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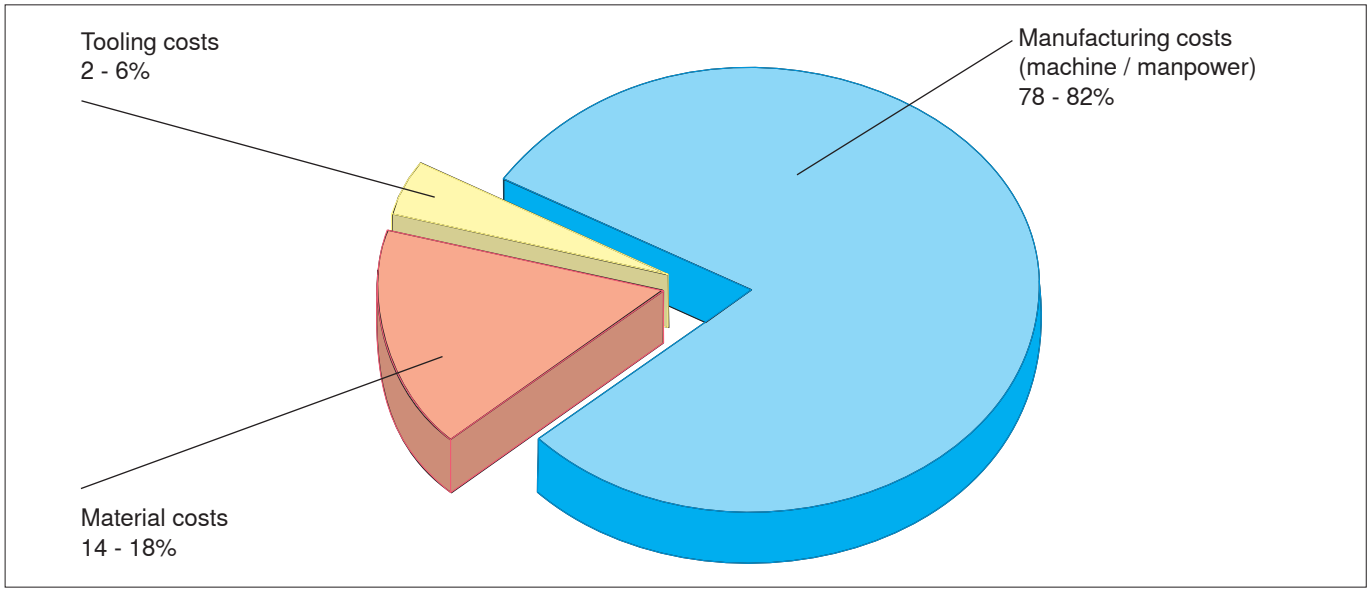
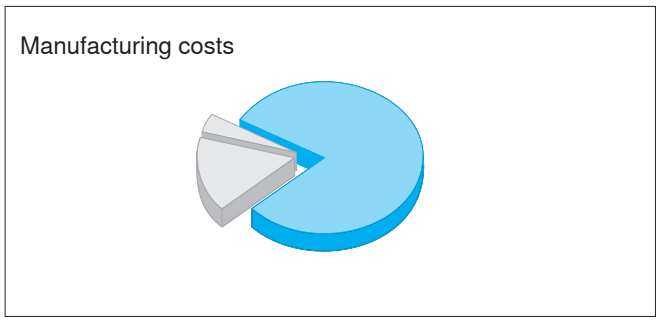
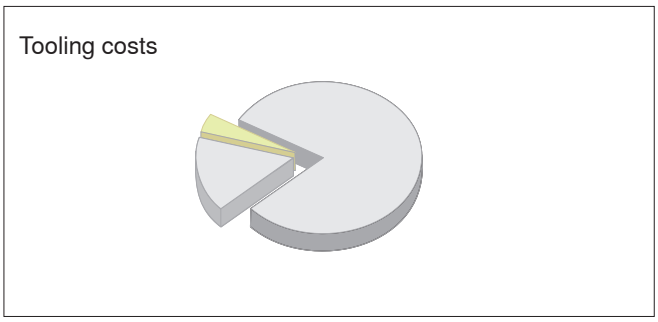
Productivity

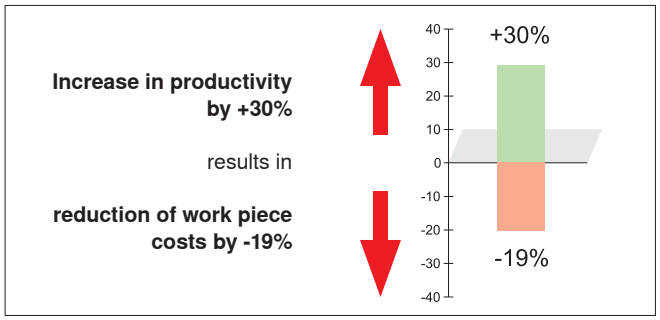
Break-down of work piece costs

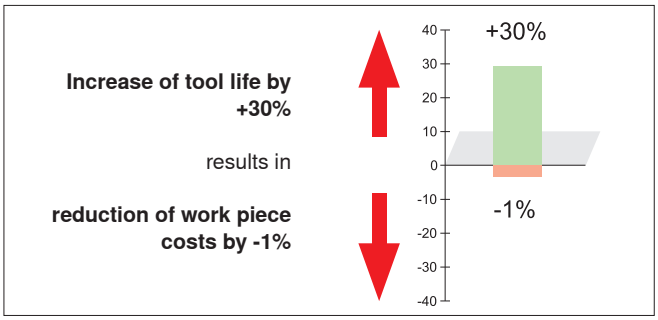
Turn the cost screw together with CERATIZIT











Increase in productivity (parts produced per time unit)

Improved utilisation of the available machine capacity leads to considerable cost reduction per work piece. In this context CERATIZIT EcoCut makes a decisive contribution through:

- fewer tool changes
- increase of v_c
- increase of f
- increase of a_p

Increased tool life

As the average tool costs amount to only 2 - 6 % of the work piece costs, improving tool life typically can reduce total costs minimally (below 1%).

Four machining operations with only one tool

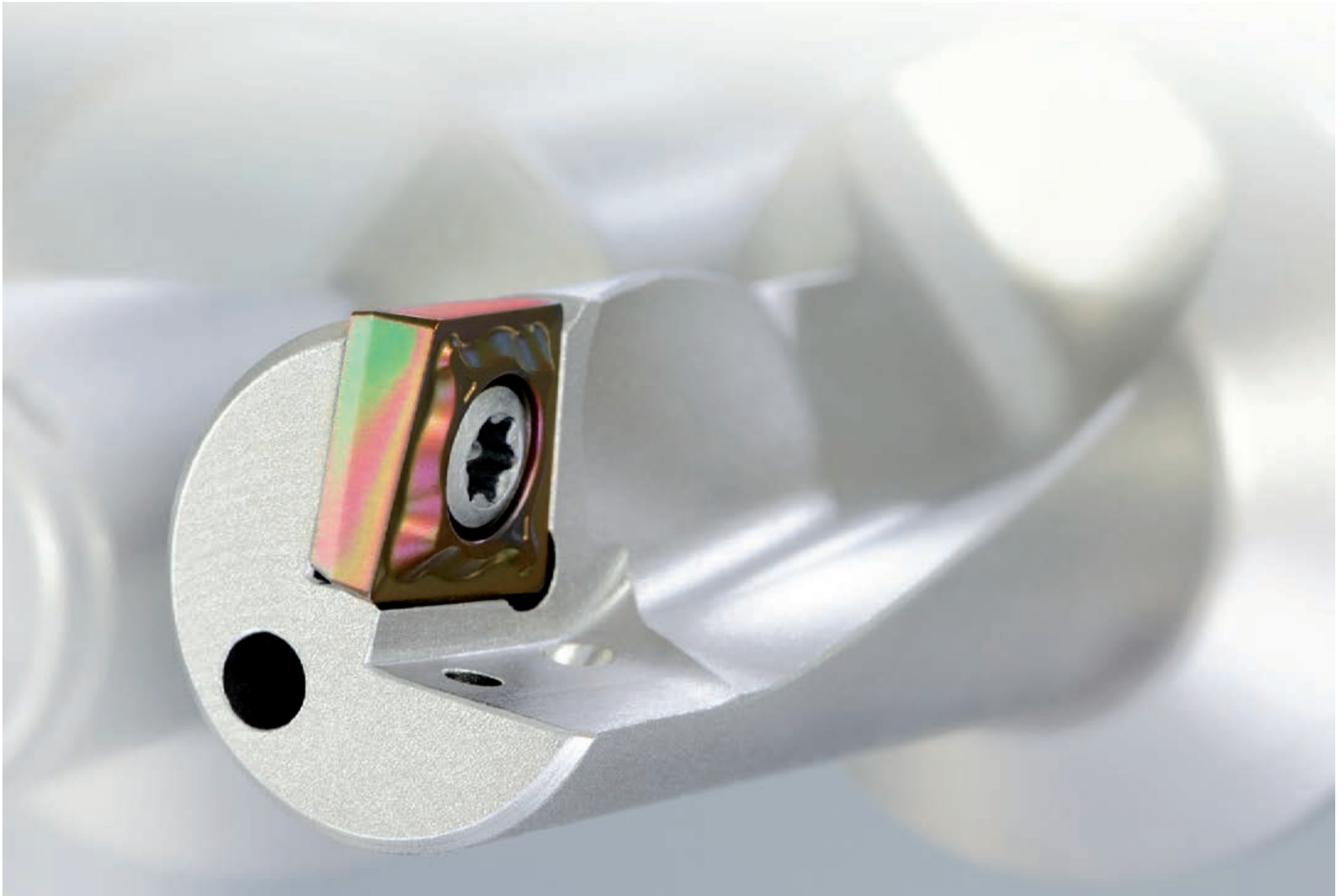
- Drilling into solid material with flat bottom holes
- Boring applications
- Turning of face profiles
- External turning applications

Conventional

EcoCut

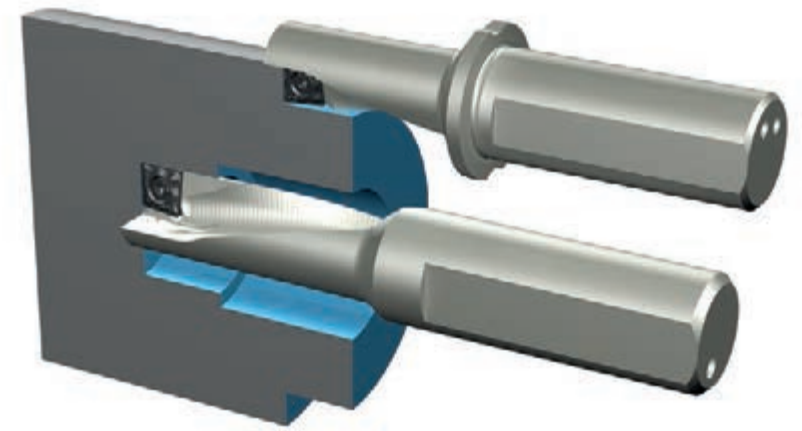
Advantages of EcoCut

- Problem solver for insufficient tool storage
- Less programming effort
- Produces a flat bottom hole
- Reduced tool and insert inventory costs. Considerable tool acquisition cost savings
- Shorter set-up times. Reduced pre-setting time



4 machining operations – 1 tool

- Turning of face profiles, internal and external profiles as well as drilling into solid material
- Thanks to the multi-function tool, more turret positions on the machine are kept free
- Using EcoCut you will achieve larger depths of cut (a_p) compared to conventional boring bars



Material groups

P	●
M	●
K	●
N	●
S	○
H	

Possible applications


Drilling into solid material


Boring applications


External turning applications

Detailed information

Diameter / length ratio	Ø range	Inserts
1,5 x D 2,25 x D 3 x D 4 x D	Ø 8 - 32 mm Ø 4 - 32 mm Ø 8 - 32 mm Ø 4 - 8 mm	XCET 04.. .. XCET 17..

CERATIZIT designation system

EcoCut Classic and EcoCut Mini

X C E T 17 05 08 F N - 27P

1	2	3	4	5	6	7	8	9	10

1 Insert shape

2 Clearance angle

3 Tolerances

4 Form of top surface

5 Cutting edge length

6 Insert thickness

7 Corner radius

8 Cutting edge

9 Cutting direction

10 Chip groove

ECC 32 R - 3.0D 17 H

1	2	3	4	5	6

1 System

2 Nominal diameter [mm]

3 Cutting direction

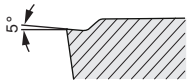
4 Maximum drilling depth,
for example: 3.0 x diameter

5 Insert size

6 Tool holder in Densimet

-EN

- Positive geometry
- Universal application
- Small to medium feed rates



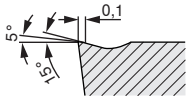
f [mm]

0,05 - 0,275

Machining conditions		
CTCP425	**CTCP435**	**CTPP430**
CTCP435	**CTPP430**	**CTPP430**
CTCP425	**CTCP435**	
CTCP435	CTPP430	CTPP430

-M50Q

- Positive geometry
- Masterfinish cutting edge
- Medium to high feed rates



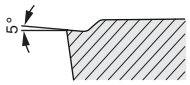
f [mm]

0,2 - 0,425

Machining conditions		
CTCP425	**CTCP425**	
CTCP425		
CTCP425	CTCP425	

-27P

- Positive geometry
- Ground periphery
- Sharp cutting edges
- Reduced tendency to adhesion
- First choice for non-ferrous metals



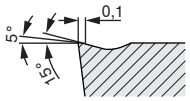
f [mm]

0,1 - 0,4

Machining conditions		
H216T	**H216T**	**H216T**

-27Q

- Highly positive geometry
- Masterfinish cutting edge
- Ground periphery
- Sharp cutting edge
- Reduced tendency to adhesion



f [mm]

0,2 - 0,5

Machining conditions		
H210T	**H210T**	

Grade overview

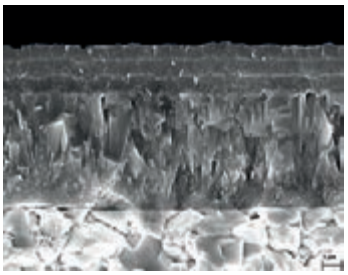
Grade designation	Standard designation ISO	Standard designation ANSI	Cutting material	Application range 01 05 10 15 20 25 30 35 40 45 50	P Steel	M Stainless	K Cast iron	N Non-ferrous metals	S Heat-resistant	H Hard materials
CTCP425 COLORSTAR™	HC-P25	C6	C		●					
	HC-K30	C1	C				●			
	HC-M20	-	C			○				
CTPP430 SILVERSTAR™	HC-P30	C6	P		●					
	HC-M25	-	P			●				
	HC-S25	-	P						●	
	HC-K30	C1	P				○			
	HC-N25	C2	P					○		
CTPP435 SILVERSTAR™	HC-P35	C5	P		●					
	HC-M30	-	P			●				
	HC-S30	-	P						●	
CTCP435 COLORSTAR™	HC-P35	C6	C		●					
	HC-K40	C1	C				●			
	HC-M30	-	C			○				
H210T	HW-N10	C3	W					●		
	HW-S10	-	W						●	
	HW-K10	C3	W				○			
H216T	HW-N15	C3	W					●		
	HW-K15	C3	W				●			
CTWN425	HW-N25	C2	W					●		

● Main application

○ Extended application

CTWN425 / CTPP435 for EcoCut Mini

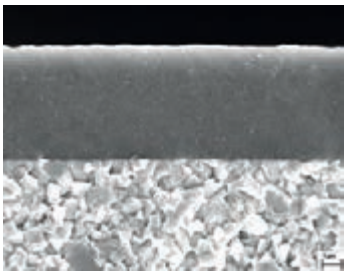
CTCP425 COLORSTAR™	HC-P25 | HC-K30 | HC-M20	● ● ○



Specification:
Composition: Co 7.0%; mixed carbides 8.1%; WC balance | Grain size: 1-2 µm | Hardness: HV_{30} 1450 | Coating specification: CVD Ti(CnN) + Al_2O_3 multi-layer

Recommended application:
The wear-resistant solution for steel and cast iron under stable conditions and with high cutting speed.

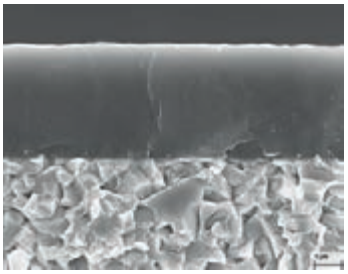
CTPP430 SILVERSTAR™	HC-P30 | HC-M25 | HC-S25 | HC-K30 | HC-N25	● ● ● ○ ○



Specification:
Composition: Co 9.0%; others 0.75%; WC balance | Grain size: 0.85 µm | Hardness: HV_{30} 1590 | Coating specification: PVD TiAlN

Recommended application:
The universal high-performance grade for steel, austenitic steel and heat-resistant alloys.

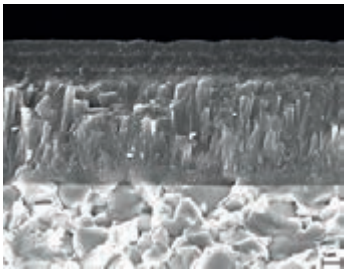
CTPP435 SILVERSTAR™	HC-P35 | HC-M30 | HC-S30	● ● ●



Specification:
Composition: Co 10.3%; others 1.2%; WC balance | Grain size: 0.7 µm | Hardness: HV_{30} 1600 | Coating specification: PVD TiN / TiAlN

Recommended application:
The universal high-performance grade for steel, austenitic steel and heat-resistant alloys.

CTCP435 COLORSTAR™	HC-P35 | HC-K40 | HC-M30	● ● ○



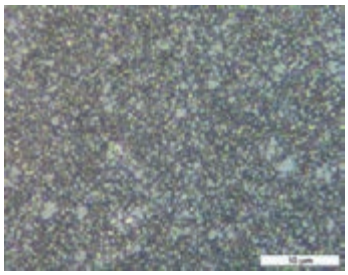
Specification:
Composition: Co 9.6%; mixed carbides 7.8%; others 0.4%; WC balance | Grain size: 1-2 µm | Hardness: HV_{30} 1400 | Coating specification: CVD Ti(C,N) + Al_2O_3 multi-layer

Recommended application:
The reliable choice when machining steel and cast iron under unstable conditions.

CTWN425 / CTPP435 for EcoCut Mini

Grade description

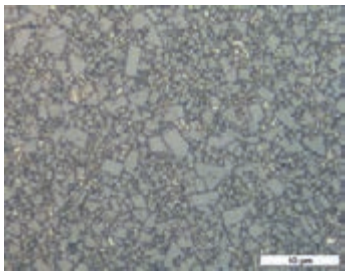
H210T	HW-N10 | HW-S10 | HW-K10	● ● ○



Specification:
Composition: Co 6.0%; WC balance | Grain size: 0.8 μm | Hardness: HV_{30} 1850

Recommended application:
The wear-resistant uncoated carbide grade for the machining of aluminium and other non-ferrous metals.

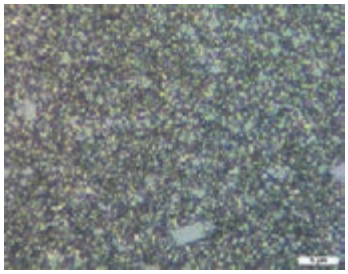
H216T	HW-N15 | HW-K15	● ●



Specification:
Composition: Co 6.0%; WC balance | Grain size: 1 μm | Hardness: HV_{30} 1630

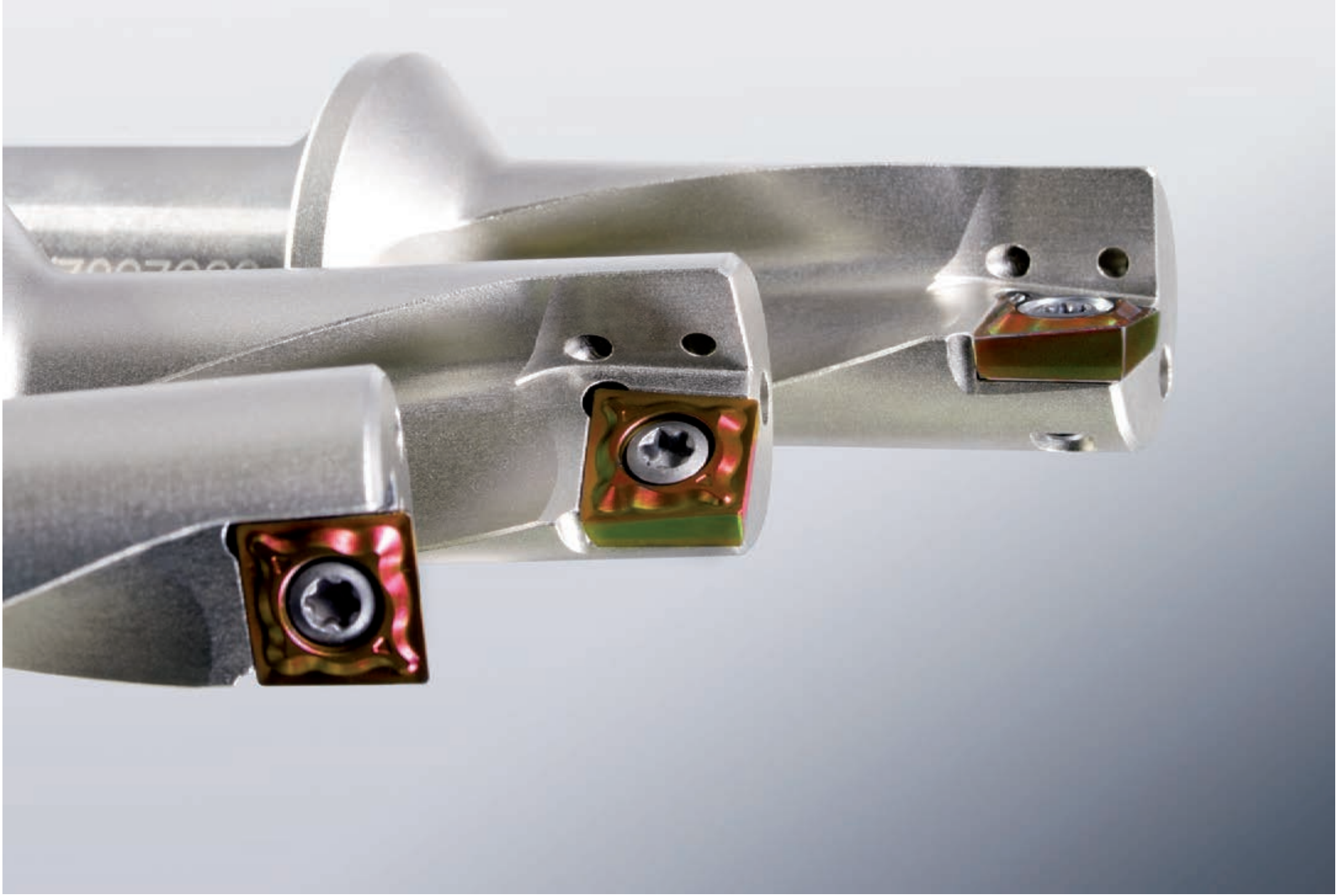
Recommended application:
The uncoated carbide grade for the machining of aluminium and other non-ferrous metals.

CTWN425	HW-N25	●



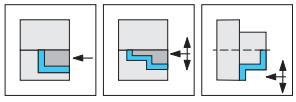
Specification:
Composition: Co 10.3%; others 1.2%; WC balance | Grain size: 0.7 μm (submicron grade) | Hardness: HV_{30} 1600

Recommended application:
The uncoated carbide grade for the machining of aluminium and other non-ferrous metals.



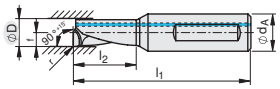
EcoCut Mini

ECM..



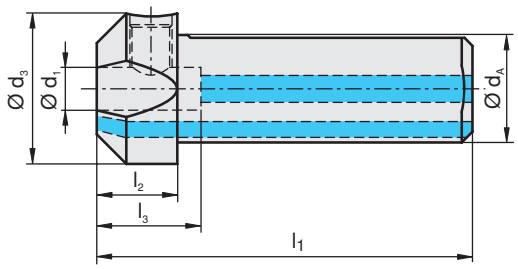
P	●
M	●
K	
N	●
S	●
H	

			CTPP435	CTWN425	RL	D_{min} [mm]	d_A [mm]	l_1 [mm]	l_2 [mm]	r [mm]	f [mm]
-27		ECM 04L-2.25D-27		●	L	4	6	35	9	0.2	2
		ECM 04L-4.00D-27		●	L	4	6	41	16	0.2	2
		ECM 04R-2.25D-27		●	R	4	6	35	9	0.2	2
		ECM 04R-4.00D-27		●	R	4	6	41	16	0.2	2
		ECM 05L-2.25D-27		●	L	5	6	37	11.25	0.2	2.5
		ECM 05L-4.00D-27		●	L	5	6	45	20	0.2	2.5
		ECM 05R-2.25D-27		●	R	5	6	37	11.25	0.2	2.5
		ECM 05R-4.00D-27		●	R	5	6	45	20	0.2	2.5
		ECM 06L-2.25D-27		●	L	6	8	38	13.5	0.2	3
		ECM 06L-4.00D-27		●	L	6	8	49	24	0.2	3
		ECM 06R-2.25D-27		●	R	6	8	38	13.5	0.2	3
		ECM 06R-4.00D-27		●	R	6	8	49	24	0.2	3
		ECM 07L-2.25D-27		●	L	7	8	42	15.75	0.2	3.5
		ECM 07L-4.00D-27		●	L	7	8	53	28	0.2	3.5
		ECM 07R-2.25D-27		●	R	7	8	42	15.75	0.2	3.5
		ECM 07R-4.00D-27		●	R	7	8	53	28	0.2	3.5
		ECM 08L-2.25D-27		●	L	8	8	45	18	0.2	4
		ECM 08L-4.00D-27		●	L	8	8	57	32	0.2	4
		ECM 08R-2.25D-27		●	R	8	8	45	18	0.2	4
		ECM 08R-4.00D-27		●	R	8	8	57	32	0.2	4
EN		ECM 04L-2.25D	●		L	4	6	35	9	0.2	2
		ECM 04L-4.00D	●		L	4	6	41	16	0.2	2
		ECM 04R-2.25D	●		R	4	6	35	9	0.2	2
		ECM 04R-4.00D	●		R	4	6	41	16	0.2	2
		ECM 05L-2.25D	●		L	5	6	37	11.25	0.2	2.5
		ECM 05L-4.00D	●		L	5	6	45	20	0.2	2.5
		ECM 05R-2.25D	●		R	5	6	37	11.25	0.2	2.5
		ECM 05R-4.00D	●		R	5	6	45	20	0.2	2.5
		ECM 06L-2.25D	●		L	6	8	38	13.5	0.2	3
		ECM 06L-4.00D	●		L	6	8	49	24	0.2	3
		ECM 06R-2.25D	●		R	6	8	38	13.5	0.2	3
		ECM 06R-4.00D	●		R	6	8	49	24	0.2	3
		ECM 07L-2.25D	●		L	7	8	42	15.75	0.2	3.5
		ECM 07L-4.00D	●		L	7	8	53	28	0.2	3.5
		ECM 07R-2.25D	●		R	7	8	42	15.75	0.2	3.5
		ECM 07R-4.00D	●		R	7	8	53	28	0.2	3.5
		ECM 08L-2.25D	●		L	8	8	45	18	0.2	4
		ECM 08L-4.00D	●		L	8	8	57	32	0.2	4
		ECM 08R-2.25D	●		R	8	8	45	18	0.2	4
		ECM 08R-4.00D	●		R	8	8	57	32	0.2	4
			CTPP435	CTWN425	RL	D_{min}	d_A	l_1	l_2	r	f



E21-E22

E23-E25



d_1 [mm]	Type, description	L N R	d_A [mm]	d_3 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]		
6	EC-ADX20-06	N	20	25	65	14	18	ECM..	E01
8	EC-ADX20-08	N	20	25	65	14	18	ECM..	E01

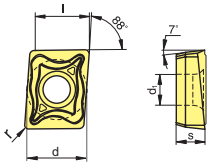
E01	310720

E38

EcoCut

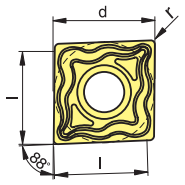
XC.. 04..

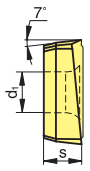
			CTCP425	CTPP430	CTCP435	H210T	H216T	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
		P	●	●	●							
		M	○	●	○							
		K	●	○	●	○	●					
		N		○		●	●					
		S		●		●						
		H										
-27P		XCET 040102FL-27P					●	4.50	4.00	1.80	0.20	2.10
		XCET 040102FR-27P					●	4.50	4.00	1.80	0.20	2.10
		XCET 040104FL-27P					●	4.50	4.00	1.80	0.40	2.10
		XCET 040104FR-27P					●	4.50	4.00	1.80	0.40	2.10
-27Q		XCET 040102FL-27Q				●		4.50	4.00	1.80	0.20	2.10
		XCET 040102FR-27Q				●		4.50	4.00	1.80	0.20	2.10
		XCET 040104FL-27Q				●		4.50	4.00	1.80	0.40	2.10
		XCET 040104FR-27Q				●		4.50	4.00	1.80	0.40	2.10
ER-EL		XCNT 040102EL	●	●	●			4.50	4.00	1.80	0.20	2.10
		XCNT 040102ER	●	●	●			4.50	4.00	1.80	0.20	2.10
		XCNT 040104EL	●	●	●			4.50	4.00	1.80	0.40	2.10
		XCNT 040104ER	●	●	●			4.50	4.00	1.80	0.40	2.10
-M50Q		XCNT 040104EL-M50Q	●					4.50	4.00	1.80	0.40	2.10
		XCNT 040104ER-M50Q	●					4.50	4.00	1.80	0.40	2.10
			CTCP425	CTPP430	CTCP435	H210T	H216T	d	l	s	r	d_1



E21-E22
E18-E20

			CTCP425	CTPP430	CTCP435	H210T	H216T	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P			●	●	●							
M			○	●	○							
K			●	○	●	○	●					
N				○		●	●					
S				●		●						
H												
-27P		XCET 050202FN-27P					●	5.80	5.00	2.10	0.20	2.25
		XCET 050204FN-27P					●	5.80	5.00	2.10	0.40	2.25
		XCET 060202FN-27P					●	6.50	6.00	2.38	0.20	2.50
		XCET 060204FN-27P					●	6.50	6.00	2.38	0.40	2.50
		XCET 070304FN-27P					●	7.60	7.00	3.18	0.40	2.80
		XCET 080304FN-27P					●	8.50	8.00	3.18	0.40	3.40
		XCET 09T304FN-27P					●	9.60	9.00	3.97	0.40	3.40
		XCET 10T304FN-27P					●	10.60	10.00	3.97	0.40	4.40
		XCET 10T308FN-27P					●	10.60	10.00	3.97	0.80	4.40
		XCET 130404FN-27P					●	13.50	12.50	4.76	0.40	5.30
		XCET 130408FN-27P					●	13.50	12.50	4.76	0.80	5.30
		XCET 170508FN-27P					●	17.50	16.00	5.56	0.80	5.30
-27Q		XCET 050202FN-27Q				●		5.80	5.00	2.10	0.20	2.25
		XCET 050204FN-27Q				●		5.80	5.00	2.10	0.40	2.25
		XCET 060202FN-27Q				●		6.50	6.00	2.38	0.20	2.50
		XCET 060204FN-27Q				●		6.50	6.00	2.38	0.40	2.50
		XCET 070304FN-27Q				●		7.60	7.00	3.18	0.40	2.80
		XCET 080304FN-27Q				●		8.50	8.00	3.18	0.40	3.40
		XCET 09T304FN-27Q				●		9.60	9.00	3.97	0.40	3.40
		XCET 10T304FN-27Q				●		10.60	10.00	3.97	0.40	4.40
		XCET 10T308FN-27Q				●		10.60	10.00	3.97	0.80	4.40
		XCET 130404FN-27Q				●		13.50	12.50	4.76	0.40	5.30
		XCET 130408FN-27Q				●		13.50	12.50	4.76	0.80	5.30
		XCET 170508FN-27Q				●		17.50	16.00	5.56	0.80	5.30
EN		XCNT 050202EN	●	●	●			5.80	5.00	2.10	0.20	2.25
		XCNT 050204EN	●	●	●			5.80	5.00	2.10	0.40	2.25
		XCNT 060202EN	●	●	●			6.50	6.00	2.38	0.20	2.50
		XCNT 060204EN	●	●	●			6.50	6.00	2.38	0.40	2.50
		XCNT 070304EN	●	●	●			7.60	7.00	3.18	0.40	2.80
		XCNT 080304EN	●	●	●			8.50	8.00	3.18	0.40	3.40
		XCNT 09T304EN	●	●	●			9.60	9.00	3.97	0.40	3.40
		XCNT 10T304EN	●	●	●			10.60	10.00	3.97	0.40	4.40
		XCNT 10T308EN	●	●	●			10.60	10.00	3.97	0.80	4.40
		XCNT 130404EN	●	●	●			13.50	12.50	4.76	0.40	5.30
		XCNT 130408EN	●	●	●			13.50	12.50	4.76	0.80	5.30
		XCNT 170508EN	●	●	●			17.50	16.00	5.56	0.80	5.30
			CTCP425	CTPP430	CTCP435	H210T	H216T	d	l	s	r	d_1



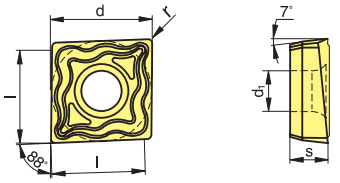


E21-E22
E18-E20

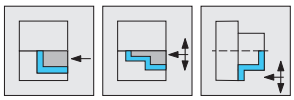
EcoCut

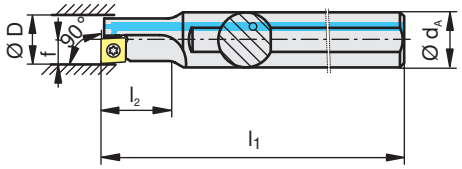
XC..

			CTCP425	CTPP430	CTCP435	H210T	H216T	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P			●	●	●							
M			○	●	○							
K			●	○	●	○	●					
N				○		●	●					
S				●		●						
H												
-M50Q		XCNT 050204EN-M50Q	●					5.80	5.00	2.10	0.40	2.25
		XCNT 060204EN-M50Q	●					6.50	6.00	2.38	0.40	2.50
		XCNT 070304EN-M50Q	●					7.60	7.00	3.18	0.40	2.80
		XCNT 080304EN-M50Q	●					8.50	8.00	3.18	0.40	3.40
		XCNT 09T304EN-M50Q	●					9.60	9.00	3.97	0.40	3.40
		XCNT 10T304EN-M50Q	●					10.60	10.00	3.97	0.40	4.40
		XCNT 10T308EN-M50Q	●					10.60	10.00	3.97	0.80	4.40
		XCNT 130404EN-M50Q	●					13.50	12.50	4.76	0.40	5.30
		XCNT 130408EN-M50Q	●					13.50	12.50	4.76	0.80	5.30
		XCNT 170508EN-M50Q	●					17.50	16.00	5.56	0.80	5.30
			CTCP425	CTPP430	CTCP435	H210T	H216T	d	l	s	r	d_1



E21-E22
E18-E20





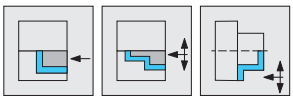
D_{min} [mm]	Type, description	LNR	d_A [mm]	l_1 [mm]	l_2 [mm]	f [mm]	[Nm]		
8	ECC 08L-1.5D 04	L	12	80	12	4	0.4	XC.. 0401..	E01
8	ECC 08R-1.5D 04	R	12	80	12	4	0.4	XC.. 0401..	E01
10	ECC 10L-1.5D 05	L	12	90	15	5	0.7	XC.. 0502..	E02
10	ECC 10R-1.5D 05	R	12	90	15	5	0.7	XC.. 0502..	E02
12	ECC 12L-1.5D 06	L	16	100	18	6	1.0	XC.. 0602..	E03
12	ECC 12R-1.5D 06	R	16	100	18	6	1.0	XC.. 0602..	E03
14	ECC 14L-1.5D 07	L	16	110	21	7	1.2	XC.. 0703..	E04
14	ECC 14R-1.5D 07	R	16	110	21	7	1.2	XC.. 0703..	E04
16	ECC 16L-1.5D 08	L	20	125	24	8	2.2	XC.. 0803..	E05
16	ECC 16R-1.5D 08	R	20	125	24	8	2.2	XC.. 0803..	E05
18	ECC 18L-1.5D 09	L	25	135	27	9	2.2	XC.. 09T3..	E05
18	ECC 18R-1.5D 09	R	25	135	27	9	2.2	XC.. 09T3..	E05
20	ECC 20L-1.5D 10	L	25	150	30	10	3.2	XC.. 10T3..	E06
20	ECC 20R-1.5D 10	R	25	150	30	10	3.2	XC.. 10T3..	E06
25	ECC 25L-1.5D 13	L	32	180	37.5	12.5	5.0	XC.. 1304..	E07
25	ECC 25R-1.5D 13	R	32	180	37.5	12.5	5.0	XC.. 1304..	E07
32	ECC 32L-1.5D 17	L	40	200	48	16	5.0	XC.. 1705..	E07
32	ECC 32R-1.5D 17	R	40	200	48	16	5.0	XC.. 1705..	E07

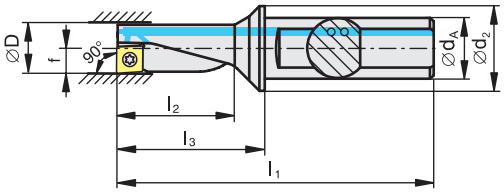
E01	11807484		11843205
E02	11807480		11843205
E03	11684214		11488748
E04	11684216		11206195
E05	11227305		11843208
E06	11610311	8095012000	
E07	11801441	8095012100	

E26+E29
E38
E15-E17

EcoCut Classic

2.25D

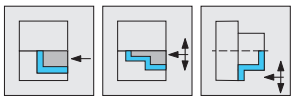


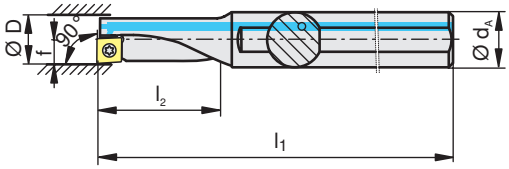


D_{min} [mm]	Type, description	LNR	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	[Nm]		
8	ECC 08L-2.25D 04	L	10	15	60	18	22.0	4	0.4	XC.. 0401..	E01
8	ECC 08R-2.25D 04	R	10	15	60	18	22.0	4	0.4	XC.. 0401..	E01
10	ECC 10L-2.25D 05	L	12	18	69.5	22.5	27.5	5	0.7	XC.. 0502..	E02
10	ECC 10R-2.25D 05	R	12	18	69.5	22.5	27.5	5	0.7	XC.. 0502..	E02
12	ECC 12L-2.25D 06	L	16	22	78	27	33.0	6	1.0	XC.. 0602..	E03
12	ECC 12R-2.25D 06	R	16	22	78	27	33.0	6	1.0	XC.. 0602..	E03
14	ECC 14L-2.25D 07	L	16	23	83.5	31.5	38.5	7	1.2	XC.. 0703..	E04
14	ECC 14R-2.25D 07	R	16	23	83.5	31.5	38.5	7	1.2	XC.. 0703..	E04
16	ECC 16L-2.25D 08	L	20	28	94	36	44.0	8	2.2	XC.. 0803..	E05
16	ECC 16R-2.25D 08	R	20	28	94	36	44.0	8	2.2	XC.. 0803..	E05
18	ECC 18L-2.25D 09	L	25	36	109.5	40.5	53.5	9	2.2	XC.. 09T3..	E05
18	ECC 18R-2.25D 09	R	25	36	109.5	40.5	53.5	9	2.2	XC.. 09T3..	E05
20	ECC 20L-2.25D 10	L	25	35	111	45	55.0	10	3.2	XC.. 10T3..	E06
20	ECC 20R-2.25D 10	R	25	35	111	45	55.0	10	3.2	XC.. 10T3..	E06
25	ECC 25L-2.25D 13	L	32	44	129	56.5	69.0	12.5	5.0	XC.. 1304..	E07
25	ECC 25R-2.25D 13	R	32	44	129	56.5	69.0	12.5	5.0	XC.. 1304..	E07
32	ECC 32L-2.25D 17	L	40	54	158	72	88.0	16	5.0	XC.. 1705..	E07
32	ECC 32R-2.25D 17	R	40	54	158	72	88.0	16	5.0	XC.. 1705..	E07

E01	11807484		11843205
E02	11807480		11843205
E03	11684214		11488748
E04	11684216		11206195
E05	11227305		11843208
E06	11610311	8095012000	
E07	11801441	8095012100	

E27+E29 E38 E15-E17





D_{min} [mm]	Type, description	L N R	d_A [mm]	l_1 [mm]	l_2 [mm]	f [mm]	[Nm]		
8	ECC 08L-3.0D 04 H	L	12	80	24	4	0.4	XC.. 0401..	E01
8	ECC 08R-3.0D 04 H	R	12	80	24	4	0.4	XC.. 0401..	E01
10	ECC 10L-3.0D 05 H	L	12	85	30	5	0.7	XC.. 0502..	E02
10	ECC 10R-3.0D 05 H	R	12	85	30	5	0.7	XC.. 0502..	E02
12	ECC 12L-3.0D 06 H	L	16	95	36	6	1.0	XC.. 0602..	E03
12	ECC 12R-3.0D 06 H	R	16	95	36	6	1.0	XC.. 0602..	E03
14	ECC 14L-3.0D 07 H	L	16	100	42	7	1.2	XC.. 0703..	E04
14	ECC 14R-3.0D 07 H	R	16	100	42	7	1.2	XC.. 0703..	E04
16	ECC 16L-3.0D 08 H	L	20	110	48	8	2.2	XC.. 0803..	E05
16	ECC 16R-3.0D 08 H	R	20	110	48	8	2.2	XC.. 0803..	E05
18	ECC 18L-3.0D 09 H	L	25	125	54	9	2.2	XC.. 09T3..	E05
18	ECC 18R-3.0D 09 H	R	25	125	54	9	2.2	XC.. 09T3..	E05
20	ECC 20L-3.0D 10 H	L	25	130	60	10	3.2	XC.. 10T3..	E06
20	ECC 20R-3.0D 10 H	R	25	130	60	10	3.2	XC.. 10T3..	E06
25	ECC 25L-3.0D 13 H	L	32	150	75	12.5	5.0	XC.. 1304..	E07
25	ECC 25R-3.0D 13 H	R	32	150	75	12.5	5.0	XC.. 1304..	E07
32	ECC 32L-3.0D 17 H	L	40	185	96	16	5.0	XC.. 1705..	E07
32	ECC 32R-3.0D 17 H	R	40	185	96	16	5.0	XC.. 1705..	E07

E01	11807484		11843205
E02	11807480		11843205
E03	11684214		11488748
E04	11684216		11206195
E05	11227305		11843208
E06	11610311	8095012000	
E07	11801441	8095012100	

E28+E29 E38 E15-E17

Cutting data

Grades, material

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
P	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
	Stainless steel	annealed	ferritic / martensitic	12	200
		tempered	martensitic	13	325
		heat-treated	ferritic / martensitic	13	200
M	Stainless steel	quenched	austenitic	14	180
		quenched	ferritic / austenitic (Duplex)	14	230 - 260
		hardened	austenitc, precipitation hardened (PH)	14	330
K	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	250
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12 % Si	23	75
		hardened	< 12 % Si	24	90
		non hardened	> 12 % Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	(110)
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	28	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat-resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	(350)
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	(320)
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		41	55 HRC

* R_m = ultimate tensile strength, measured in MPa

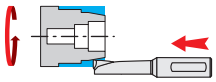
CTCP425	CTPP430	CTPP435*	CTCP435	H210T	H216T	CTWN425*
v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]
150 - 300	120 - 250	60 - 230	140 - 280			
120 - 220	80 - 180	60 - 160	100 - 200			
100 - 200	60 - 160	50 - 130	80 - 180			
120 - 220	80 - 180	60 - 160	100 - 200			
100 - 180	60 - 150	50 - 130	80 - 160			
80 - 150	60 - 130	50 - 100	70 - 140			
110 - 190	80 - 170	60 - 140	100 - 180			
70 - 150	50 - 130	40 - 100	60 - 140			
110 - 220	50 - 200	40 - 200	100 - 200			
100 - 180	50 - 150	40 - 150	80 - 150			
120 - 220	50 - 160	40 - 200	100 - 200			
100 - 200	50 - 180	40 - 180	100 - 180			
	50 - 130	40 - 100				
	50 - 120	40 - 80				
130 - 280	120 - 200	100 - 180	120 - 250	140 - 200	120 - 160	80 - 140
130 - 280	100 - 180	80 - 160	120 - 250	100 - 160	90 - 140	60 - 120
120 - 280	120 - 200	100 - 180	110 - 250	160 - 200	130 - 170	90 - 150
120 - 280	100 - 180	80 - 160	110 - 250	110 - 150	90 - 130	60 - 110
110 - 280	90 - 160	100 - 200	100 - 250	160 - 220	140 - 200	100 - 180
110 - 280	70 - 150	90 - 160	100 - 250	140 - 180	120 - 160	80 - 140
	80 - 2000	80 - 2000	80 - 2000	120 - 3000	100 - 2500	80 - 2000
	80 - 1500	80 - 1500	80 - 1500	120 - 2500	100 - 2000	80 - 1500
	80 - 1500	80 - 1500	80 - 1500	120 - 2000	100 - 1500	80 - 1500
	80 - 1300	80 - 1300	80 - 1300	120 - 1800	100 - 1500	80 - 1300
	80 - 600	80 - 600	80 - 600	120 - 1000	100 - 800	80 - 600
	80 - 400	80 - 400	80 - 400	120 - 800	100 - 600	80 - 400
	80 - 400	80 - 400	80 - 400	120 - 800	100 - 600	80 - 400
	80 - 300	80 - 300	80 - 300	120 - 600	100 - 400	80 - 300
	80 - 200	80 - 200	80 - 200	120 - 400	100 - 300	80 - 200
	60 - 160	60 - 160	60 - 160	90 - 220	80 - 180	60 - 160
	50 - 140	50 - 140	50 - 140	80 - 200	60 - 150	50 - 140
	80 - 200	80 - 200	80 - 200	120 - 300	100 - 250	80 - 200
	20 - 90	20 - 50	20 - 50	35 - 50	30 - 45	25 - 40
	20 - 90	20 - 40	20 - 40	25 - 40	20 - 35	20 - 30
	20 - 90	15 - 20	15 - 20	25 - 40	20 - 35	20 - 30
	20 - 90	10 - 20	10 - 20	20 - 30	18 - 30	15 - 25
	20 - 90	10 - 20	10 - 20	15 - 25	15 - 25	15 - 25
	40 - 100	50 - 120	50 - 120	80 - 140	60 - 120	30 - 100
	30 - 90	30 - 50	30 - 50	40 - 100	30 - 80	25 - 60

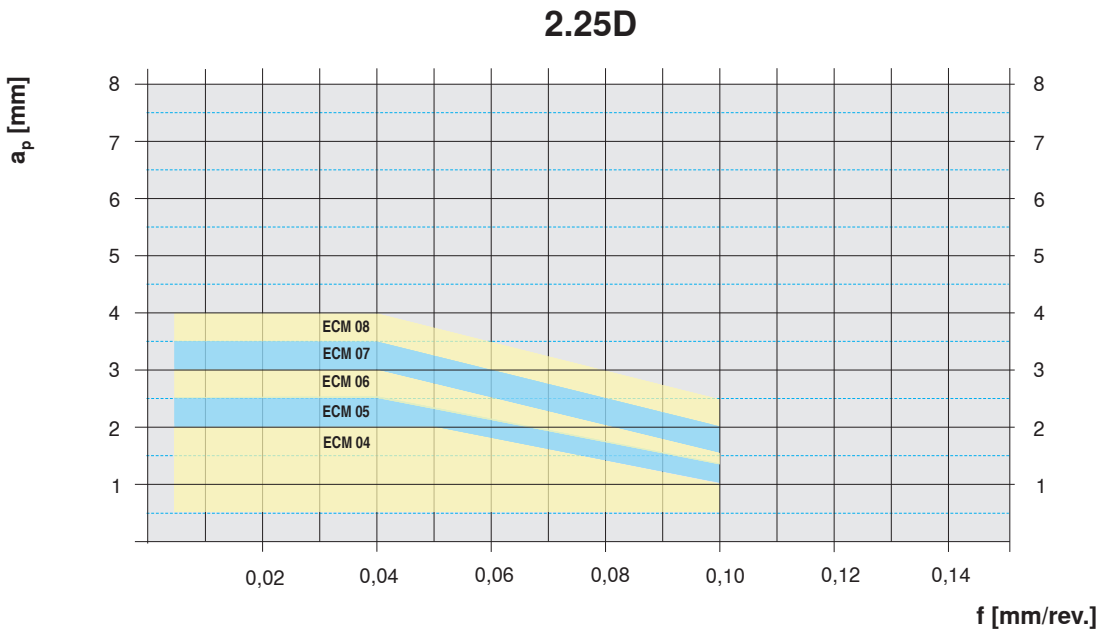
The cutting data are non-binding indications for the operator. It is recommended to adapt them to the current conditions.
* EcoCut Mini

Depth of cut / feed rate

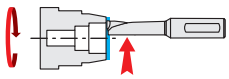
EcoCut Mini

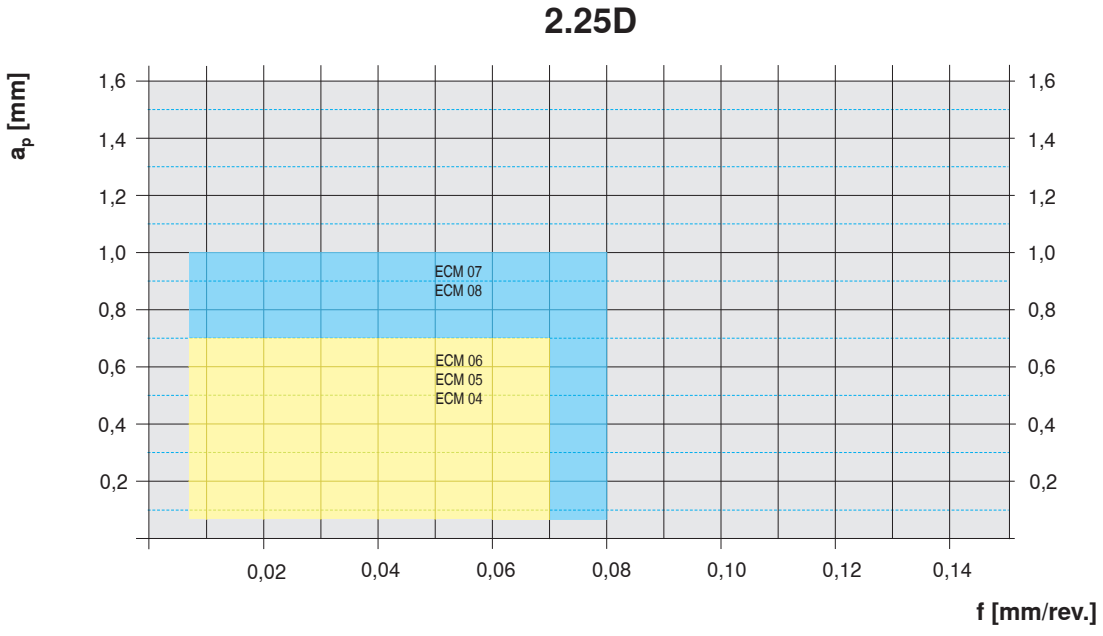
Longitudinal turning



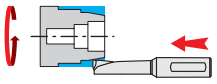


Face turning

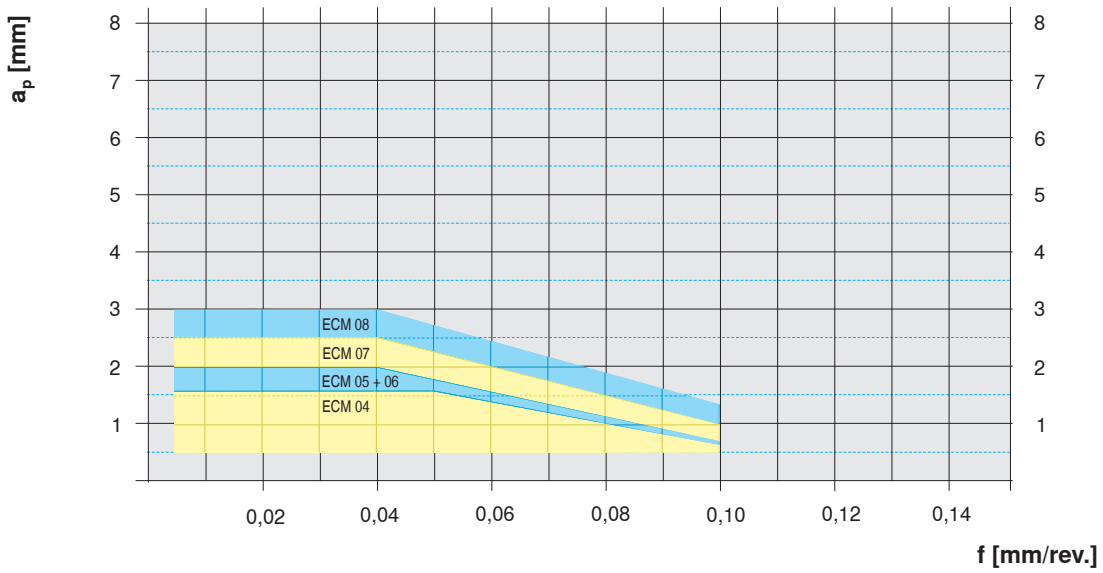




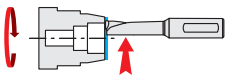
Longitudinal turning



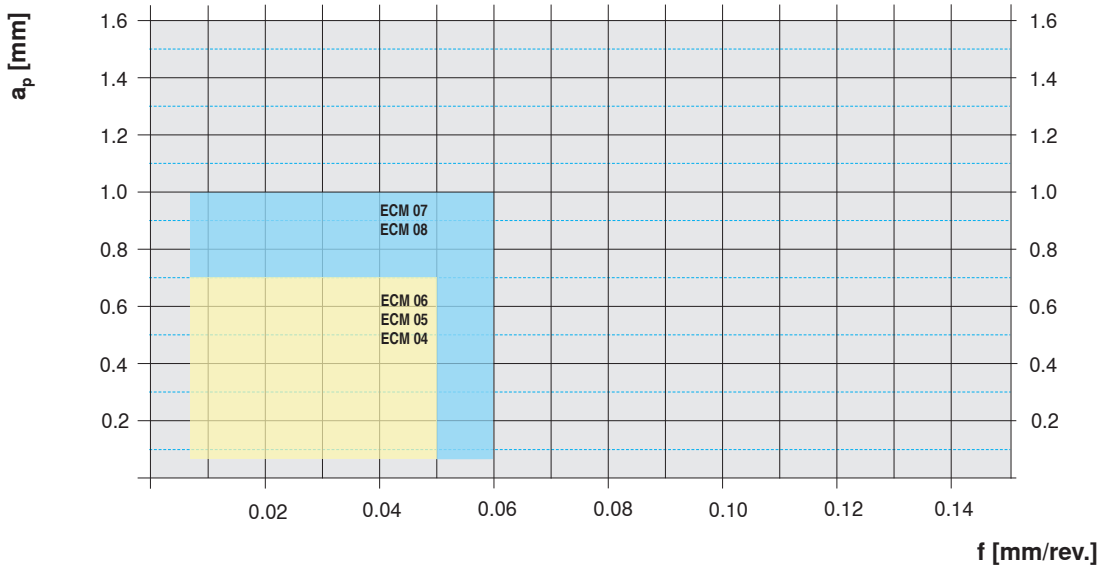
4.0D



Face turning



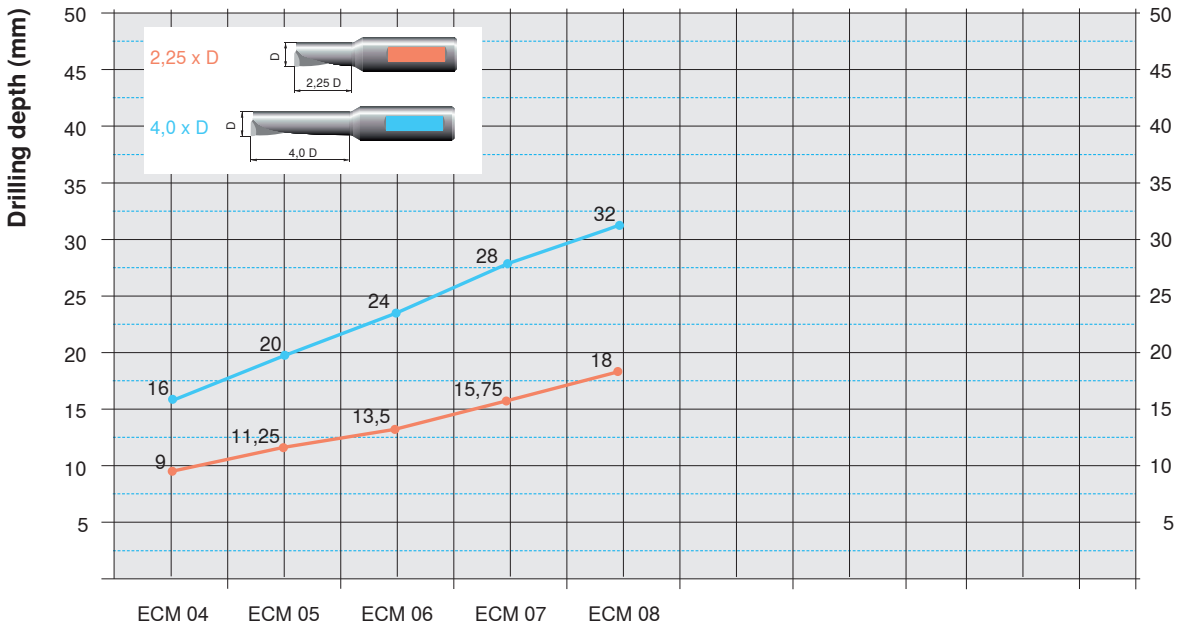
4.0D



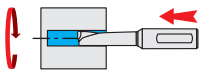
Drilling depth / feed rate

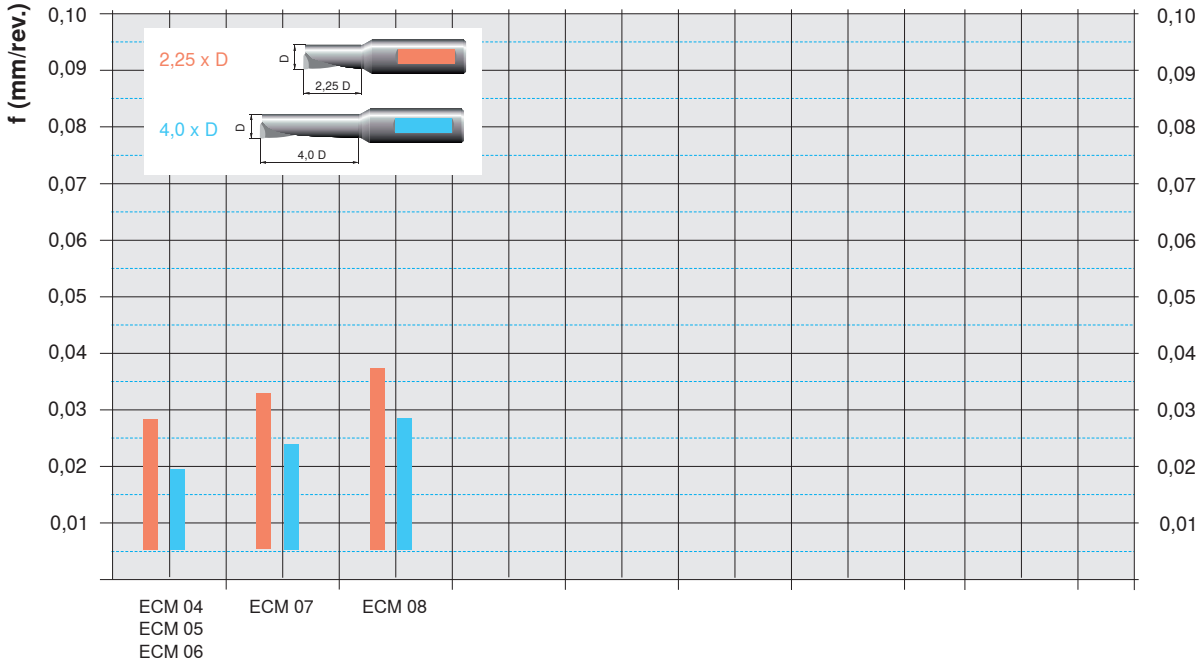
EcoCut Mini

Drilling depth



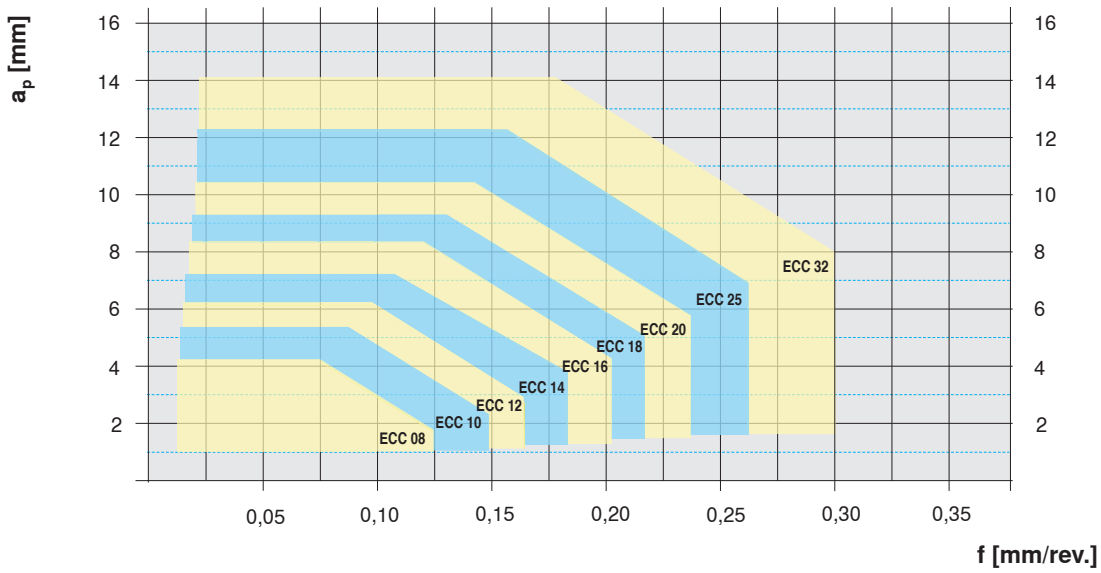
Drilling feed rate



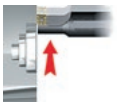


Longitudinal turning

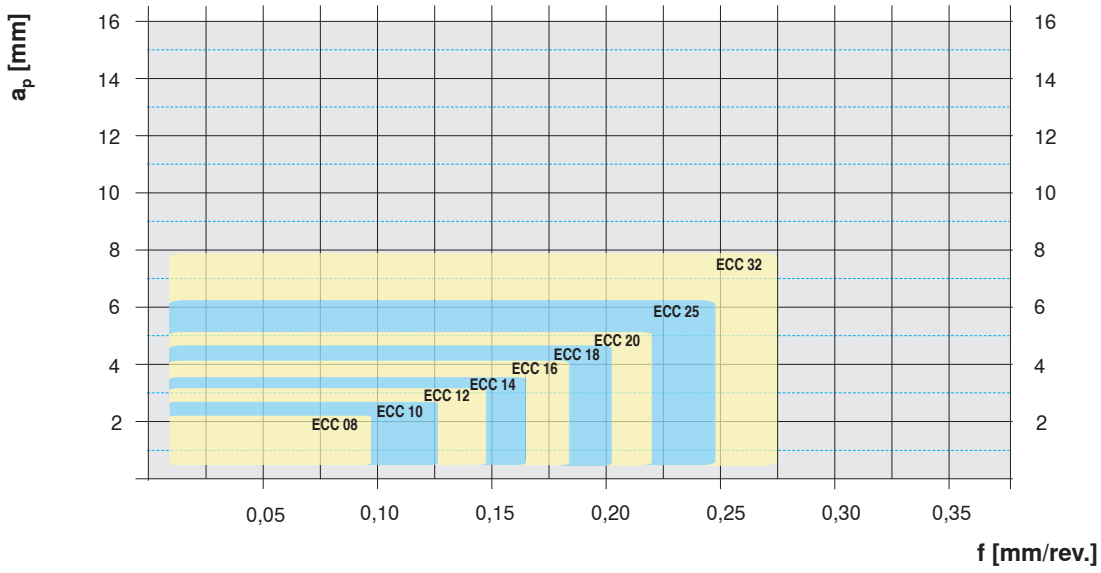
1.5D



Face turning



1.5D

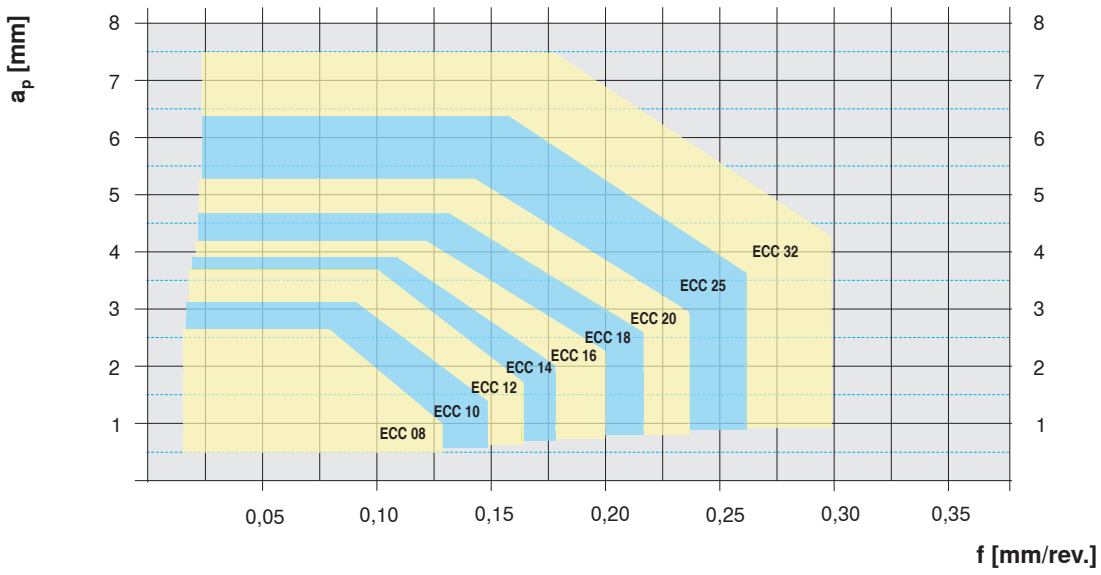


Depth of cut / feed rate

EcoCut Classic

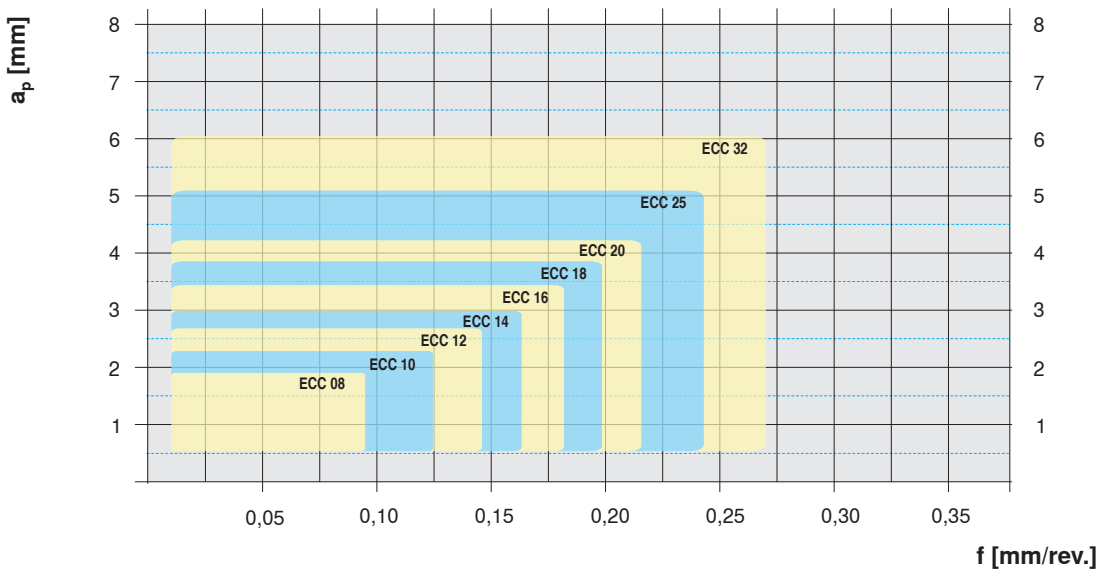
Longitudinal turning

2.25D

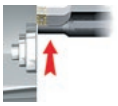


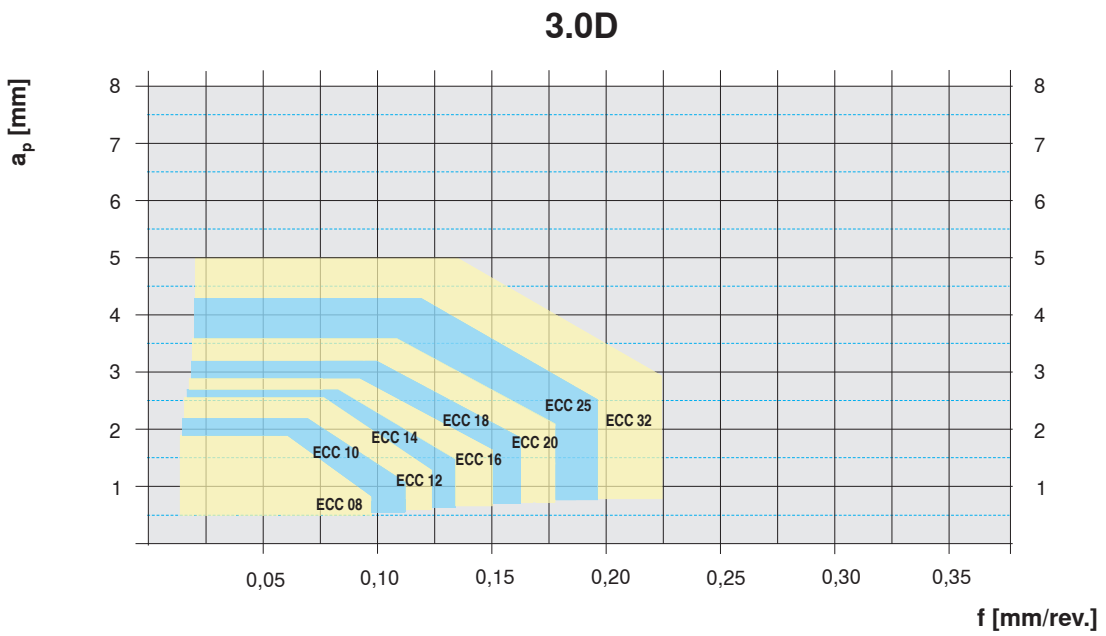
Face turning

2.25D

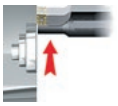


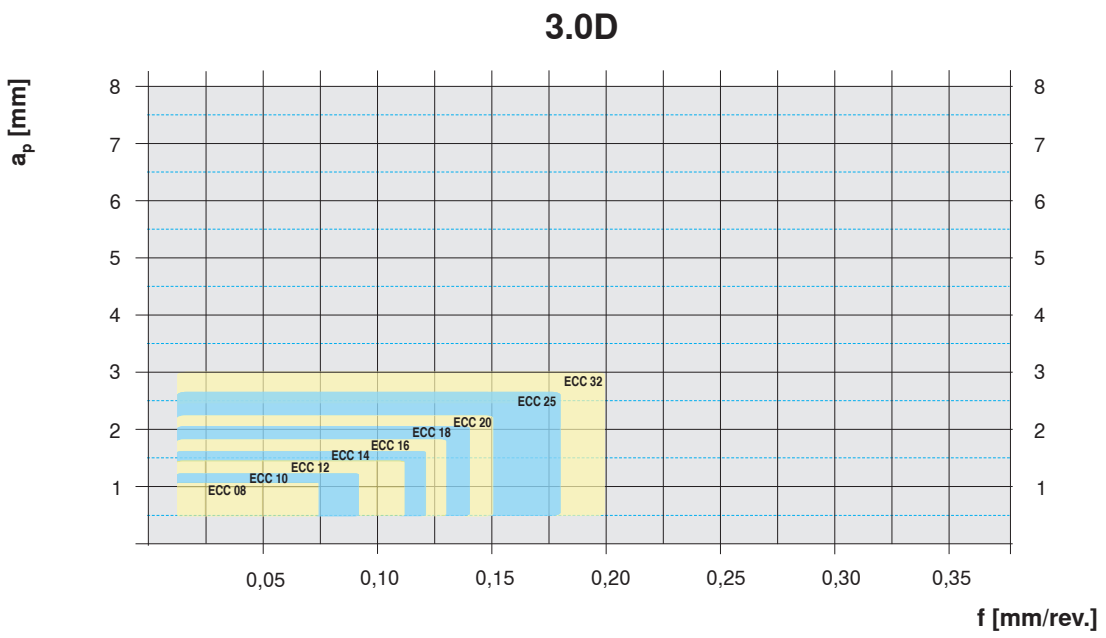
Longitudinal turning





Face turning

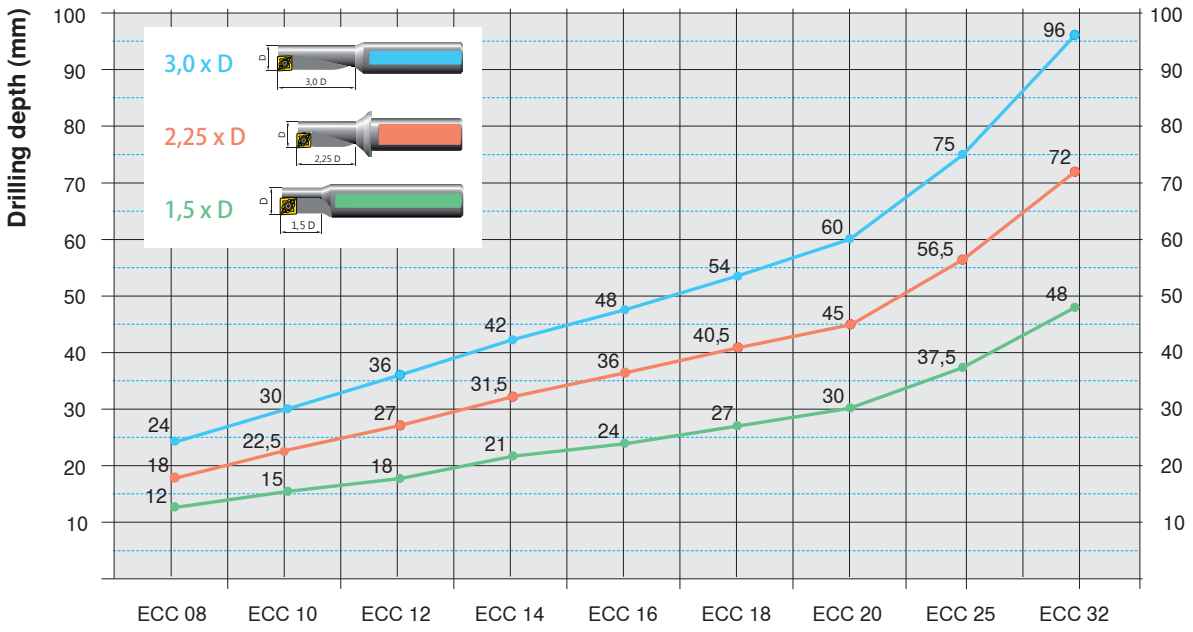




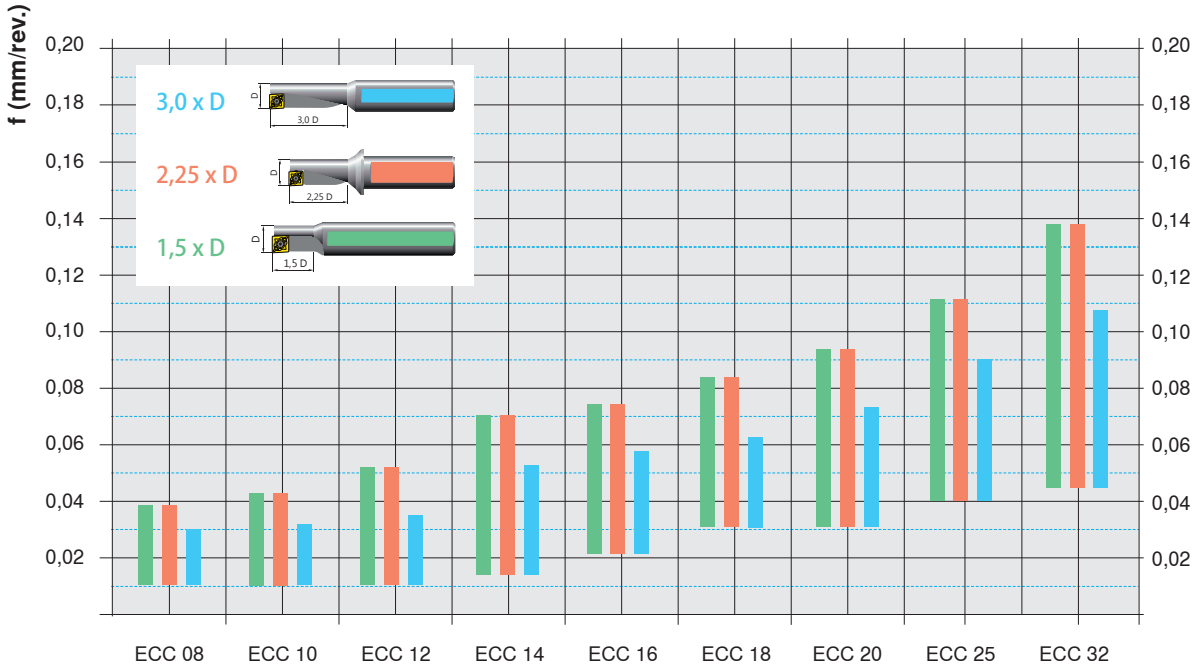
Drilling depth / feed rate

EcoCut Classic

Drilling depth

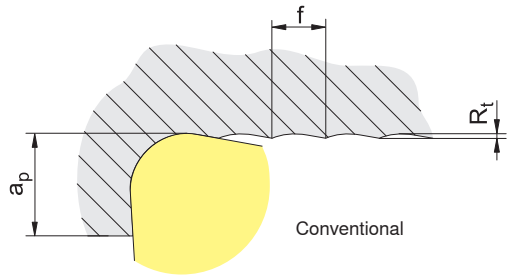


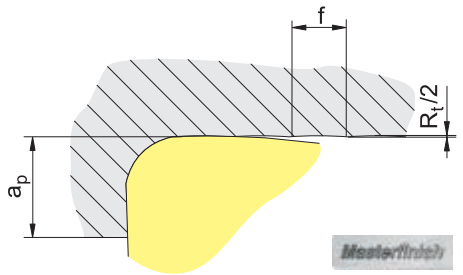
Drilling feed rate



Improved surface finish

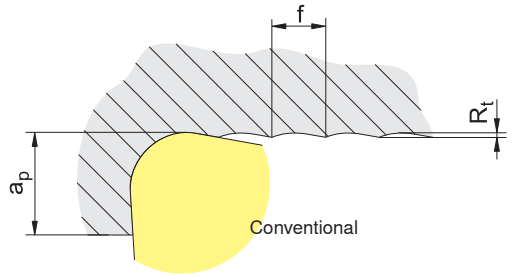
With the same feed rate an insert with 'Masterfinish' cutting edge reaches a roughness value R_a which is many times higher than the one of a conventional insert.

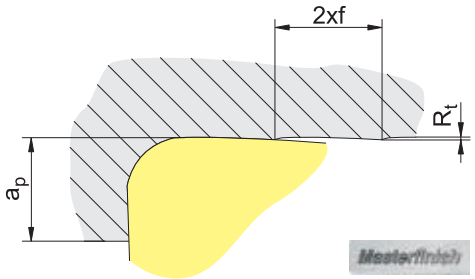


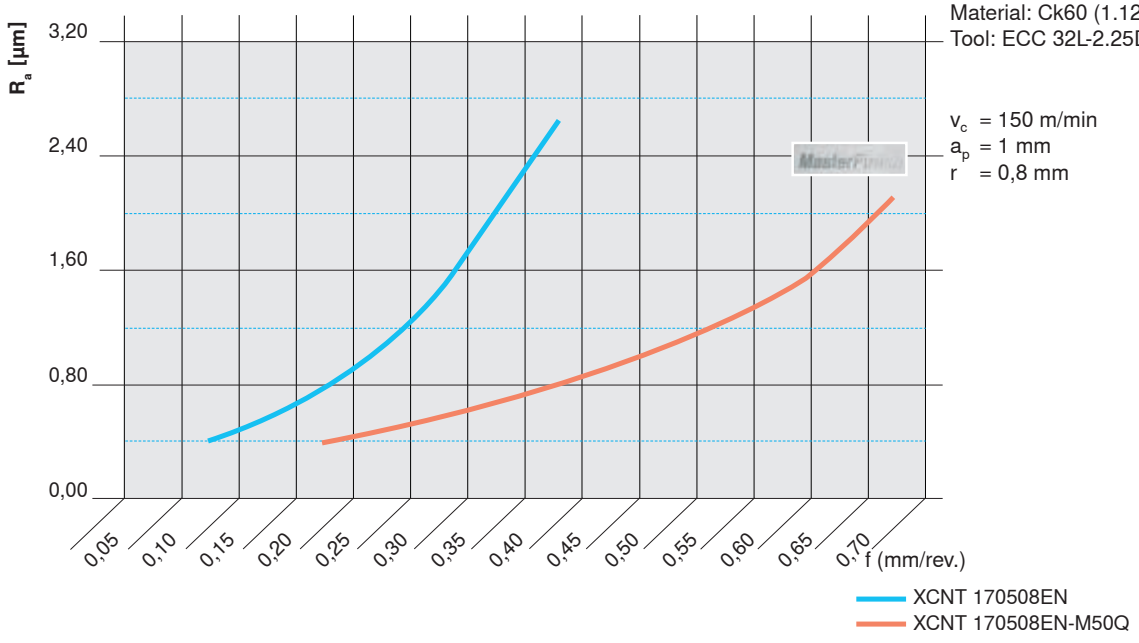


Reduced machining time

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!).

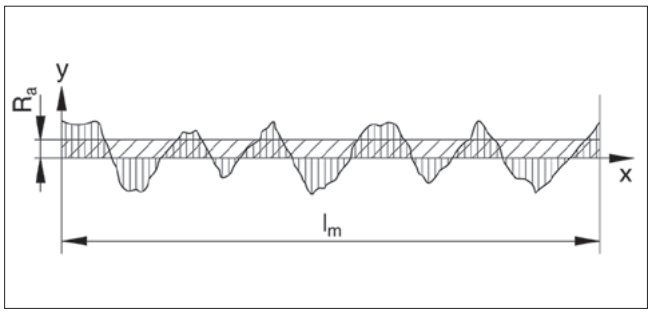






Surface quality

Surface roughness

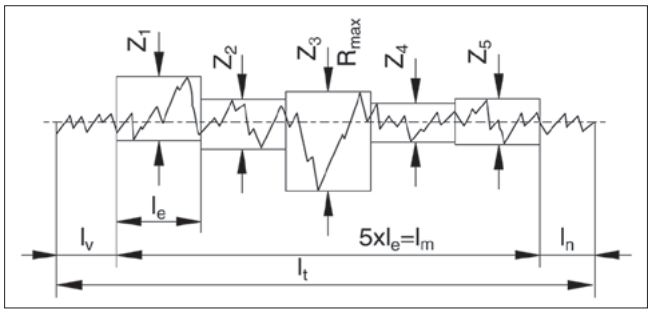


Average roughness value R_a DIN (4768)

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

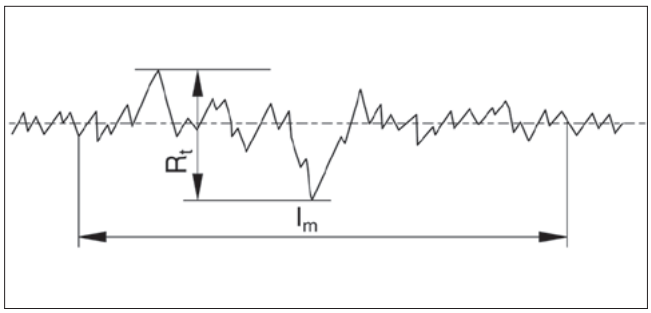
Average roughness depth R_z (DIN 4768)

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 ... Z_5

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



Maximum surface roughness depth R_t (DIN 4768/1)

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

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

≙ Surface roughness (produced through special methods)

≙ Surface roughness (produced through normal workshop methods)

≙ Surface roughness (produced through rough machining methods)

Type of problem								Corrective measures	
Type of wear				Work piece problems		Chip 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	

⇧	raise, increase, large influence	⇩	avoid, reduce large influence	≈	check, optimise
⇧	raise, increase low influence	⇩	avoid, reduce low influence	▢	use

Application

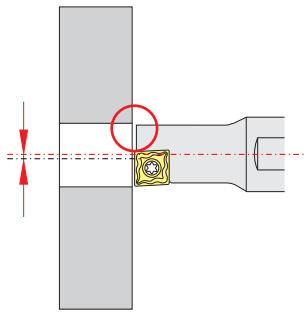
Mounting of the insert

For tools Ø 8 mm right-hand or left-hand inserts are required.
From Ø 10-32 mm neutral inserts are applied.

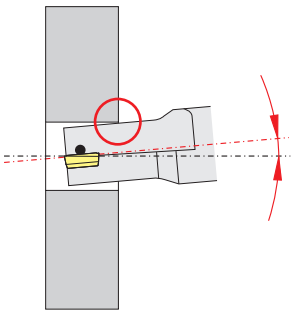
Through hole

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

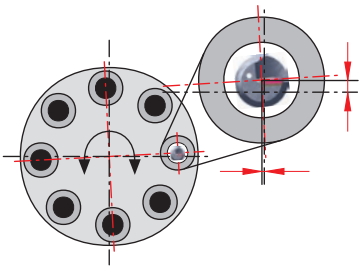
Axial displacement of the machine



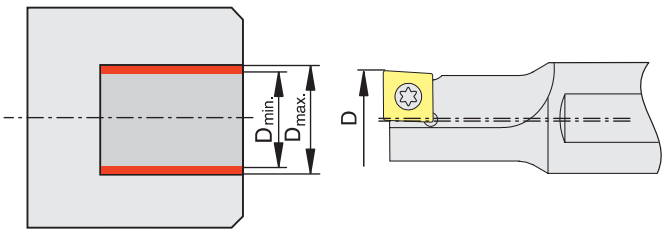
Displacement in x-direction



Angular error



Turret position error



Off-centre drilling

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

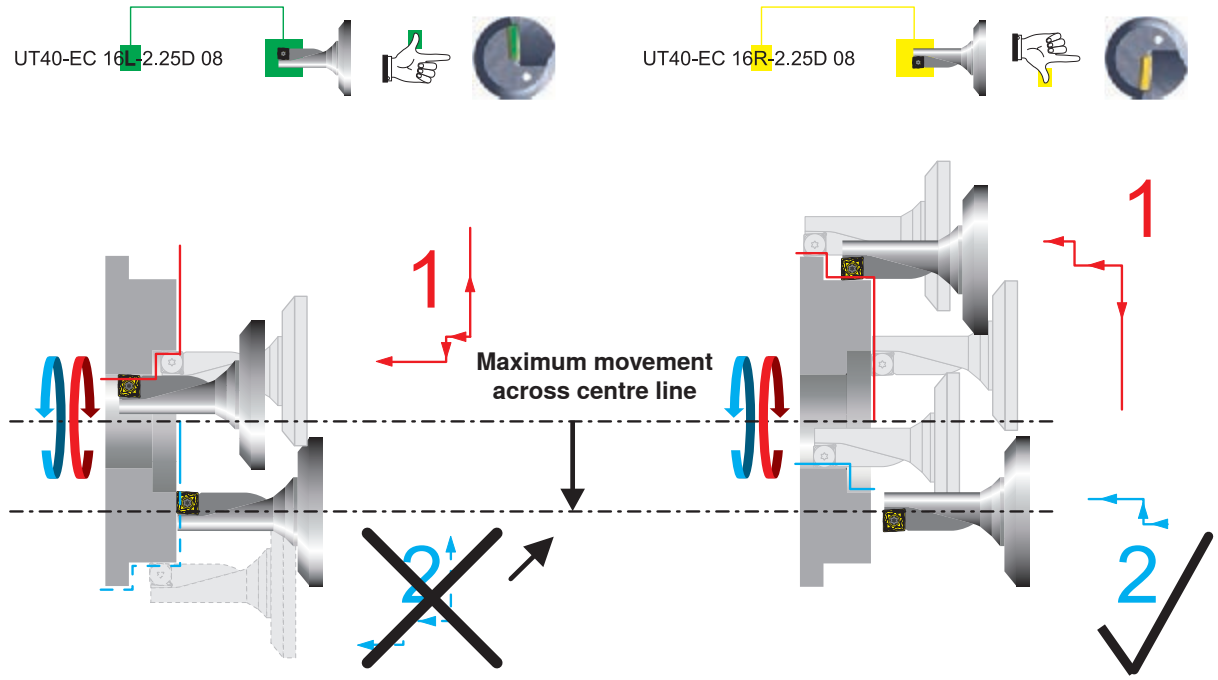
Type of tool Solid carbide	Nominal tool D [mm]	Work piece bore diameter D_{min} [mm]	Work piece bore diameter D_{max} [mm]
ECM 04 L/R - ...D	4	3,90	4,20
ECM 05 L/R - ...D	5	4,90	5,20
ECM 06 L/R - ...D	6	5,90	6,20
ECM 07 L/R - ...D	7	6,90	7,20
ECM 08 L/R - ...D	8	7,90	8,20

Type of tool	Nominal tool D [mm]	Work piece bore diameter D_{min} [mm]	Work piece bore diameter D_{max} [mm]
ECC 08 L/R - ... 04	8	7,85	8,30
ECC 10 L/R - ... 05	10	9,85	10,50
ECC 12 L/R - ... 06	12	11,85	12,50
ECC 14 L/R - ... 07	14	13,85	14,50
ECC 16 L/R - ... 08	16	15,85	16,50
ECC 18 L/R - ... 09	18	17,85	18,50
ECC 20 L/R - ... 10	20	19,80	20,50
ECC 25 L/R - ... 13	25	24,80	25,80
ECC 32 L/R - ... 17	32	31,80	33,00

Application

Machining across centre line

Machining across centre line



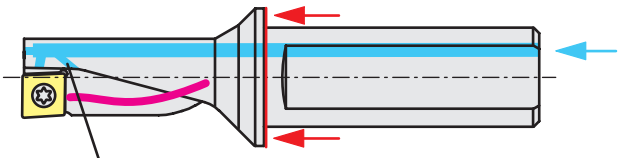
Situation

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

Solution

Use a right-hand EcoCut tool.

Chip booster/coolant pressure

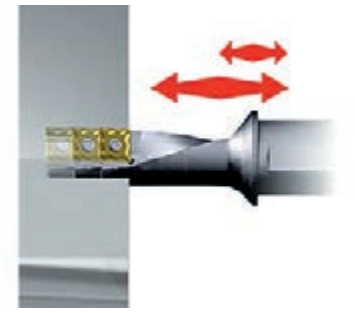


Internal coolant supply (chip booster)

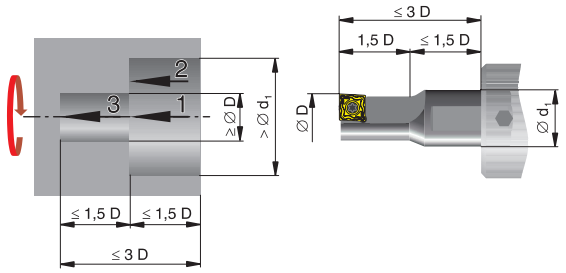
Helical chip pocket (stability)

Axial abutment face (stability)

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 evacuation 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.

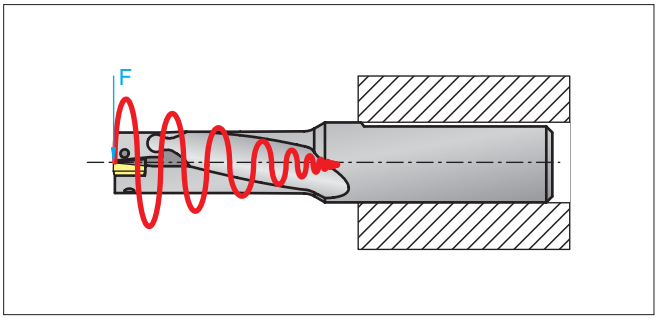
Application

Densimet

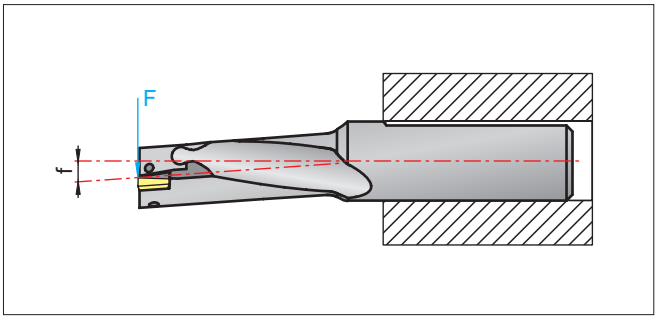
The advantages of DENSIMET compared to steel

The new generation of our EcoCut 3.0D series with the new designation offers maximised performance. The tools are classified with the new designation **ECC .. 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	Nominal tool Ø Modulus of elasticity (N/mm^2)	Density (g/mm^3)
Steel	210 000	7,85
DENSIMET	360 000	17,50



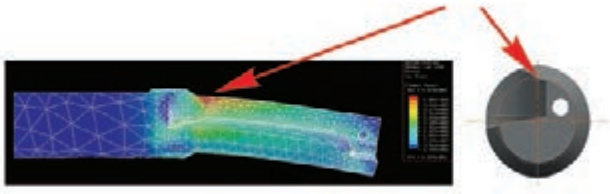
Vibration-damping



40% lower deflection than steel

The new chip flute design

Maximum tension



Version with straight chip flute

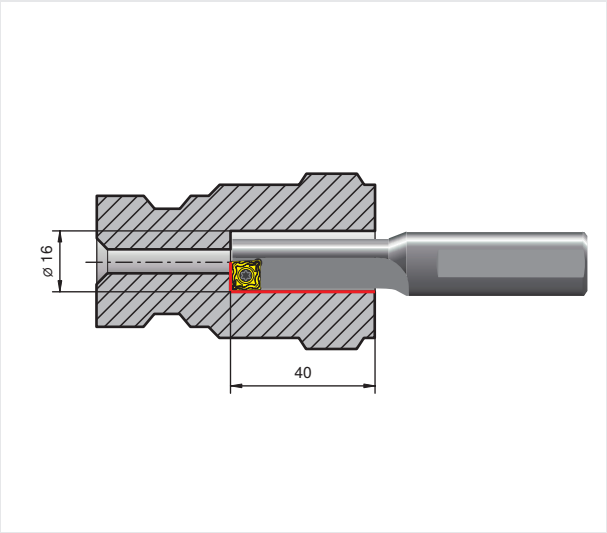
Version with helical chip flute

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

	Material	Type, description	Key size
	11206195	10002494/TORX 08IP F	T08IP
	11488748	10007404/TORX 07IP F	T07IP
	11843205	10014921/TORX 06IP F	T06IP
	11843208	10014922/TORX 09IP F	T09IP
	8095012000	SD-T15IP-80mm	T15IP
	8095012100	SD-T20IP-100mm	T20IP

	Material	Type, description	l [mm]	Thread size	Key size
	310720	7897990/M8X1X8 DIN913	8.0	M8	SW4
	11227305	M3,0x7,0-09IP/10003007	7.0	M3,0	T09IP
	11610311	M3,5X8,6-15IP/10008749	8.6	M3,5	T15IP
	11684214	M2,2x5,0-07IP/10009244	5.0	M2,2	T07IP
	11684216	M2,5x6,0-08IP/10009243	6.0	M2,5	T08IP
	11801441	M4,5X10,5-20IP/10013040	10.5	M4,5	T20IP
	11807480	M2,0x4,3-06IP/10013332	4.3	M2,0	T06IP
	11807484	M1,8x3,6-06IP/10013338	3.6	M1,8	T06IP

Machining example



Technical data

Work piece	bush
Material	C45 ANSI 1045
Tensile strength	730 - 900 N/mm^2
Tool	ECC 16L-3.0D 08 H
Insert	XCNT 080304EN CTCP435
Competitor	2 tools

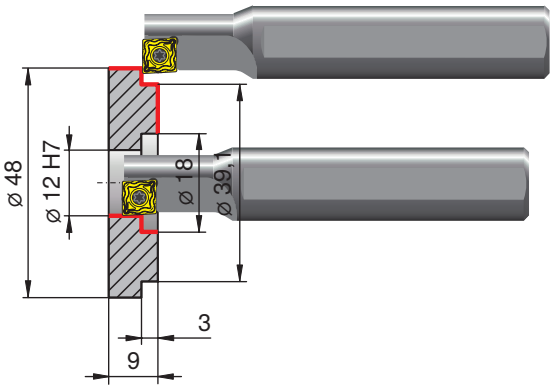
		Drilling	
V_c	[m/min]	176	
f	[mm]	0.06	
a_p	[Ø mm]	16	

Criteria

- Deep hole with 90° shoulder applying only one tool

Result

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



Technical data

Work piece	flange
Material	16 MnCr5 / 1.7131 ANSI 5115
Tensile strength	800 - 900 N/mm^2
Tool	ECC 12L-1.5D 06
Insert	XCNT 060204EN CTCP435
Competitor	3 tools

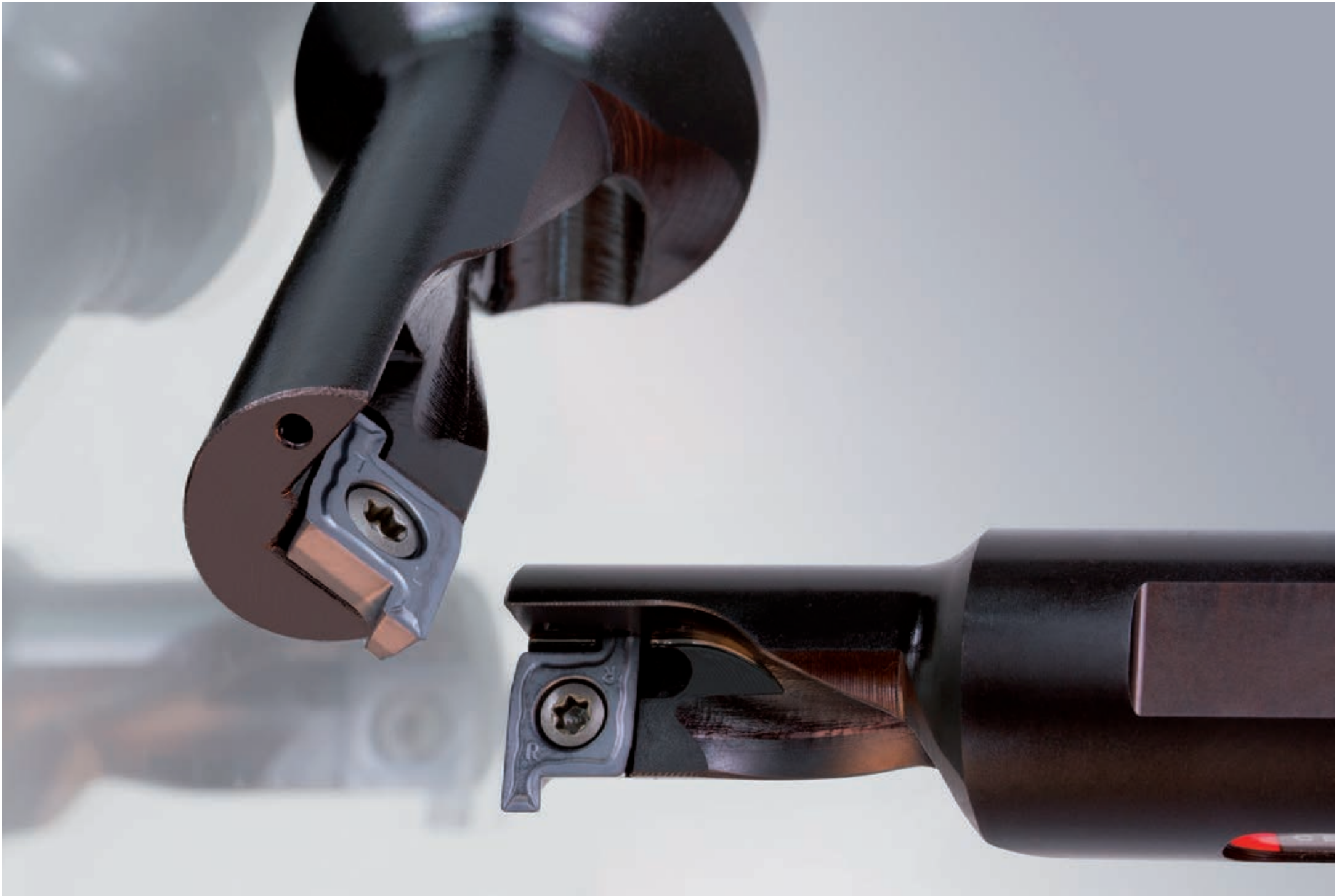
		Drilling	Boring	Face turning	External turning
V_c	[m/min]	150	150	200	150
f	[mm]	0.03	0.1	0.1	0.1

Criteria

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

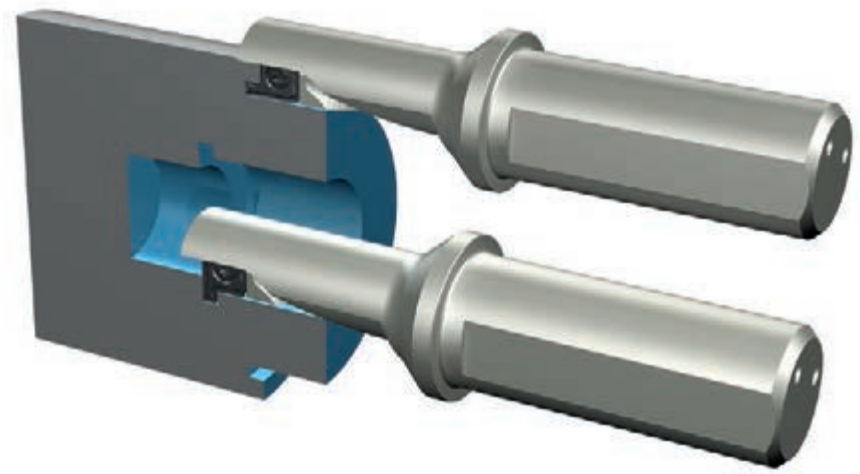
Result

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



Drilling, turning, parting and grooving with only one tool

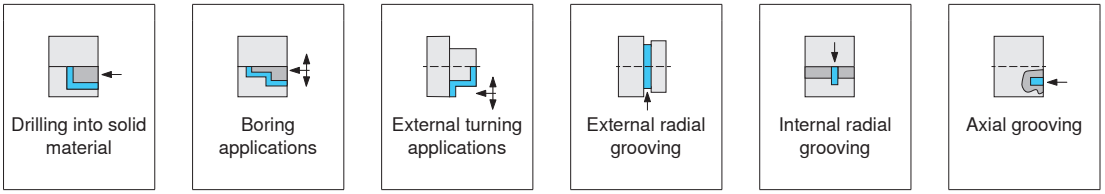
- The ProfileMaster is excellently suited for profiles that are so complex that they can normally only be produced with the use of several tools
- In addition, it helps free up valuable positions on the machine and minimise the need to change tools
- Thanks to the Masterfinish effect, the ProfileMaster produces an excellent surface finish in the shortest possible time



Material groups

P	●
M	●
K	
N	○
S	●
H	

Possible applications



Detailed information

Diameter / length ratio	Ø range	Inserts
1,5 x D 2,25 x D	Ø 10 - 32 mm	PM 10.. .. PM 32..

CERATIZIT designation system

PM 25 R G 35 30 04 - M20

1	2	3	4	5	6	7	8

1
ProfileMaster

2
Nominal diameter [mm]

3
Cutting direction

4
Version

5
Parting and grooving width [$^{mm}/_{10}$]

6
Parting and grooving depth [$^{mm}/_{10}$]

7
Corner radius

8
Chip groove

PMC 25 R - 2.25D

1	2	3	4

1
ProfileMaster

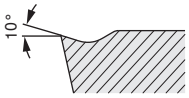
2
Nominal diameter [mm]

3
Cutting direction

4
Maximum drilling depth,
for example: 3.0 x diameter

-M20

- Positive geometry
- Universal application
- Small to medium feed rates



f [mm]	Machining conditions		
	CTC1435	**CTC1435**	**CTP2440**
	CTC1435	**CTP2440**	**CTP2440**
	CTC1435	CTC1435	CTC1435
0,05 - 0,25			
	CTP2440		

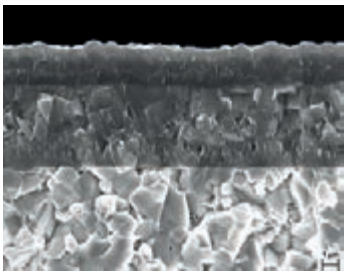
Grade overview

Grade designation	Standard designation ISO	Standard designation ANSI	Cutting material	Application range 01 05 10 15 20 25 30 35 40 45 50	P Steel	M Stainless	K Cast iron	N Non-ferrous metals	S Heat-resistant	H Hard materials
CTC1435	HC-P35	C6	C		●					
	HC-M30	-	C			○				
	HC-K20	C2	C				○			
CTP2440	HC-M35	-	P			●				
	HC-P40	C5	P		●					
	HC-N25	C2	P					○		
	HC-S30	-	P						○	

● Main application

○ Extended application

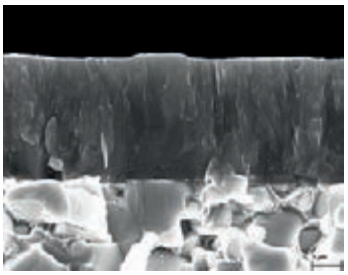
CTC1435	HC-P35 | HC-M30 | HC-K20	● ○ ○



Specification:
Composition: Co 9.6%; mixed carbide 7.4%; WC balance | Grain size: 1 - 2 μm | Hardness: HV_{30} 1400 | Coating specification: CVD TiCN-Al_2O_3 multi-layer

Recommended application:
First choice for steel and cast iron materials.

CTP2440	HC-M35 | HC-P40 | HC-N25 | HC-S30	● ● ○ ○

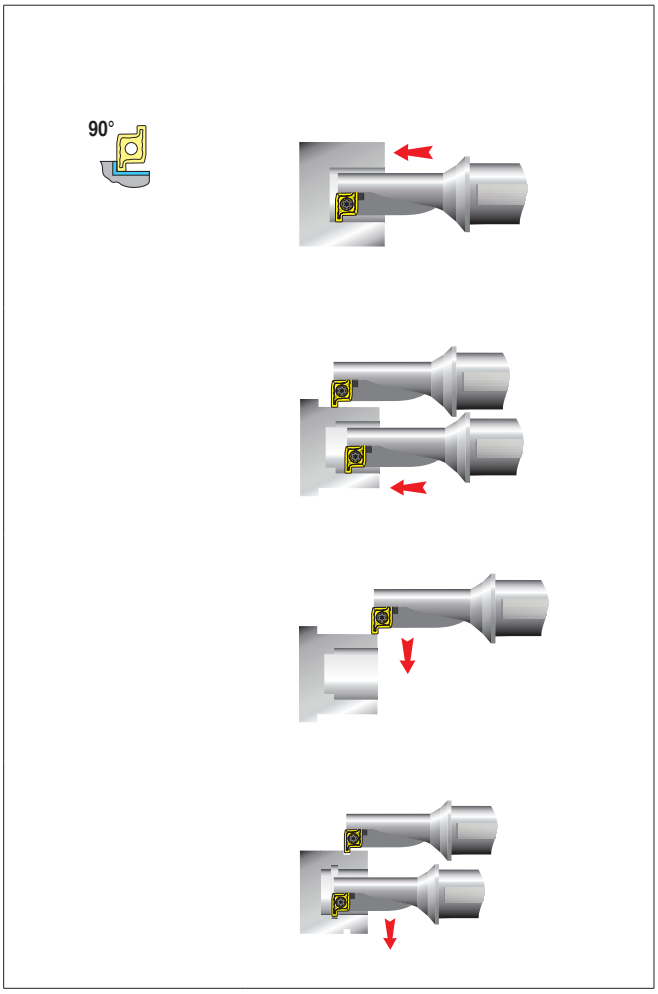


Specification:
Composition: Co 9.6%; mixed carbides 7.4%; WC balance | Grain size: 1 - 2 μm | Hardness: HV_{30} 1400 | Coating specification: PVD TiAlN

Recommended application:
First choice for stainless and steel materials under unstable conditions.

ProfileMaster

Machining methods



Machining methods - radial application 90°

Drilling into solid material with flat bottom holes

Boring applications

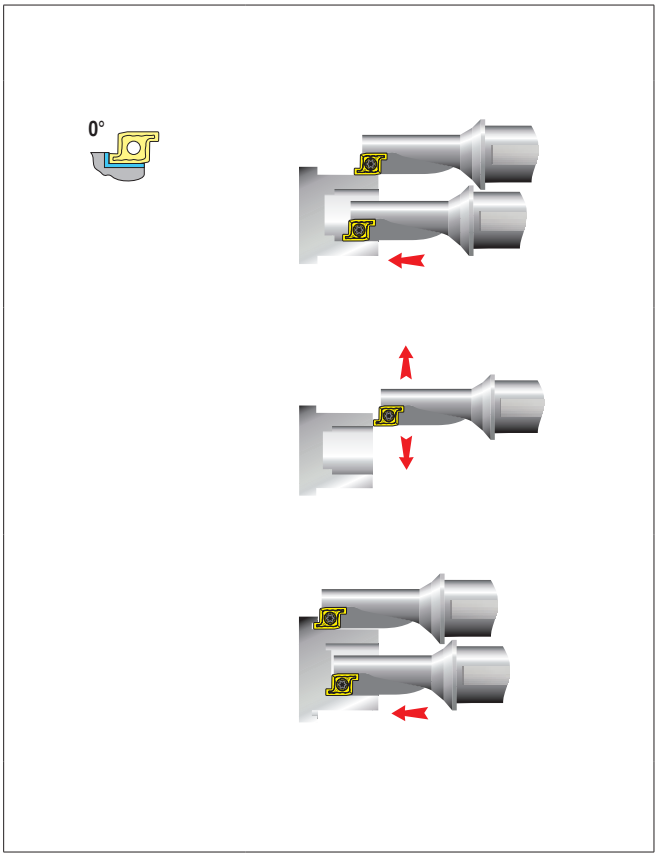
External turning applications

Internal turning applications

Turning of face profiles

External radial grooving

Internal radial grooving



Machining methods - radial application 0°

External turning applications

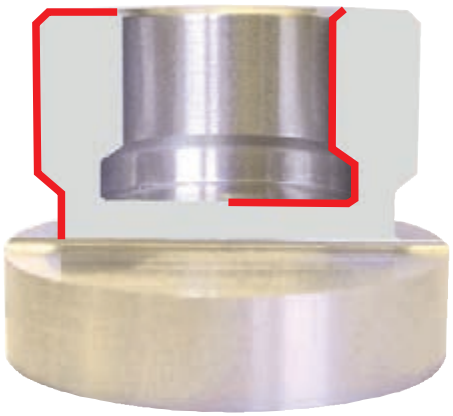
Boring applications

Turning of face profiles

External radial grooving

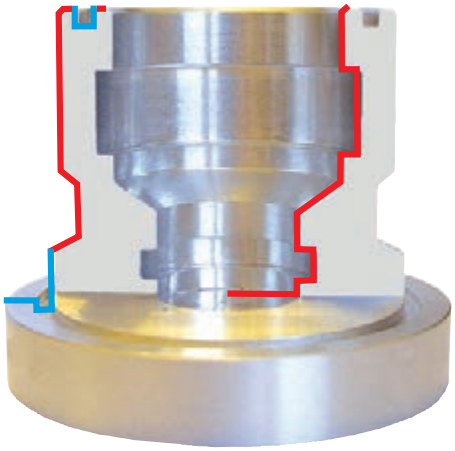
Internal radial grooving

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



right-hand tool

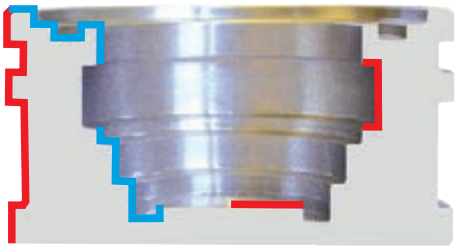
● right-hand insert



right-hand tool

● left-hand insert

● right-hand insert



left-hand tool

right-hand tool

● right-hand insert

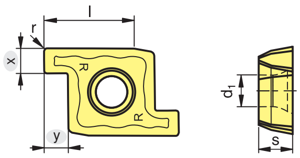
● right-hand insert

ProfileMaster

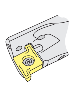
PM..

	CTC1435	CTP2440
P	●	●
M	○	●
K	○	
N		○
S		○
H		

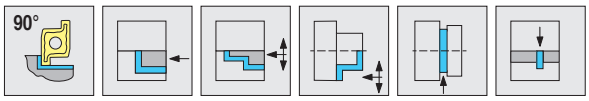
	Designation	CTC1435	CTP2440	x [mm]	y [mm]	l [mm]	s [mm]	d_1 [mm]	r [mm]
-M20	PM 10LG 201504-M20	●	●	2.00	1.50	5.00	2.10	2.10	0.40
	PM 10RG 201504-M20	●	●	2.00	1.50	5.00	2.10	2.10	0.40
	PM 12LG 201804-M20	●	●	2.00	1.80	6.00	2.30	2.50	0.40
	PM 12RG 201804-M20	●	●	2.00	1.80	6.00	2.30	2.50	0.40
	PM 16LG 252004-M20	●	●	2.50	2.00	8.00	2.80	3.40	0.40
	PM 16RG 252004-M20	●	●	2.50	2.00	8.00	2.80	3.40	0.40
	PM 20LG 302504-M20	●	●	3.00	2.50	10.00	3.80	4.10	0.40
	PM 20RG 302504-M20	●	●	3.00	2.50	10.00	3.80	4.10	0.40
	PM 25LG 353004-M20	●	●	3.50	3.00	12.50	4.50	4.40	0.40
	PM 25RG 353004-M20	●	●	3.50	3.00	12.50	4.50	4.40	0.40
	PM 32LG 404004-M20	●	●	4.00	4.00	16.00	5.50	6.00	0.40
	PM 32RG 404004-M20	●	●	4.00	4.00	16.00	5.50	6.00	0.40

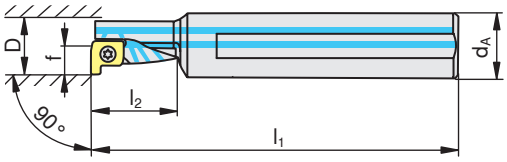


E55-E56



E50-E53





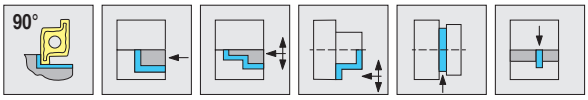
D_{min} [mm]	Type, description	LNR	d_A [mm]	l_1 [mm]	l_2 [mm]	f [mm]	[Nm]		
10	PM 10R-1.5D	R	12	80	15	5	0.4	PM 10..	E01
10	PM 10L-1.5D	L	12	80	15	5	0.4	PM 10..	E01
12	PM 12R-1.5D	R	16	90	18	6	1.0	PM 12..	E02
12	PM 12L-1.5D	L	16	90	18	6	1.0	PM 12..	E02
16	PM 16R-1.5D	R	20	125	24	8	2.2	PM 16..	E03
16	PM 16L-1.5D	L	20	125	24	8	2.2	PM 16..	E03
20	PM 20R-1.5D	R	25	150	30	10	3.2	PM 20..	E04
20	PM 20L-1.5D	L	25	150	30	10	3.2	PM 20..	E04
25	PM 25R-1.5D	R	32	180	37.5	12.5	3.2	PM 25..	E05
25	PM 25L-1.5D	L	32	180	37.5	12.5	3.2	PM 25..	E05
32	PM 32R-1.5D	R	40	200	48	16	5.0	PM 32..	E06
32	PM 32L-1.5D	L	40	200	48	16	5.0	PM 32..	E06

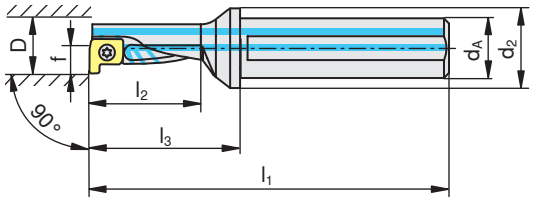
E01	11161940	8095010000
E02	169858	8095010100
E03	169857	8095010200
E04	54976	8095010500
E05	165795	8095010500
E06	11185832	8095010600

E57-E59 E68 E49

ProfileMaster

90° / 2.25D

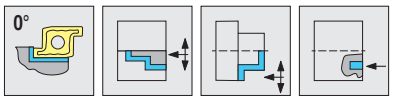


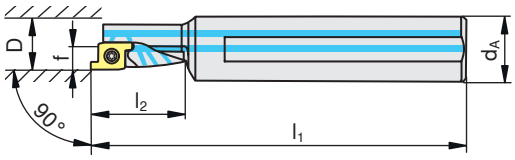


D_{min} [mm]	Type, description	LNR	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	[Nm]		
10	PM 10R-2.25D	R	12	16	72.4	22.5	30.4	5	0.4	PM 10..	E01
10	PM 10L-2.25D	L	12	16	72.4	22.5	30.4	5	0.4	PM 10..	E01
12	PM 12R-2.25D	R	16	20	78	27	33.0	6	1.0	PM 12..	E02
12	PM 12L-2.25D	L	16	20	78	27	33.0	6	1.0	PM 12..	E02
16	PM 16R-2.25D	R	20	25	96.5	36	46.5	8	2.2	PM 16..	E03
16	PM 16L-2.25D	L	20	25	96.5	36	46.5	8	2.2	PM 16..	E03
20	PM 20R-2.25D	R	25	32	111	45	55.0	10	3.2	PM 20..	E04
20	PM 20L-2.25D	L	25	32	111	45	55.0	10	3.2	PM 20..	E04
25	PM 25R-2.25D	R	32	40	132.6	56.3	72.6	12.5	3.2	PM 25..	E05
25	PM 25L-2.25D	L	32	40	132.6	56.3	72.6	12.5	3.2	PM 25..	E05
32	PM 32R-2.25D	R	40	50	158	72	88.0	16	5.0	PM 32..	E06
32	PM 32L-2.25D	L	40	50	158	72	88.0	16	5.0	PM 32..	E06

E01	11161940	8095010000
E02	169858	8095010100
E03	169857	8095010200
E04	54976	8095010500
E05	165795	8095010500
E06	11185832	8095010600

E57-E59 E68 E49





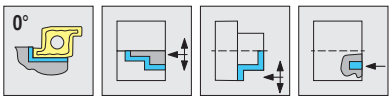
D_{min} [mm]	Type, description	LNR	d_A [mm]	l_1 [mm]	l_2 [mm]	f [mm]	[Nm]		
16	PM 16R-1.5D	R	20	127.3	26.3	5.70	2.2	PM 16..	E01
16	PM 16L-1.5D	L	20	127.3	26.3	5.70	2.2	PM 16..	E01
20	PM 20R-1.5D	R	25	152.8	32.8	7.20	3.2	PM 20..	E02
20	PM 20L-1.5D	L	25	152.8	32.8	7.20	3.2	PM 20..	E02
25	PM 25R-1.5D	R	32	183.3	40.8	9.20	3.2	PM 25..	E03
25	PM 25L-1.5D	L	32	183.3	40.8	9.20	3.2	PM 25..	E03
32	PM 32R-1.5D	R	40	204.3	52.3	11.70	5.0	PM 32..	E04
32	PM 32L-1.5D	L	40	204.3	52.3	11.70	5.0	PM 32..	E04

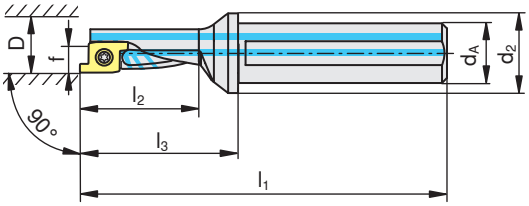
E01	169857	8095010200
E02	54976	8095010500
E03	165795	8095010500
E04	11185832	8095010600

E60-E61 E68 E49

ProfileMaster

0° / 2.25D





D_{min} [mm]	Type, description	LNR	d_A [mm]	d_2 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	f [mm]	[Nm]		
16	PM 16R-2.25D	R	20	25	98.8	38.3	48.8	5.70	2.2	PM 16..	E01
16	PM 16L-2.25D	L	20	25	98.8	38.3	48.8	5.70	2.2	PM 16..	E01
20	PM 20R-2.25D	R	25	32	113.8	47.8	57.8	7.20	3.2	PM 20..	E02
20	PM 20L-2.25D	L	25	32	113.8	47.8	57.8	7.20	3.2	PM 20..	E02
25	PM 25R-2.25D	R	32	40	135.9	59.6	75.9	9.20	3.2	PM 25..	E03
25	PM 25L-2.25D	L	32	40	135.9	59.6	75.9	9.20	3.2	PM 25..	E03
32	PM 32R-2.25D	R	40	50	162.3	76.3	92.3	11.70	5.0	PM 32..	E04
32	PM 32L-2.25D	L	40	50	162.3	76.3	92.3	11.70	5.0	PM 32..	E04

E01	169857	8095010200
E02	54976	8095010500
E03	165795	8095010500
E04	11185832	8095010600

E60-E61 E68 E49

Cutting data

Grades, material

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
P	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
	Stainless steel	annealed	ferritic / martensitic	12	200
		tempered	martensitic	13	325
		heat-treated	ferritic / martensitic	13	200
M	Stainless steel	quenched	austenitic	14	180
		quenched	ferritic / austenitic (Duplex)	14	230 - 260
		hardened	austenitc, precipitation hardened (PH)	14	330
K	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	250
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12 % Si	23	75
		hardened	< 12 % Si	24	90
		non hardened	> 12 % Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	(110)
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	28	100
	Non-metallic materials		thermosetting plastics	29	–
			fibre-reinforced plastics	29	–
			hard rubber	30	–
S	Heat-resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	(350)
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	(320)
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		41	55 HRC

* R_m = ultimate tensile strength, measured in MPa

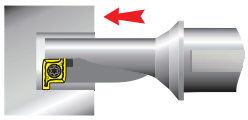
CTC1435 v_c [m/min]	CTP2440 v_c [m/min]
140 - 280	120 - 250
100 - 200	80 - 180
80 - 180	60 - 150
100 - 200	80 - 180
80 - 160	60 - 150
70 - 140	60 - 120
100 - 180	80 - 160
60 - 140	50 - 120
100 - 200	50 - 200
80 - 150	50 - 150
100 - 200	50 - 200
100 - 180	50 - 180
	50 - 100
	50 - 80
120 - 250	
120 - 250	
110 - 250	
110 - 250	
100 - 250	
100 - 250	
	100 - 500
	100 - 300
	100 - 500
	100 - 300
	100 - 200
	100 - 500
	100 - 500
	100 - 300
	100 - 300
	80 - 180
	60 - 150
	100 - 250
	20 - 50
	20 - 40
	15 - 25
	10 - 20
	10 - 20
	50 - 120
	30 - 50

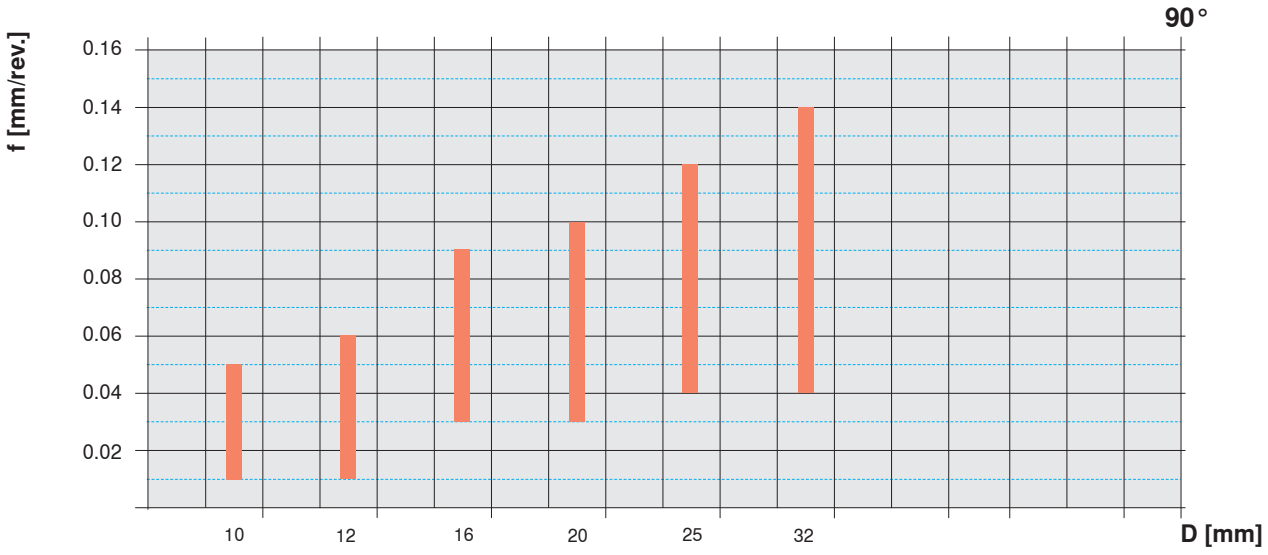
The cutting data are non-binding indications for the operator. It is recommended to adapt them to the current conditions.

ProfileMaster

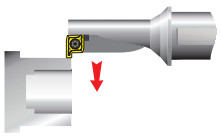
90° depth of cut/feed rate

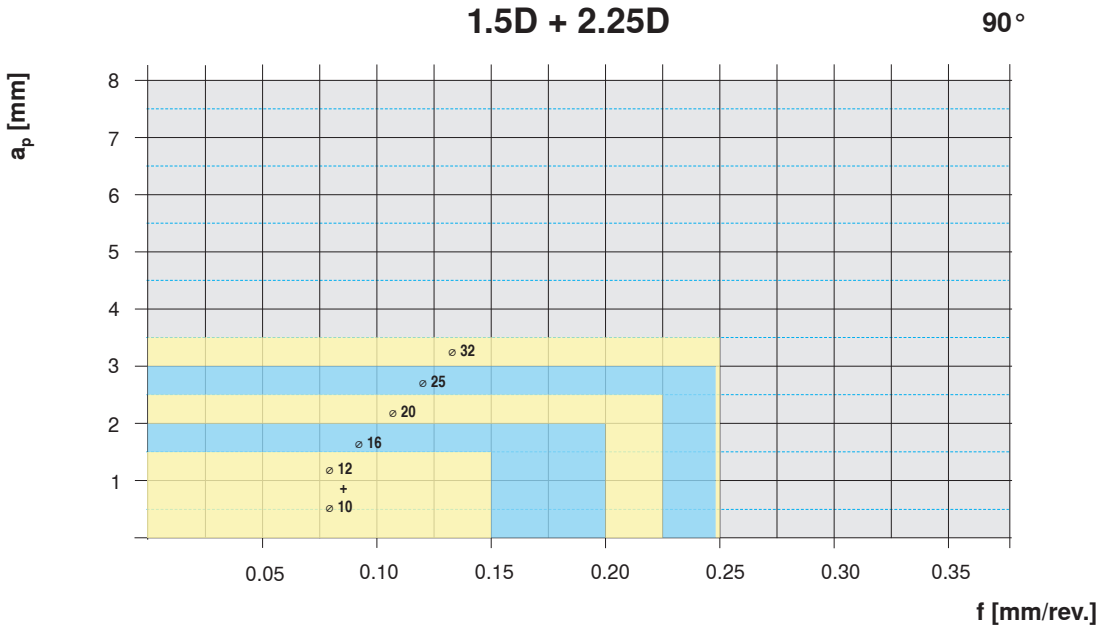
Drilling



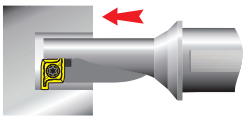


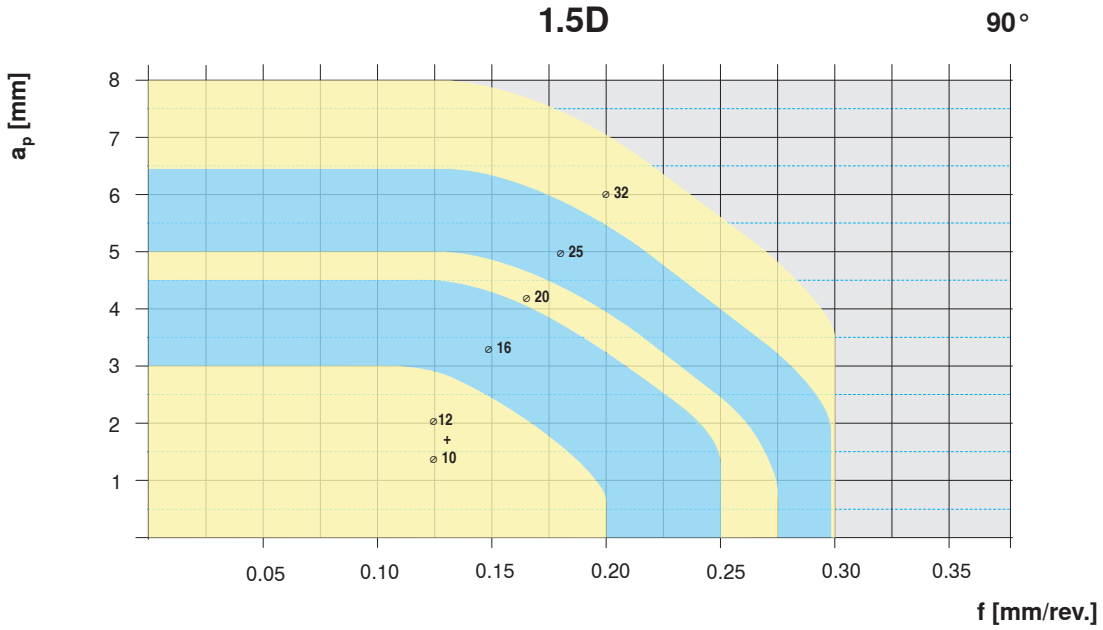
Face turning



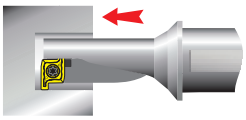


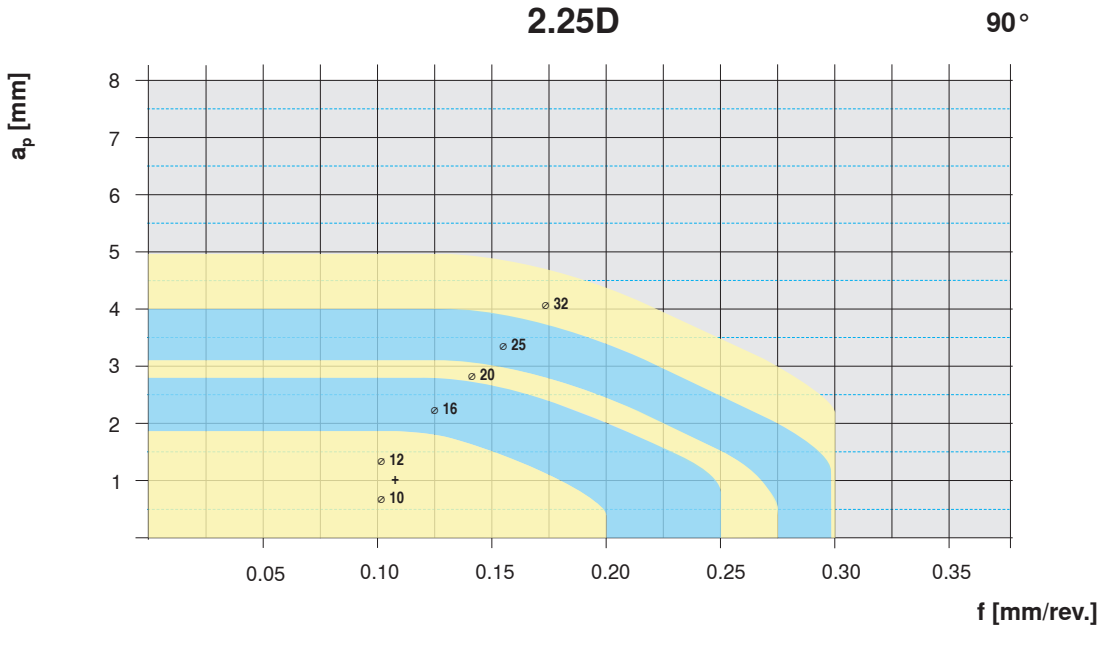
Longitudinal turning





Longitudinal turning

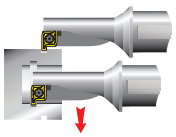


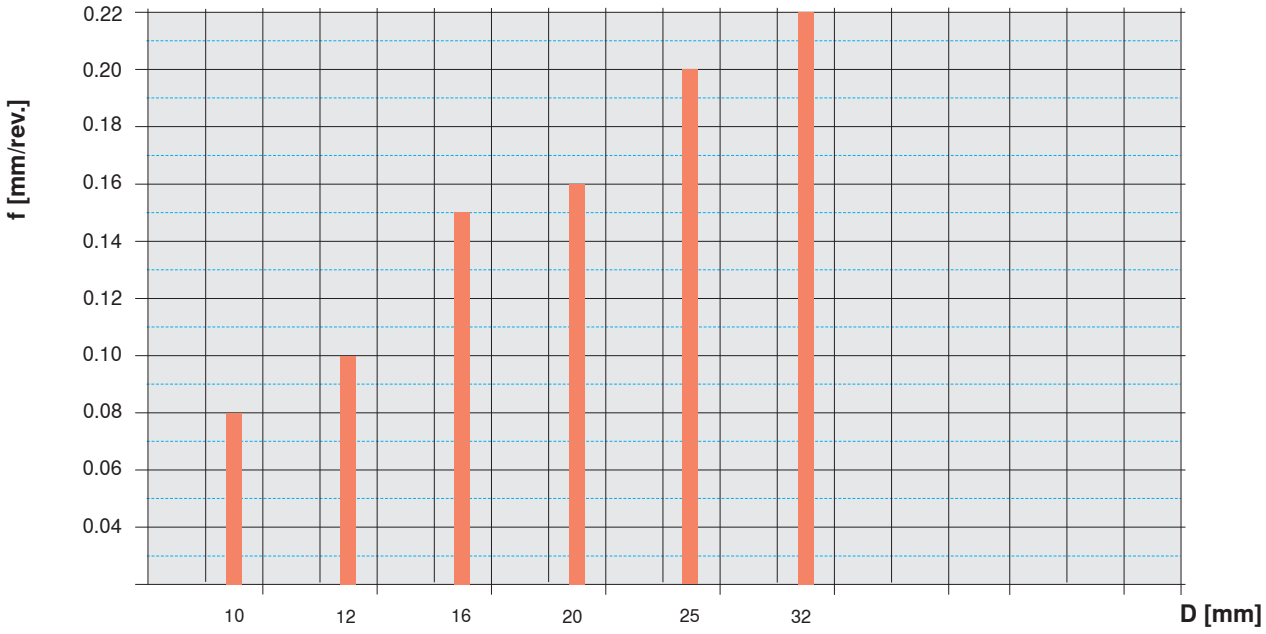


ProfileMaster

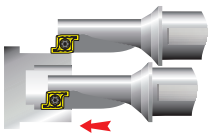
90° depth of cut/feed rate

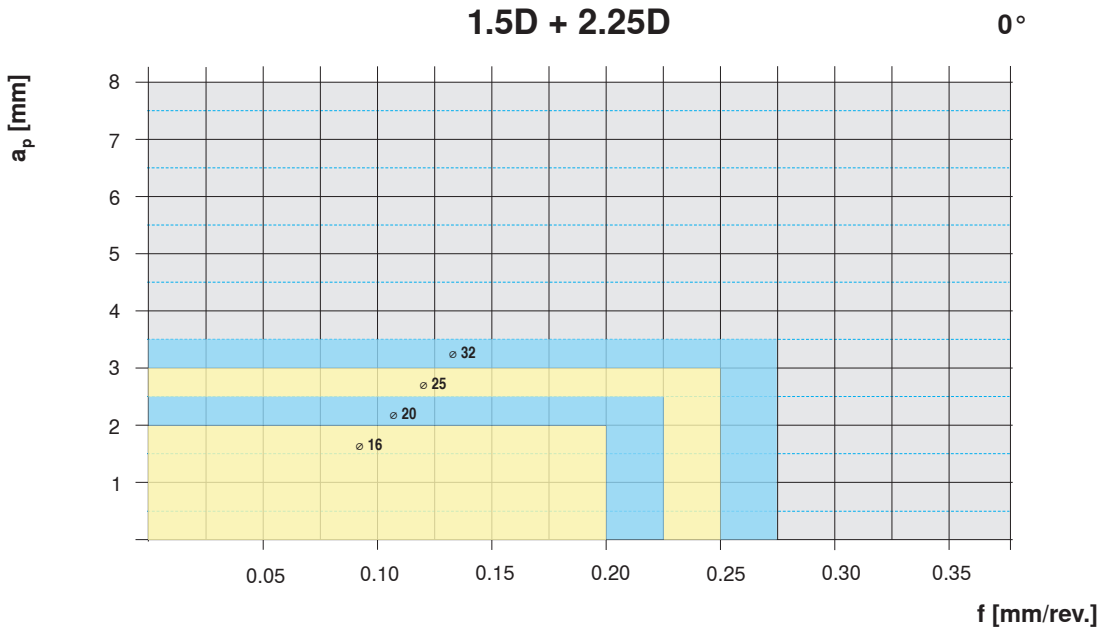
Radial grooving - internal + external



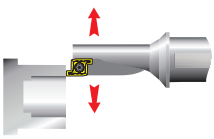


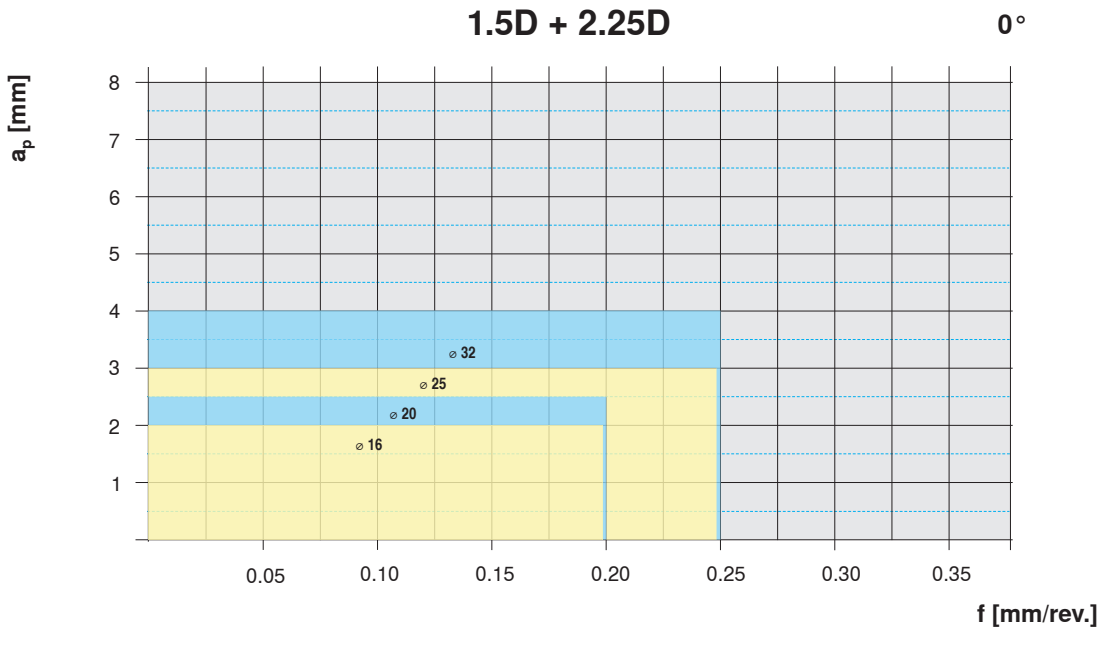
Longitudinal turning





Face turning

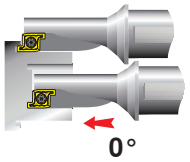


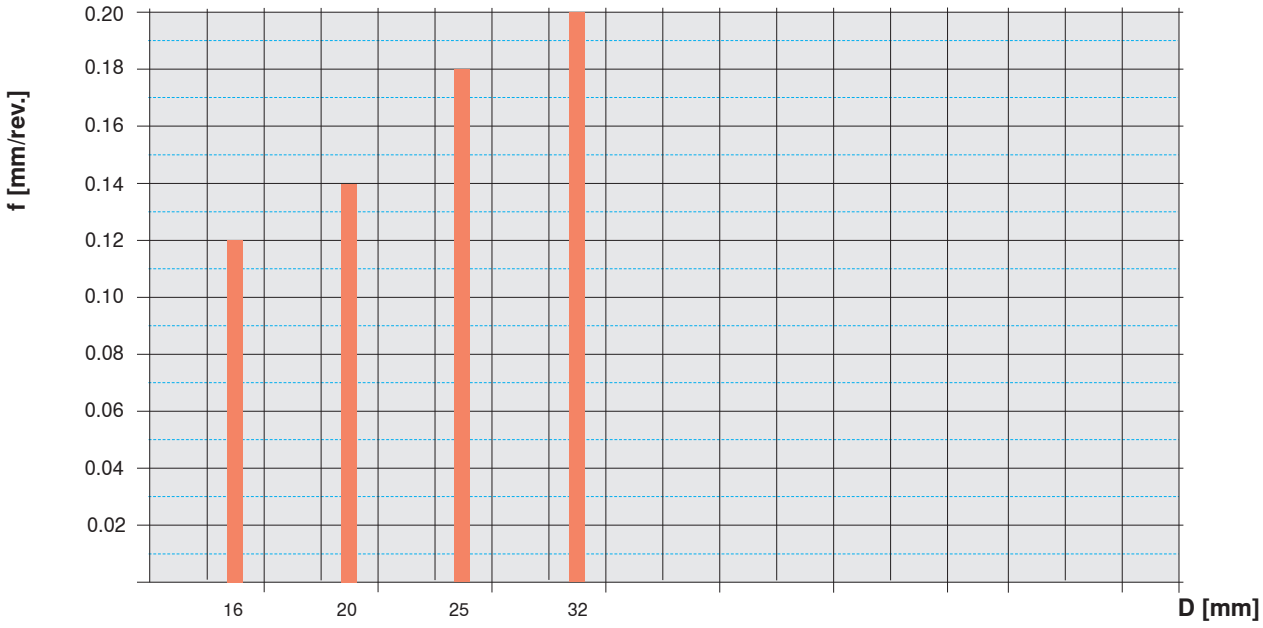


ProfileMaster

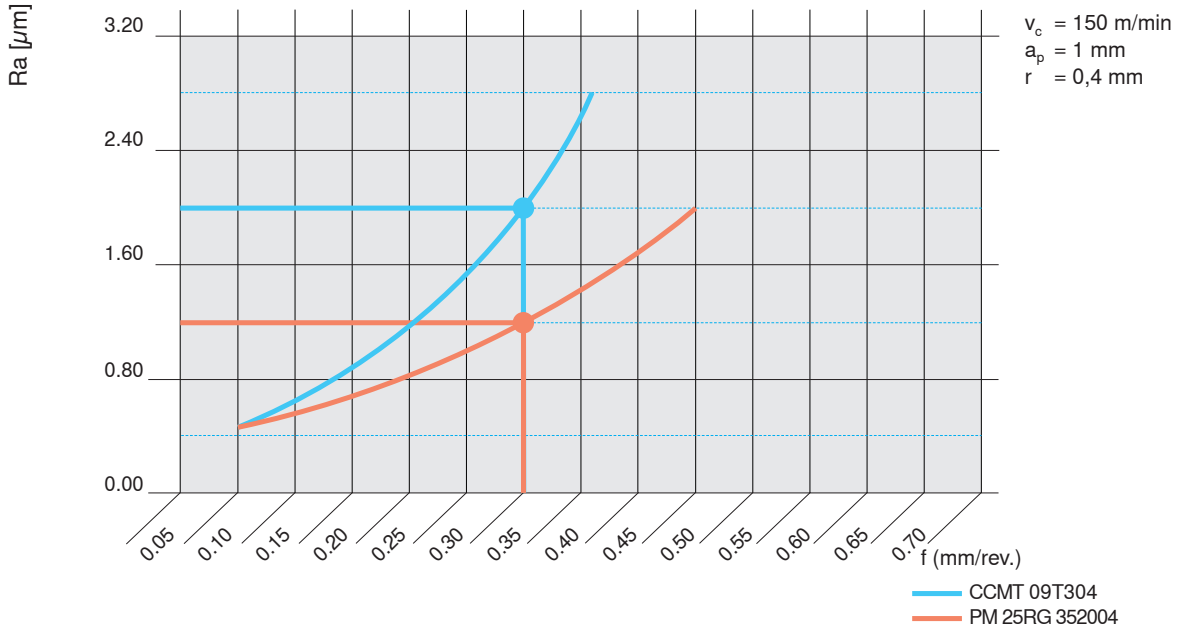
0° depth of cut/feed rate

Axial grooving - internal + external





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



ProfileMaster

Problems, corrective measures

Type of problem								Corrective measures	
Type of wear				Work piece problems		Chip 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	

⇧ raise, increase, large influence

⇧ raise, increase low influence

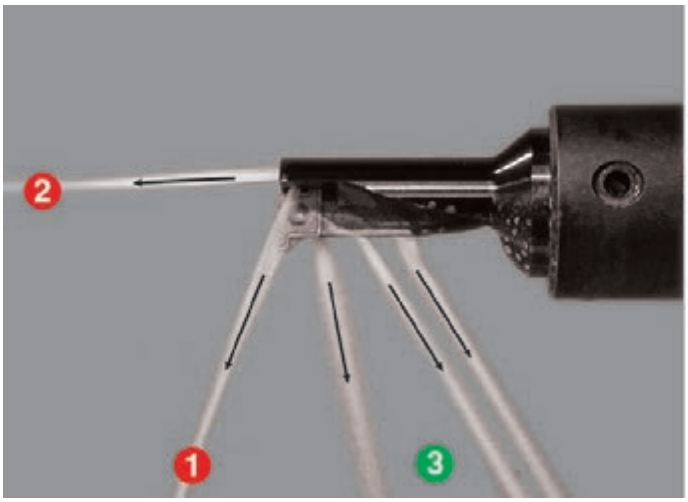
⇩ avoid, reduce large influence

⇩ avoid, reduce low influence

≈ check, optimise

▢ use

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



1 Cooling of the inserts

2 General coolant stream

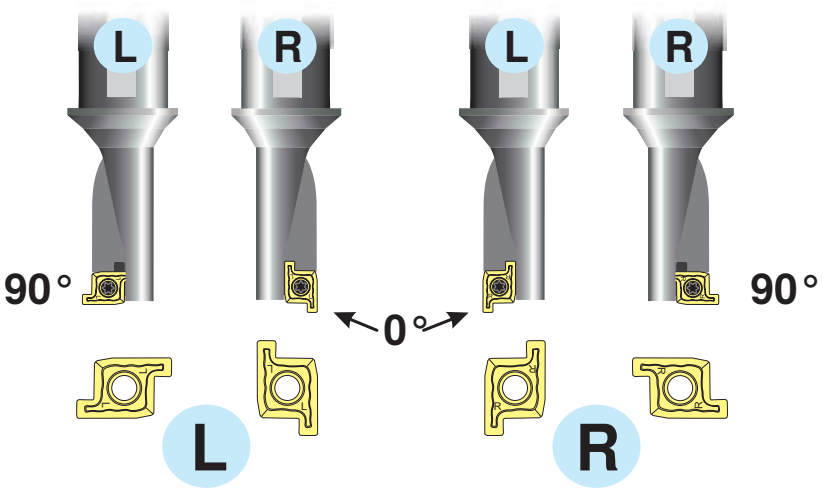
3 Chipbooster prevents chips from getting stuck between tool and work piece

⚠ 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

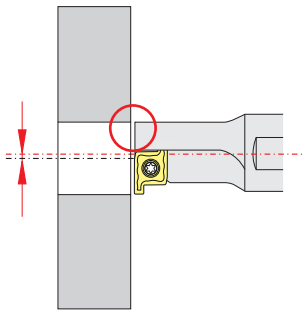
Application

Mounting of the insert

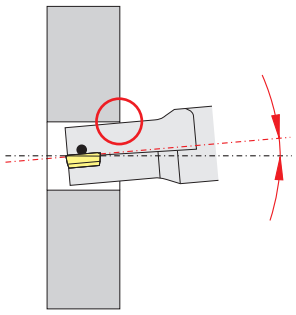


Axial displacement of the machine

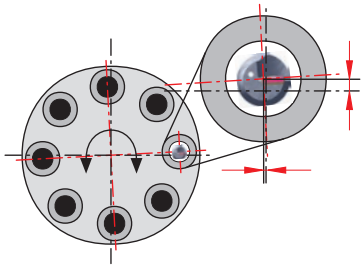
Displacement in x-direction



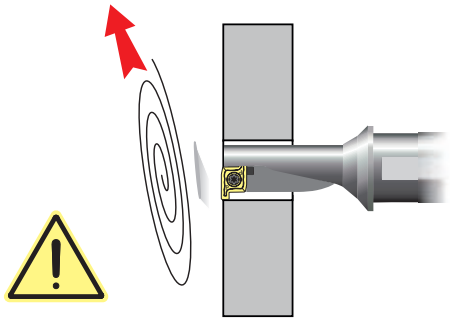
Angular error



Turret position error

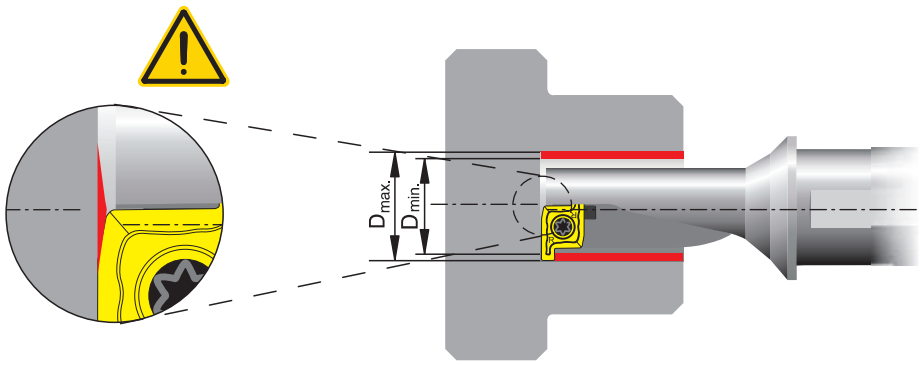


Through hole



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

Off-centre drilling



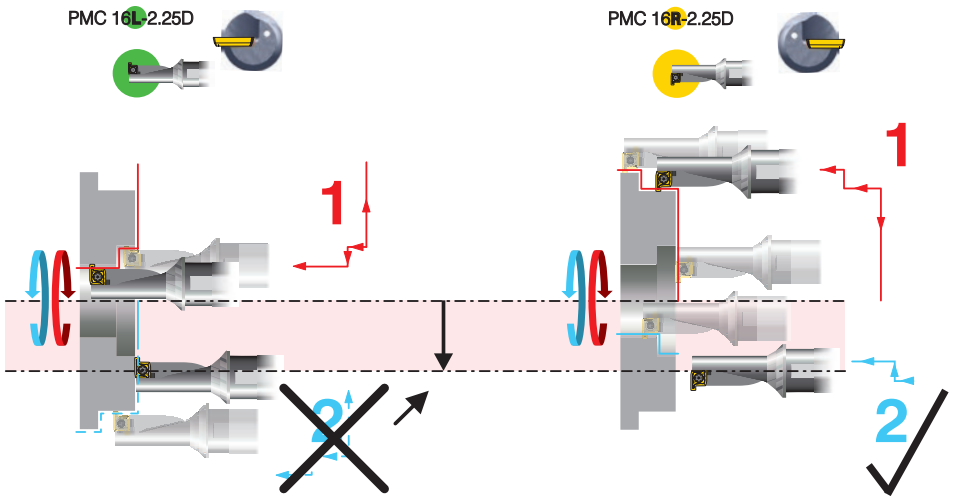
Due to the special construction of ProfileMaster tools and inserts off-centre drilling is possible. Thus desired devations from the tool's nominal diameter can be obtained (see table below).

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

Machining across centre line

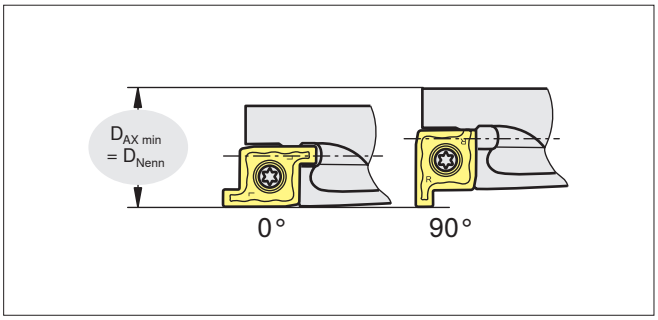
Situation:
In case of insufficient movement of the machine across the centre line the external diameter can not be machined with the same tool.

Solution:
Use a right-hand ProfileMaster tool.

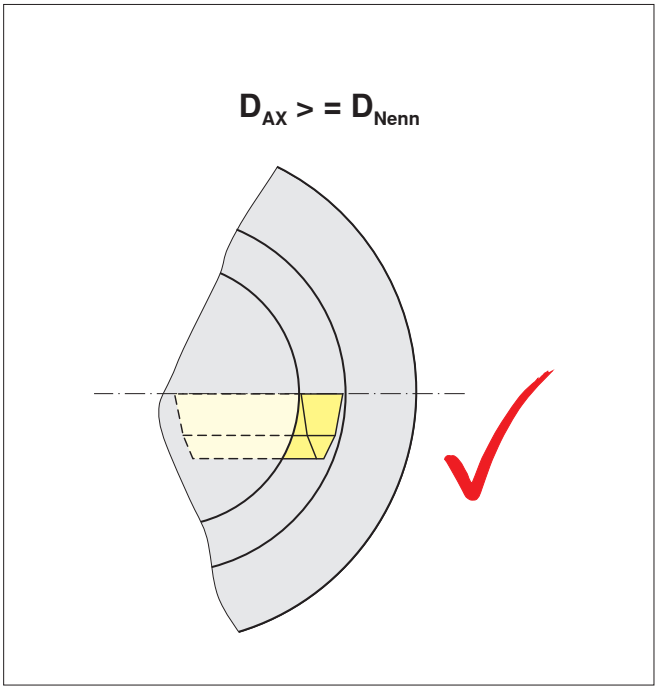


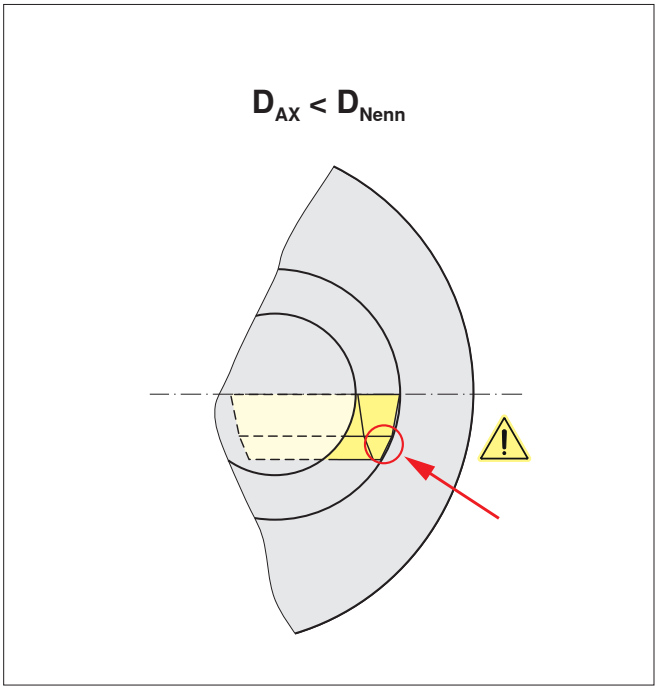
ProfileMaster

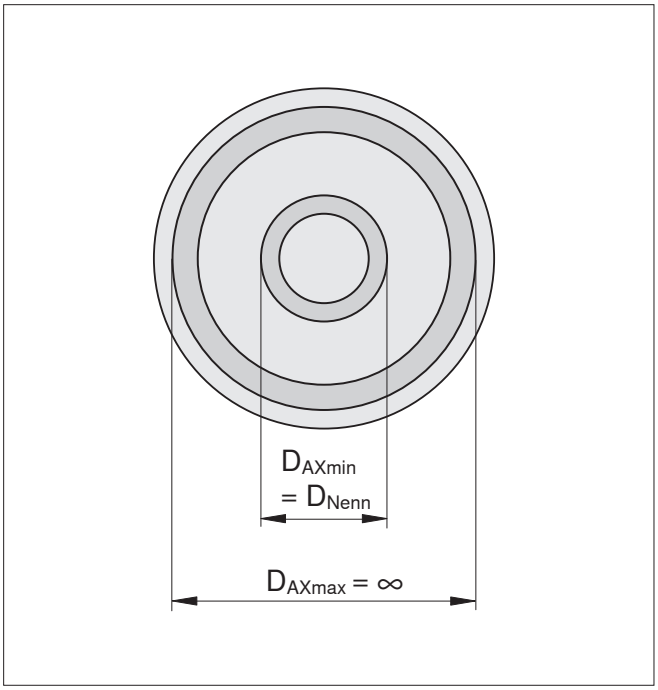
Axial grooving - application 0°



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





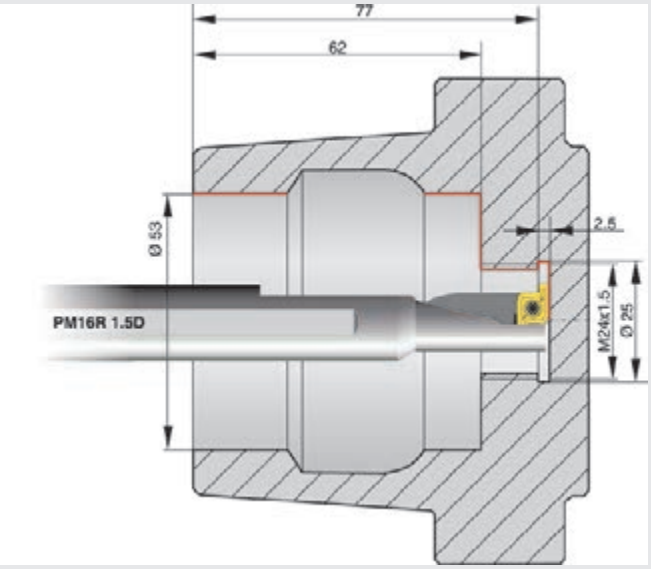


If the first cut is carried out with a diameter which is smaller than the nominal tool diameter D_{Nenn} (90° application), collision will result.

	Material	Type, description	Key size
	8095010000	SD-T06-60mm	T06
	8095010100	SD-T07-60mm	T07
	8095010200	SD-T08-60mm	T08
	8095010500	SD-T15-80mm	T15
	8095010600	SD-T20-100mm	T20

	Material	Type, description	l [mm]	Thread size	Key size
	11161940	10001230/M1,8X3,8/T06	3.8	M1,8	T6
	11185832	10001785/M5,0X10,8/T20	10.8	M5	T20
	165795	7883209/M3,5X8,6/T15	8.6	M3,5	T15
	169857	7883214/M3,0X5,7/T08	5.7	M3	T08
	169858	7883215/M2,2X4,0/T07	4	M2,2	T07
	54976	7722111/M3,5X7,2/T15	7.2	M3,5	T15

Machining example



Technical data

Work piece	HSK100 adapter
Material	1.2342 X38 CrMoV 5 1
Tensile strength	approx. 1100 N/mm^2
Tool	PM 16R-1.5D
Insert	PM 16RG 252004-M20 CTP2440
Competitor	2 tools

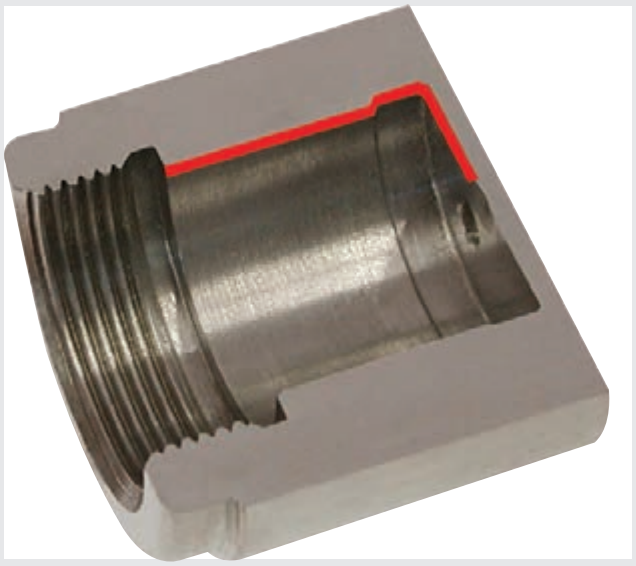
		CERATIZIT	
v_c	[m/min]	150	
f	[mm]	0.15	
a_p	[Ø mm]	1	

Criteria

- Problems due to lack of turret positions
- Optimisation of machining time

Result

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



Technical data

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

		CERATIZIT	Competitor
v_c	[m/min]	105	105
a_p	[mm]	0,03 - 5,0	0,3 - 5,0
$f_{turning}$	[mm]	0,15	0,1
$f_{grooving}$	[mm]	0,06	0,06

Criteria

- Increase in productivity
- Insufficient quality of groove surface

Result

- Machining time reduced by 50%
- Enhanced groove quality