	d <sub>1</sub> [mm]	
			H210T	H216T	CTC1425	CTC1435	CTP2440						
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			●									
	XCET 130408FN-27Q		●										
	XCNT 130408EN				●	●	●						
	XCNT 130408EN-M50Q				●								
17	XCET 170508FN-27P		●				17.50	16.00	5.56	0.80			
	XCET 170508FN-27Q	●											
	XCNT 170508EN			●	●	●							
	XCNT 170508EN-M50Q			●									



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



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

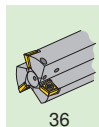
Ordering example: 10 pieces XCET 130404FN-27P H216T



42-43

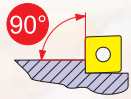


31-35



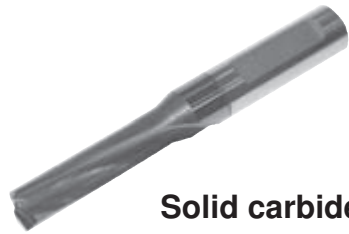
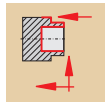
36



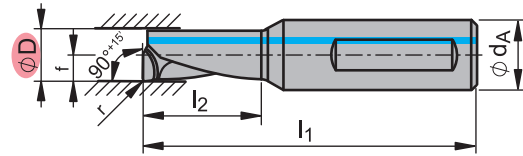


# EcoCut Mini

## ECM Ø 4 - 5 mm



Solid carbide



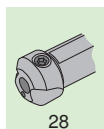
D [mm]	Type, description	L R		TSM30	CM45				d <sub>A</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	f [mm]	r [mm]
4	EC 04R-2.25D	R		●					6	35	9	2	0.2
	EC 04R-2.25D-27		●										
	EC 04R-4.00D		●										
	EC 04R-4.00D-27		●										
	EC 04L-2.25D	L		●									
	EC 04L-2.25D-27		●										
	EC 04L-4.00D		●										
	EC 04L-4.00D-27		●										
5	EC 05R-2.25D	R		●				6	37	11.25	2.5	0.2	
	EC 05R-2.25D-27		●										
	EC 05R-4.00D		●										
	EC 05R-4.00D-27		●										
	EC 05L-2.25D	L		●									
	EC 05L-2.25D-27		●										
	EC 05L-4.00D		●										
	EC 05L-4.00D-27		●										

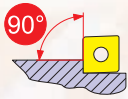


Steel	●	■	■	■	■
Stainless	●	■	■	■	■
Cast iron	○	○	○	○	○
Non ferrous metals	●	○	○	○	○
Heat resistant	○	○	○	○	○
Hard materials					

- Uncoated
- Coated
- Main application

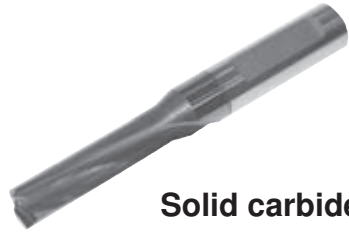
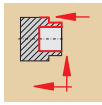
Ordering example: 10 pieces EC 04R-2.25D CM45



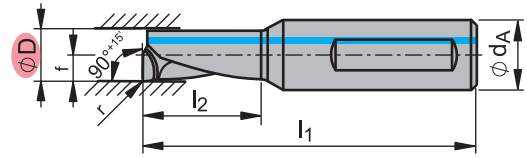


# EcoCut Mini

## ECM Ø 6 - 7 mm



Solid carbide



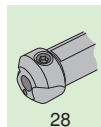
D [mm]	Type, description	L R	TSM30	CM45					$d_A$ [mm]	$l_1$ [mm]	$l_2$ [mm]	$f$ [mm]	$r$ [mm]
6	EC 06R-2.25D	R	●	●					8	38	13.5	3	0.2
	EC 06R-2.25D-27		●										
	EC 06R-4.00D		●	●									
	EC 06R-4.00D-27		●										
	EC 06L-2.25D	L	●	●				49		24			
	EC 06L-2.25D-27		●										
	EC 06L-4.00D		●	●									
	EC 06L-4.00D-27		●										
7	EC 07R-2.25D	R	●	●				8	42	15.75	3.5	0.2	
	EC 07R-2.25D-27		●										
	EC 07R-4.00D		●	●									
	EC 07R-4.00D-27		●										
	EC 07L-2.25D	L	●	●					53	28			
	EC 07L-2.25D-27		●										
	EC 07L-4.00D		●	●									
	EC 07L-4.00D-27		●										

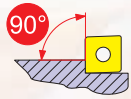


Steel	●	●	●	●	●	●
Stainless	●	●	●	●	●	●
Cast iron	○	○	○	○	○	○
Non ferrous metals	●	○	○	○	○	○
Heat resistant	○	○	○	○	○	○
Hard materials						

- Uncoated
- Coated
- Main application

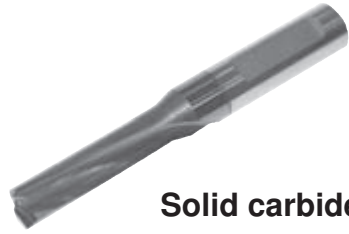
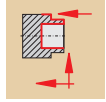
Ordering example: 10 pieces EC 06R-2.25D CM45



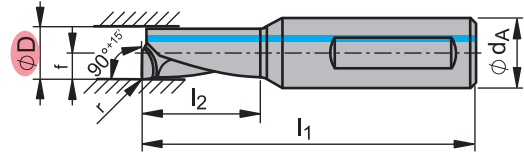


# EcoCut Mini

## ECM Ø 8 mm



Solid carbide



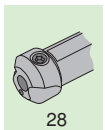
D [mm]	Type, description	L R		TSM30	CM45				d <sub>A</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	f [mm]	r [mm]
8	EC 08R-2.25D	R		●					8	45	18	4	0.2
	EC 08R-2.25D-27		●										
	EC 08R-4.00D			●									
	EC 08R-4.00D-27		●										
	EC 08L-2.25D	L		●				8	45	18	4	0.2	
	EC 08L-2.25D-27		●										
	EC 08L-4.00D			●									
	EC 08L-4.00D-27		●										



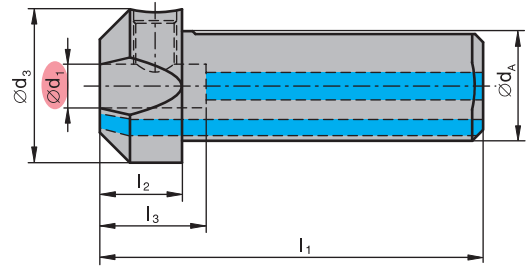
Steel	●	●	●	●	●	●	●	●
Stainless	●	●	●	●	●	●	●	●
Cast iron	○	○	○	○	○	○	○	○
Non ferrous metals	●	○	○	○	○	○	○	○
Heat resistant	○	○	○	○	○	○	○	○
Hard materials								

- Uncoated
- Coated
- Main application

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




# 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					

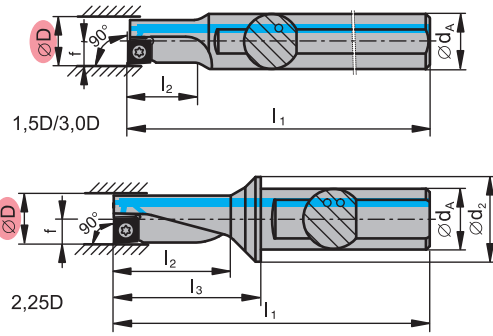
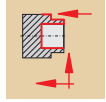
Ordering example: 1 piece EC-ADX20-06

$d_1$ [mm]	 1 piece		
6	7897990/M8X1X8 DIN913		
8	7897990/M8X1X8 DIN913		



# EcoCut Classic

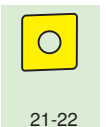
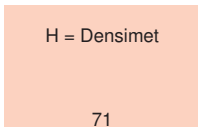
EC Ø 8 - 12 mm



D [mm]	Type, description	L R 	d <sub>A</sub> [mm]	d <sub>2</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [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			

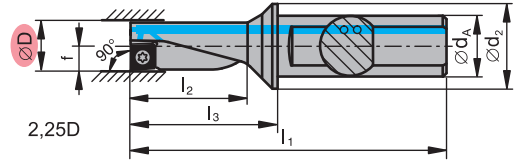
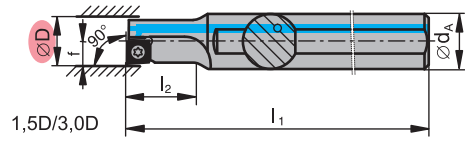
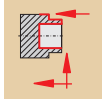
Ordering example: 1 piece EC 08R-1.5D 04

	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

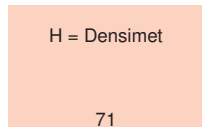
## EC Ø 14 - 18 mm



D [mm]	Type, description	L R	d <sub>A</sub> [mm]	d <sub>2</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [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						

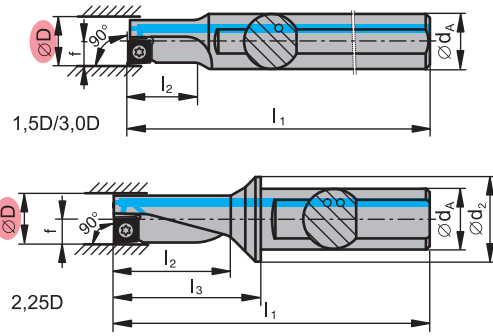
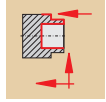
Ordering example: 1 piece EC 14R-1.5D 07

	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

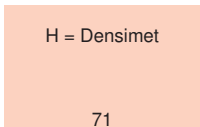
EC Ø 20 - 32 mm



D [mm]	Type, description	L R 								
			d <sub>A</sub> [mm]	d <sub>2</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [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			

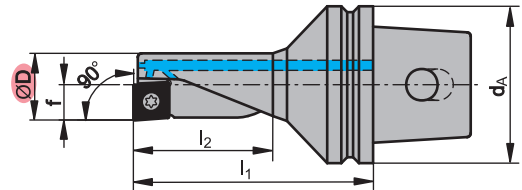
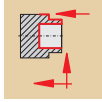
Ordering example: 1 piece EC 20R-1.5D 10


	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






# EcoCut Classic UTS

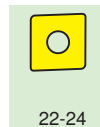
EC Ø 16 - 32 mm



D [mm]	Type, description	L R	d <sub>A</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [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		40	60	36		
18	UT40-EC 18L-2.25D 09	L	40	65	40.5	9	XC.. 09T3..
	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

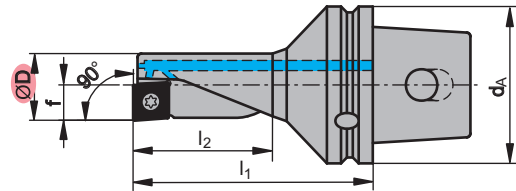
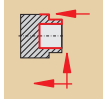
	D [mm]	 10 pieces	 1 piece
XC.. 0803..	16	7883203/M3,0X7,3/T08	7724106/TORX T08
XC.. 09T3..	18	7883203/M3,0X7,3/T08	7724106/TORX T08
XC.. 10T3..	20	7883209/M3,5X8,6/T15	7724103/TORX T15
XC.. 1304..	25	7822114/M4,5X10,5/T20	7724104/TORX T20
XC.. 1705..	32	7822114/M4,5X10,5/T20	7724104/TORX T20





# EcoCut Classic UTS MIY

## EC Ø 25 - 32 mm for Mazak Integrex



D [mm]	Type, description	L R 	d <sub>A</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	f [mm]	
							XC.. 1304..
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		105	72	16	XC.. 1705..
	UT63-EC 32L-2.25D 17-MIY	L					

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

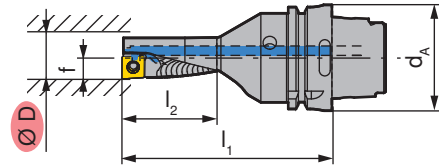
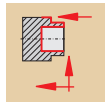
	D [mm]	 10 pieces	 1 piece
XC.. 1304..	25	7822114/M4,5X10,5/T20	7724104/TORX T20
XC.. 1705..	32	7822114/M4,5X10,5/T20	7724104/TORX T20











# EcoCut Classic HSK-T

ECC Ø 25 - 32 mm



D [mm]	Type, description	L R		d <sub>A</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [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		XC.. 1705..
	HSK-T63-EC-32L-2.25D 17	L							

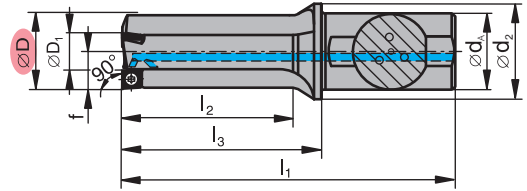
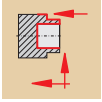
Ordering example: 1 piece HSK-T63-EC-25R-2.25D 13

	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



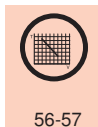
D [mm]	Type, description	L R		D <sub>1</sub> [mm]	d <sub>A</sub> [mm]	d <sub>2</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	f [mm]	
40	ECR 4020R03-2.25D 10	R		20	40	50	175	90	105.0	20	XC.. 10T3..
	ECR 4020L03-2.25D 10	L									
60	ECR 6032R03-2.25D 17	R		32	70	232	135	162.0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

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



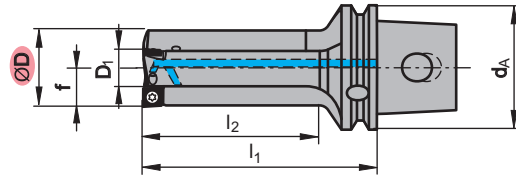
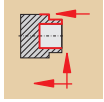
Initial bore necessary!

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



# EcoCut Rebore UTS MIY

## ECR Ø 40 mm for Mazak Integrex



D [mm]	Type, description	L R	D <sub>1</sub> [mm]	d <sub>A</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [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!

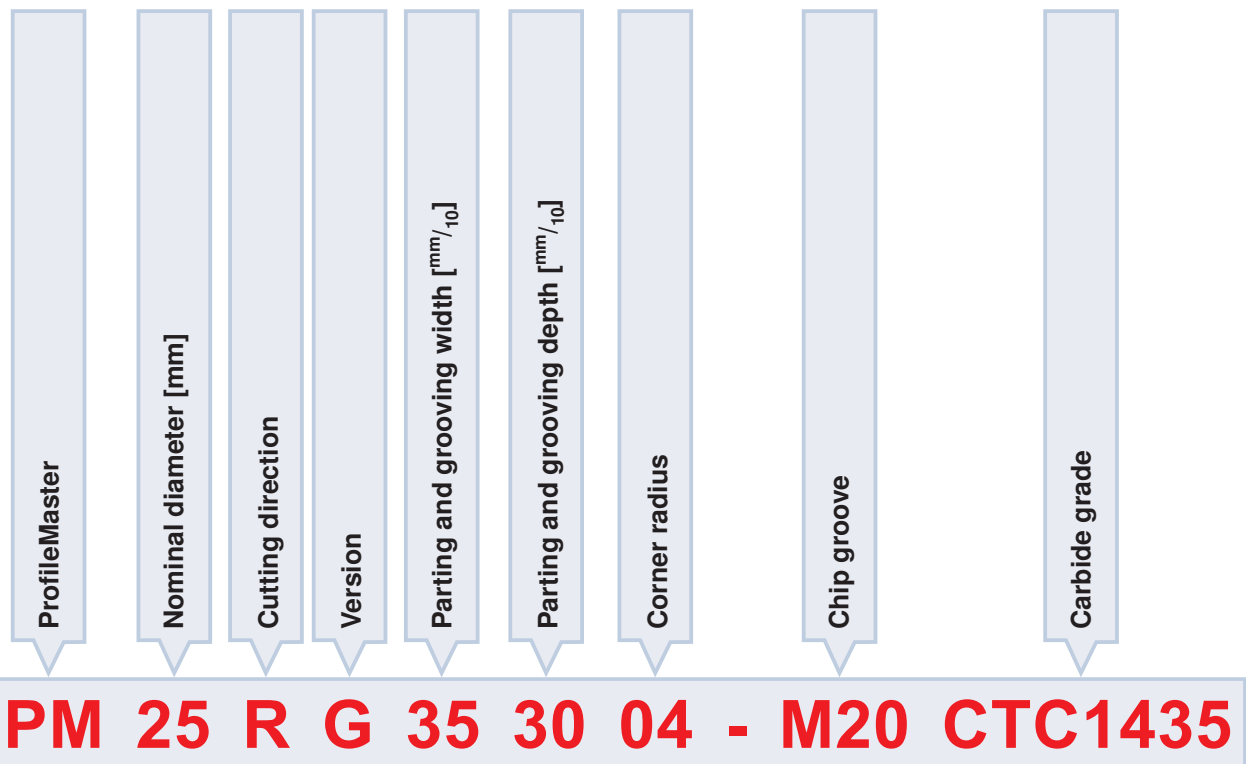
	D [mm]			
XC.. 10T3..	40	10 pieces 7883209/M3,5X8,6/T15	1 piece 7724103/TORX T15	



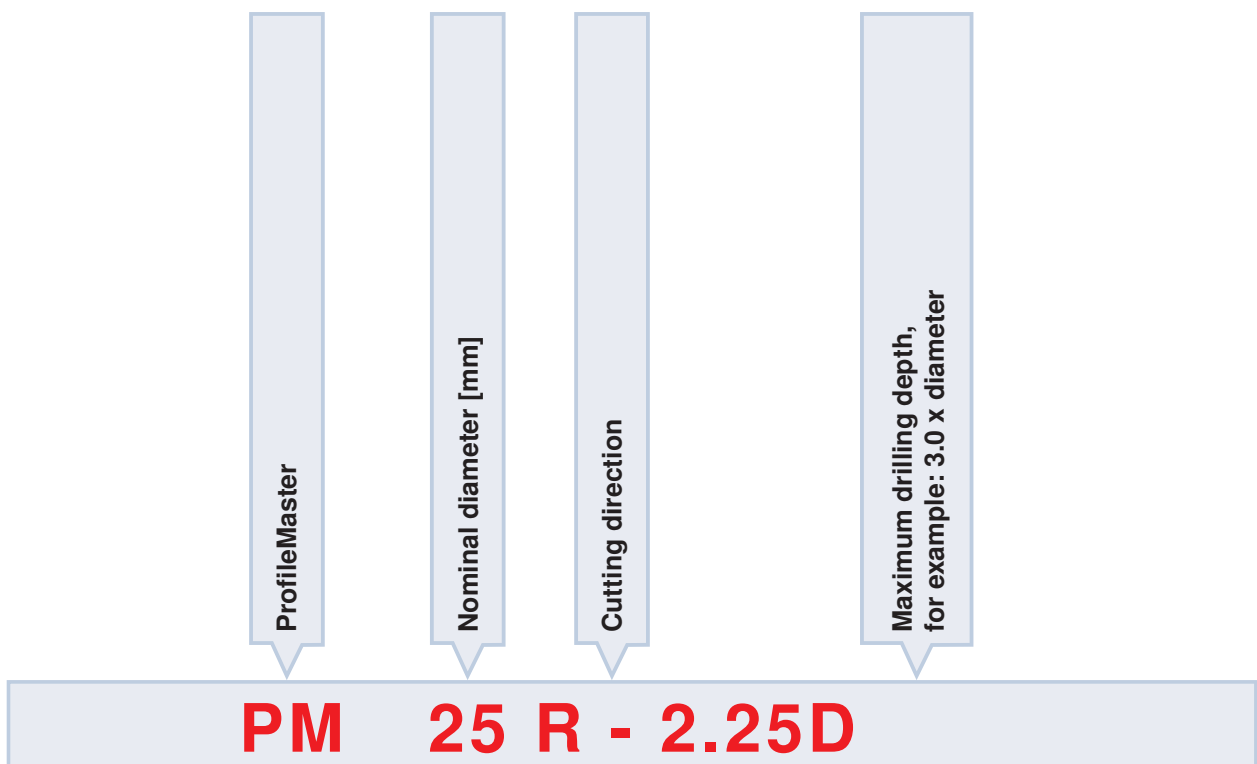
# ProfileMaster

## Designation systems

### Inserts

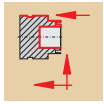


### Tools



# ProfileMaster

## PM Ø 10 - 32 mm



-M20

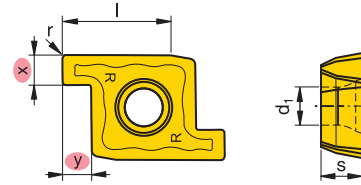
Size	Type, description	L N R	CTC1435	CTP2440			x	y	l	s	d <sub>1</sub>	r				
							[mm]	[mm]	[mm]	[mm]	[mm]	[mm]				
10	PM 10RG 201504-M20	R	●	●			2.00	1.50	5.00	2.10	2.10	0.40				
	PM 10LG 201504-M20	L	●	●												
12	PM 12RG 201804-M20	R	●	●			2.00	1.80	6.00	2.30	2.50		0.40			
	PM 12LG 201804-M20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

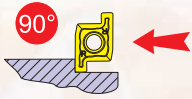


Steel	●	●	●	●
Stainless	○	●	●	●
Cast iron	○	●	●	●
Non ferrous metals	○	○	○	○
Heat resistant	○	○	○	○
Hard materials	○	○	○	○

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

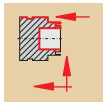
Ordering example: 10 pieces PM 10RG 201504-M20 CTP2440



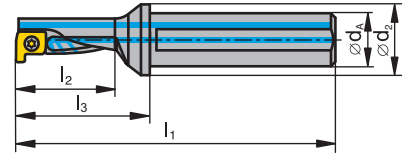
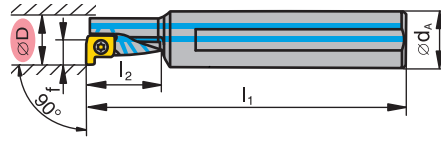


# ProfileMaster

## PM Ø 10 - 32 mm



90°



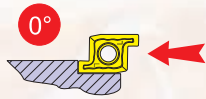
D [mm]	Type, description	L R						f [mm]	
			d <sub>A</sub> [mm]	d <sub>2</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]		
10	PM 10R-1.5D	R	12		80	15	5	PM 10..	
	PM 10R-2.25D				16	22.5			
	PM 10L-1.5D	L			80	15			
	PM 10L-2.25D				16	22.5			
12	PM 12R-1.5D	R	16		90	18	6	PM 12..	
	PM 12R-2.25D				20	27			
	PM 12L-1.5D	L			90	18			
	PM 12L-2.25D				20	27			
16	PM 16R-1.5D	R	20		125	24	8	PM 16..	
	PM 16R-2.25D				25	36			
	PM 16L-1.5D	L			125	24			
	PM 16L-2.25D				25	36			
20	PM 20R-1.5D	R	25		150	30	10	PM 20..	
	PM 20R-2.25D				32	45			
	PM 20L-1.5D	L			150	30			
	PM 20L-2.25D				32	45			
25	PM 25R-1.5D	R	32		180	37.5	12.5	PM 25..	
	PM 25R-2.25D				40	56.3			
	PM 25L-1.5D	L			180	37.5			
	PM 25L-2.25D				40	56.3			
32	PM 32R-1.5D	R	40		200	48	16	PM 32..	
	PM 32R-2.25D				50	72			
	PM 32L-1.5D	L			200	48			
	PM 32L-2.25D				50	72			

Ordering example: 1 piece PM 10R-1.5D

	d <sub>A</sub> [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	

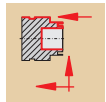




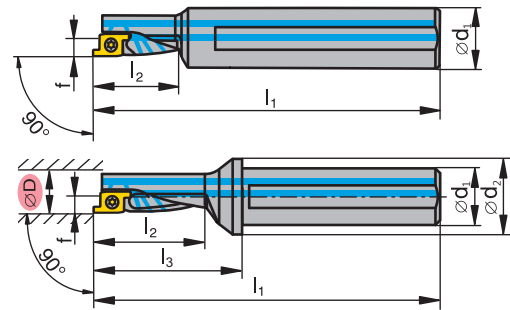







# ProfileMaster

## PM Ø 16 - 32 mm



0°

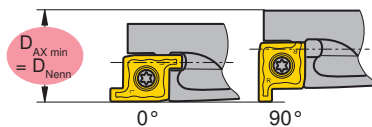


D [mm]	Type, description	L R								
			$d_A$ [mm]	$d_2$ [mm]	$l_1$ [mm]	$l_3$ [mm]	$l_2$ [mm]	$f$ [mm]		
16	PM 16R-1.5D	R	20	25	127.3	48.8	38.3	26.3	5.70	
	PM 16R-2.25D									
	PM 16L-1.5D	L								
	PM 16L-2.25D									
20	PM 20R-1.5D	R	25	32	152.8	57.8	47.8	32.8	7.20	
	PM 20R-2.25D									
	PM 20L-1.5D	L								
	PM 20L-2.25D									
25	PM 25R-1.5D	R	32	40	183.3	75.9	59.6	40.8	9.20	
	PM 25R-2.25D									
	PM 25L-1.5D	L								
	PM 25L-2.25D									
32	PM 32R-1.5D	R	40	50	204.3	92.3	76.3	52.3	11.70	
	PM 32R-2.25D									
	PM 32L-1.5D	L								
	PM 32L-2.25D									

Ordering example: 1 piece PM 16R-1.5D






Not suitable for drilling!



Details see page

75

	$d_A$ [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	



# Cutting data

## Grades, material

Work piece material		Type of treatment / alloy	VDI 3323 group	Hardness HB	
<b>A</b>	Non alloyed steel	annealed	≤ 0,15% C	1	125
		annealed	0,15% - 0,45% C	2	150 - 250
		tempered	≥ 0,45% 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
<b>R</b>	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
<b>F</b>	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
<b>N</b>	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% Si	23	80
		hardened	< 12% Si	24	90
		non hardened	> 12% 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	-
	<b>S</b>	Heat resistant alloys	annealed	Fe-base	31
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 <sup>2</sup>	35	-
Titanium alloys			pure titanium	36	R <sub>m</sub> 440*
			alpha + beta alloys	37	R <sub>m</sub> 1050*
<b>H</b>	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<sub>m</sub> = 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
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–

# EcoCut / ProfileMaster

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)				
	↑	↓	↓	↓ ↑	↓ ↑	↓		Cutting speed		Cutting values	
↓		~	↓	↓ ↑	↓	↑	↓	Feed rate			
↑		↑	↑	↓	↑			Corner radius		larger ↓ ↑ smaller	Selection of inserts
↓		↑	↑					Cutting material		wear resistance ↓ ↑ toughness	
~				~	~			Clamping of tool		General criteria	
~				~	~			Clamping of work piece			
~				~	↓			Overhang			
~		~		~	~			Tip height			
	●	●	●		●	●		Cooling lubricant			

## Corrective measures

↑ raise, increase, large influence

↓ avoid, reduce large influence

~ check, optimize

↑ raise, increase low influence

↓ avoid, reduce low influence

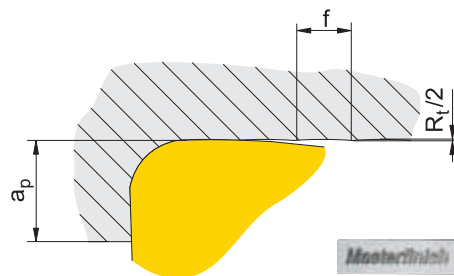
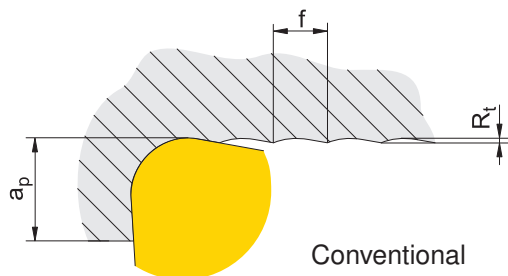
● use

# EcoCut / ProfileMaster Masterfinish

## Operating principle / benefit

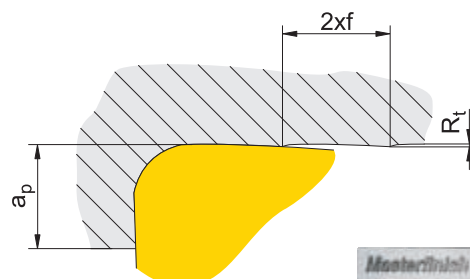
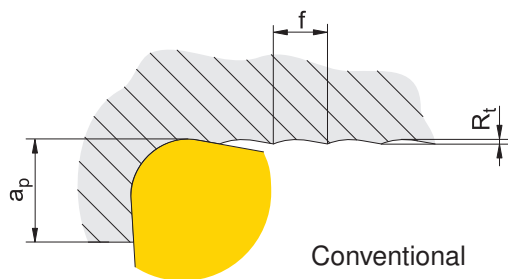
### Improved surface finish

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

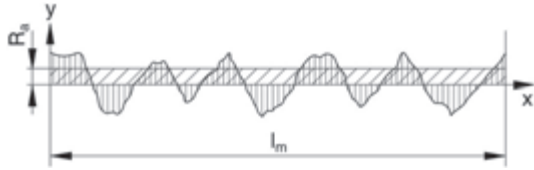
If you want to reach the same  $R_a$ -value as with a standard insert, a twice as high feed rate can be applied for the insert with 'Masterfinish' cutting edge (= shorter production time per component!).



# EcoCut / ProfileMaster

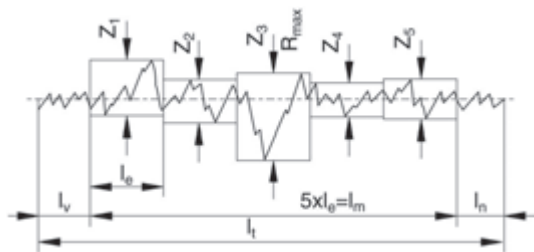
## Surface quality

### ISO-DIN measured surface roughness



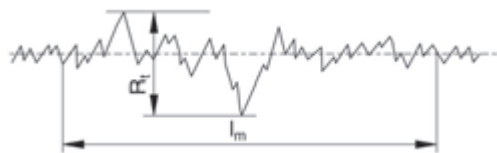
#### Average roughness value $R_a$ (DIN 4768)

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 $R_i$ (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	$R_a$ [ $\mu\text{m}$ ]	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	$R_z$ [ $\mu\text{m}$ ]	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)

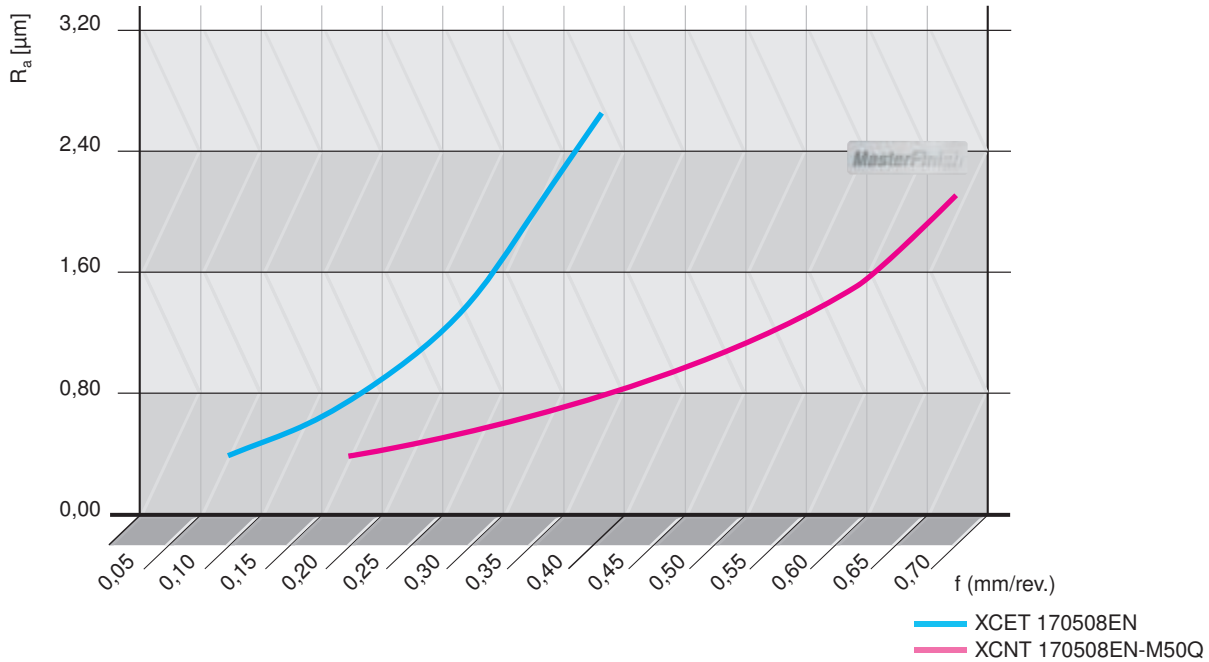
# EcoCut / ProfileMaster

## Surface finish / feed rate

### EcoCut

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

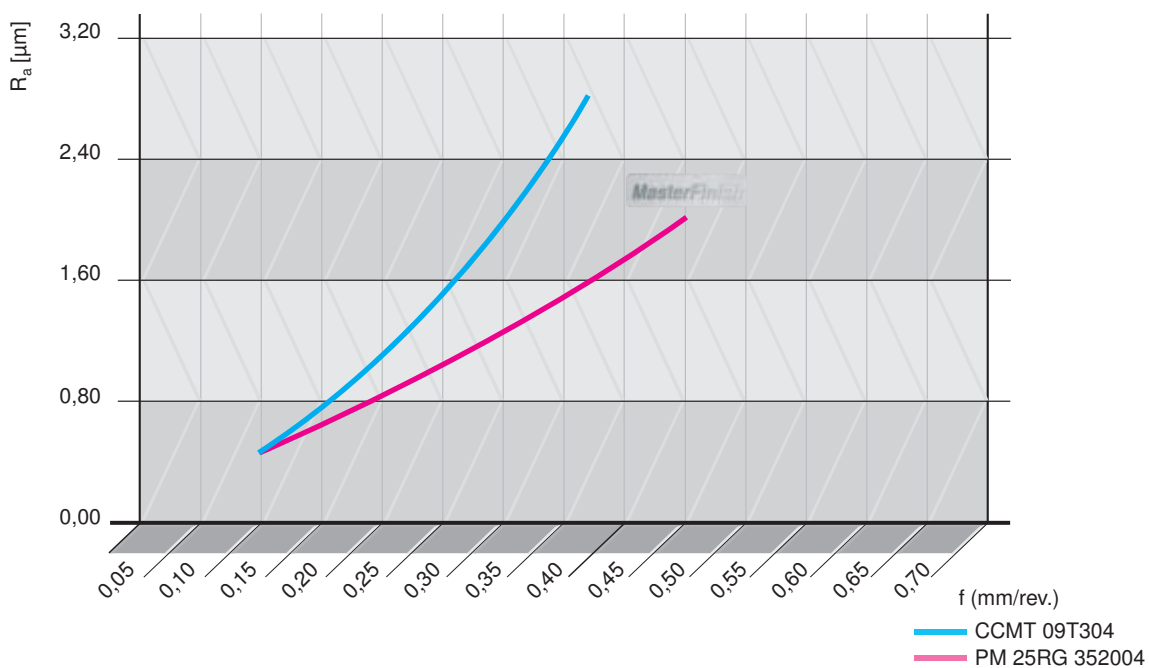
$v_c = 150$  m/min  
 $a_p = 1$  mm  
 $r = 0,8$  mm



### 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

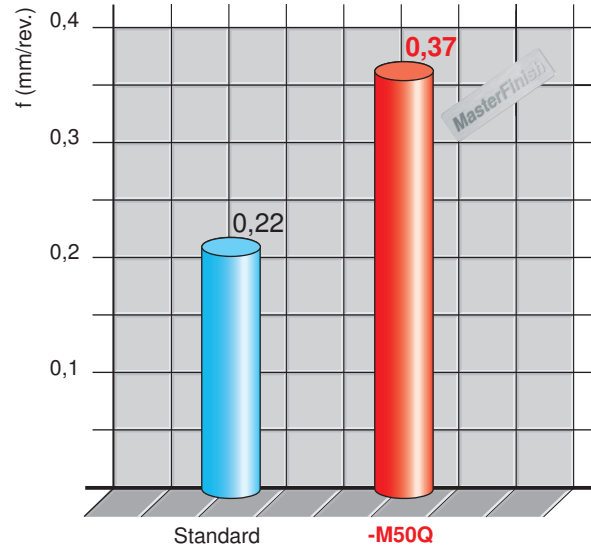
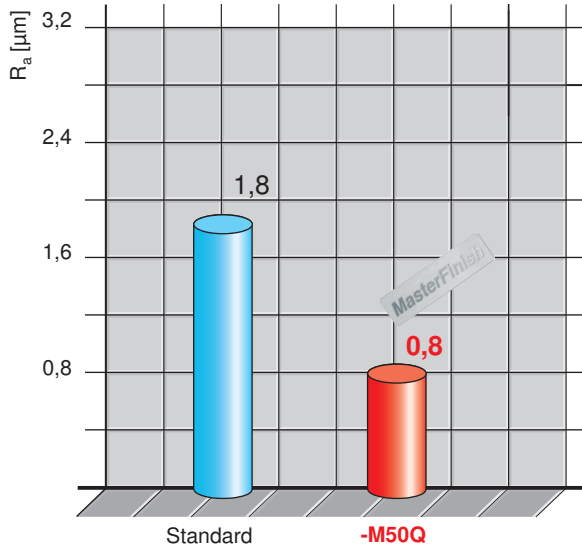
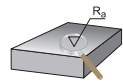
### R = 0.4 mm corner radius / steel



To achieve  $f = 0.25$  mm



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



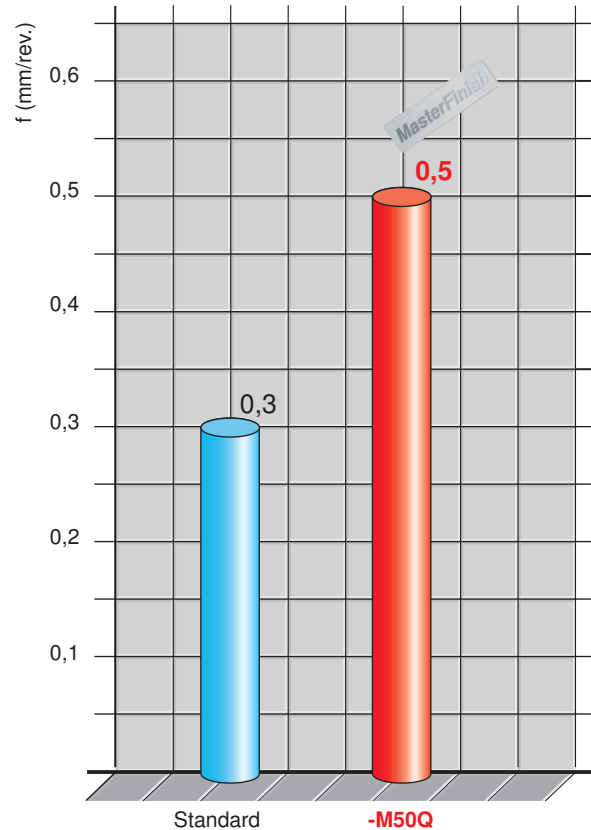
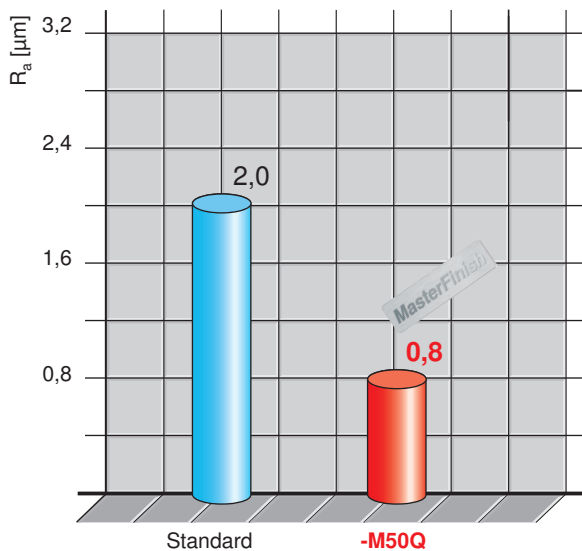
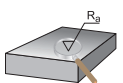
### R = 0.8 mm corner radius / steel



To achieve  $f = 0.35$  mm



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





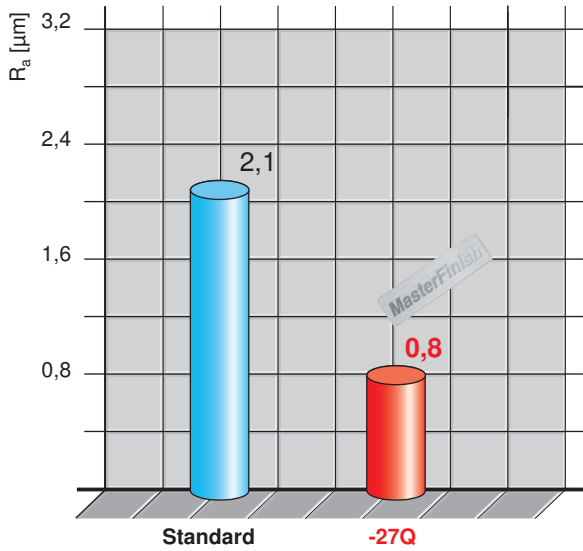
# EcoCut

## Surface finish / feed rate

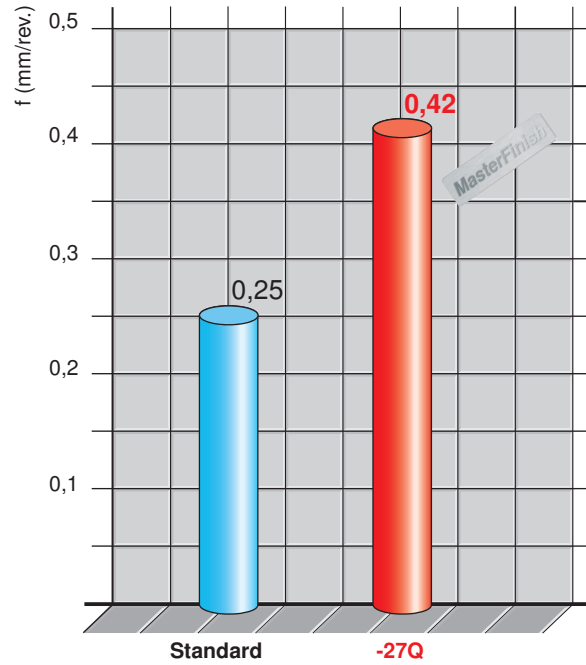
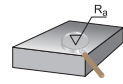
### R = 0.4 mm corner radius / aluminium



To achieve  $f = 0.25$  mm



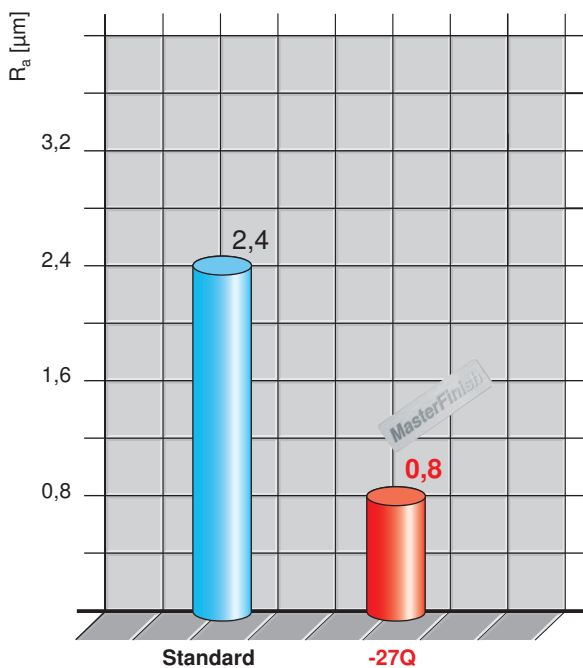
To achieve  $R_a = 1.6$   $\mu\text{m}$



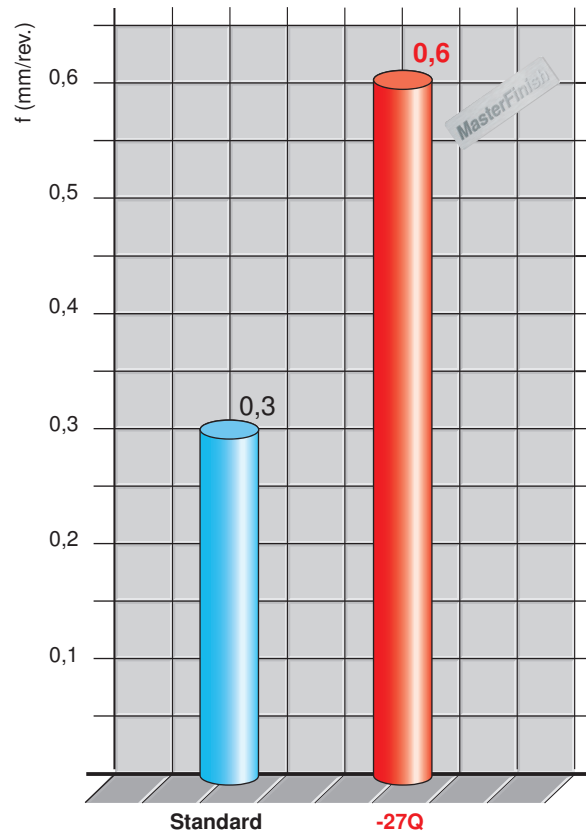
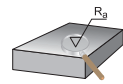
### R = 0.8 mm corner radius / aluminium



To achieve  $f = 0.45$  mm



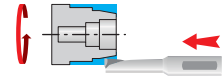
To achieve  $R_a = 1.6$   $\mu\text{m}$



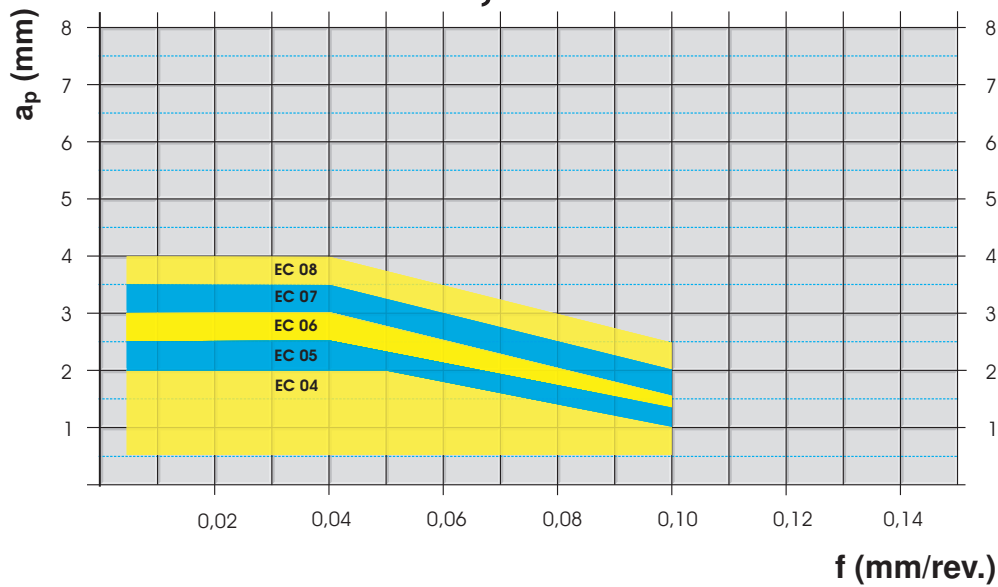
# EcoCut Mini

## Depth of cut / feed rate

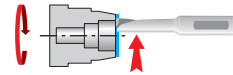
### Longitudinal turning



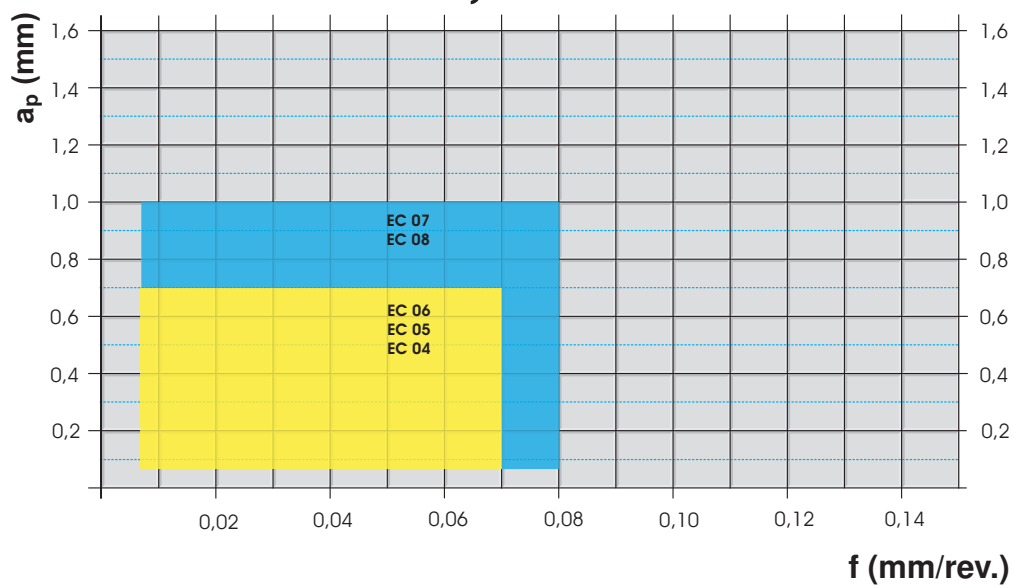
## 2,25D



### Face turning



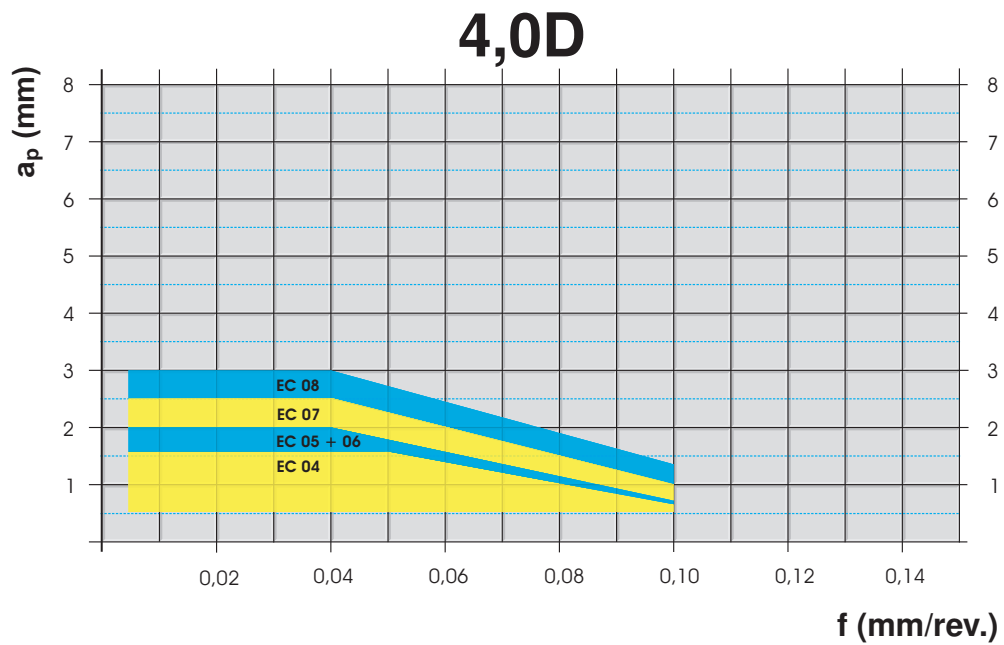
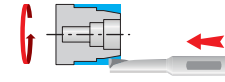
## 2,25D



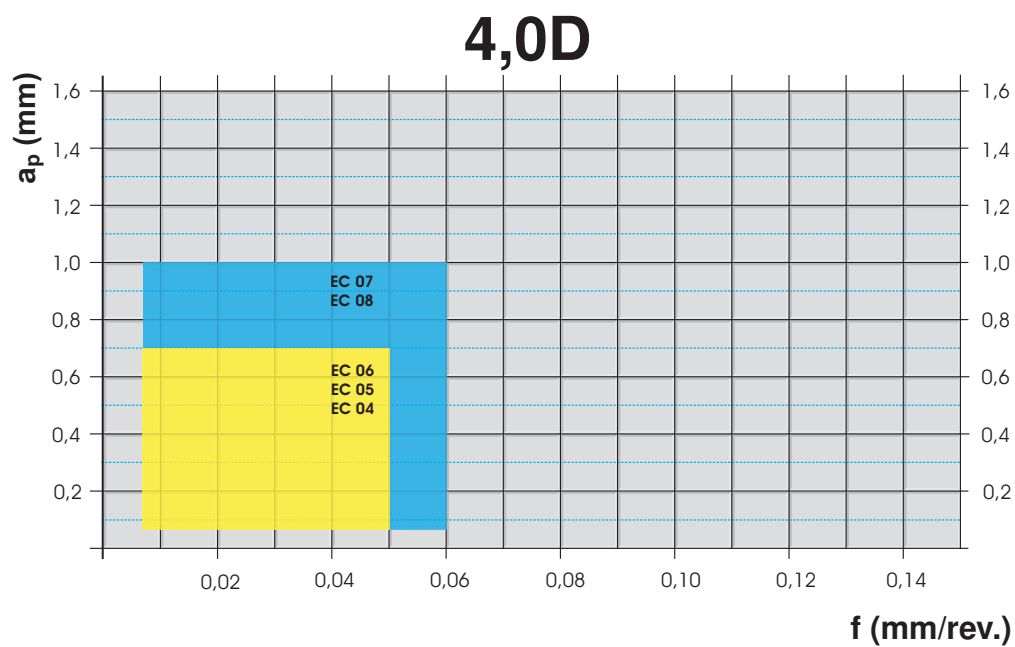
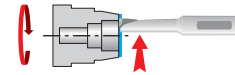
# EcoCut Mini

## Depth of cut / feed rate

### Longitudinal turning



### Face turning

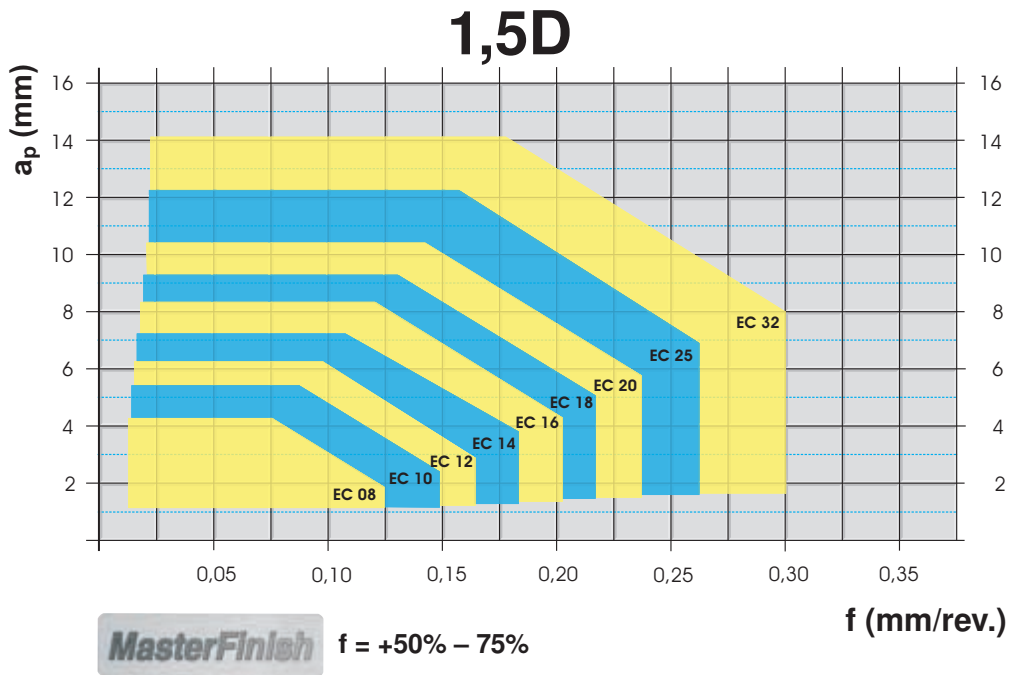




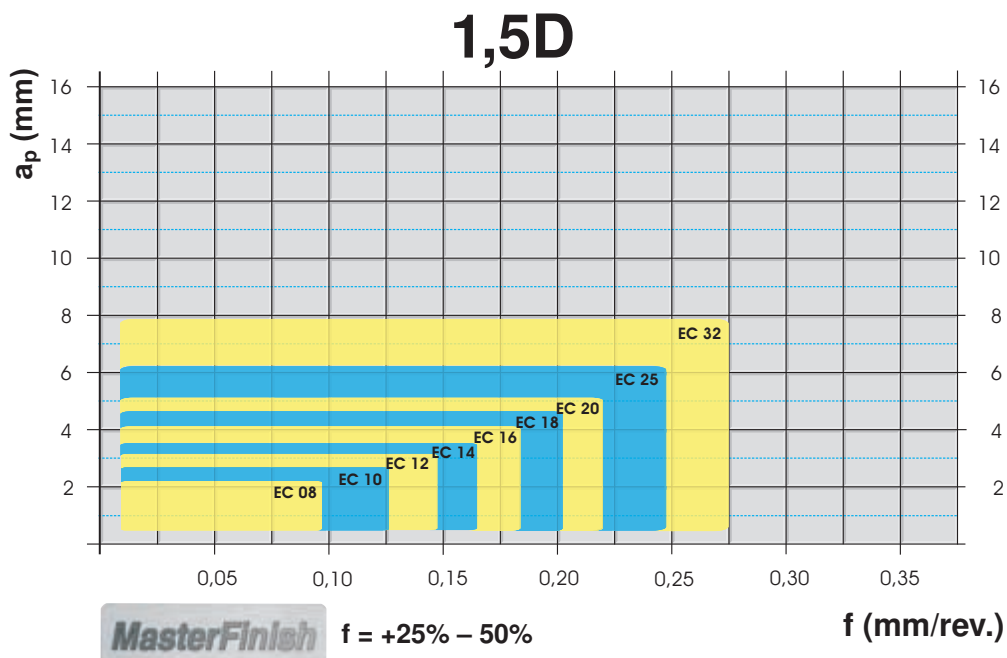
# EcoCut Classic

## Depth of cut / feed rate

### Longitudinal turning



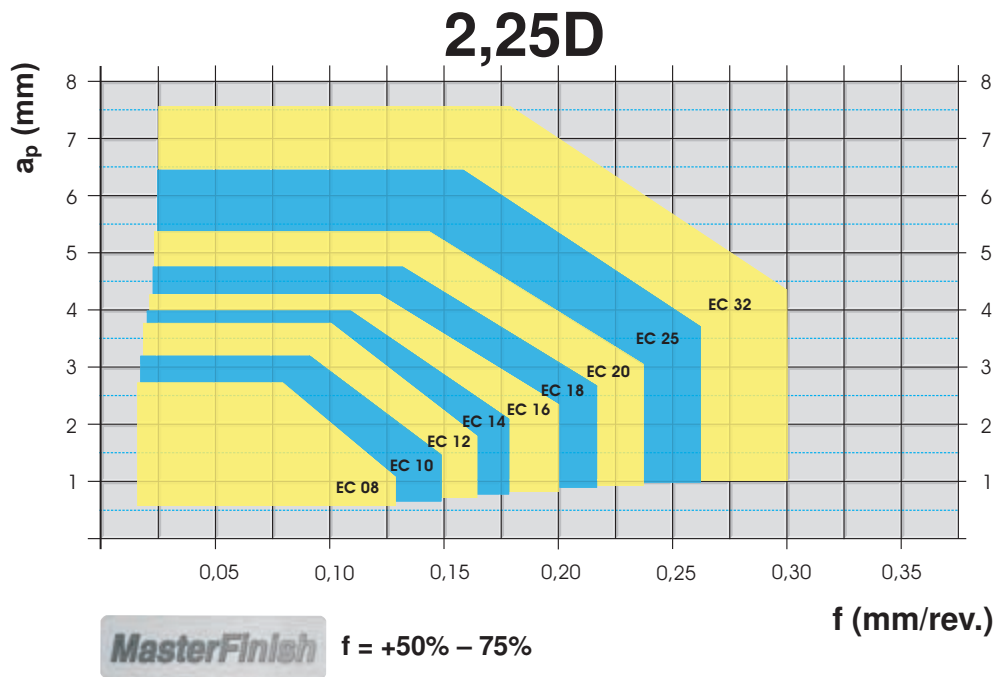
### Face turning



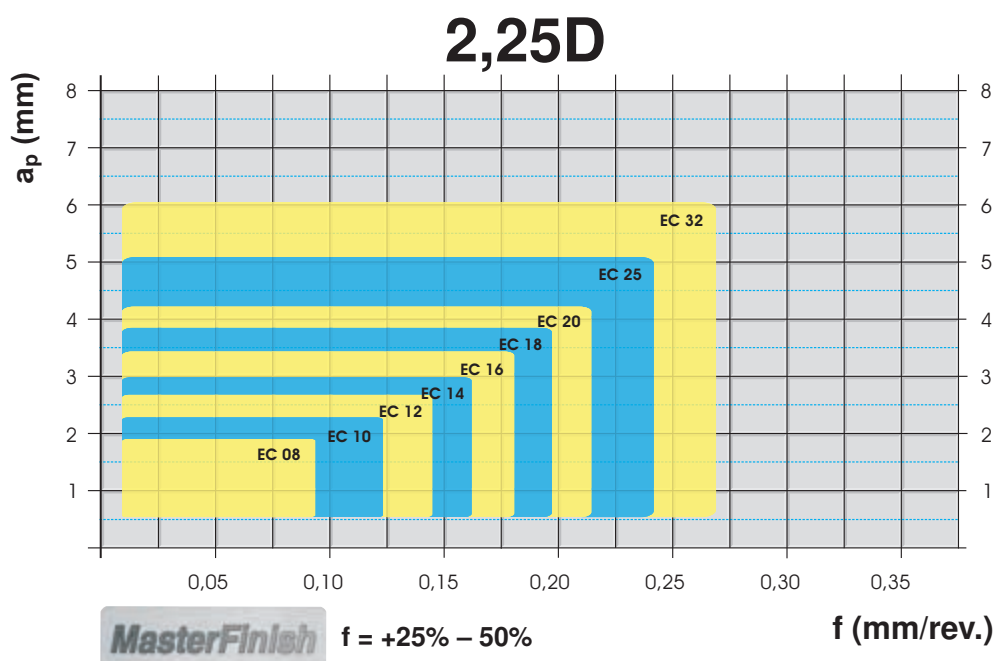
# EcoCut Classic

## Depth of cut / feed rate

### Longitudinal turning



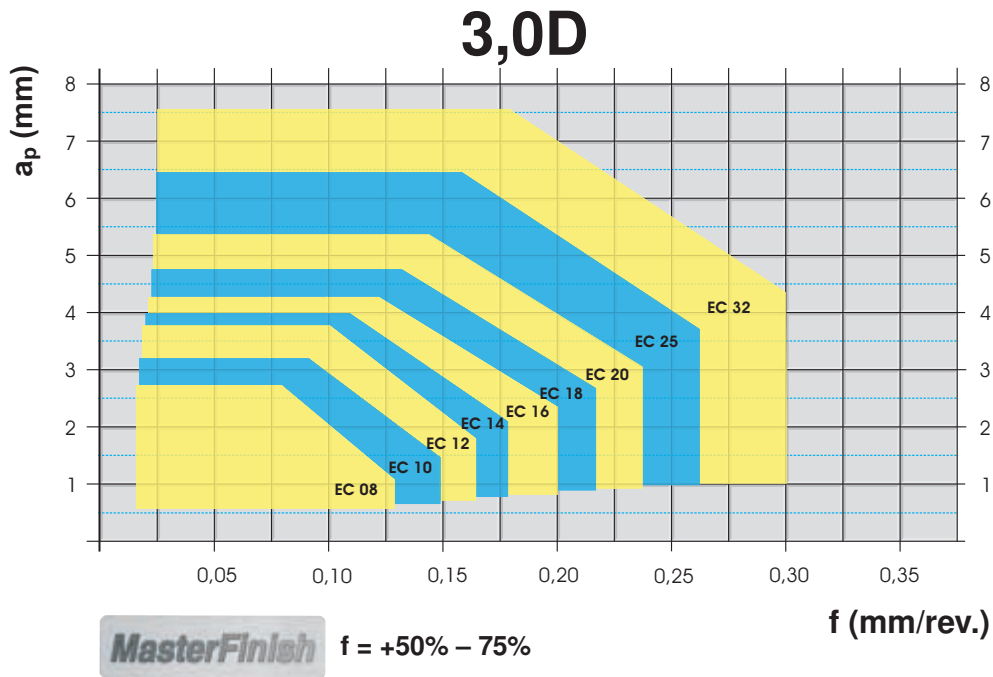
### Face turning



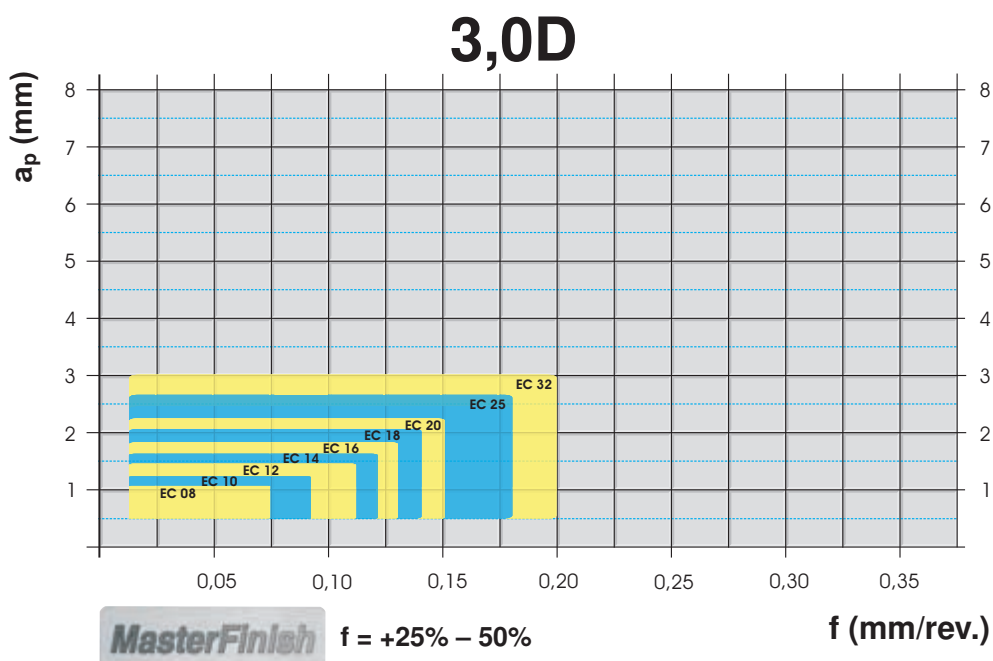
# EcoCut Classic

## Depth of cut / feed rate

### Longitudinal turning



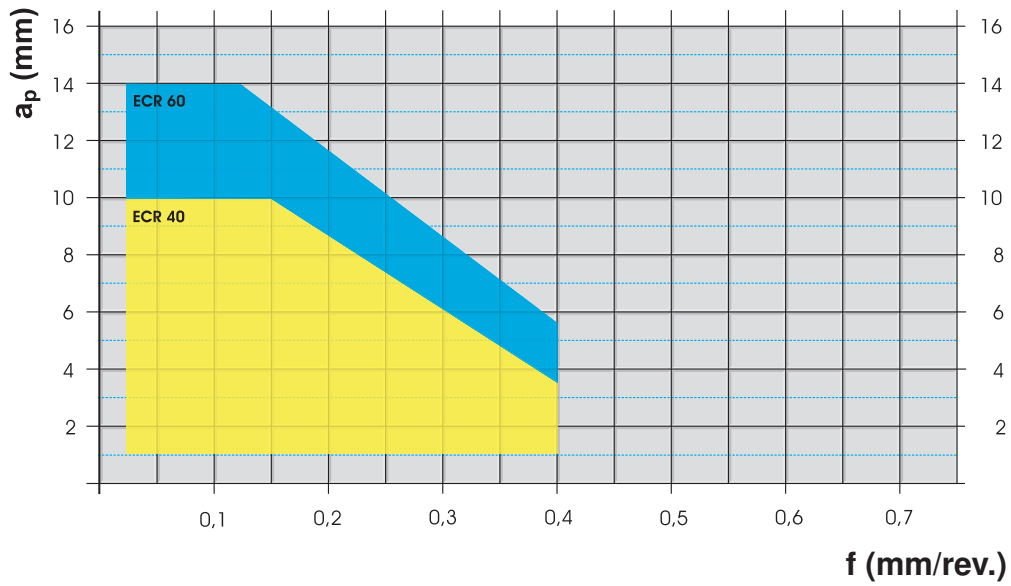
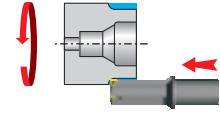
### Face turning



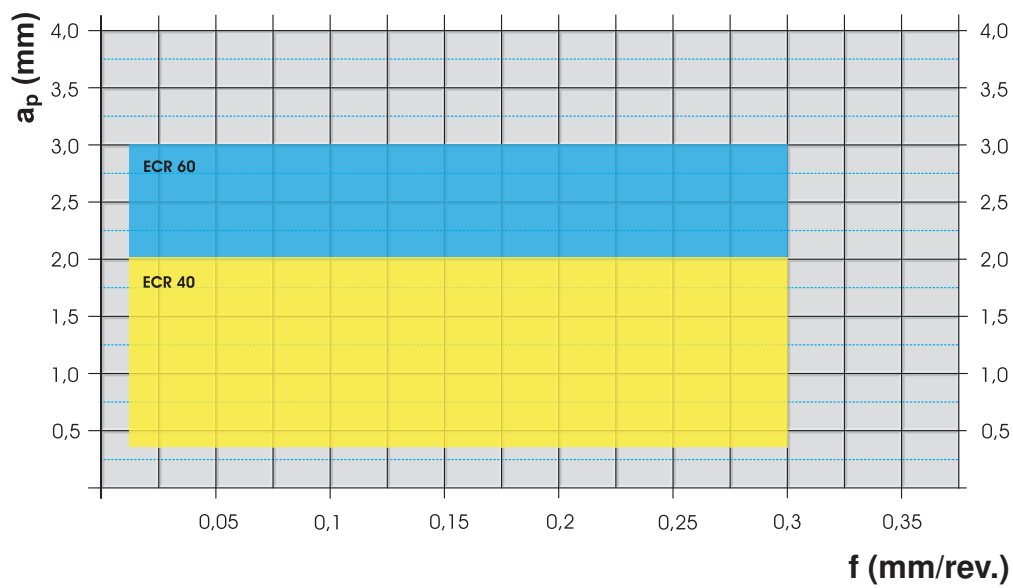
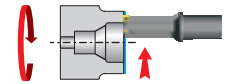
# EcoCut Rebore

## Depth of cut / feed rate

### Longitudinal turning



### Face turning

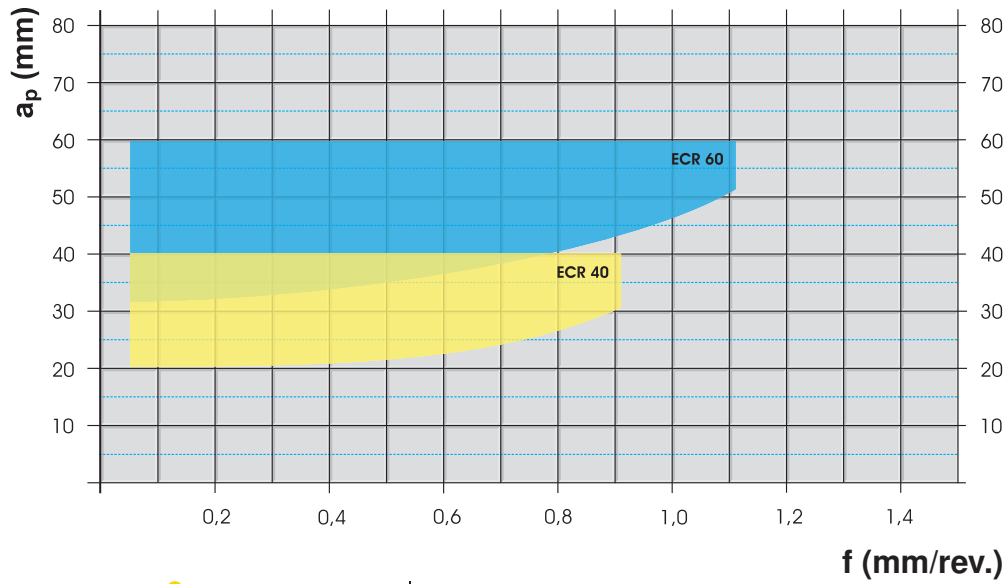
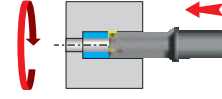




# EcoCut Rebore

## Depth of cut / feed rate

### Counterboring

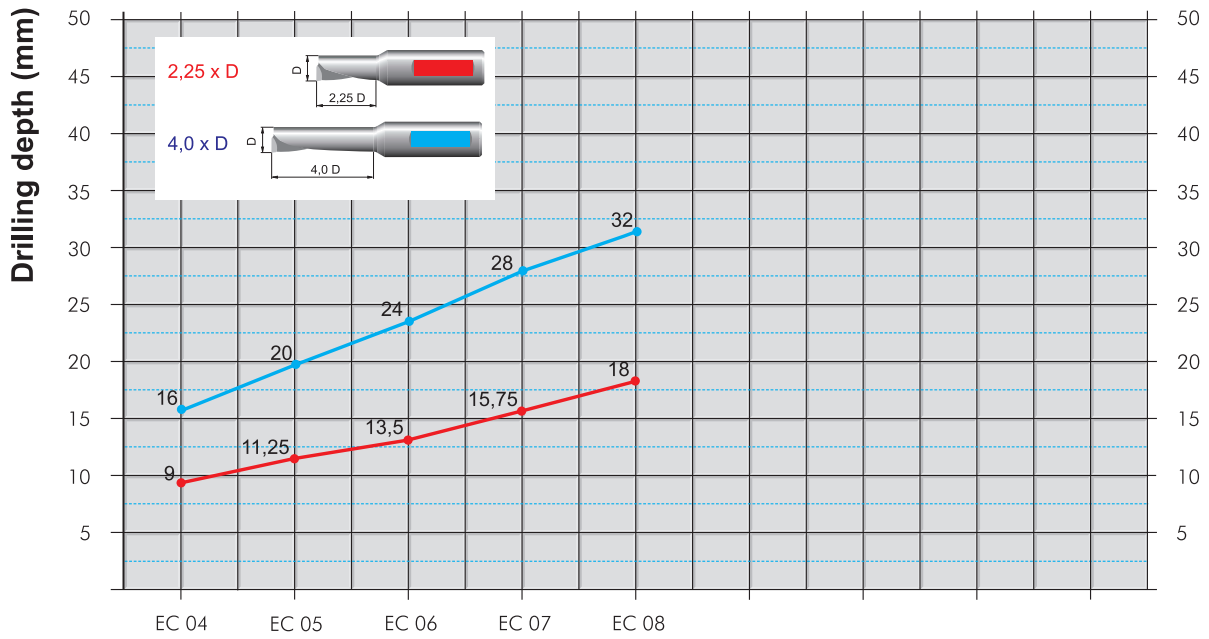


Tools	Initial bore
Ø 40 mm	Ø min = 20 mm
Ø 60 mm	Ø min = 32 mm

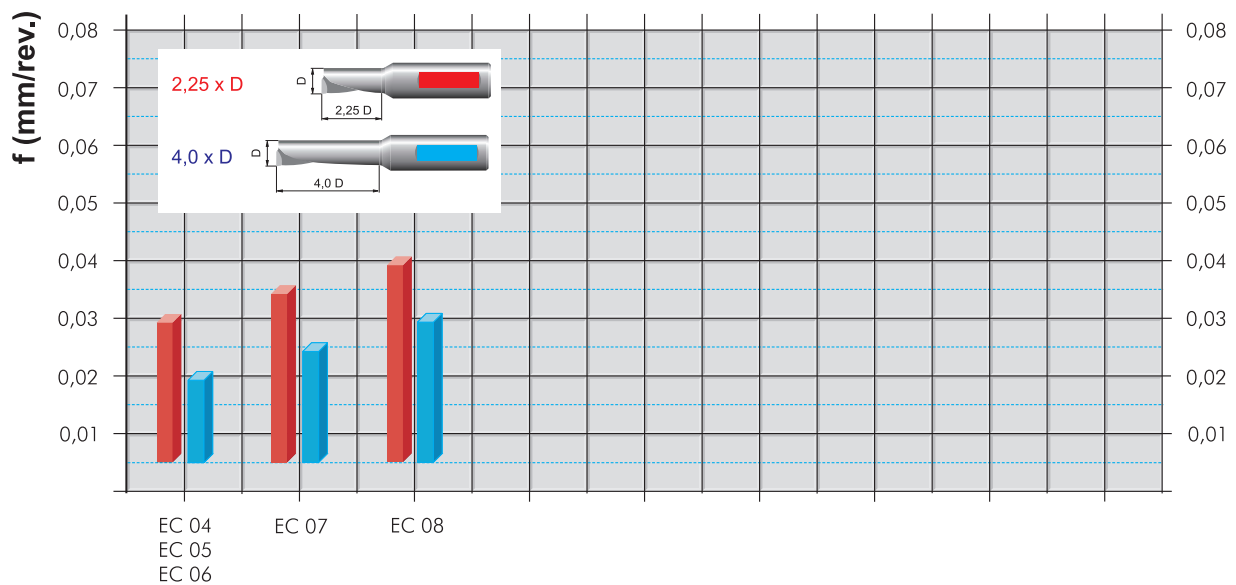
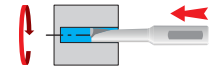
# EcoCut Mini

## Drilling depth / feed rate

### Drilling depth



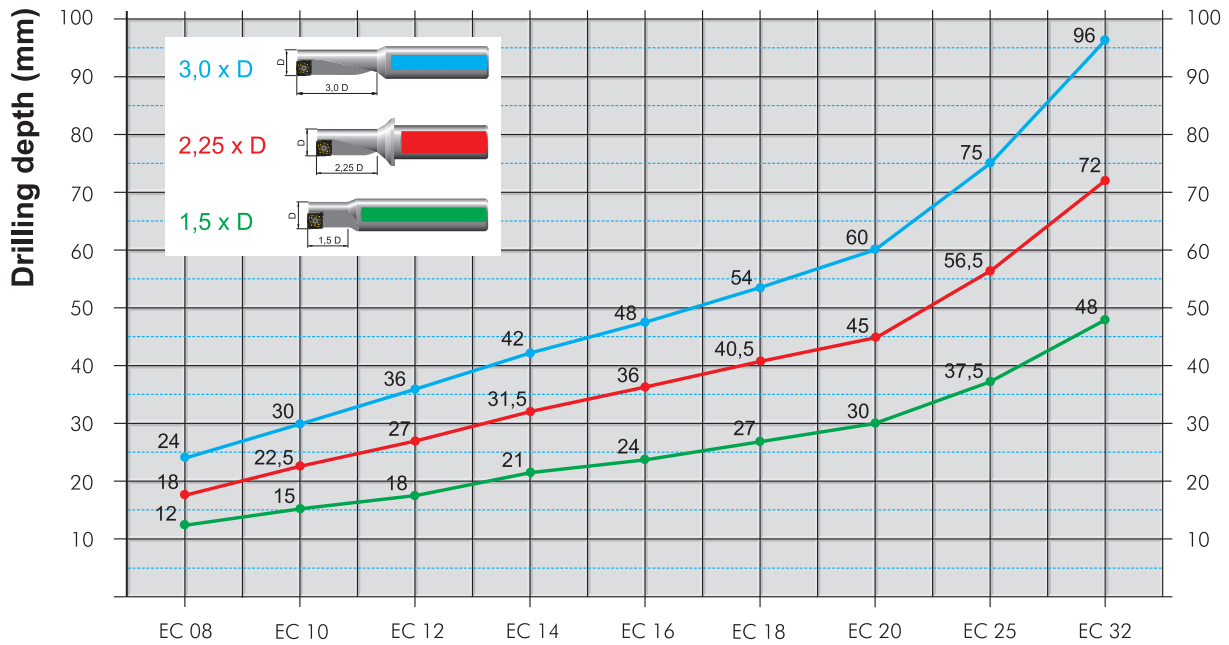
### Drilling feed rate



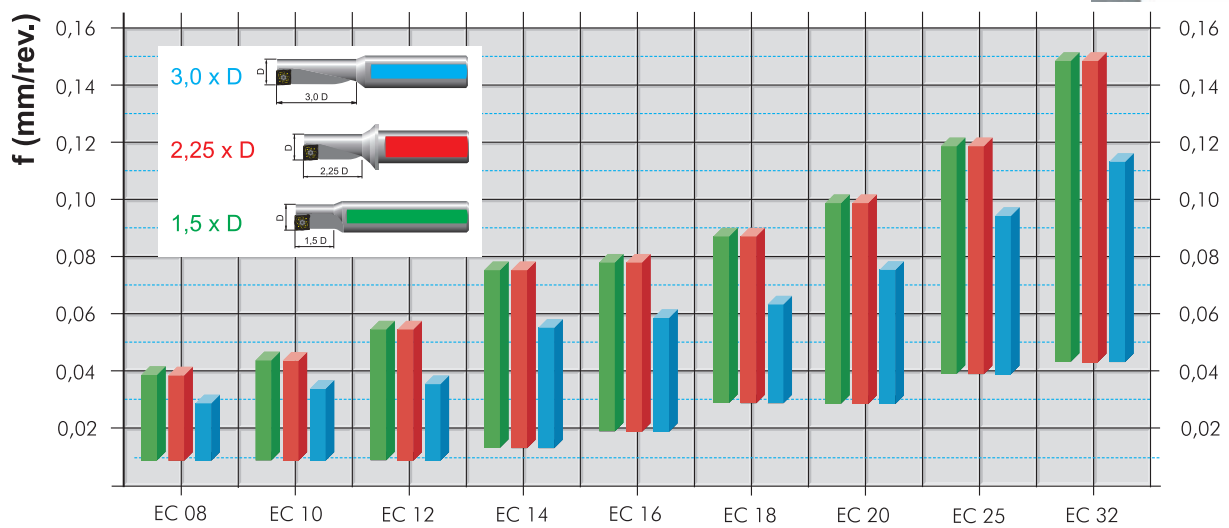
# EcoCut Classic

## Drilling depth / feed rate

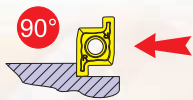
### Drilling depth



### Drilling feed rate



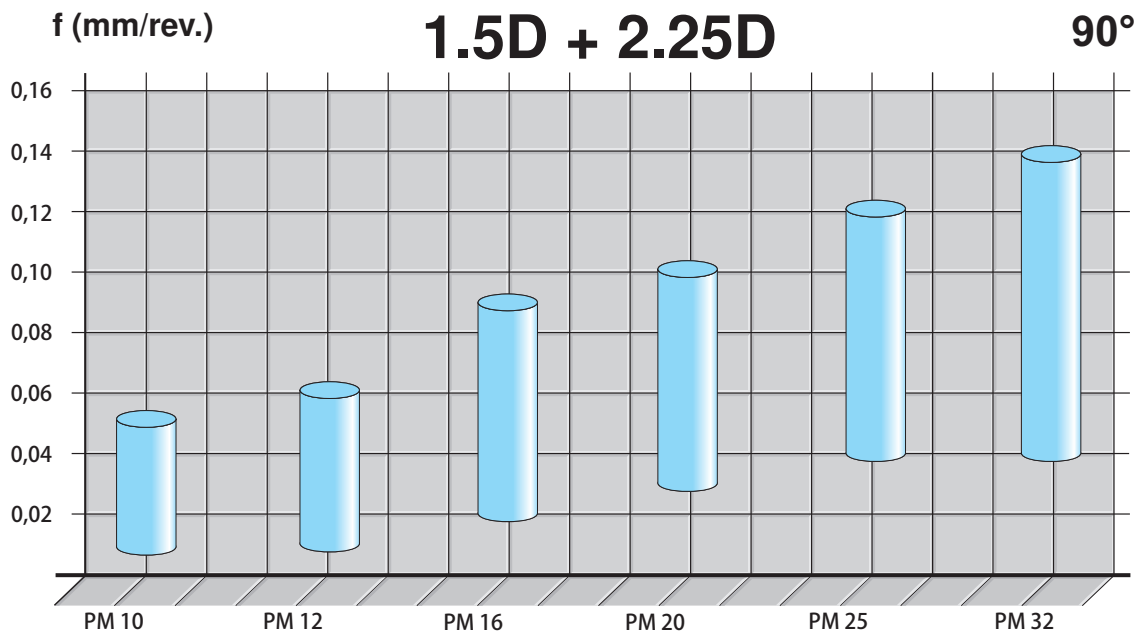
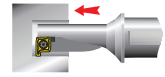
**MasterFinish** f = +20% – 30%



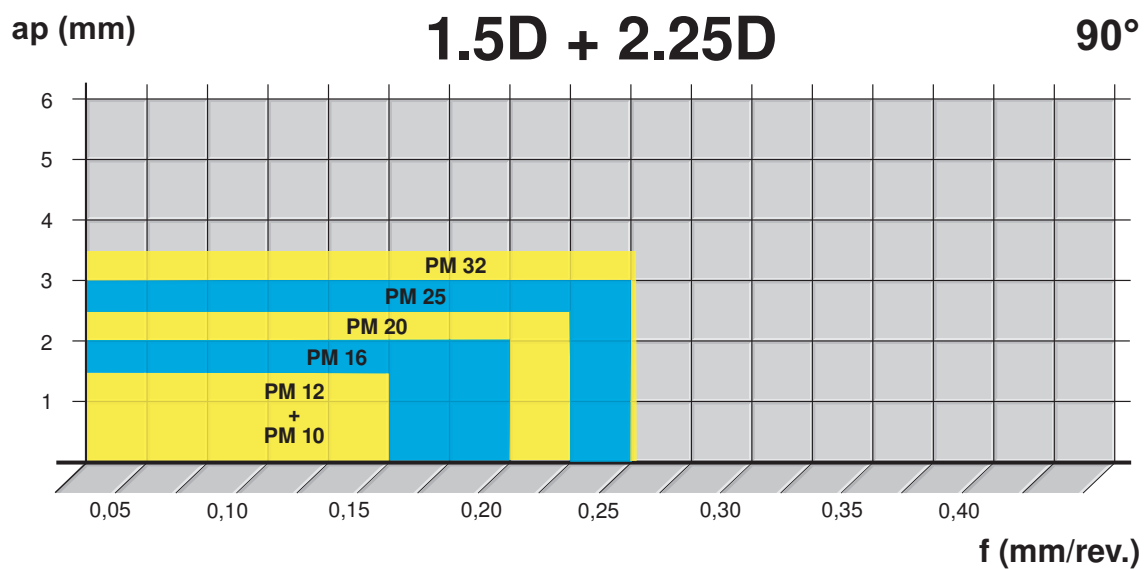
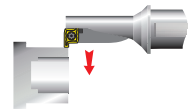
# ProfileMaster

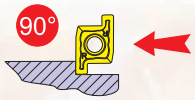
## Depth of cut / feed rate

### Drilling



### Face turning

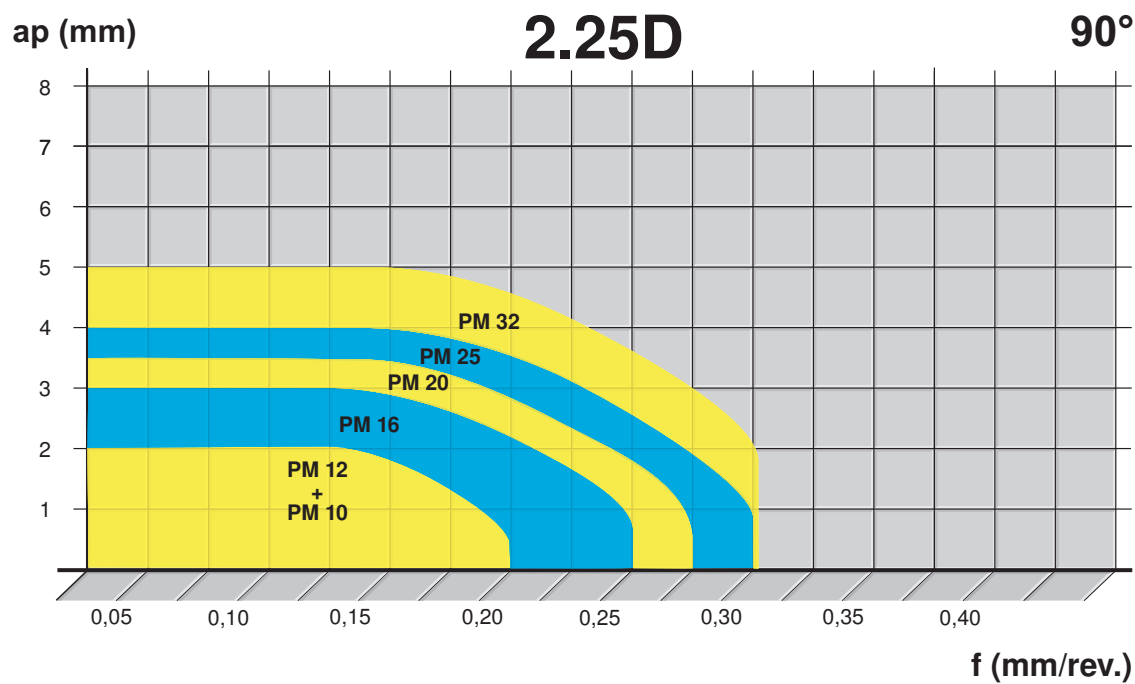
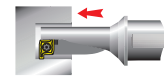
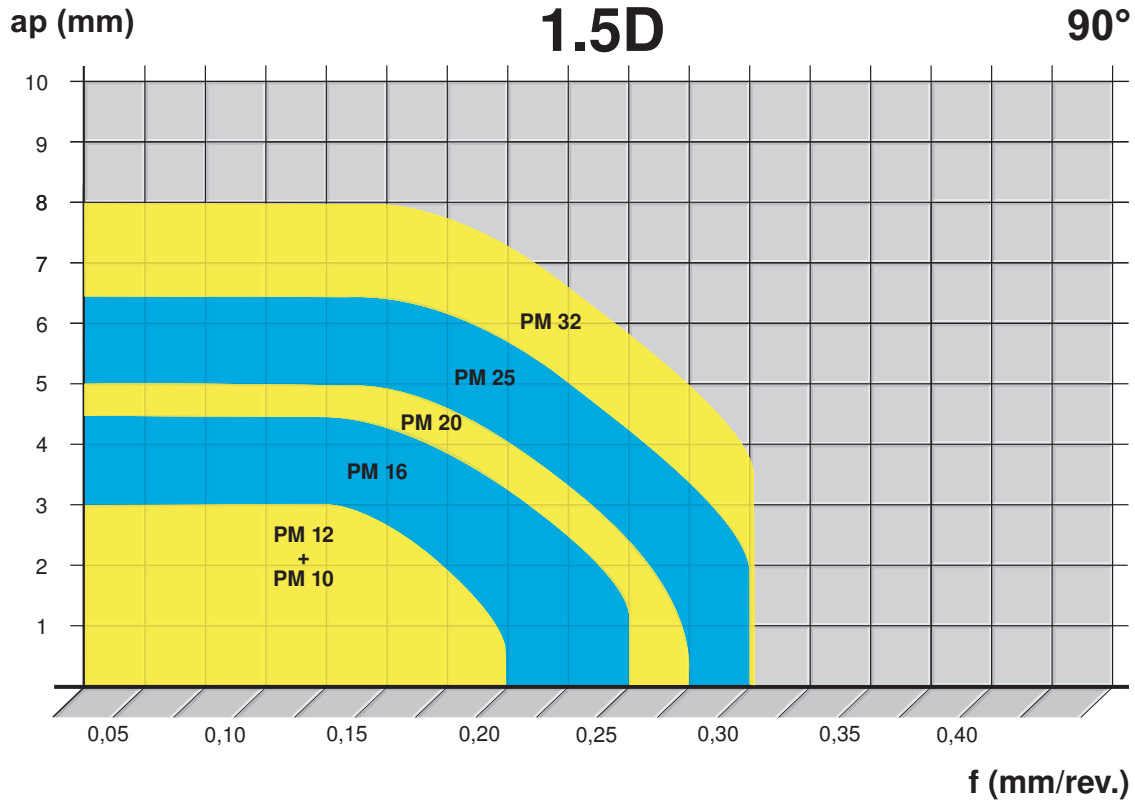
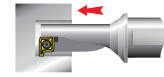


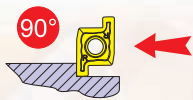


# ProfileMaster

## Depth of cut / feed rate

### Longitudinal turning

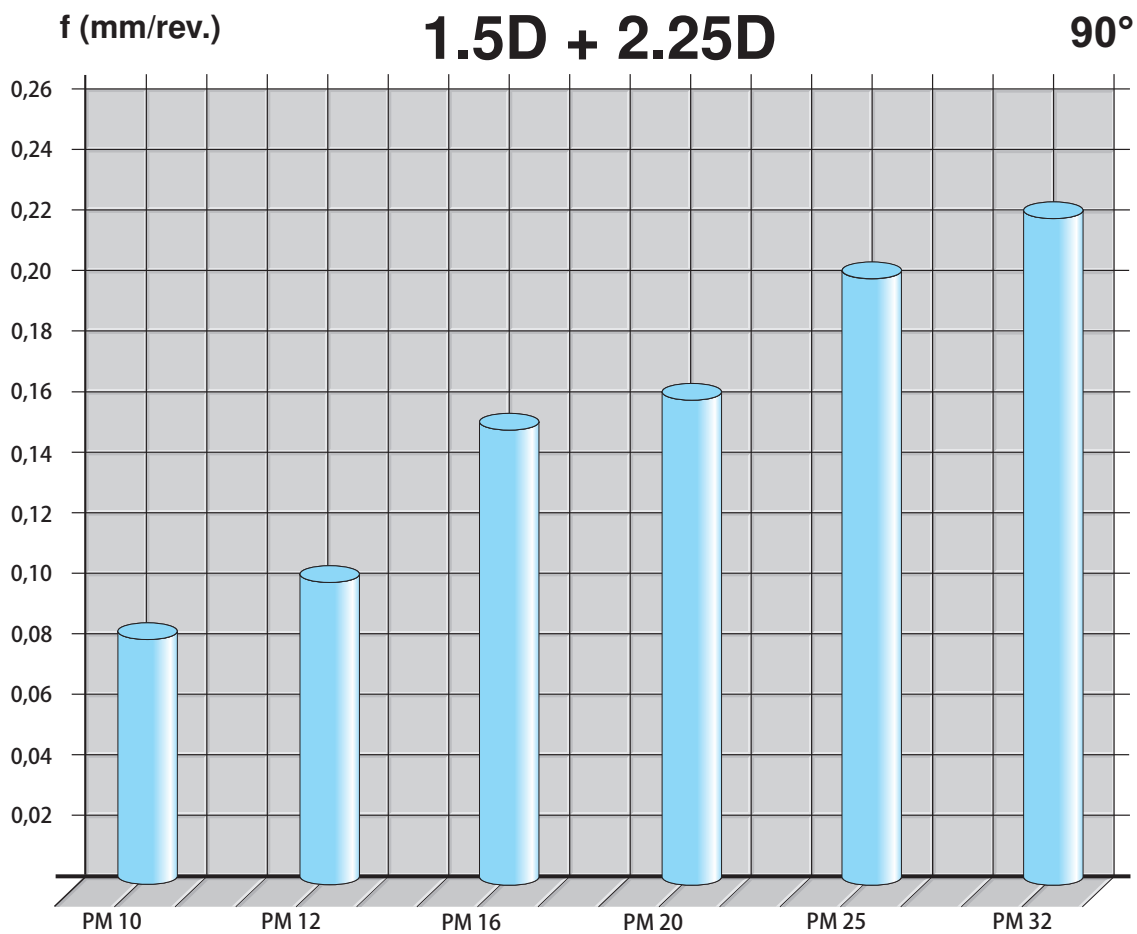
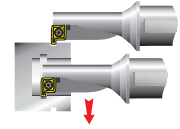




# ProfileMaster

## Feed rate

### Radial grooving - internal + external

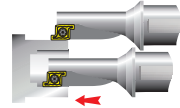




# ProfileMaster

## Depth of cut / feed rate

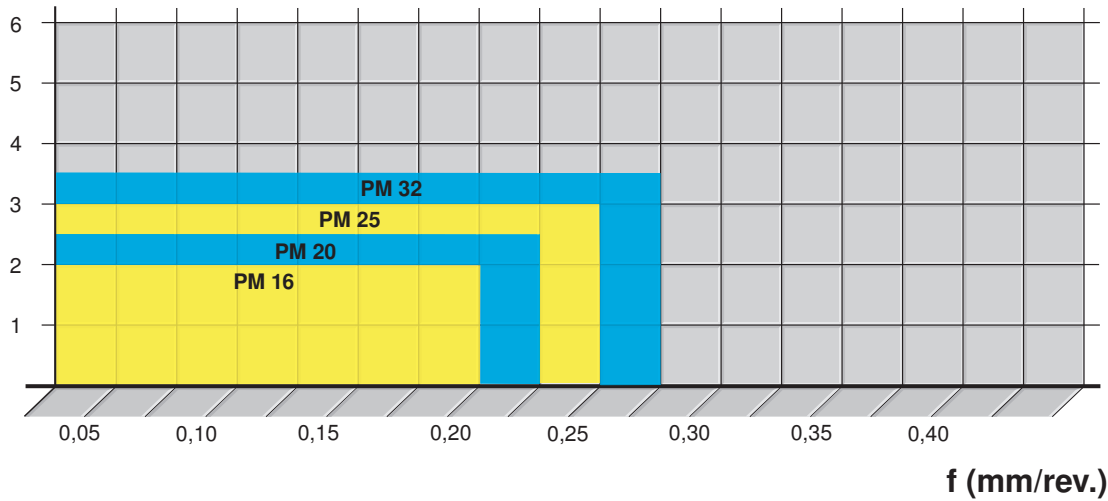
### Longitudinal turning



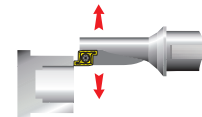
ap (mm)

**1.5D + 2.25D**

0°



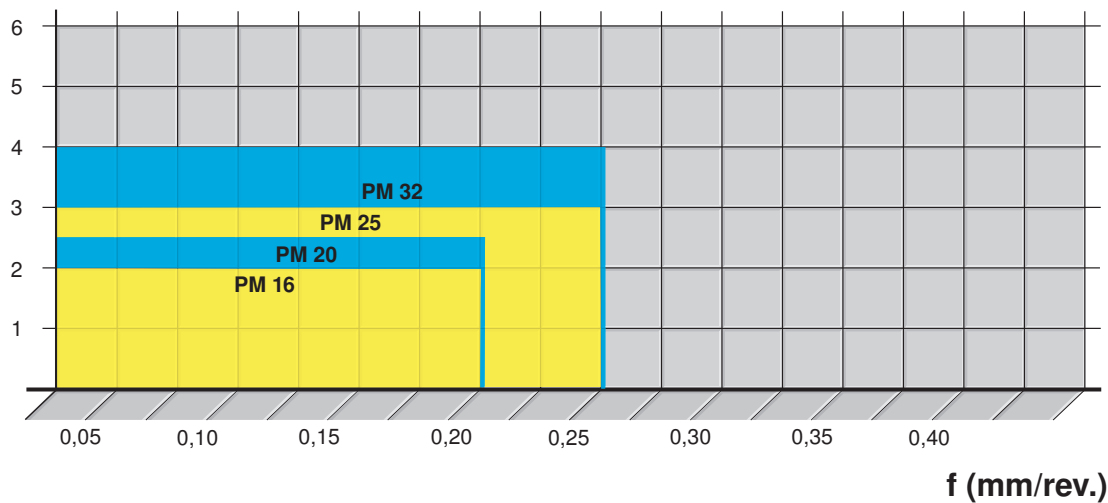
### Face turning



ap (mm)

**1.5D + 2.25D**

0°

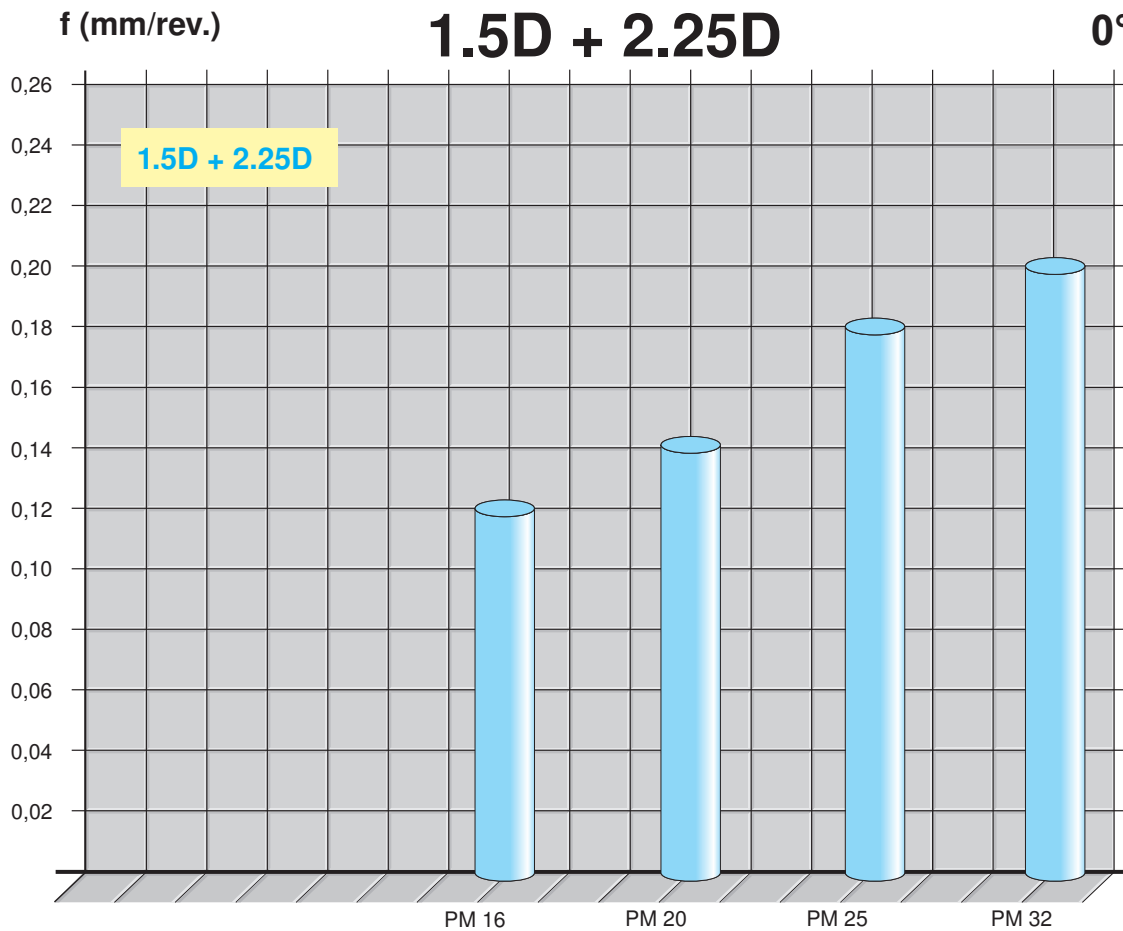
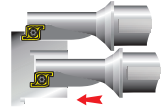




# ProfileMaster

## Feed rate

### Axial grooving - internal + external



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



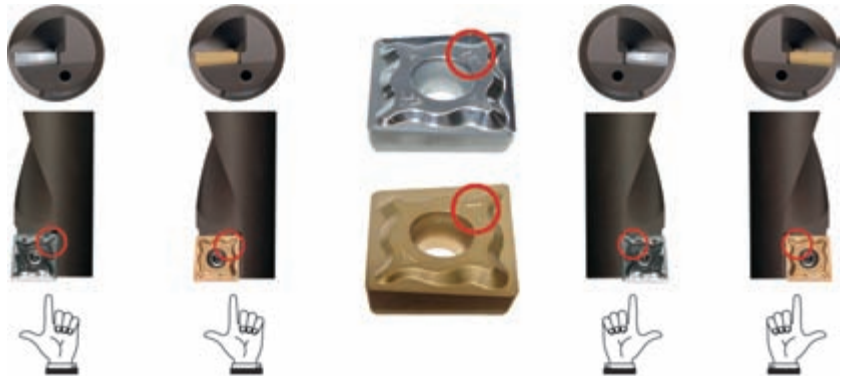


# EcoCut Application

## 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.

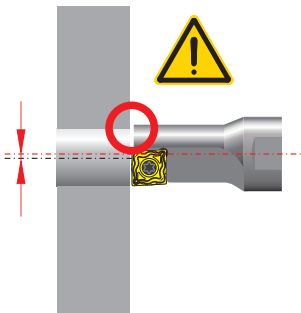


Left-hand tool

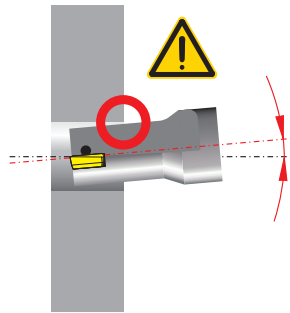
Right-hand tool

## Axial displacement of the machine

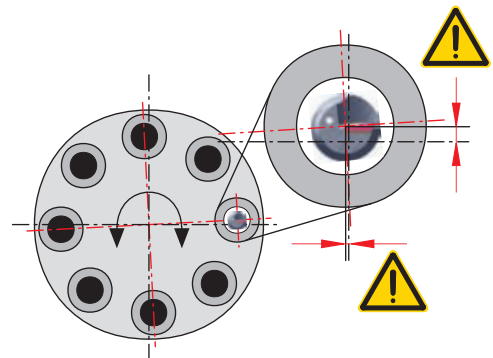
### Displacement in x-direction



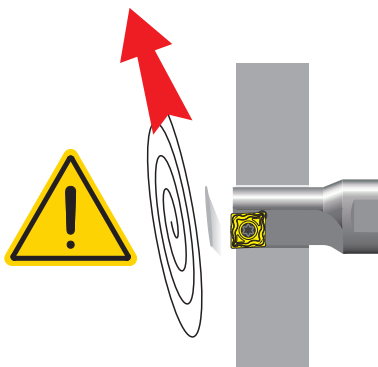
### Angular error



### Turret position error



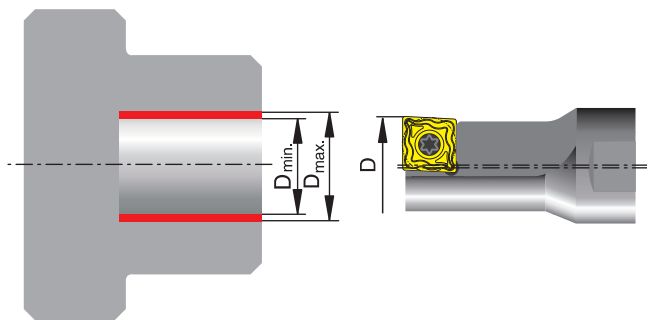
## Through hole



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 <sub>min</sub> (mm)	D <sub>max</sub> (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

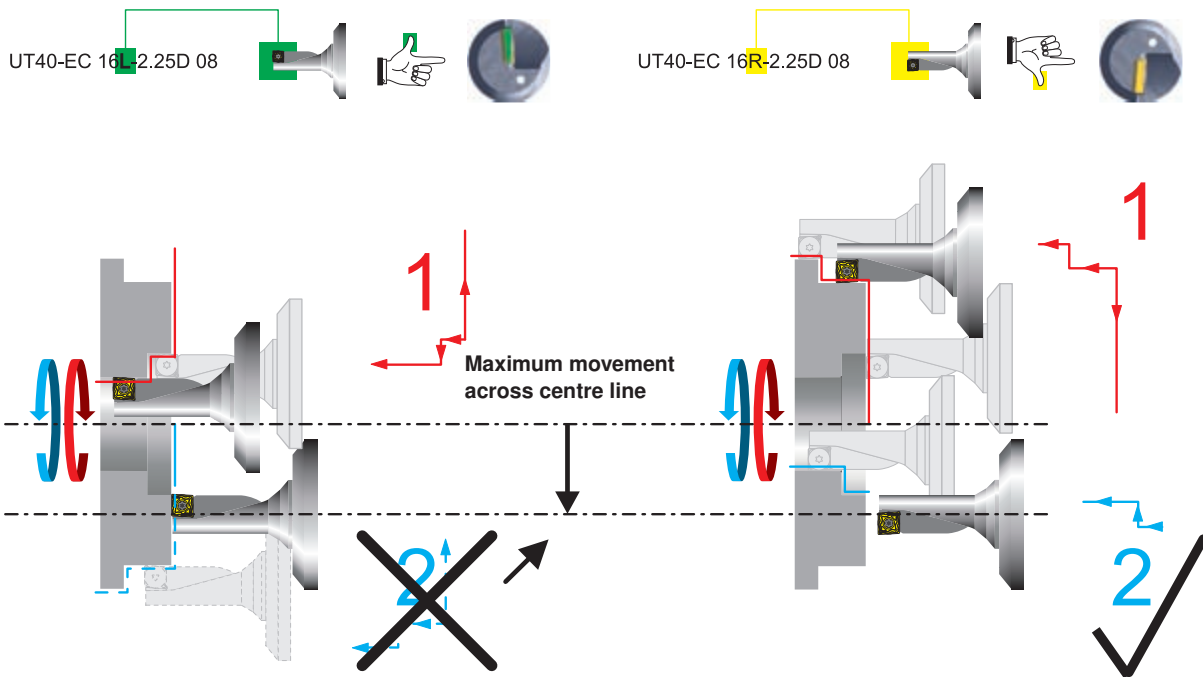
## Machining across centre line

### Situation:

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

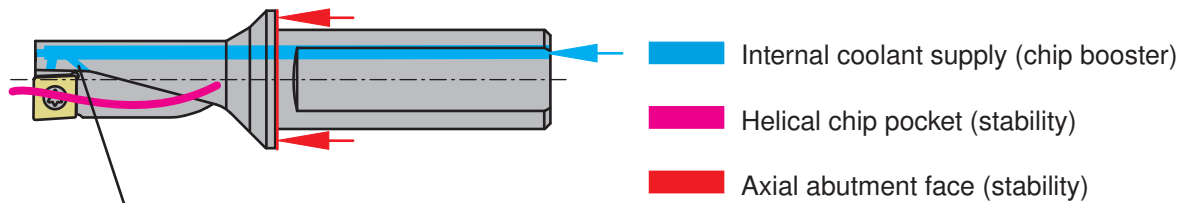
### Solution:

Use a right-hand EcoCut tool.

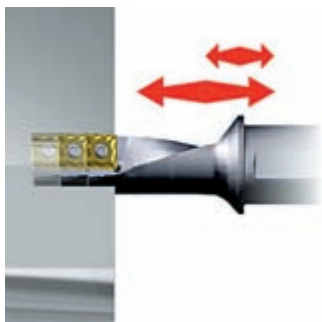


# EcoCut Application

## Chip booster / coolant pressure

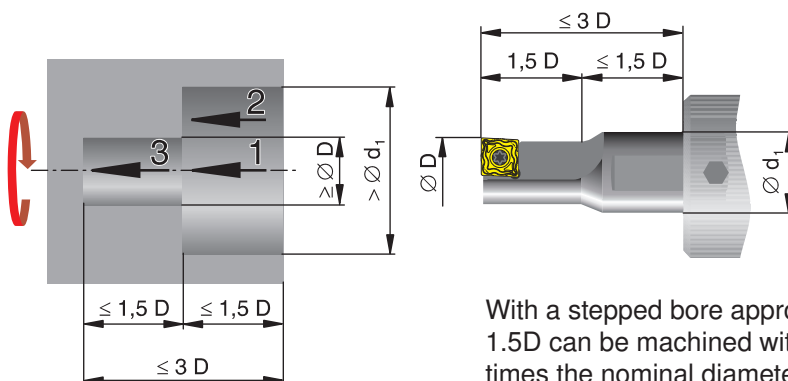


EcoCut offers an innovative detail solution for **range 2.25D**, namely additional bidirectional coolant supply for better chip evacuation. An additional **backwards directed coolant stream** improves chip transportation from the flute area. A minimum coolant pressure of 1.5-3 bar (optimum 5-7 bar) is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



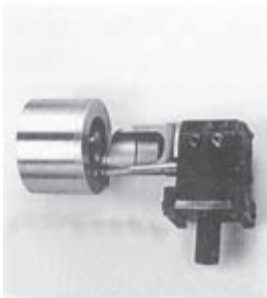
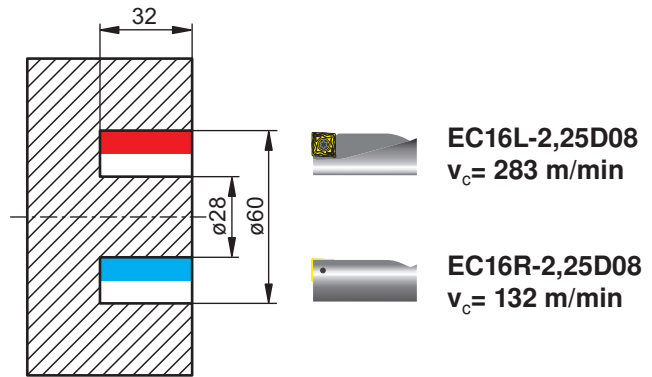
With a stepped bore approach EcoCut tools EC.. 1.5D can be machined with holes of up to three times the nominal diameter (see picture). Operation sequences 1, 2 and 3 respectively should be followed.

# EcoCut Application

**Material:**  
Machining steel 9SMn20

**Insert:**  
XCNT080304EN GM40

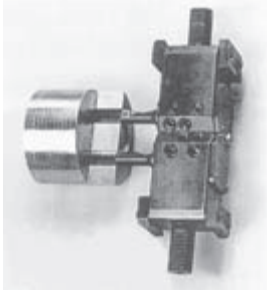
**Cutting data:**  
 $n = 1500 \text{ min}^{-1}$   
 $f = 0.05 \text{ mm/rev.}$



**Special tool**

Machining time:

**120 s**

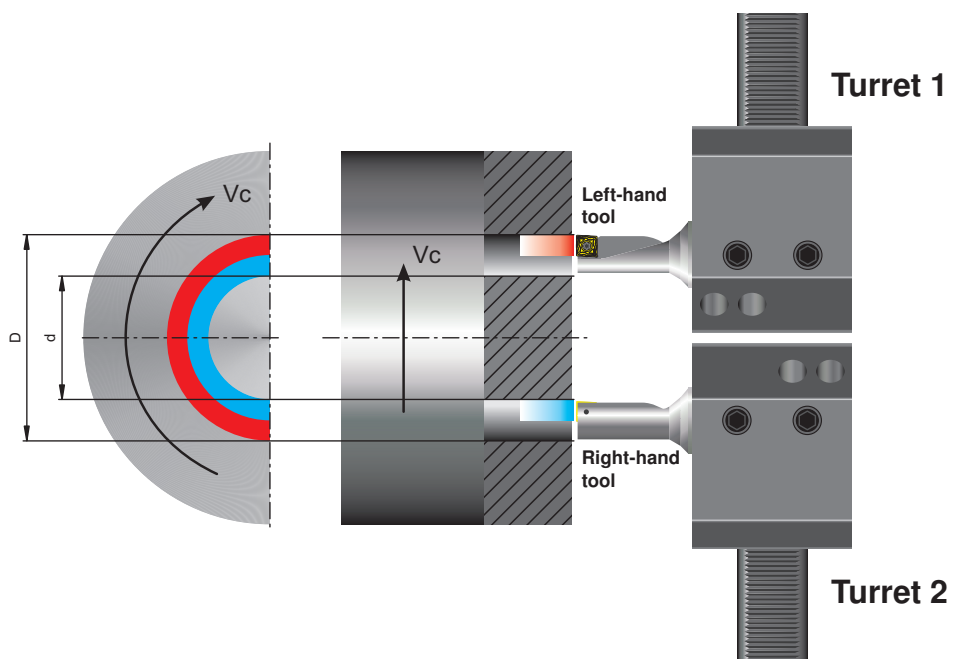


**CERATIZIT EcoCut**

Machining time:

**20 s**

**Time saving: 83%**



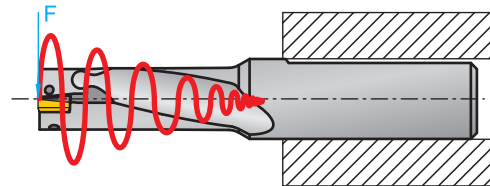
# EcoCut Densimet

## The advantages of DENSIMET compared to steel

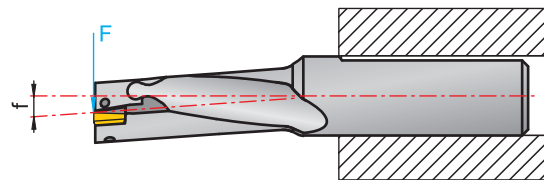
The new generation of our EcoCut 3.0D series with the new designation offers maximized performance. The tools are classified with the new designation **EC .. R/L-3.0D .. H** and have particularly been developed for bigger drilling depths and maximum precision requirements. The material used here is DENSIMET, 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 <sup>2</sup> )	Density (g/mm <sup>3</sup> )
Steel	210 000	7,85
DENSIMET	360 000	17,50

Vibration-damping

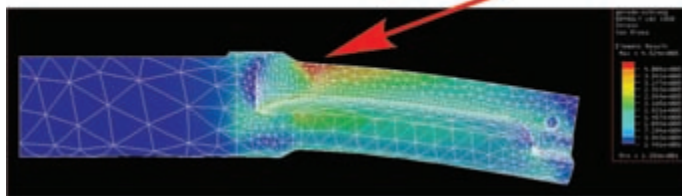


40% lower deflection than steel



## The new chip flute design

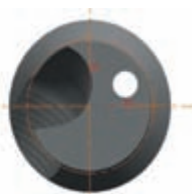
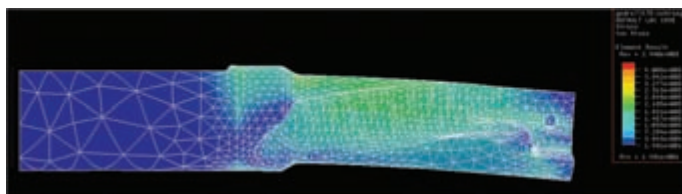
Version with straight chip flute



Maximum tension



Version with helical chip flute



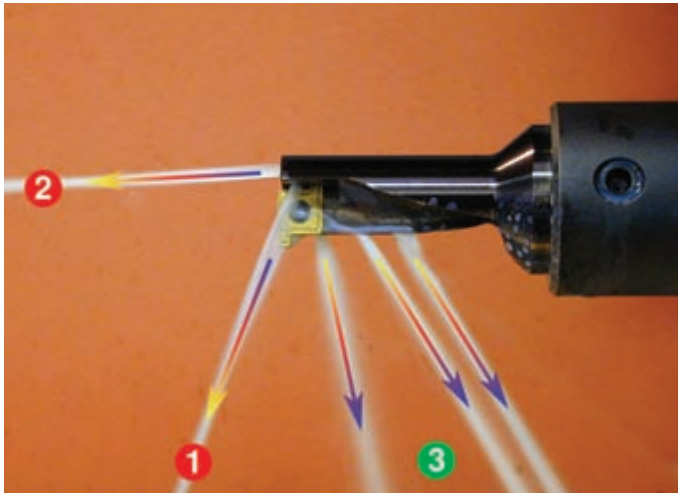
Up to 50% reduced tensions in the tool through Finite Element Modelling (FEM), optimized chip pocket design

# 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 Chipbooster prevents chips from getting stuck between tool and work piece

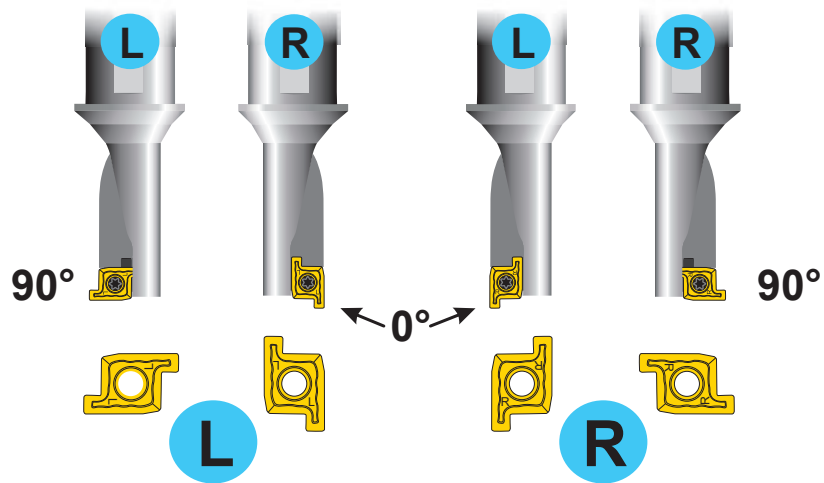


In order to guarantee efficient chip evacuation from a hole, a minimum coolant pressure of 3 - 6 bar (optimum 7 - 10 bar) is required.



# ProfileMaster Application

## Mounting of the insert

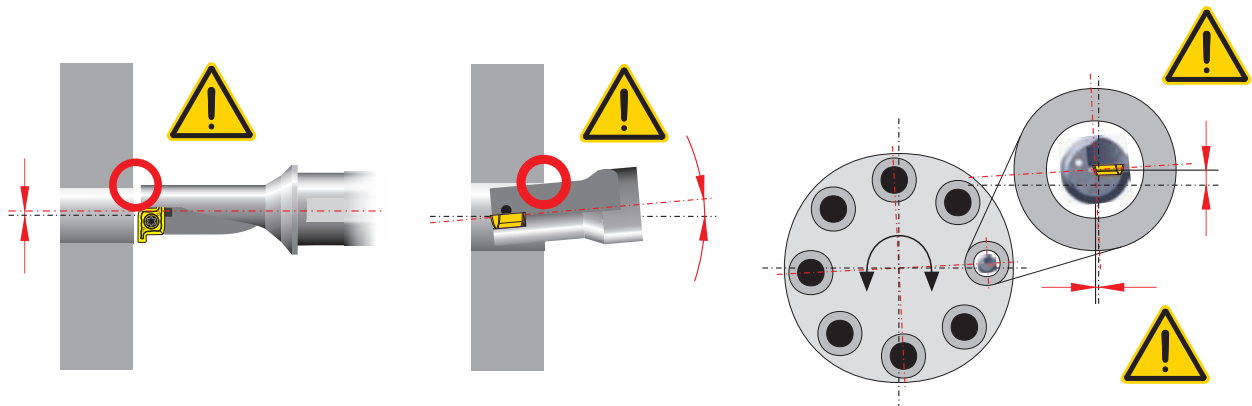


## Axial displacement of the machine

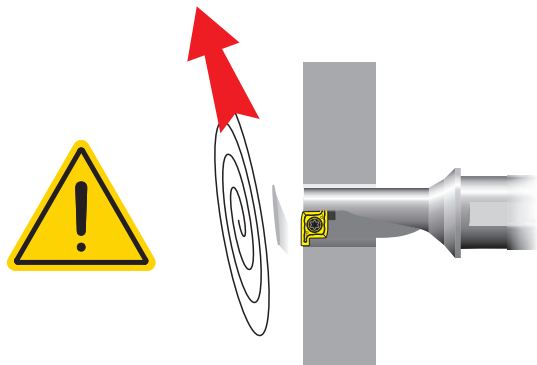
Displacement in x-direction

Angular error

Turret position error



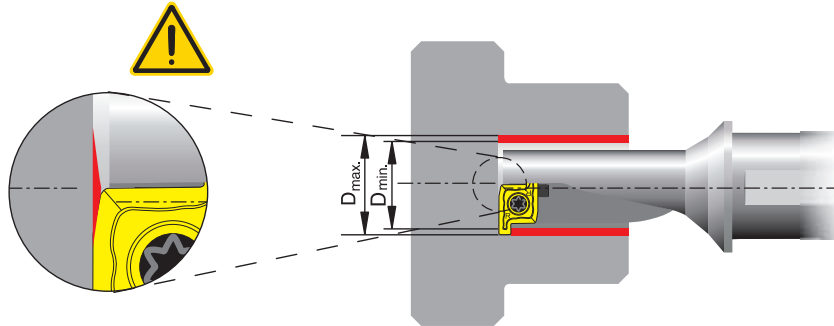
## Through hole



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 <sub>min</sub> (mm)	D <sub>max</sub> (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

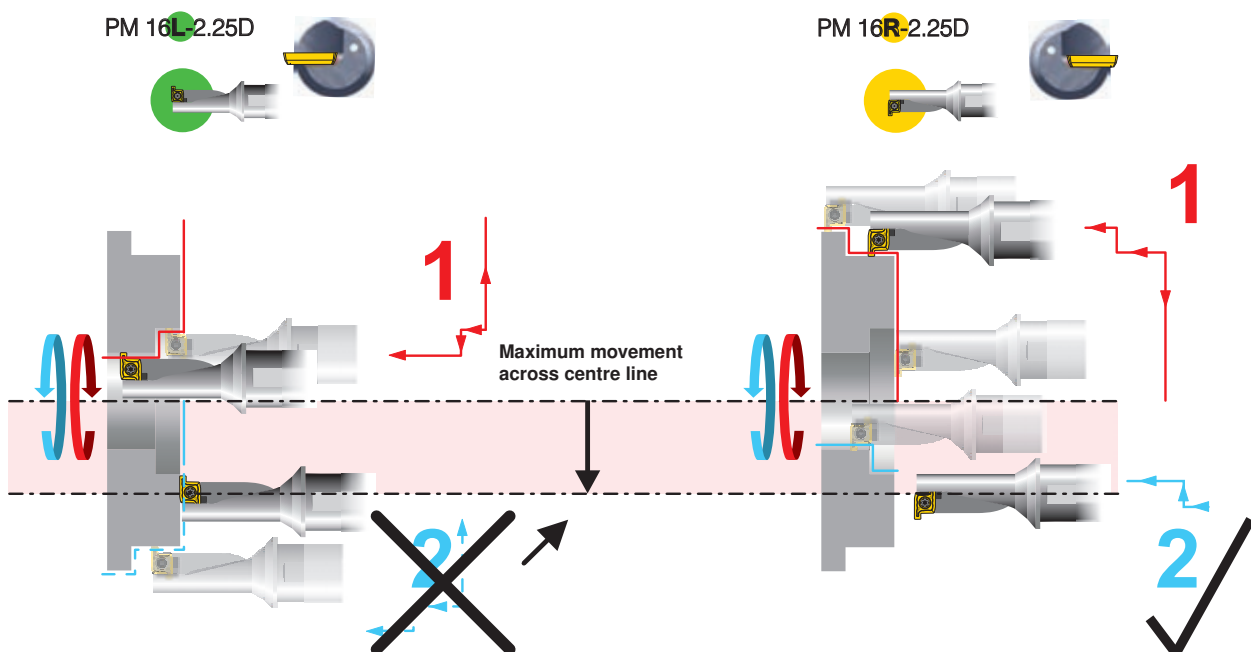
## Machining across centre line

### Situation:

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

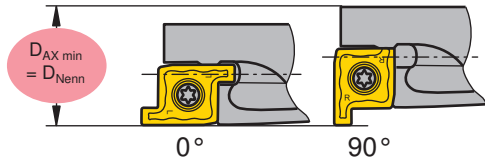
### Solution:

Use a right-hand ProfileMaster tool.

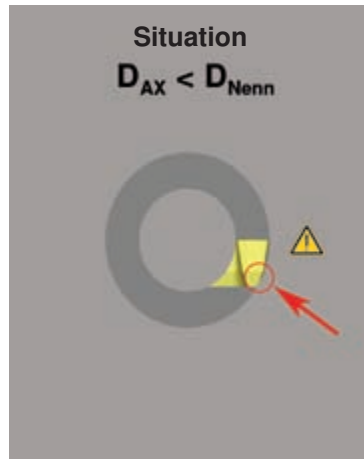
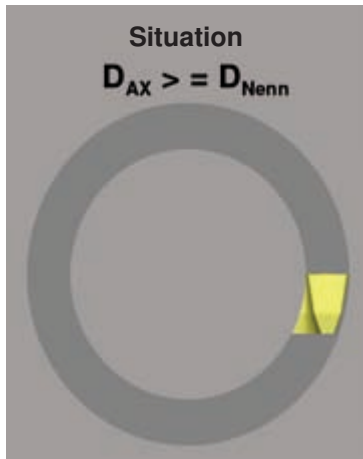


# ProfileMaster Application

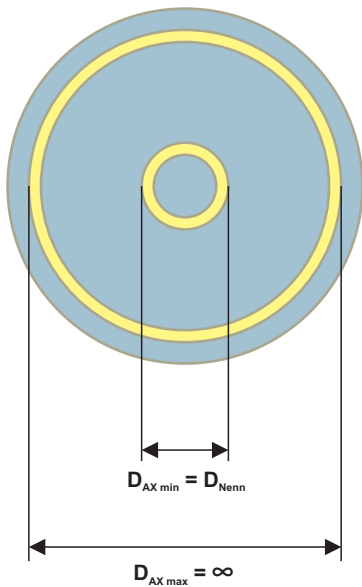
## Axial grooving - axial application 0°



$D_{Nenn}$	$D_{AXmin}$	$D_{AXmax}$
16	16	$\infty$
20	20	$\infty$
25	25	$\infty$
32	32	$\infty$

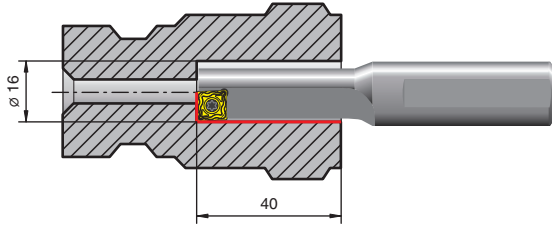


If the first cut is carried out with a diameter which is smaller than the nominal tool diameter  $D_{Nenn}$  (90° application), collision will result.



# EcoCut

## Machining examples



### Criterion:

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

### Result:

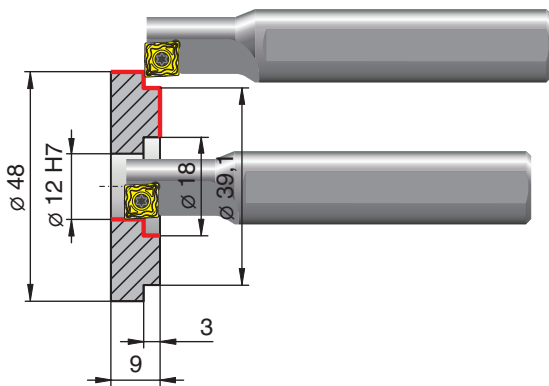
- > Machining time reduced by 50% compared to original machining method

### Technical data:

Work piece:	bush
Material:	Sae 1045
Tensile strength:	730 - 900 N/mm <sup>2</sup>
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:

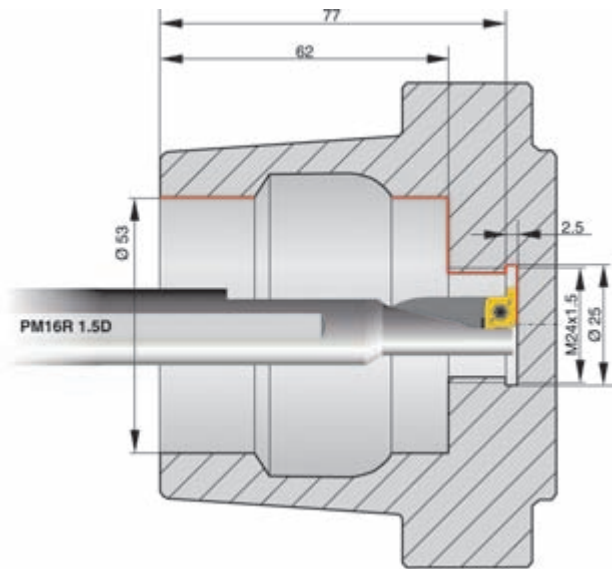
Work piece:	flange
Material:	16 MnCr5 / 1.7131
Tool:	EC 12L-1.5D 06
Insert:	XCNT 060204EN GM40
Competitor:	3 tools

### 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/mm<sup>2</sup>  
 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 writing area consisting of 28 horizontal grey lines on a white background, intended for text entry.

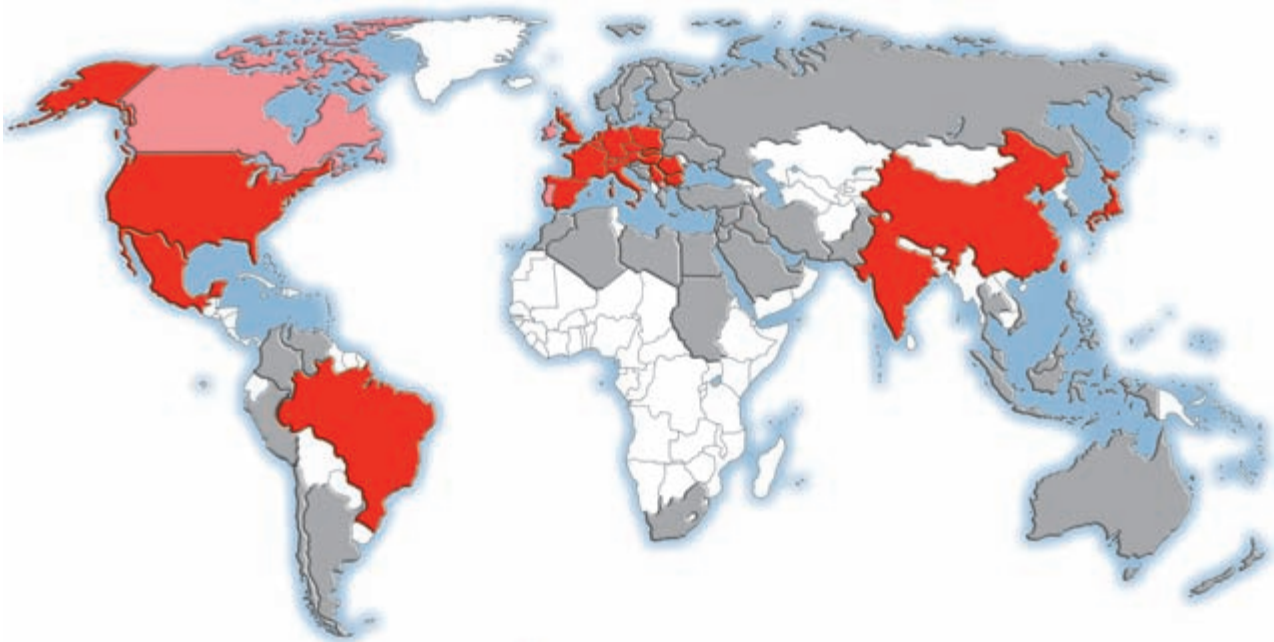
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[www.ceratizit.com](http://www.ceratizit.com)

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We reserve the right to make technical changes  
for improvement of the product.