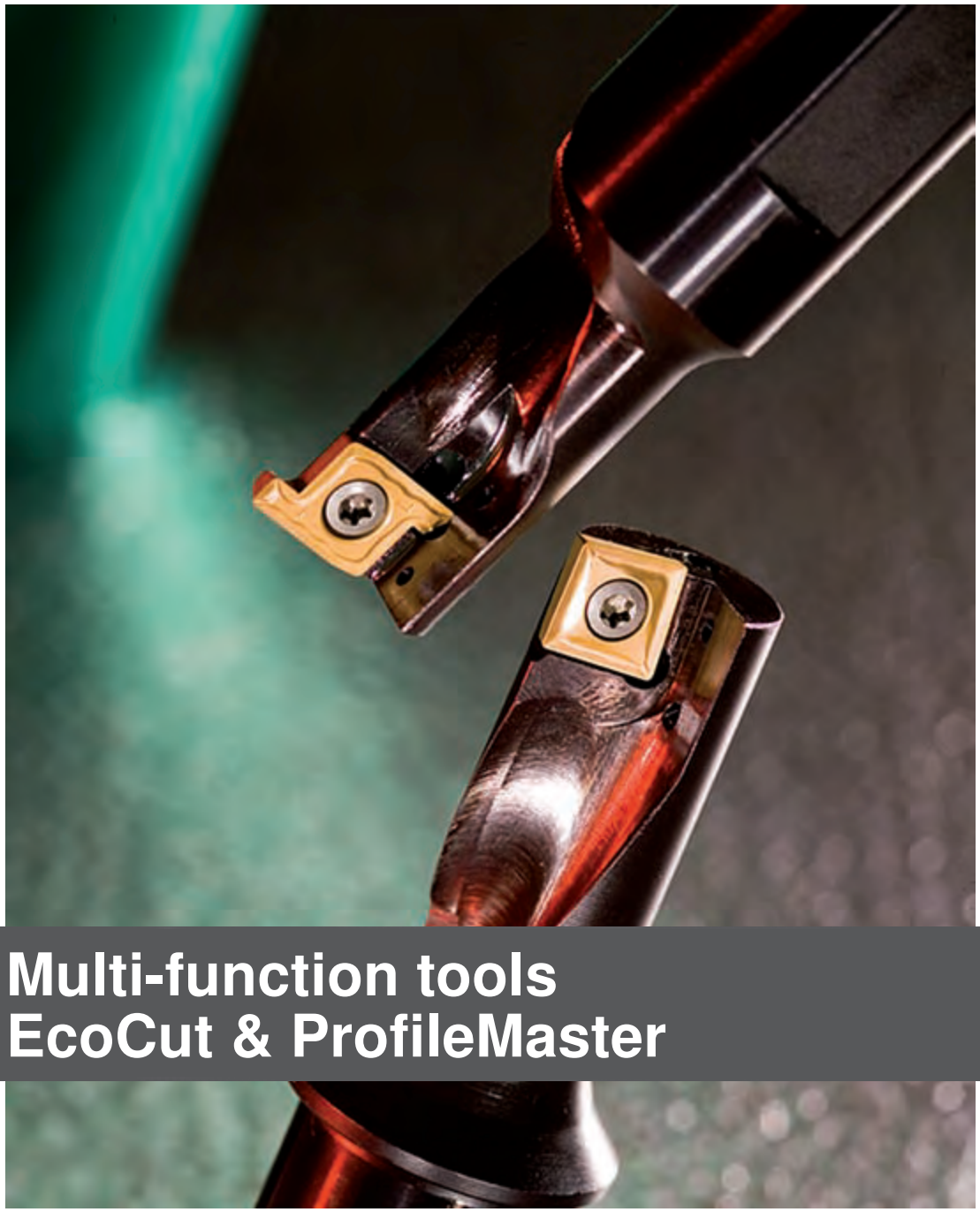
hard material matters

CERATIZIT

hard material matters



Multi-function tools
EcoCut & ProfileMaster

CERATIZIT – secrets of success

Secrets of success

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

Corporate values

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

Tailored cutting tool solutions

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

Contents

Introduction

Inserts, tools

Technical information

✓ 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

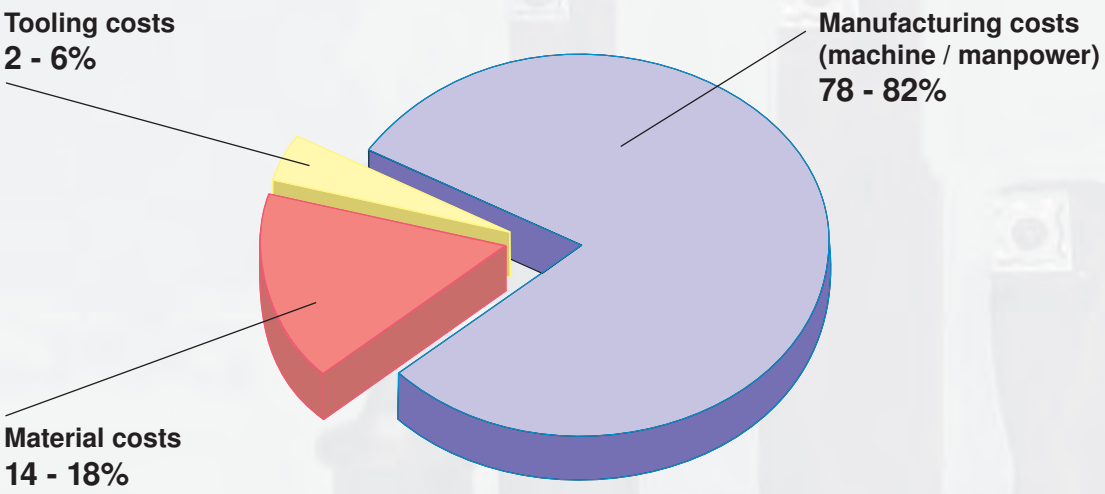
✓ Reduced stock-keeping
costs

✓ Produces a flat bottom
hole

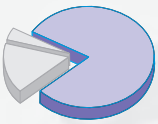
EcoCut / ProfileMaster
Productivity

Turn the cost screw together with CERATIZIT

Break-down of work piece costs

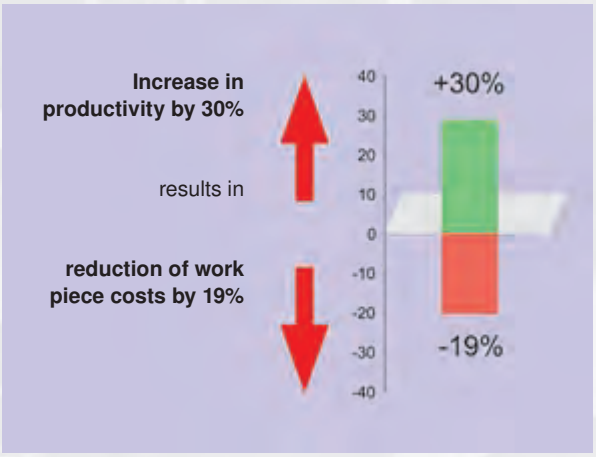


Increase in productivity (parts produced per time unit):

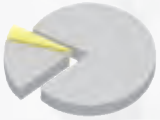


Due to improved utilization of the available machine capacity considerable cost reduction per work piece becomes possible.
In this context CERATIZIT EcoCut makes a decisive contribution through:

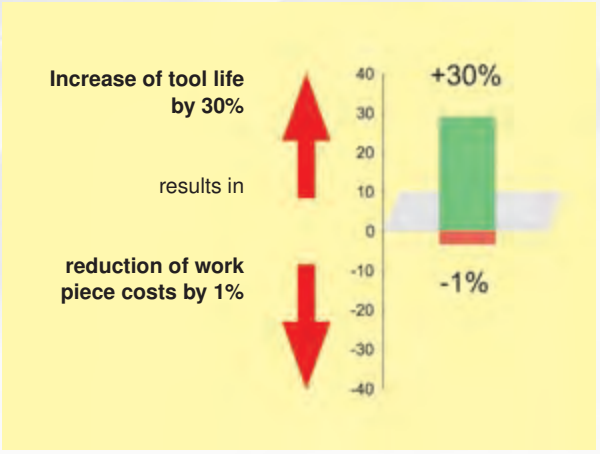
- Fewer tool changes
- Increased v_c
- Increased f
- Increased a_p



Increased tool life:



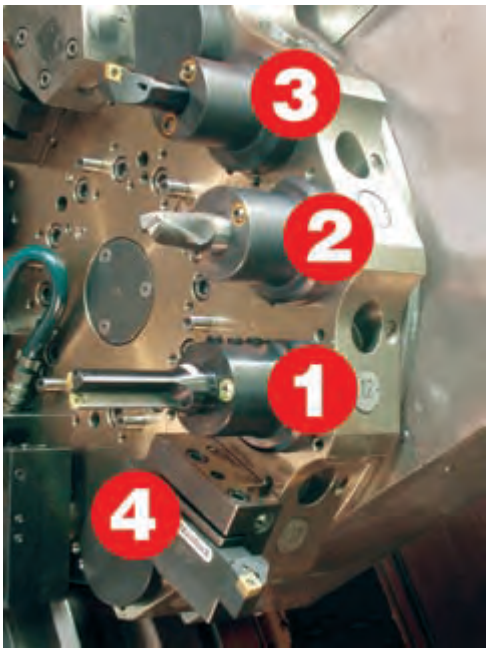
As the average tool costs amount to only 2 - 6% of the work piece costs, prolonging tool life typically can only reduce total costs minimally.

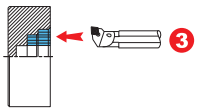


EcoCut

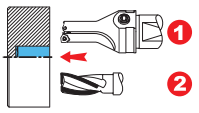
Four machining operations with only one tool

Conventional

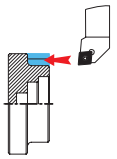




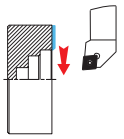
Internal turning applications



Drilling into solid material with flat bottom holes

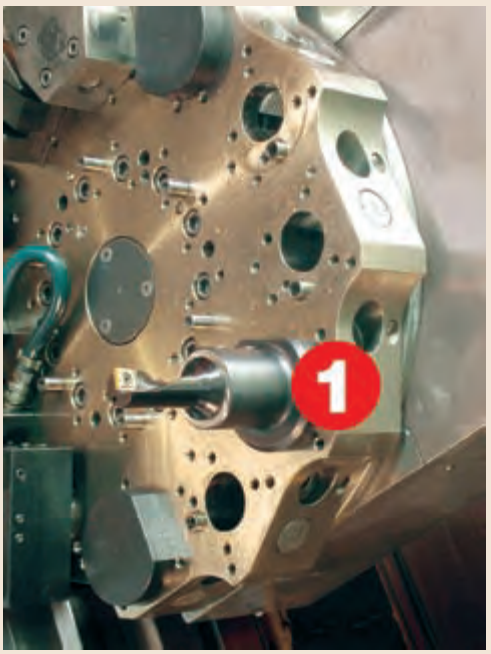


External turning applications

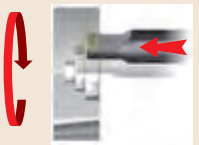


Turning of face profiles

EcoCut



Drilling into solid material with flat bottom holes



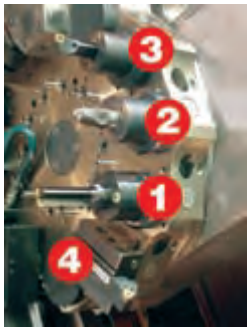
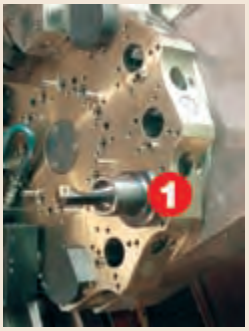
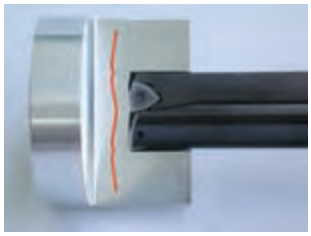
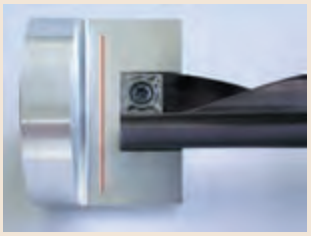
Internal turning applications

Turning of face profiles

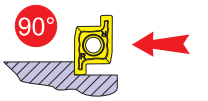
External turning applications

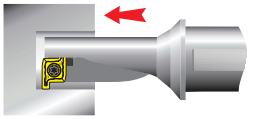
⚠ Reverse direction of rotation

EcoCut / ProfileMaster
Benefits

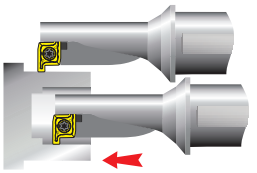
Conventional		EcoCut
	Problem solver for insufficient tool storage	
	Less programming effort	
	Produces a flat bottom hole	
	Reduced stock-keeping costs for tools and indexable inserts Considerable cost savings concerning tool acquisition	
	Shorter set-up times Reduced pre-setting times	

Machining methods - radial application 90°

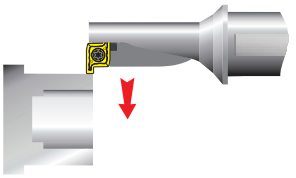




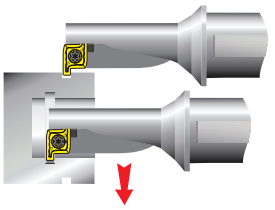
1. Drilling into solid material with flat bottom holes
2. Boring applications



3. External turning applications
4. Internal turning applications

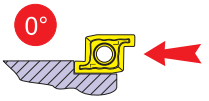


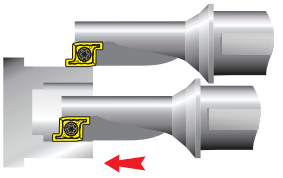
5. Turning of face profiles



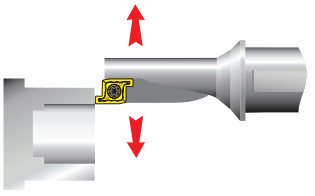
6. External radial grooving
7. Internal radial grooving

Machining methods - radial application 0°

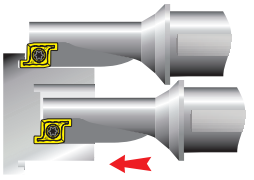




1. External turning applications
2. Boring applications



3. Turning of face profiles

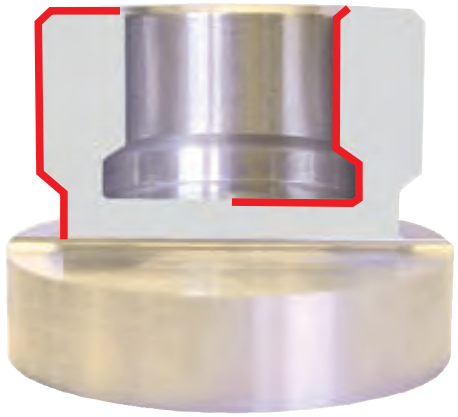


4. External radial grooving
5. Internal radial grooving

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

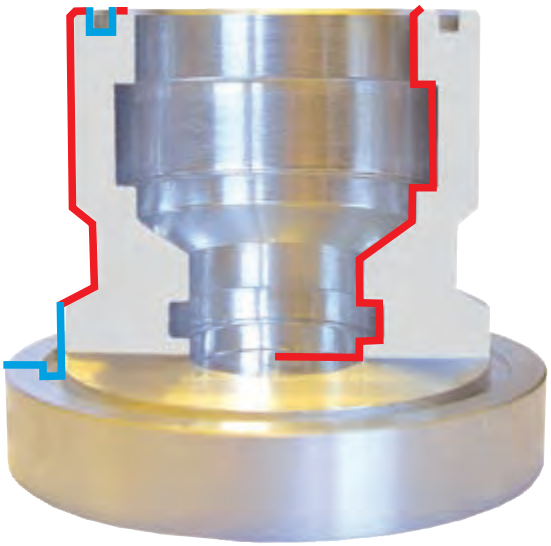
ProfileMaster

Provides the comprehensive solution



right-hand tool

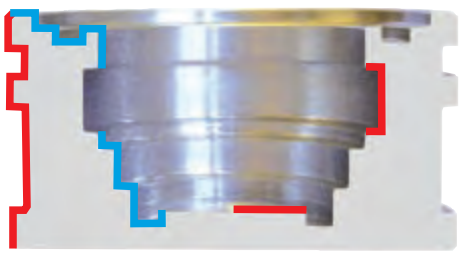
right-hand insert



right-hand tool

left-hand insert

right-hand insert

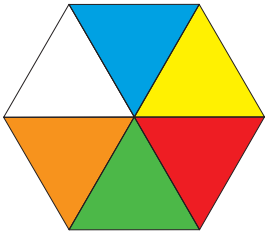


left-hand tool

right-hand tool

right-hand insert

Material



Based on VDI 3323 CERATIZIT's MasterGuide divides materials into six main groups (P, M, K, N, S, H) .
Each is given a color, 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

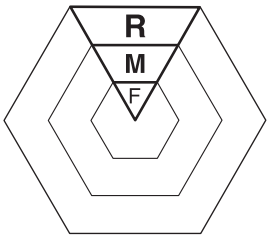
Red: cast iron
Cast iron, gray cast iron, tempered iron, spheroidal cast iron, CGI, sintered iron

Green: non ferrous metals and non metals
Al wrought and Al cast alloys, copper, copper alloys, non metal materials

Orange: heat resistant alloys / titanium
Ni/Co-base alloys, Ti alloys

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

Machining application type



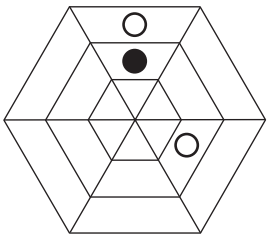
Each colored segment is divided into three sections, and each section indicates the relevant machining application type:

R = rough machining

M = medium machining

F = fine machining

Application

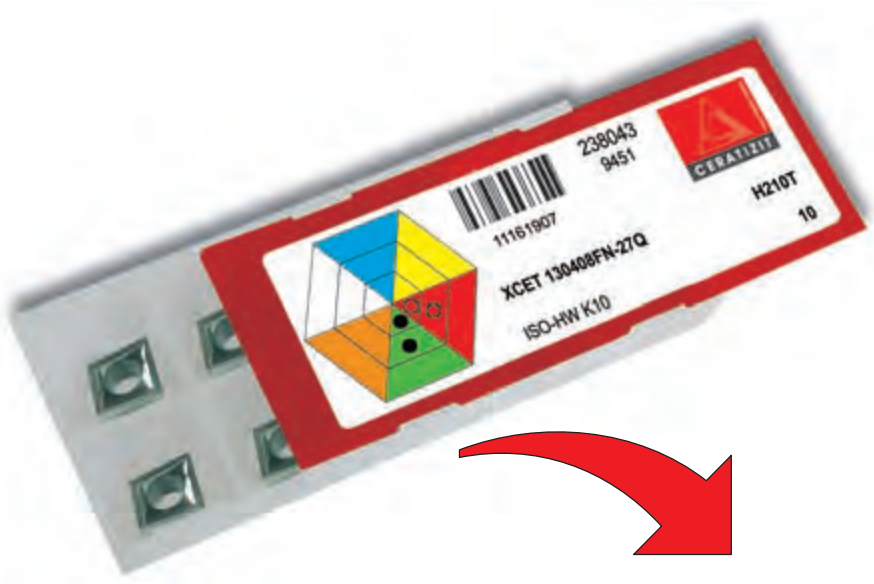


The ideal application area for the insert is indicated by a black circle. Extended applications are indicated by an open circle. The CERATIZIT MasterGuide provides you with an easily understandable structure for choosing a product and enables you to reduce grade and geometry stocks.

● **Main application**

○ **Extended application**

The right indexable insert at a glance



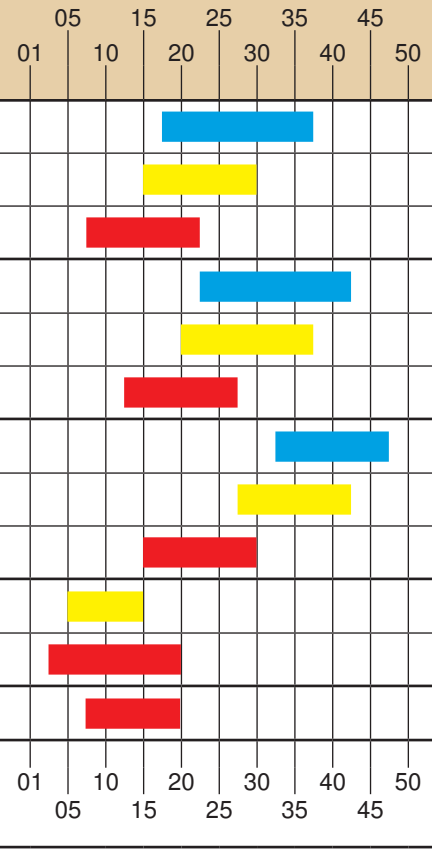
Main application:
Medium and fine machining of non ferrous metals and non-metallic materials.

Extended application:
Medium and fine machining of cast iron.

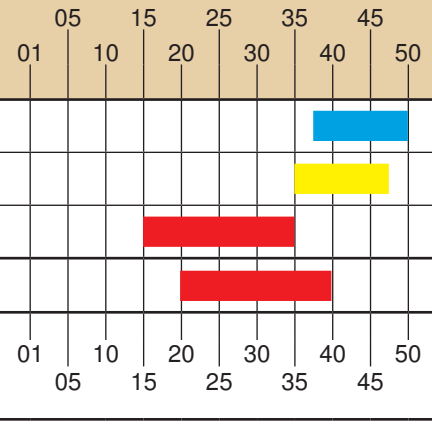

CERATIZIT
EC 14R-2,25D
CERATIZI

Grade overview

Grade designation	Standard designation	Cutting material	Application range	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
CTC1425	HC-P25	C		●					
	HC-M20	C			○				
	HC-K15	C				●			
CTC1435	HC-P35	C		●					
	HC-M30	C			○				
	HC-K20	C				○			
CTP2440	HC-P40	P		●					
	HC-M35	P			●				
	HC-K25	P					○	○	
H210T	HW-M10	W			○				
	HW-K10	W				○	●	●	
H216T / H10T	HW-K15	W				●	●		



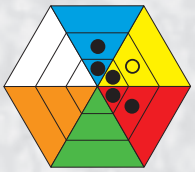
Grade designation	Standard designation	Cutting material	Application range	P Steel	M Stainless	K Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
CM45	HC-P45	P		●					
	HC-M40	P			●			○	
	HC-K25	P				○	○		
TSM30	HW-K30	W				○	●	○	

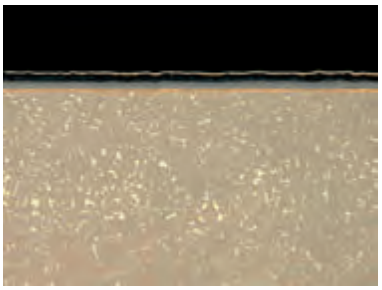


Grade description
Steel

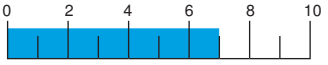
CTC1425

HC-P25
HC-M20
HC-K15

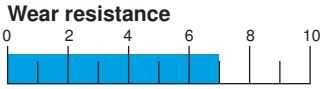




Toughness



Wear resistance



Composition:
Co 7%; mixed carbides 8%; WC balance

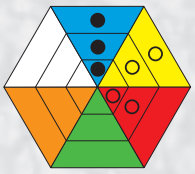
Grain size:
1 - 2 µm

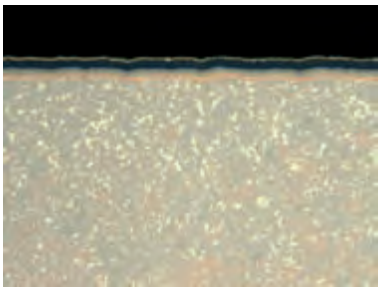
Hardness:
HV 1450

Coating specification:
CVD
TiN + Ti (C,N) + Ti (N,B) + Al_2O_3 + Ti (C,N,B);
6 µm

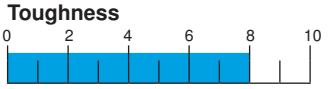
CTC1435

HC-P35
HC-M30
HC-K20

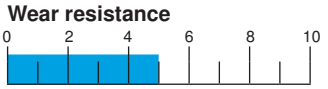




Toughness



Wear resistance



Composition:
Co 9.6%; mixed carbides 7.4%; WC balance

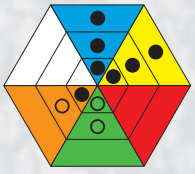
Grain size:
1 - 2 µm

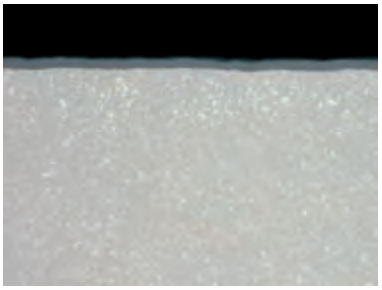
Hardness:
HV 1400

Coating specification:
CVD
TiN + Ti (C,N) + Ti (N,B) + Al_2O_3 + Ti (C,N,B);
6 µm

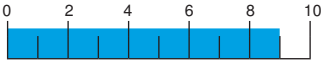
CTP2440

HC-P40
HC-M35
HC-K25

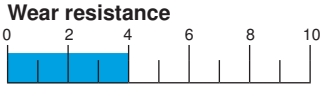




Toughness



Wear resistance



Composition:
Co 9.6%; mixed carbides 7.4%; WC balance

Grain size:
1 - 2 µm

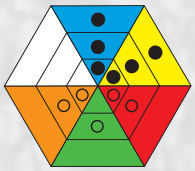
Hardness:
HV 1400

Coating specification:
PVD
TiAlN; 3 - 5 µm

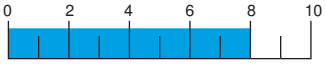
Grade description
Steel / stainless steel

CM45

HC-P45
HC-M40
HC-K25



Toughness



Wear resistance

Composition:
Co 10%; WC balance

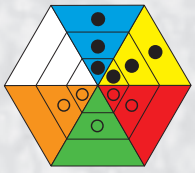
Grain size:
.7 µm (submicron grade)

Hardness:
HV 1600

Coating specification:
PVD
TiAlN; 2 - 4 µm

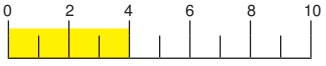
CM45

HC-P45
HC-M40
HC-K25



Toughness

Wear resistance



Composition:
Co 10%; WC balance

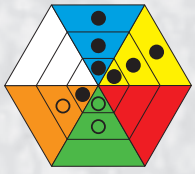
Grain size:
.7 µm (submicron grade)

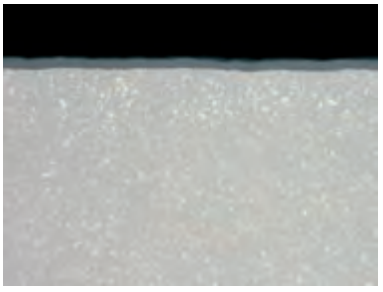
Hardness:
HV 1600

Coating specification:
PVD
TiAlN; 2 - 4 µm

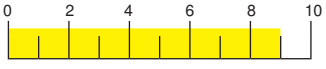
CTP2440

HC-P40
HC-M35
HC-K25

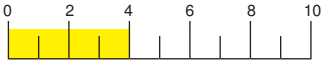




Toughness



Wear resistance



Composition:
Co 9.6%; mixed carbides 7.4%; WC balance

Grain size:
1 - 2 µm

Hardness:
HV 1400

Coating specification:
PVD
TiAlN; 3 - 5 µm

Grade description

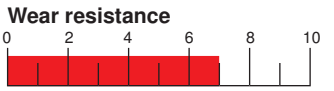
Cast iron, non ferrous metals and non metal

CTC1425

HC-P25
HC-M20
HC-K15

Toughness

Wear resistance



Composition:
Co 7%; mixed carbides 8%; WC balance

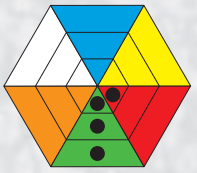
Grain size:
1 - 2 µm

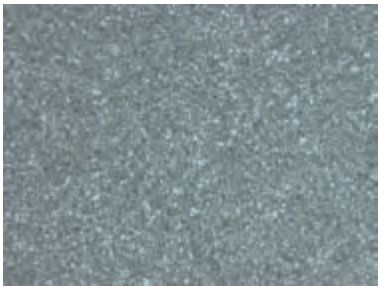
Hardness:
HV 1450

Coating specification:
CVD
TiN + Ti (C,N) + Ti (N,B) + Al_2O_3 + Ti (C,N,B);
6 µm

H216T / H10T

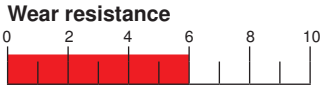
HW-K15





Toughness

Wear resistance



Composition:
Co 6%; WC balance

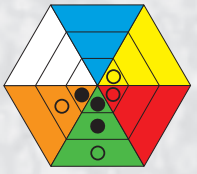
Grain size:
1 µm

Hardness:
HV_{30} 1630

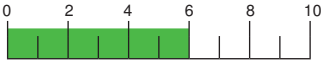
Properties, application:
- Optimally suitable for aluminum
- High wear resistance
- High heat resistance
- Low tendency to adhesion

H210T

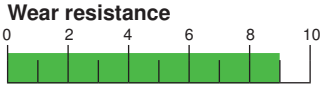
HW-M10
HW-K10



Toughness



Wear resistance



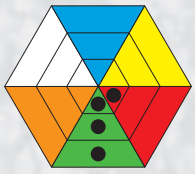
Properties, application:
- Ideal for heat resistant alloys, titanium, refractory metals (W, Mo), aluminum and glass & carbon fibre reinforced plastics
- Low tendency to adhesion

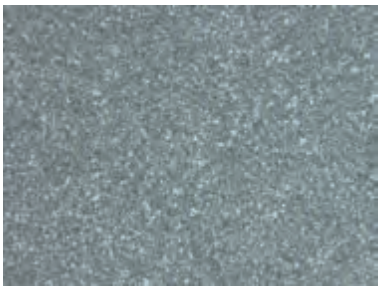
Grade description

Non ferrous metals, heat resistant alloys, titanium

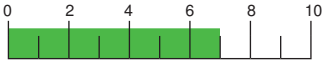
H216T / H10T

HW-K15

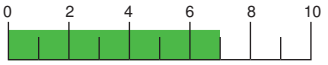




Toughness



Wear resistance



Composition:
Co 6%; WC balance

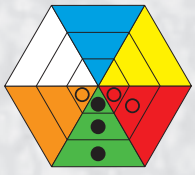
Grain size:
1 µm

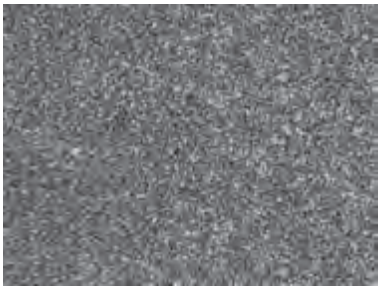
Hardness:
HV_{30} 1630

Properties, application:
- Optimally suitable for aluminum
- High wear resistance
- High heat resistance
- Low tendency to adhesion

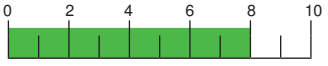
TSM30

HW-K30

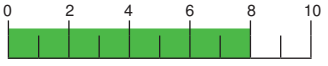




Toughness



Wear resistance



Composition:
Co 10%; WC balance

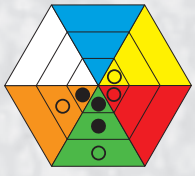
Grain size:
.7 µm (submicron grade)

Hardness:
HV 1550

Properties, application:
- Optimally suitable for aluminum
- High wear resistance
- Good toughness

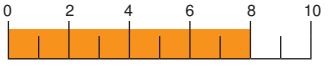
H210T

HW-M10
HW-K10



Toughness

Wear resistance



Composition:
Co 6%; WC balance

Grain size:
.8 µm (submicron grade)

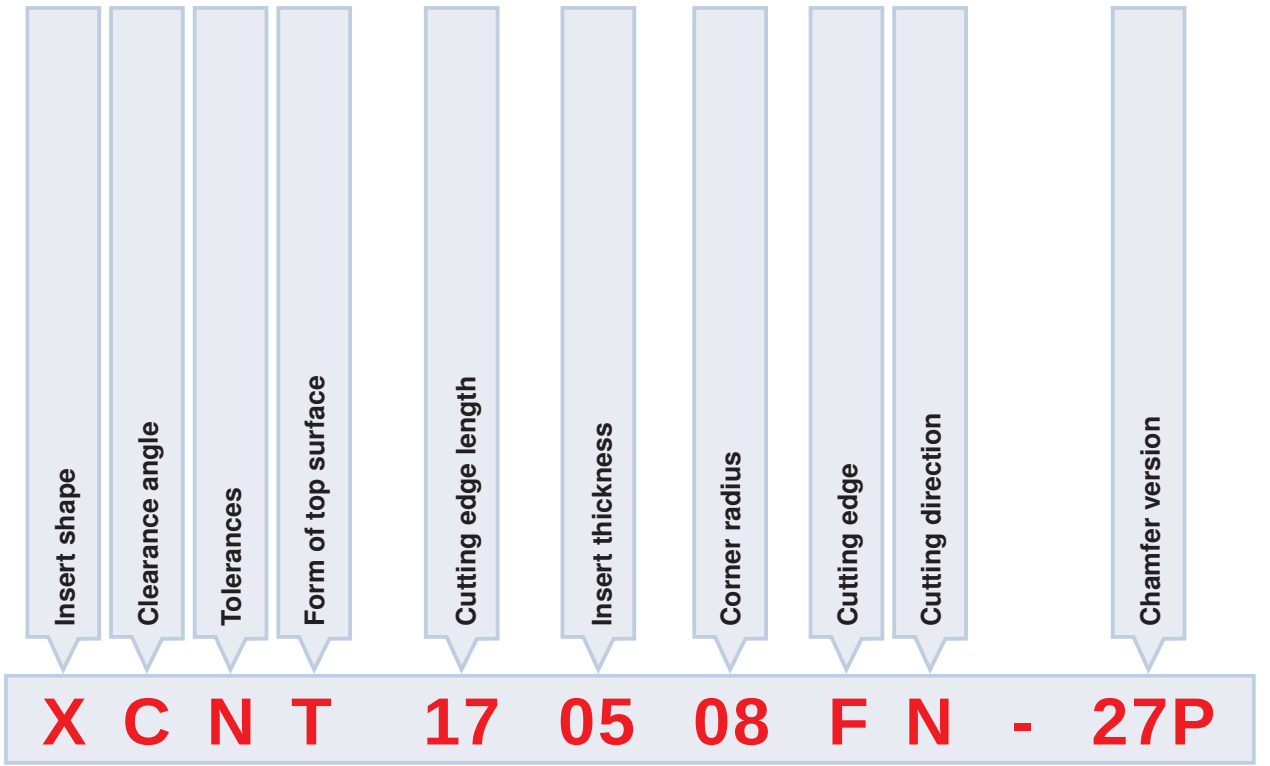
Hardness:
HV 1850

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

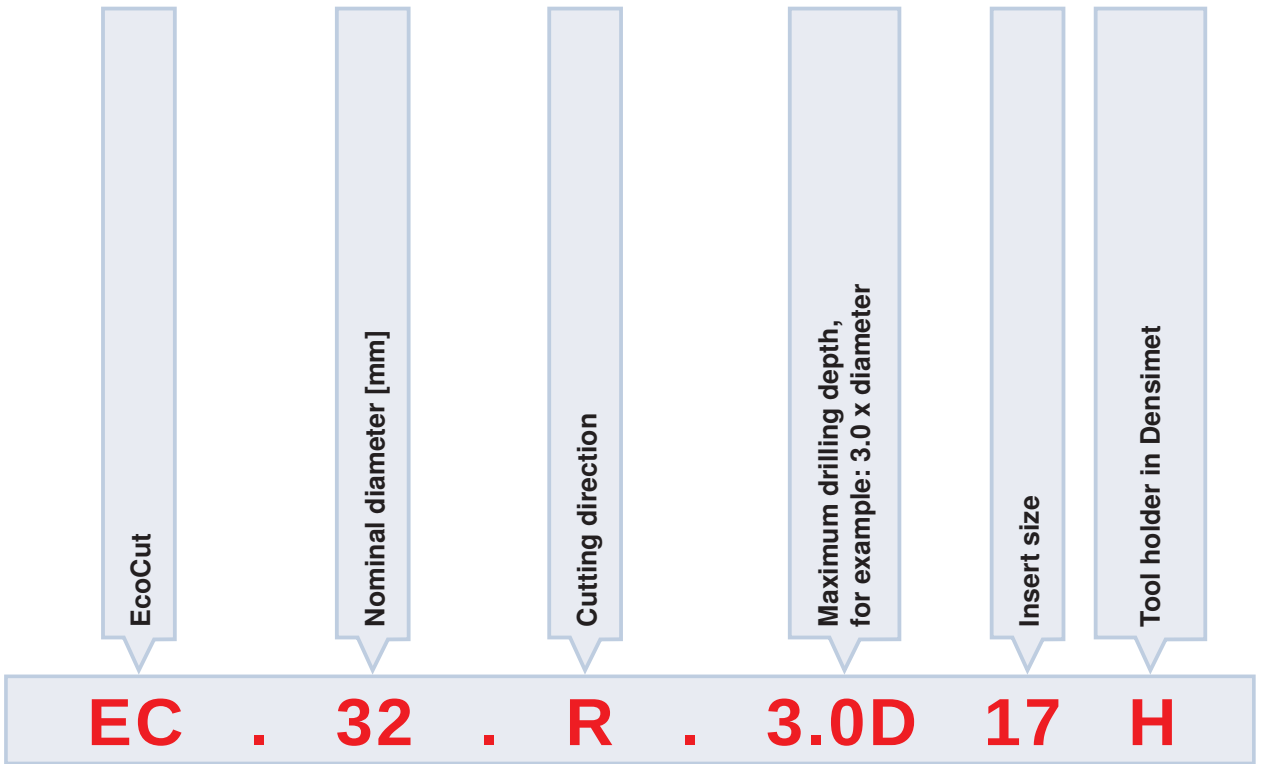
EcoCut

Designation systems

Inserts



Tools



EcoCut
XCET 04


-27P

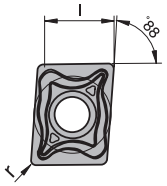

-27Q

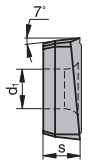

ER-EL


-M50Q

(l) [mm]	Type, description	L N R	H210T	H216T	CTC1425	CTC1435	CTP2440		r [inch]	l [inch]	s [inch]	d_1 [inch]
04	XCET 040102FR-27P	R		●					.008	.157	.071	.083
	XCET 040102FR-27Q		●									
	XCNT 040102ER				●	●	●					
	XCET 040102FL-27P	L		●								
	XCET 040102FL-27Q		●									
	XCNT 040102EL				●	●	●					
	XCET 040104FR-27P	R		●					.016			
	XCET 040104FR-27Q		●									
	XCNT 040104ER				●	●	●					
	XCNT 040104ER-M50Q					●						
	XCET 040104FL-27P	L		●								
	XCET 040104FL-27Q		●									
	XCNT 040104EL				●	●	●					
	XCNT 040104EL-M50Q					●						

	H210T	H216T	CTC1425	CTC1435	CTP2440	
Steel			●	●	●	
Stainless	○		○	○	●	
Cast iron	○	●	●	○		
Non ferrous metals	●	●			○	
Heat resistant	●				○	
Hard materials						





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

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

42-43
29

EcoCut
XCET 05-07


-27P

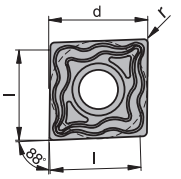

-27Q

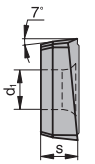

EN


-M50Q

(l) [mm]	Type, description	L N R	H210T	H216T	CTC1425	CTC1435	CTP2440		d [inch]	l [inch]	s [inch]	r [inch]	d_1 [inch]
05	XCET 050202FN-27P	N		●					.228	.197	.083	.008	.089
	XCET 050202FN-27Q		●									.008	
	XCNT 050202EN				●	●	●					.008	
	XCET 050204FN-27P			●								.016	
	XCET 050204FN-27Q		●									.016	
	XCNT 050204EN				●	●	●					.016	
	XCNT 050204EN-M50Q					●						.016	
06	XCET 060202FN-27P			●					.256	.236	.094	.008	.098
	XCET 060202FN-27Q		●									.008	
	XCNT 060202EN				●	●	●					.008	
	XCET 060204FN-27P			●								.016	
	XCET 060204FN-27Q		●									.016	
	XCNT 060204EN				●	●	●					.016	
	XCNT 060204EN-M50Q					●						.016	
07	XCET 070304FN-27P			●					.299	.276	.125	.016	.110
	XCET 070304FN-27Q		●									.016	
	XCNT 070304EN				●	●	●					.016	
	XCNT 070304EN-M50Q					●						.016	

	H210T	H216T	CTC1425	CTC1435	CTP2440	
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

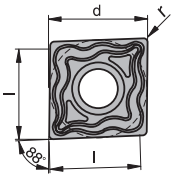

-27Q

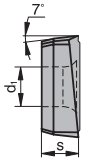

EN


-M50Q

(l) [mm]	Type, description	L N R	H210T	H216T	CTC1425	CTC1435	CTP2440		d [inch]	l [inch]	s [inch]	r [inch]	d_1 [inch]
08	XCET 080304FN-27P	N		●					.335	.315	.125	.016	.134
	XCET 080304FN-27Q		●										
	XCNT 080304EN				●	●	●						
	XCNT 080304EN-M50Q				●								
09	XCET 09T304FN-27P			●					.378	.354	.156		
	XCET 09T304FN-27Q		●										
	XCNT 09T304EN				●	●	●						
	XCNT 09T304EN-M50Q				●								
10	XCET 10T304FN-27P			●					.417	.394			.173
	XCET 10T304FN-27Q		●										
	XCNT 10T304EN				●	●	●						
	XCNT 10T304EN-M50Q				●								
	XCET 10T308FN-27P			●								.031	
	XCET 10T308FN-27Q		●										
	XCNT 10T308EN				●	●	●						
	XCNT 10T308EN-M50Q				●								

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





● Main application

○ Extended application

● International CERATIZIT range, for present availability see price list

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


42-43


30-31


36-37

EcoCut
XCET 13-17


-27P

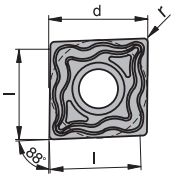

-27Q

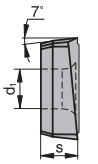

EN


-M50Q

(l) [mm]	Type, description	L N R	H210T	H216T	CTC1425	CTC1435	CTP2440		d [inch]	l [inch]	s [inch]	r [inch]	d_1 [inch]
13	XCET 130404FN-27P	N		●					.531	.492	.187	.016	.209
	XCET 130404FN-27Q		●										
	XCNT 130404EN				●	●	●						
	XCNT 130404EN-M50Q				●								
	XCET 130408FN-27P			●								.031	
	XCET 130408FN-27Q		●										
	XCNT 130408EN				●	●	●						
	XCNT 130408EN-M50Q				●								
17	XCET 170508FN-27P			●					.689	.630	.219		
	XCET 170508FN-27Q		●										
	XCNT 170508EN				●	●	●						
	XCNT 170508EN-M50Q				●								

	H210T	H216T	CTC1425	CTC1435	CTP2440	
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

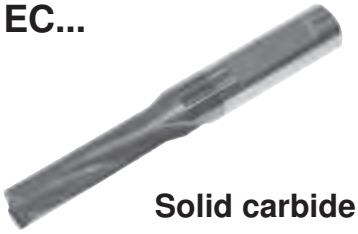

36

EcoCut Mini

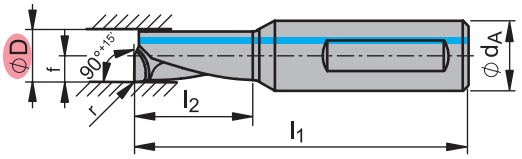
ECM Ø .157 - .197 inch

CERATIZIT

EC...



Solid carbide



D [inch]	Type, description	L R	TSM30	CM45					d_A [inch]	l_1 [inch]	l_2 [inch]	f [inch]	r [inch]
.157	EC 04R-2.25D	R		●					.236	1.378	.354	.079	.008
	EC 04R-2.25D-27		●										
	EC 04R-4.00D			●						1.614	.630		
	EC 04R-4.00D-27		●										
	EC 04L-2.25D	L		●						1.378	.354		
	EC 04L-2.25D-27		●										
	EC 04L-4.00D			●						1.614	.630		
	EC 04L-4.00D-27		●										
.197	EC 05R-2.25D	R		●						1.457	.443	.098	
	EC 05R-2.25D-27		●										
	EC 05R-4.00D			●						1.772	.787		
	EC 05R-4.00D-27		●										
	EC 05L-2.25D	L		●						1.457	.443		
	EC 05L-2.25D-27		●										
	EC 05L-4.00D			●						1.772	.787		
	EC 05L-4.00D-27		●										

	TSM30	CM45				
Steel		●				
Stainless		●				
Cast iron	○	○				
Non ferrous metals	●	○				
Heat resistant	○	○				
Hard materials						

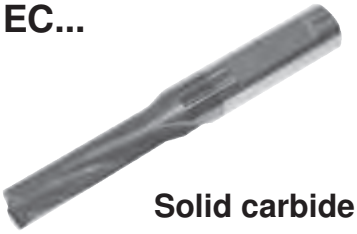
● Uncoated
○ Coated
● Main application

Ordering example: 1 pieces EC 04R-2.25D CM45

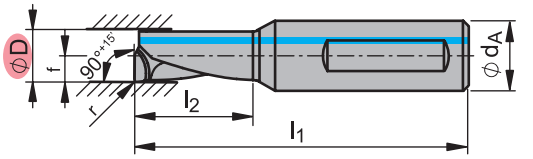
EcoCut Mini

ECM Ø .236 - .276 inch

EC...



Solid carbide



D [inch]	Type, description	L R	TSM30	CM45					d_A [inch]	l_1 [inch]	l_2 [inch]	f [inch]	r [inch]
.236	EC 06R-2.25D	R		●					.315	1.496	.531	.118	.008
	EC 06R-2.25D-27		●										
	EC 06R-4.00D			●						1.929	.945		
	EC 06R-4.00D-27		●										
	EC 06L-2.25D	L		●						1.496	.531		
	EC 06L-2.25D-27		●										
	EC 06L-4.00D			●						1.929	.945		
	EC 06L-4.00D-27		●										
.276	EC 07R-2.25D	R		●						1.654	.620	.138	
	EC 07R-2.25D-27		●										
	EC 07R-4.00D			●						2.087	1.102		
	EC 07R-4.00D-27		●										
	EC 07L-2.25D	L		●						1.654	.620		
	EC 07L-2.25D-27		●										
	EC 07L-4.00D			●						2.087	1.102		
	EC 07L-4.00D-27		●										

	TSM30	CM45				
Steel		●				
Stainless		●				
Cast iron	○	○				
Non ferrous metals	●	○				
Heat resistant	○	○				
Hard materials						

● Uncoated
○ Coated
● Main application

Ordering example: 1 pieces EC 06R-2.25D CM45

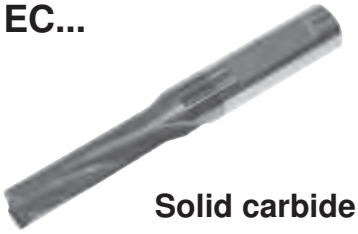
42-43
50-58
28

EcoCut Mini

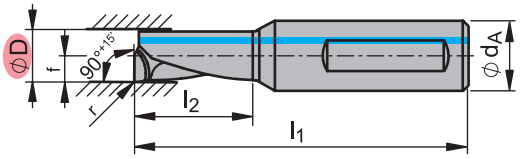
ECM Ø .315 inch

CERATIZIT

EC...



Solid carbide



D [inch]	Type, description	L R	TSM30	CM45					d_A [inch]	l_1 [inch]	l_2 [inch]	f [inch]	r [inch]
.315	EC 08R-2.25D	R		●					.315	1.772	.709	.157	.008
	EC 08R-2.25D-27		●										
	EC 08R-4.00D			●						2.244	1.260		
	EC 08R-4.00D-27		●										
	EC 08L-2.25D	L		●						1.772	.709		
	EC 08L-2.25D-27		●										
	EC 08L-4.00D			●						2.244	1.260		
	EC 08L-4.00D-27		●										

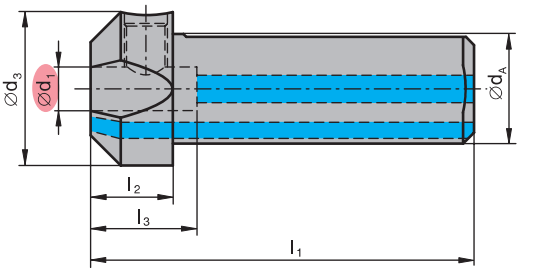
	TSM30	CM45				
Steel		●				
Stainless		●				
Cast iron	○	○				
Non ferrous metals	●	○				
Heat resistant	○	○				
Hard materials						

● Uncoated
○ Coated
● Main application

Ordering example: 1 pieces EC 08R-2.25D CM45

EcoCut Mini

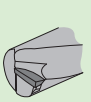
Adapters



[inch]	Type, description	d_A [inch]	d_3 [inch]	l_1 [inch]	l_2 [inch]	l_3 [mm]
.236	EC-ADX12-06-E	.750	.984	2.500	.550	
.315	EC-ADX12-08-E	.750				

Ordering example: 1 piece EC-ADX12-06-E

[inch]	 1 piece		
.236	7897990/M8X1X8 DIN913		
.315	7897990/M8X1X8 DIN913		

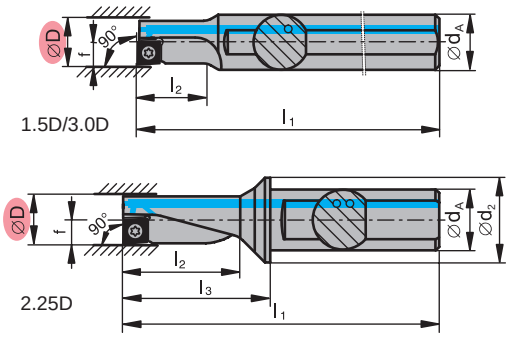


25-27

EcoCut Classic

EC Ø .315 - .472 inch

EC...



D [inch]	Type, description	L R	d_A [inch]	d_2 [inch]	l_2 [inch]	l_1 [inch]	l_3 [inch]	f [inch]	
.315	EC 08R-1.5D 04-E	R	.500		.47	3.1		.157	XC.. 0401..
	EC 08R-2.25D 04-E		.375	.472	.71	2.3	.870		
	EC 08R-3.0D 04 H-E		.500		.94	3.1			
	EC 08L-1.5D 04-E	L	.500		.47	3.1			
	EC 08L-2.25D 04-E		.375	.472	.71	2.3	.870		
	EC 08L-3.0D 04 H-E		.500		.94	3.1			
.394	EC 10R-1.5D 05-E	R	.500		.59	3.5		.197	XC.. 0502..
	EC 10R-2.25D 05-E		.500	.630	.89	2.7	1.085		
	EC 10R-3.0D 05 H-E		.500		1.18	3.3			
	EC 10L-1.5D 05-E	L	.500		.59	3.5			
	EC 10L-2.25D 05-E		.500	.630	.89	2.7	1.085		
	EC 10L-3.0D 05 H-E		.500		1.18	3.3			
.472	EC 12R-1.5D 06-E	R	.625		.71	3.9		.236	XC.. 0602..
	EC 12R-2.25D 06-E		.625	.787	1.06	3.0	1.300		
	EC 12R-3.0D 06 H-E		.625		1.42	3.7			
	EC 12L-1.5D 06-E	L	.625		.71	3.9			
	EC 12L-2.25D 06-E		.625	.787	1.06	3.0	1.300		
	EC 12L-3.0D 06 H-E		.625		1.42	3.7			

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

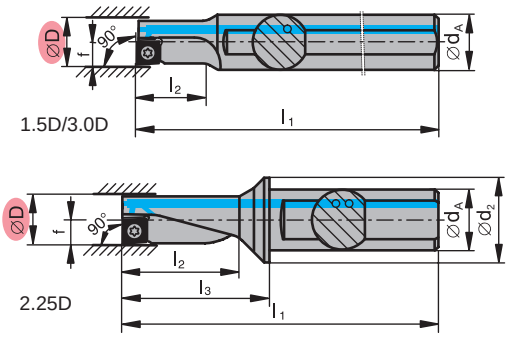
	D [inch]	10 pieces	1 piece	
XC.. 0401..	.315	7815108/M1,8X3,4/T06	7883305/TORX T06	
XC.. 0502..	.394	7815110/M2,0X4,0/T06	7883305/TORX T06	
XC.. 0602..	.472	7722113/M2,2X5/T07	7724105/TORX T07	

42-43 | 53-59 | H = Densimet 71 | 21-22

EcoCut Classic

EC Ø .551 - .709 inch

EC...



D [inch]	Type, description	L R	d_A [inch]	d_2 [inch]	l_1 [inch]	l_2 [inch]	l_3 [inch]	f [inch]	
.551	EC 14R-1.5D 07-E	R	.625		4.3	.83		.276	XC.. 0703..
	EC 14R-2.25D 07-E			.787	3.2	1.24	1.520		
	EC 14R-3.0D 07 H-E				3.9	1.65			
	EC 14L-1.5D 07-E	L			4.3	.83			
	EC 14L-2.25D 07-E			.787	3.2	1.24	1.520		
	EC 14L-3.0D 07 H-E				3.9	1.65			
.630	EC 16R-1.5D 08-E	R	.750		4.9	.94		.315	XC.. 0803..
	EC 16R-2.25D 08-E			.984	3.7	1.42	1.730		
	EC 16R-3.0D 08 H-E				4.3	1.89			
	EC 16L-1.5D 08-E	L			4.9	.94			
	EC 16L-2.25D 08-E			.984	3.7	1.42	1.730		
	EC 16L-3.0D 08 H-E				4.3	1.89			
.709	EC 18R-1.5D 09-E	R	1.000		5.3	1.06		.354	XC.. 09T3..
	EC 18R-2.25D 09-E			1.260	4.3	1.59	2.110		
	EC 18R-3.0D 09 H-E				5.0	2.12			
	EC 18L-1.5D 09-E	L			5.3	1.06			
	EC 18L-2.25D 09-E			1.260	4.3	1.59	2.110		
	EC 18L-3.0D 09 H-E				5.0	2.12			

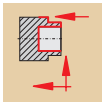
Ordering example: 1 piece EC 14R-1.5D 07-E

	D [inch]	10 pieces	1 piece	
XC.. 0703..	.551	7815101/M2,5X6,0/T08	7724106/TORX T08	
XC.. 0803..	.630	7883203/M3,0X7,3/T08	7724106/TORX T08	
XC.. 09T3..	.709	7883203/M3,0X7,3/T08	7724106/TORX T08	

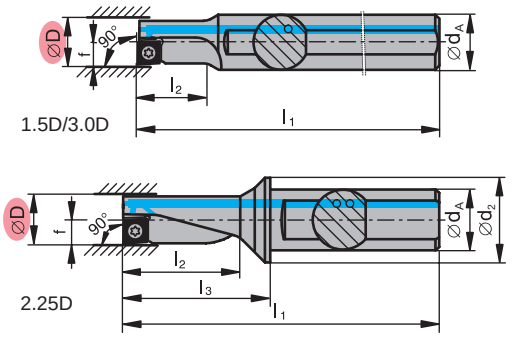
42-43 53-59 H = Densimet 71 22-23

EcoCut Classic

EC Ø .787 - 1.260 inch



EC...



D [inch]	Type, description	L R	d_A [inch]	d_2 [inch]	l_2 [inch]	l_1 [inch]	l_3 [inch]	f [inch]	
.787	EC 20R-1.5D 10-E	R	1.000		1.18	5.9		.394	XC.. 10T3..
	EC 20R-2.25D 10-E			1.260	1.77	4.4	2.170		
	EC 20R-3.0D 10 H-E				2.36	5.1			
	EC 20L-1.5D 10-E	L			1.18	5.9			
	EC 20L-2.25D 10-E			1.260	1.77	4.4	2.170		
	EC 20L-3.0D 10 H-E				2.36	5.1			
.984	EC 25R-1.5D 13-E	R	1.250		1.48	7.0		.492	XC.. 1304..
	EC 25R-2.25D 13-E			1.575	2.22	5.0	2.715		
	EC 25R-3.0D 13 H-E				2.95	5.9			
	EC 25L-1.5D 13-E	L			1.48	7.0			
	EC 25L-2.25D 13-E			1.575	2.22	5.0	2.715		
	EC 25L-3.0D 13 H-E				2.95	5.9			
1.260	EC 32R-1.5D 17-E	R	1.500		1.89	7.8		.630	XC.. 1705..
	EC 32R-2.25D 17-E			1.969	2.83	6.2	3.460		
	EC 32R-3.0D 17 H-E				3.78	7.2			
	EC 32L-1.5D 17-E	L			1.89	7.8			
	EC 32L-2.25D 17-E			1.969	2.83	6.2	3.460		
	EC 32L-3.0D 17 H-E				3.78	7.2			

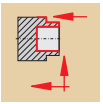
Ordering example: 1 piece EC 20R-1.5D 10-E

	D [inch]	10 pieces	1 piece	
XC.. 10T3..	.787	7883209/M3,5X8,6/T15	7724103/TORX T15	
XC.. 1304..	.984	7822114/M4,5X10,5/T20	7724104/TORX T20	
XC.. 1705..	1.260	7822114/M4,5X10,5/T20	7724104/TORX T20	

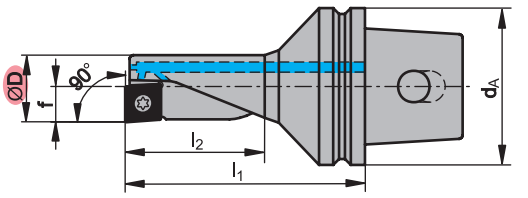
42-43 | 53-59 | H = Densimet 71 | 23-24

EcoCut Classic UTS

EC Ø .630 - 1.260 inch



2.25D (=l_2)



D [inch]	Type, description	L R	d_A [mm]	l_1 [inch]	l_2 [inch]	f [inch]	
.630	UT40-EC 16R-2.25D 08	R	40	2.3	1.417	.315	XC.. 0803..
	UT50-EC 16R-2.25D 08		50	2.7	1.417		
	UT40-EC 16L-2.25D 08	L	40	2.3	1.417		
.709	UT40-EC 18L-2.25D 09	L	40	2.5	1.594	.354	XC.. 09T3..
.787	UT40-EC 20R-2.25D 10	R	40	2.7	1.772	.394	XC.. 10T3..
	UT50-EC 20R-2.25D 10		50	3.1	1.772		
	UT40-EC 20L-2.25D 10	L	40	2.7	1.772		
	UT50-EC 20L-2.25D 10		50	3.1	1.772		
.984	UT40-EC 25R-2.25D 13	R	40	3.1	2.224	.492	XC.. 1304..
	UT50-EC 25R-2.25D 13		50	3.5	2.224		
	UT63-EC 25R-2.25D 13		63	3.7	2.224		
	UT40-EC 25L-2.25D 13	L	40	3.1	2.224		
1.260	UT40-EC 32R-2.25D 17	R	40	3.7	2.835	.630	XC.. 1705..
	UT50-EC 32R-2.25D 17		50	3.9	2.835		
	UT63-EC 32R-2.25D 17		63	4.1	2.835		
	UT40-EC 32L-2.25D 17	L	40	3.7	2.835		
	UT50-EC 32L-2.25D 17		50	3.9	2.835		

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

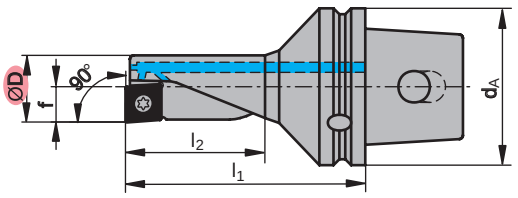
	D [inch]	10 pieces	1 piece	
XC.. 0803..	.630	7883203/M3,0X7,3/T08	7724106/TORX T08	
XC.. 09T3..	.709	7883203/M3,0X7,3/T08	7724106/TORX T08	
XC.. 10T3..	.787	7883209/M3,5X8,6/T15	7724103/TORX T15	
XC.. 1304..	.984	7822114/M4,5X10,5/T20	7724104/TORX T20	
XC.. 1705..	1.260	7822114/M4,5X10,5/T20	7724104/TORX T20	

42-43 53-59 22-24

EcoCut Classic UTS MIY

EC Ø .984 - 1.260 inch for Mazak Integrex

2.25D (=l_2)



D [inch]	Type, description	L R	d_A [mm]	l_1 [inch]	l_2 [inch]	f [inch]	
.984	UT63-EC 25R-2.25D 13-MIY	R	63	3.7	2.224	.492	XC.. 1304..
	UT63-EC 25L-2.25D 13-MIY	L					
1.260	UT63-EC 32R-2.25D 17-MIY	R		4.1	2.835	.630	XC.. 1705..

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

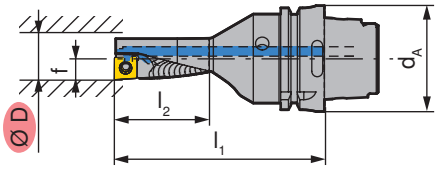
	D [inch]	10 pieces	1 piece	
XC.. 1304..	**.984**	7822114/M4,5X10,5/T20	7724104/TORX T20	
XC.. 1705..	**1.260**	7822114/M4,5X10,5/T20	7724104/TORX T20	

42-43 53-59 24


PM 16L-2.25D
CERATIZIT
CERATIZIT

EcoCut Classic HSK-T

ECC Ø .984 - 1.260 inch



D [inch]	Type, description	L R	d_A [mm]	l_1 [inch]	l_2 [inch]	f [inch]	
.984	HSK-T63-EC-25R-2.25D 13	R	63	4.9	2.22	.492	XC.. 1304..
	HSK-T63-EC-25L-2.25D 13	L					
1.260	HSK-T63-EC-32R-2.25D 17	R			2.83	.630	XC.. 1705..
	HSK-T63-EC-32L-2.25D 17	L					

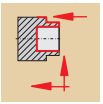
Ordering example: 1 piece HSK-T63-EC-25R-2.25D 13

	D [inch]	10 pieces	1 piece	
XC.. 1304..	.984	7822114/M4,5X10,5/T20	7724104/TORX T20	
XC.. 1705..	1.260	7822114/M4,5X10,5/T20	7724104/TORX T20	

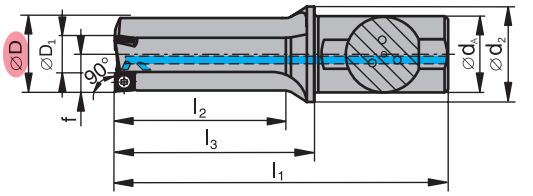
42-43 53-59 24

EcoCut Rebore

ECR Ø 1.575 - 2.362 inch



2.25D (=l_2)



D [inch]	Type, description	L R	D_1 [inch]	d_A [inch]	d_2 [inch]	l_1 [inch]	l_2 [inch]	l_3 [inch]	f [inch]	
1.575	ECR 4020R03-2.25D 10	R	.787	1.575	1.969	6.8	3.543	4.134	.787	XC.. 10T3..
	ECR 4020L03-2.25D 10	L								
2.362	ECR 6032R03-2.25D 17	R	1.260		2.756	9.1	5.314	6.378	1.181	XC.. 1705..
	ECR 6032L03-2.25D 17	L								

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

Initial bore necessary!

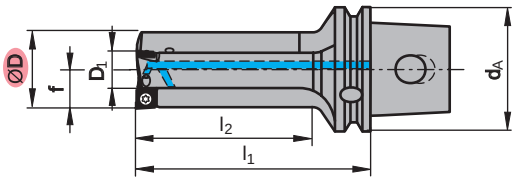
	D [inch]	10 pieces	1 piece	
XC.. 10T3..	1.575	7883209/M3,5X8,6/T15	7724103/TORX T15	
XC.. 1705..	2.362	7822114/M4,5X10,5/T20	7724104/TORX T20	

42-43 56-57 23-24

EcoCut Rebore UTS MIY

ECR Ø 1.575 inch for Mazak Integrex

2.25D (=l_2)



D [inch]	Type, description	L R	D_1 [inch]	d_A [mm]	l_1 [inch]	l_2 [inch]	f [inch]	
1.575	UT63-ECR40R3-2.25D-MIY	R	.787	63	6.2	3.543	.787	XC.. 10T3..

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

Initial bore necessary!

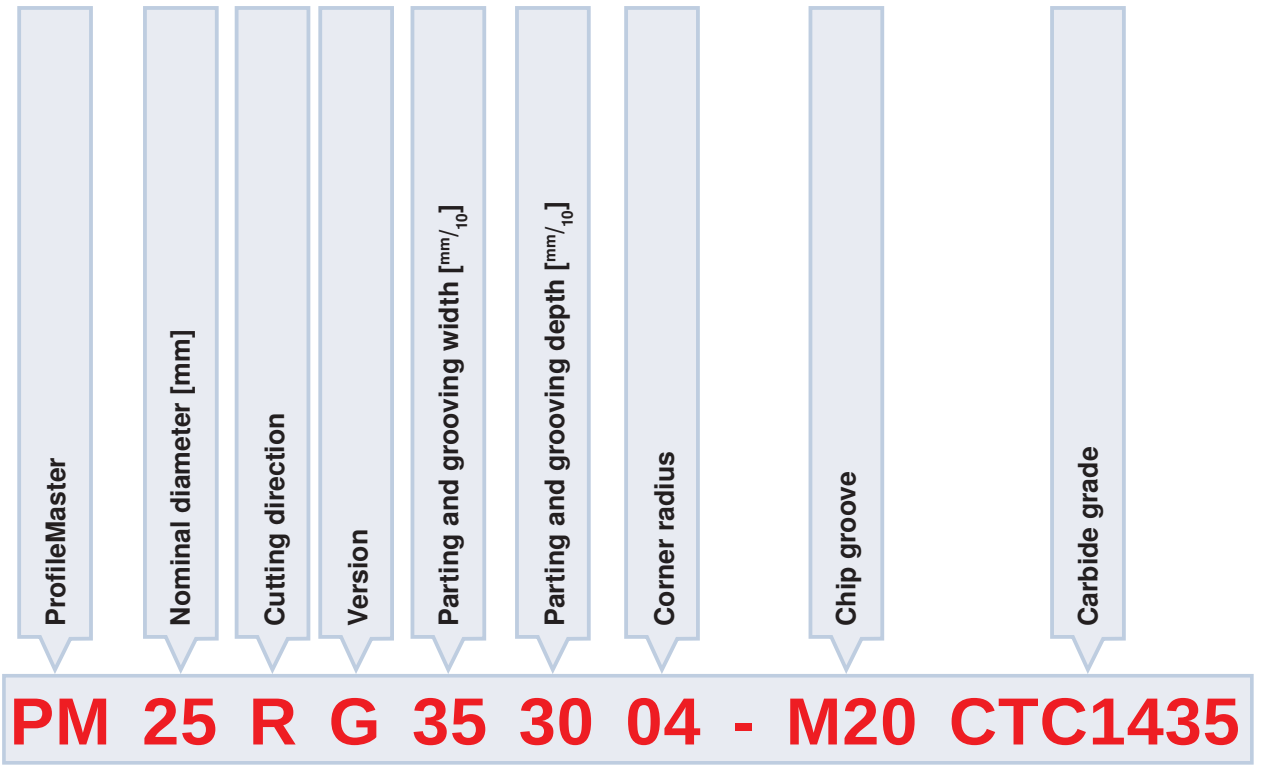
	D [inch]	10 pieces	1 piece	
XC.. 10T3..	**1.575**	7883209/M3,5X8,6/T15	7724103/TORX T15	

42-43 56-57 23

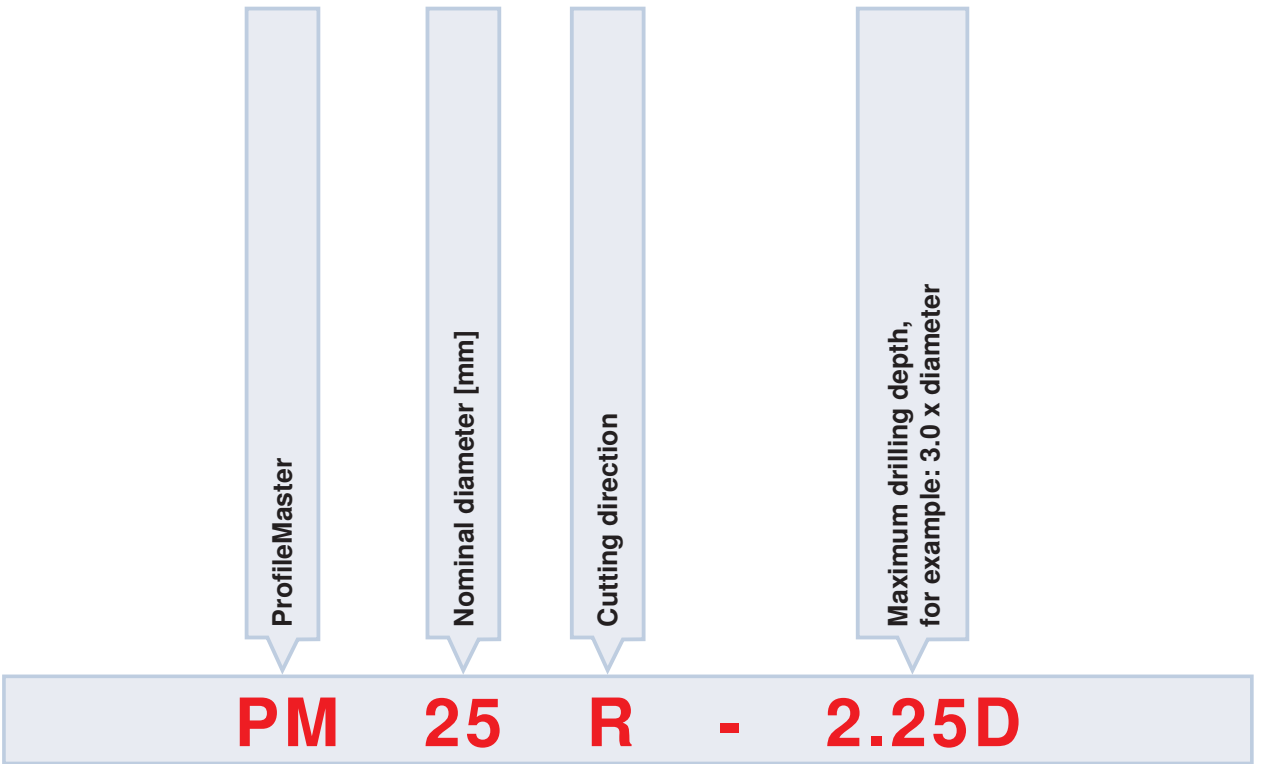
ProfileMaster

Designation systems

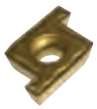
Inserts



Tools



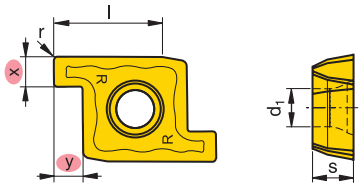
ProfileMaster
PM Ø .394 - 1.260 inch



-M20

Size	Type, description	L N R	CTC1435	CTP2440			x [inch]	y [inch]	l [inch]	s [inch]	d_1 [inch]	r [mm]
.394	PM 10RG 201504-M20	R	●	●			.079	.059	.197	.083	.083	.40
	PM 10LG 201504-M20	L	●	●			.079					
.472	PM 12RG 201804-M20	R	●	●			.079	.071	.236	.091	.098	
	PM 12LG 201804-M20	L	●	●			.079					
.630	PM 16RG 252004-M20	R	●	●			.098	.079	.315	.110	.134	
	PM 16LG 252004-M20	L	●	●			.098					
.787	PM 20RG 302504-M20	R	●	●			.118	.098	.394	.150	.161	
	PM 20LG 302504-M20	L	●	●			.118					
.984	PM 25RG 353004-M20	R	●	●			.138	.118	.492	.177	.173	
	PM 25LG 353004-M20	L	●	●			.138					
1.260	PM 32RG 404004-M20	R	●	●			.157	.157	.630	.217	.236	
	PM 32LG 404004-M20	L	●	●			.157					

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



● Main application

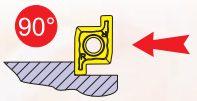
○ Extended application

● International CERATIZIT range, for present availability see price list

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

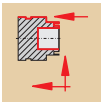

42-43


40-41

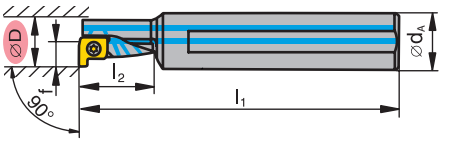


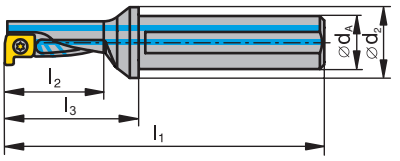
ProfileMaster

PM Ø .394 - 1.260 inch



90°





D [inch]	Type, description	L R	d_A [inch]	d_2 [inch]	l_1 [inch]	l_2 [inch]	l_3 [inch]	f [inch]	
.394	PM 10R-1.5D-E	R	.500		3.1	.590		.197	PM 10..
	PM 10R-2.25D-E			.630	2.8	.886	1.197		
	PM 10L-2.25D-E	L		.630	2.8	.886	1.197		
	PM 10L-1.5D-E				3.1	.590			
.472	PM 12R-1.5D-E	R	.625		3.5	.709		.236	PM 12..
	PM 12R-2.25D-E			.787	3.0	1.063	1.299		
	PM 12L-1.5D-E	L			3.5	.709			
	PM 12L-2.25D-E			.787	3.0	1.063	1.299		
.630	PM 16R-1.5D-E	R	.750		4.9	.945		.315	PM 16..
	PM 16R-2.25D-E			.984	3.8	1.417	1.831		
	PM 16L-2.25D-E	L		.984	3.8	1.417	1.831		
	PM 16L-1.5D-E				4.9	.945			
.787	PM 20R-1.5D-E	R	1.000		5.9	1.181		.394	PM 20..
	PM 20R-2.25D-E			1.260	4.4	1.772	2.165		
	PM 20L-1.5D-E	L			5.9	1.181			
	PM 20L-2.25D-E			1.260	4.4	1.772	2.165		
.984	PM 25R-1.5D-E	R	1.250		7.0	1.476		.492	PM 25..
	PM 25R-2.25D-E			1.575	5.2	2.217	2.858		
	PM 25L-1.5D-E	L			7.0	1.476			
	PM 25L-2.25D-E			1.575	5.2	2.217	2.858		
1.260	PM 32R-1.5D-E	R	1.500		7.8	1.890		.630	PM 32..
	PM 32R-2.25D-E			1.969	6.2	2.835	3.465		
	PM 32L-1.5D-E	L			7.8	1.890			
	PM 32L-2.25D-E			1.969	6.2	2.835	3.465		

Ordering example: 1 piece PM 10R-1.5D-E

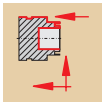
	d_A [inch]			
PM 10..	**.500**	10001230/M1,8X3,8/T06	7883305/TORX T06	
PM 12..	**.625**	7883215/M2,2X4,0/T07	7724105/TORX T07	
PM 16..	**.750**	7883214/M3,0X5,7/T08	7724106/TORX T08	
PM 20..	**1.000**	7722111/M3,5X7,2/T15	7724103/TORX T15	
PM 25..	**1.250**	7883209/M3,5X8,6/T15	7724103/TORX T15	
PM 32..	**1.500**	10001785/M5,0X10,8/T20	7724104/TORX T20	

42-43

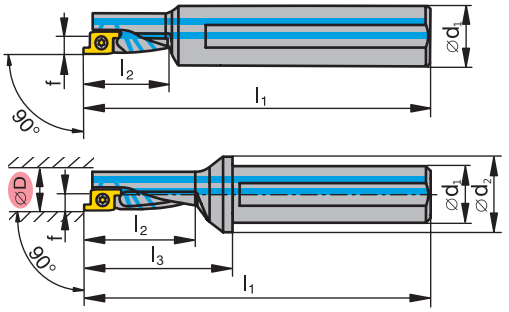
39

ProfileMaster

PM Ø .630 - 1.260 inch



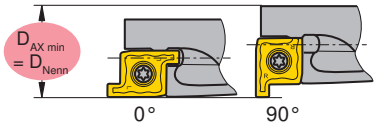
0 °



D [inch]	Type, description	L R	d_A [inch]	d_2 [inch]	l_1 [inch]	l_2 [inch]	l_3 [inch]	f [inch]	
.630	PM 16R-1.5D-E	R	.750		5.012	1.036		.224	PM 16..
	PM 16R-2.25D-E			.984	3.923	1.508	1.9		
	PM 16L-2.25D-E	L		.984	3.923	1.508	1.9		
	PM 16L-1.5D-E				5.012	1.036			
.787	PM 20R-1.5D-E	R	1.000		6.016	1.291		.284	PM 20..
	PM 20R-2.25D-E			1.260	4.525	1.882	2.2		
	PM 20L-1.5D-E	L			6.016	1.291			
	PM 20L-2.25D-E			1.260	4.525	1.882	2.2		
.984	PM 25R-1.5D-E	R	1.250		7.217	1.606		.362	PM 25..
	PM 25R-2.25D-E			1.575	5.363	2.347	2.9		
	PM 25L-1.5D-E	L			7.217	1.606			
	PM 25L-2.25D-E			1.575	5.363	2.347	2.9		
1.260	PM 32R-1.5D-E	R	1.500		8.043	2.059		.461	PM 32..
	PM 32R-2.25D-E			1.969	6.384	3.004	3.6		
	PM 32L-1.5D-E	L			8.043	2.059			
	PM 32L-2.25D-E			1.969	6.384	3.004	3.6		

Ordering example: 1 piece PM 16R-1.5D-E

Not suitable for drilling!



Details see page
75

	d_A [inch]			
PM 16..	**.750**	7883214/M3,0X5,7/T08	7724106/TORX T08	
PM 20..	**1.000**	7722111/M3,5X7,2/T15	7724103/TORX T15	
PM 25..	**1.250**	7883209/M3,5X8,6/T15	7724103/TORX T15	
PM 32..	**1.500**	10001785/M5,0X10,8/T20	7724104/TORX T20	

42-43

39

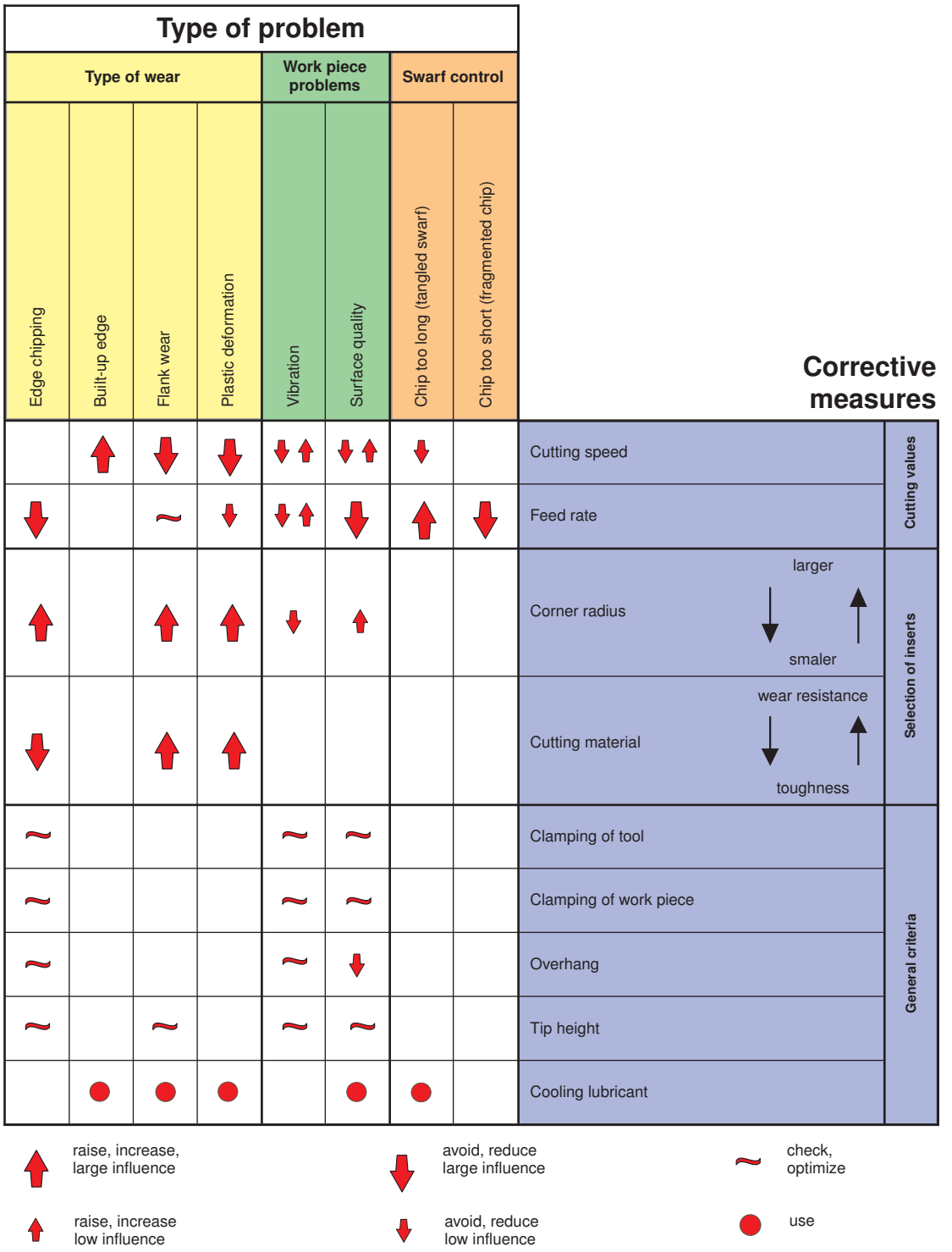
Cutting data
Grades, material

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ 0.15% C	1	125
		annealed	.15% - .45% C	2	150 - 250
		tempered	≥ .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
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Gray cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminum wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminum 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	–
S	Heat resistant alloys	annealed	Fe-base	31	200
		hardened	Fe-base	32	280
		annealed	Ni or Co-base	33	250
		hardened	Ni or Co-base 30 - 58 HRC	34	–
		cast	Ni or Co-base 1500 - 2200 N/mm²	35	–
	Titanium alloys		pure titanium	36	R_m 440*
			alpha + beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		40	55 HRC

* R_m = ultimate tensile strength, measured in MPa

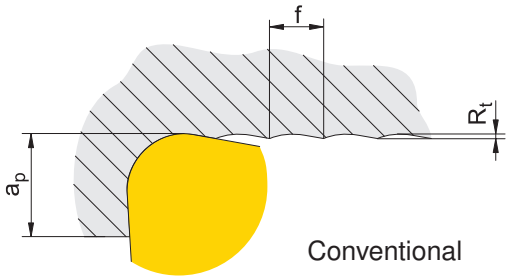
Cutting data
Grades, material

Uncoated carbide			Coated carbide			
H210T v_c [sfm]	**H216T/H10T** v_c [sfm]	**TSM30** v_c [sfm]	**CTC1425** v_c [sfm]	**CTC1435** v_c [sfm]	**CTP2440** v_c [sfm]	**CM45** v_c [sfm]
–	–	–	492 - 984	459 - 918	394 - 820	197 - 754
–	–	–	394 - 722	328 - 656	262 - 590	197 - 608
–	–	–	328 - 656	262 - 590	197 - 492	164 - 494
–	–	–	394 - 722	328 - 656	262 - 590	197 - 608
–	–	–	328 - 585	262 - 525	197 - 492	164 - 494
–	–	–	262 - 492	230 - 459	197 - 394	164 - 328
–	–	–	361 - 623	328 - 590	262 - 525	197 - 458
–	–	–	230 - 492	197 - 459	164 - 394	131 - 328
–	–	–	361 - 722	328 - 656	164 - 656	131 - 656
–	–	–	328 - 585	262 - 492	164 - 492	131 - 492
–	–	–	394 - 722	328 - 656	164 - 656	131 - 656
–	–	–	328 - 656	328 - 590	164 - 590	131 - 590
–	–	–	–	–	164 - 328	131 - 328
–	–	–	–	–	164 - 262	131 - 262
458 - 656	394 - 608	262 - 458	426 - 918	394 - 820	–	328 - 590
328 - 525	295 - 458	197 - 394	426 - 918	394 - 820	–	262 - 608
252 - 656	494 - 558	295 - 492	394 - 918	361 - 820	–	328 - 590
361 - 492	295 - 494	197 - 361	394 - 918	361 - 820	–	262 - 608
525 - 722	458 - 656	328 - 590	361 - 918	328 - 820	–	328 - 656
458 - 590	394 - 252	262 - 458	361 - 918	328 - 820	–	295 - 608
394 - 9840	328 - 8200	262 - 6560	–	–	328 - 1640	262 - 6560
394 - 8200	328 - 6560	262 - 4920	–	–	328 - 984	262 - 4920
394 - 6560	328 - 4920	262 - 4920	–	–	328 - 1640	262 - 4920
394 - 5904	328 - 4920	262 - 4264	–	–	328 - 984	262 - 4264
394 - 3280	328 - 2624	262 - 1968	–	–	328 - 656	262 - 1968
394 - 2624	328 - 1968	262 - 1312	–	–	328 - 1640	262 - 1312
394 - 2624	328 - 1968	262 - 1312	–	–	328 - 1640	262 - 1312
394 - 1968	328 - 1312	262 - 984	–	–	328 - 984	262 - 984
394 - 1312	328 - 984	262 - 656	–	–	328 - 984	262 - 656
295 - 722	262 - 590	197 - 525	–	–	262 - 590	197 - 525
262 - 656	197 - 492	164 - 458	–	–	197 - 492	164 - 458
394 - 984	328 - 820	262 - 656	–	–	328 - 820	262 - 656
115- 164	98 - 148	82 - 131	–	–	66 - 164	66 - 164
82 - 131	66 - 115	66 - 98	–	–	66 - 131	66 - 131
82 - 131	66 - 115	66 - 98	–	–	49 - 82	49 - 82
66 - 98	59 - 98	49 - 82	–	–	33 - 66	33 - 66
49 - 82	49 - 852	49 - 82	–	–	33 - 66	33 - 66
262 - 458	197 - 394	98 - 328	–	–	164 - 394	164 - 394
131 - 328	98 - 262	82 - 197	–	–	98 - 164	98 - 164
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–

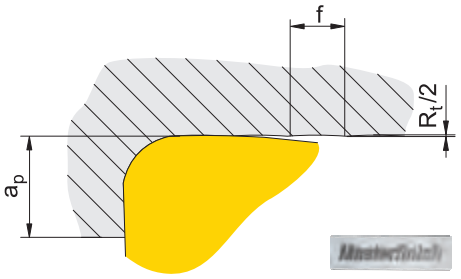

Type of problem
Type of wear
Work piece problems
Swarf control
Edge chipping
Built-up edge
Flank wear
Plastic deformation
Vibration
Surface quality
Chip too long (tangled swarf)
Chip too short (fragmented chip)
Corrective measures
Cutting speed
Feed rate
Corner radius
larger
smaler
Cutting material
wear resistance
toughness
Clamping of tool
Clamping of work piece
Overhang
Tip height
Cooling lubricant
Cutting values
Selection of inserts
General criteria
raise, increase, large influence
raise, increase low influence
avoid, reduce large influence
avoid, reduce low influence
check, optimize
use

Operating principle / benefit

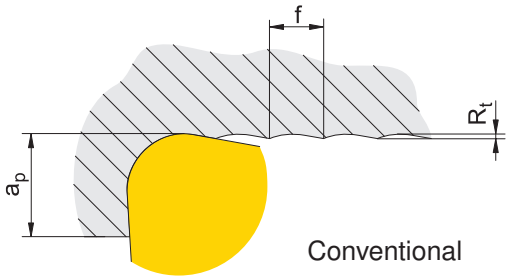
Improved surface finish
With the same feed rate an insert with 'Masterfinish' cutting edge reaches a roughness value R_a which is many times higher than the one of a conventional insert.



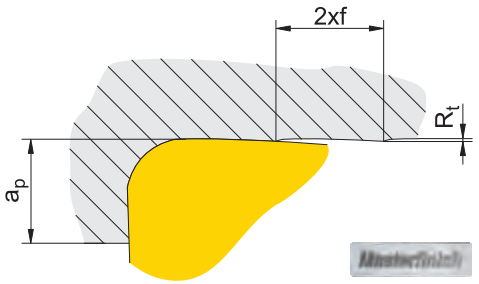
Conventional



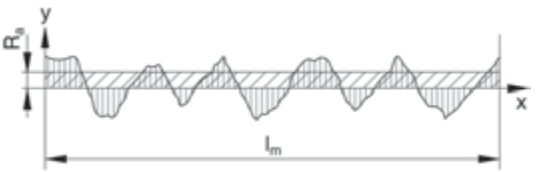
Shorter machining time
If you want to reach the same R_a-value as with a standard insert, a twice as high feed rate can be applied for the insert with 'Masterfinish' cutting edge (= shorter production time per component!).



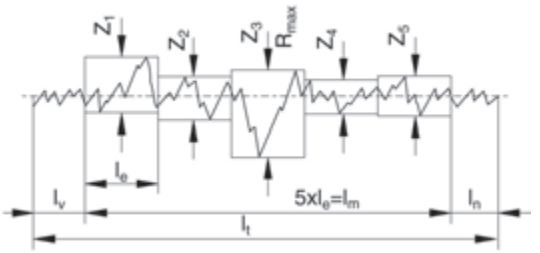
Conventional



ISO-DIN measured surface roughness

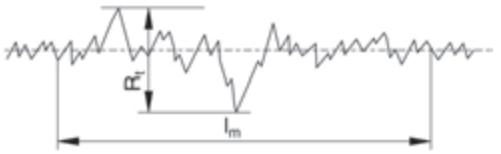


Average roughness value R_a (DIN 4768)
This is defined as the arithmetical mean of the absolute sums of the roughness profile R within the entire measured length l_m.



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 ... Z_5
This is the vertical distance between the highest and the lowest point of the roughness profile R within a single measured length l_e.



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

Surface quality according to manufacturing method

Surface symbol according to ISO 1302	new	.025	.05	.1	.2	.4	.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]	.025	.05	.1	.2	.4	.8	1.6	3.2	6.3	12.5	25	50
Surface roughness depth	R_z [µm]	.25	.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													

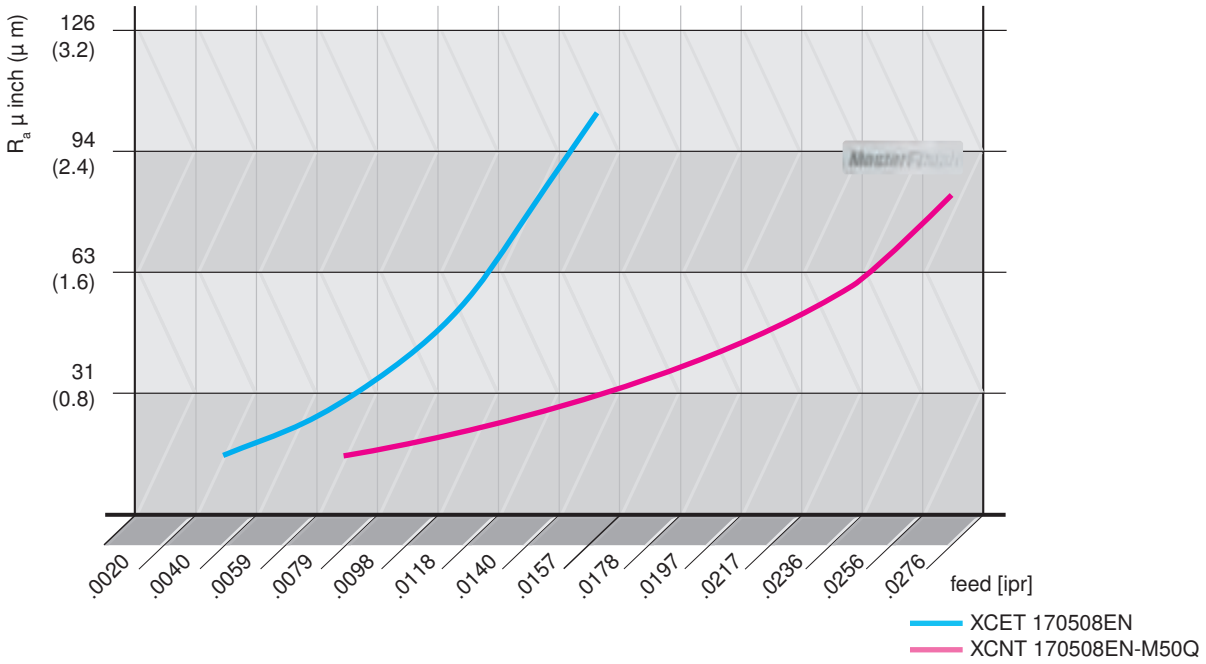
≙ Surface roughness (produced through special methods)
≙ Surface roughness (produced through normal workshop methods)
≙ Surface roughness (produced through rough machining methods)

EcoCut / ProfileMaster
Surface finish / feed rate

EcoCut

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

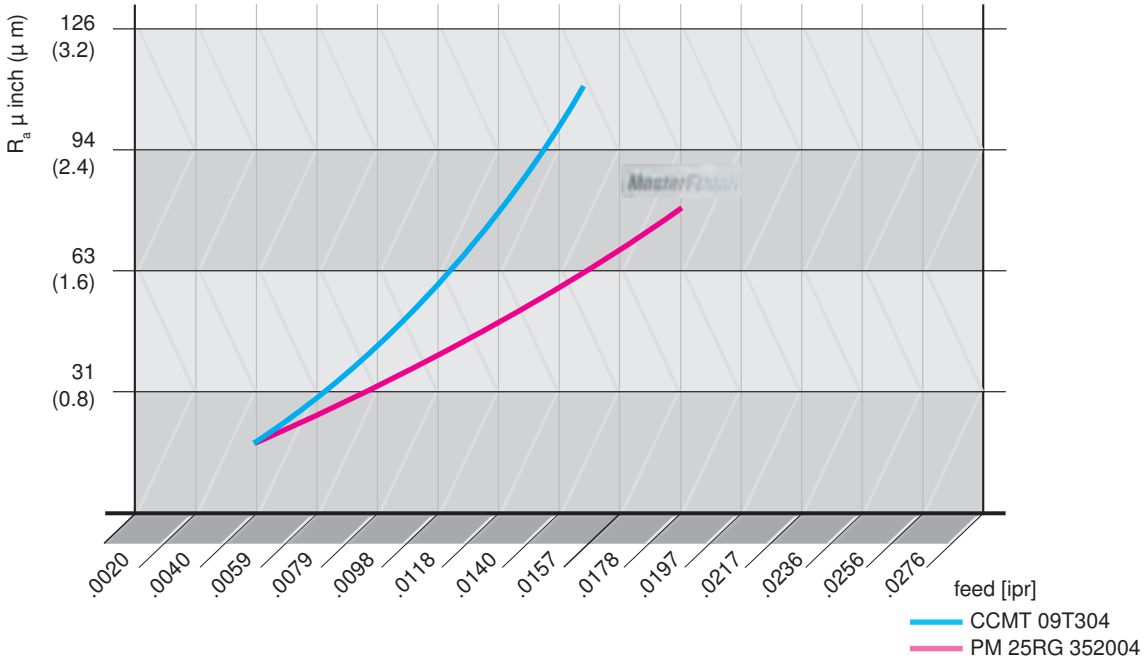
v_c = 492 sfm
a_p = .0394 inch
r = .0315 inch



ProfileMaster

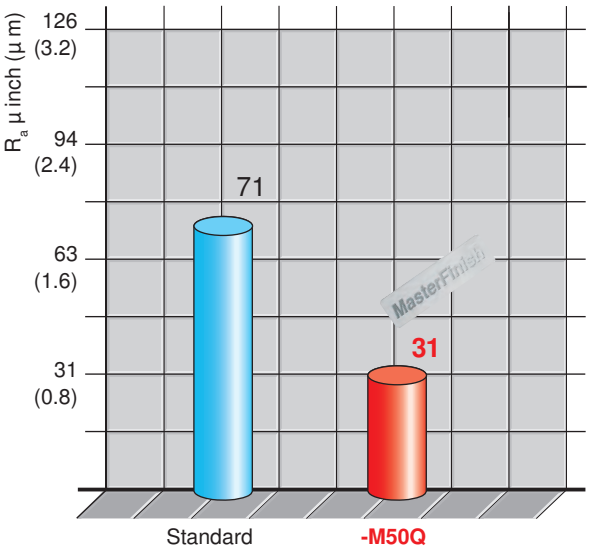
Material: Ck60 (1.1221)
with a standard boring bar and ProfileMaster

v_c = 492 sfm
a_p = .0394 inch

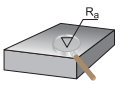


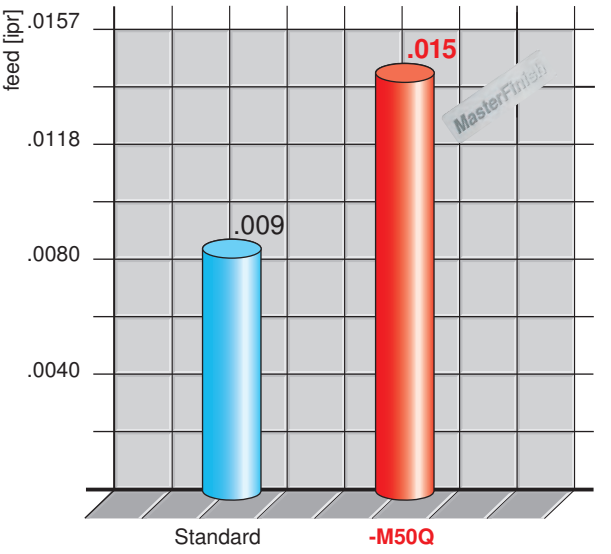
R = .0157 inch corner radius / steel

f = .0098 inch constant



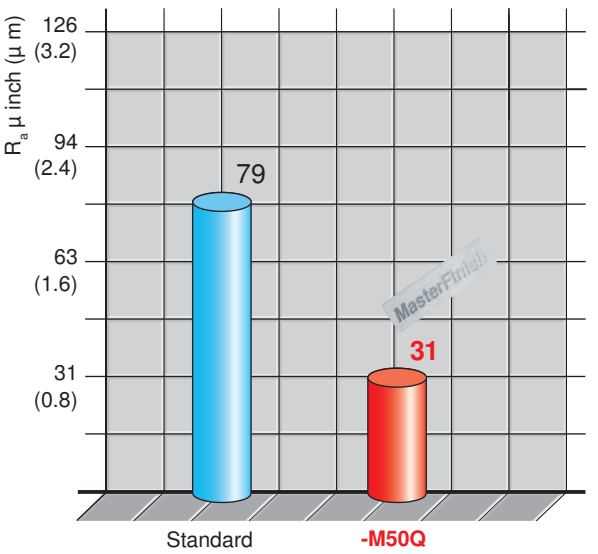
To achieve R_a = 1.6 µm



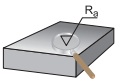


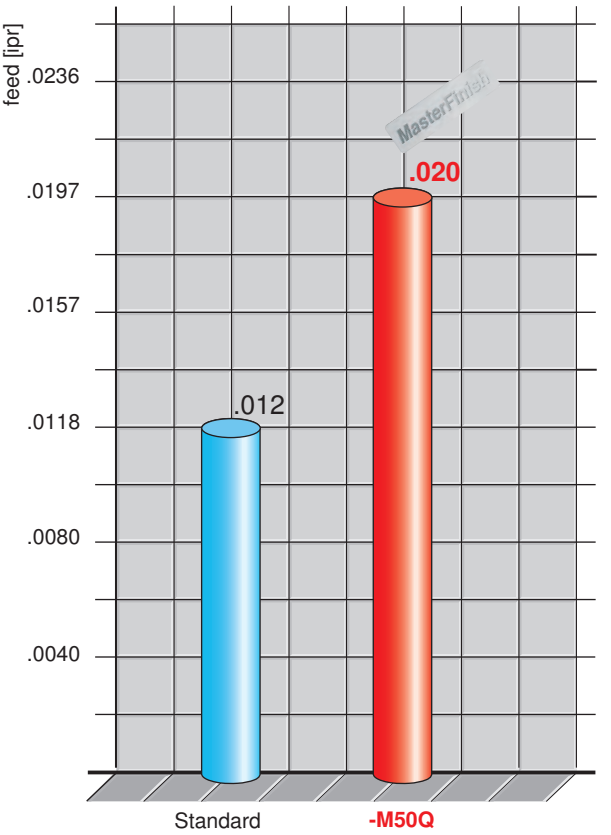
R = .0315 inch corner radius / steel

f = .0138 inch constant



To achieve R_a = 1.6 µm

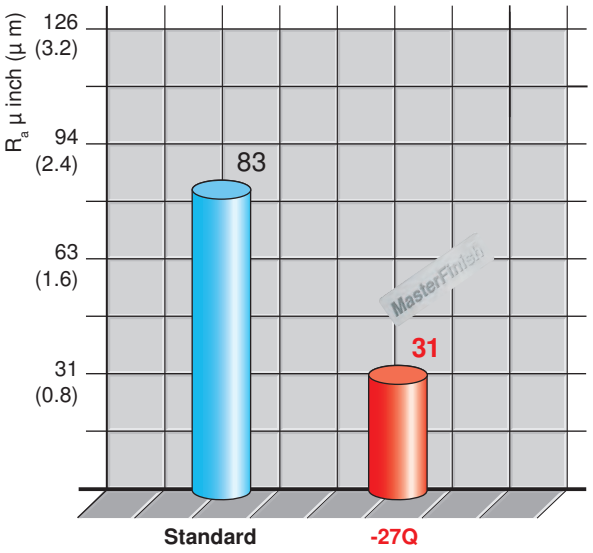




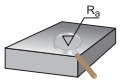
EcoCut
Surface finish / feed rate

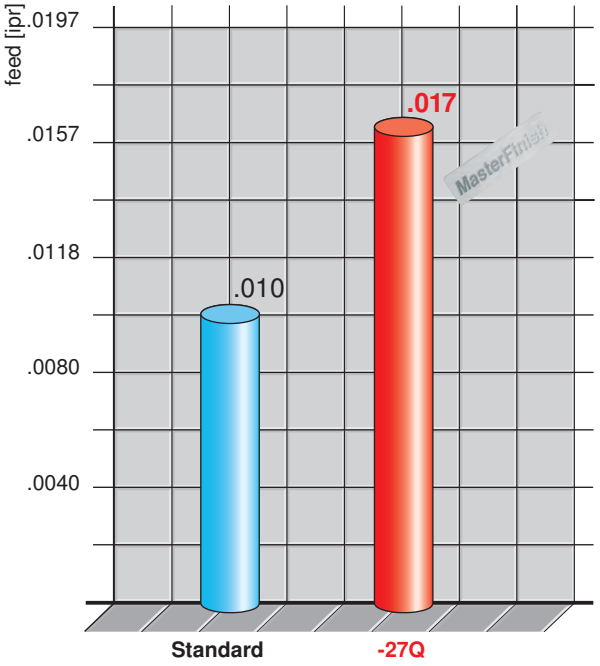
R = .0157 inch corner radius / aluminum

f = .0098 inch constant



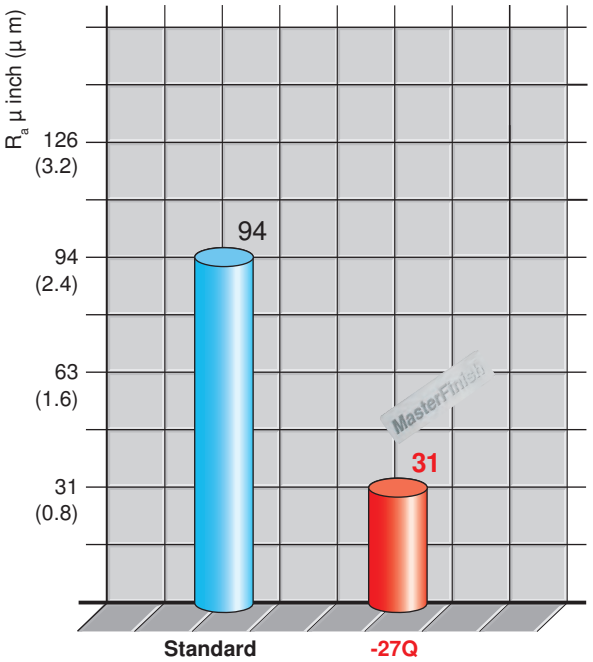
To achieve R_a = 1.6 µm



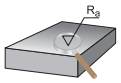


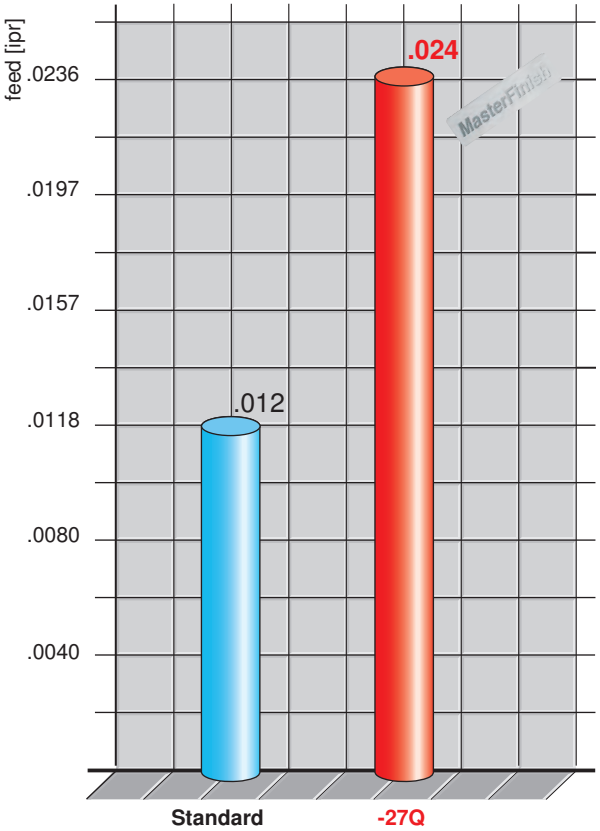
R = .0315 inch corner radius / aluminum

f = .0177 inch constant



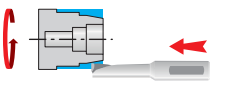
To achieve R_a = 1.6 µm



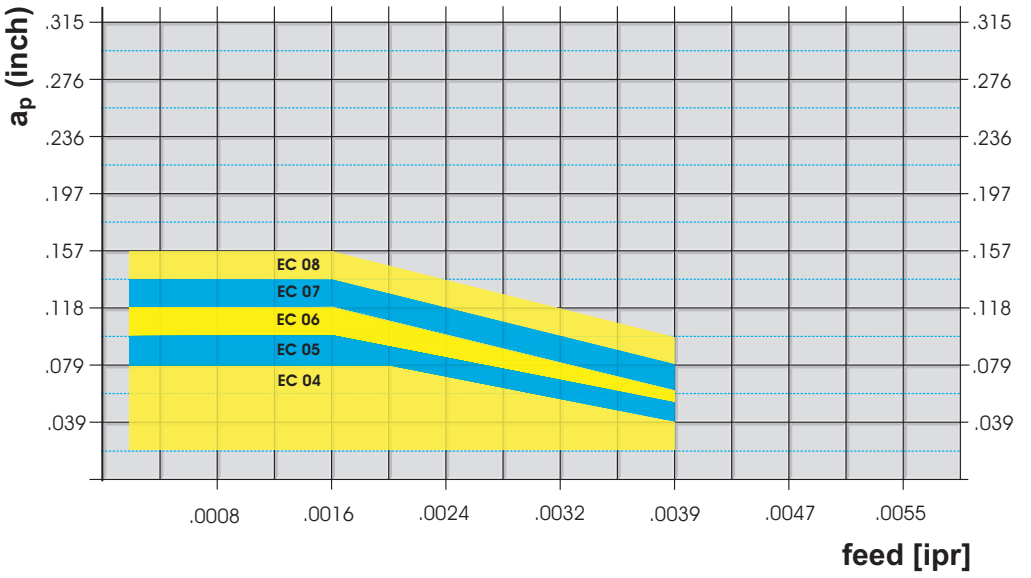


EcoCut Mini
Depth of cut / feed rate

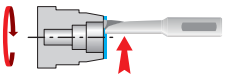
Longitudinal turning



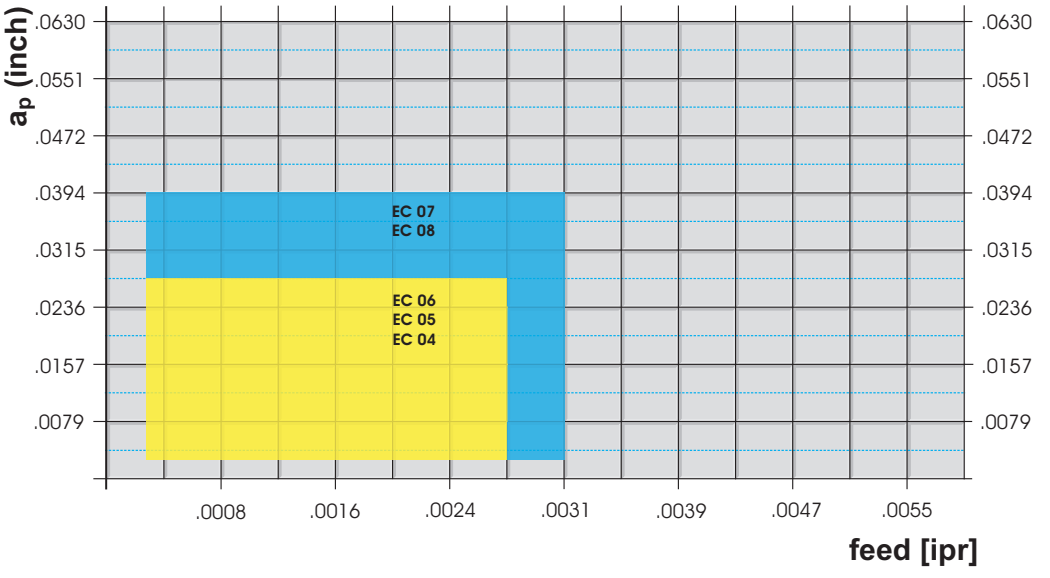
2.25D



Face turning

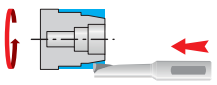


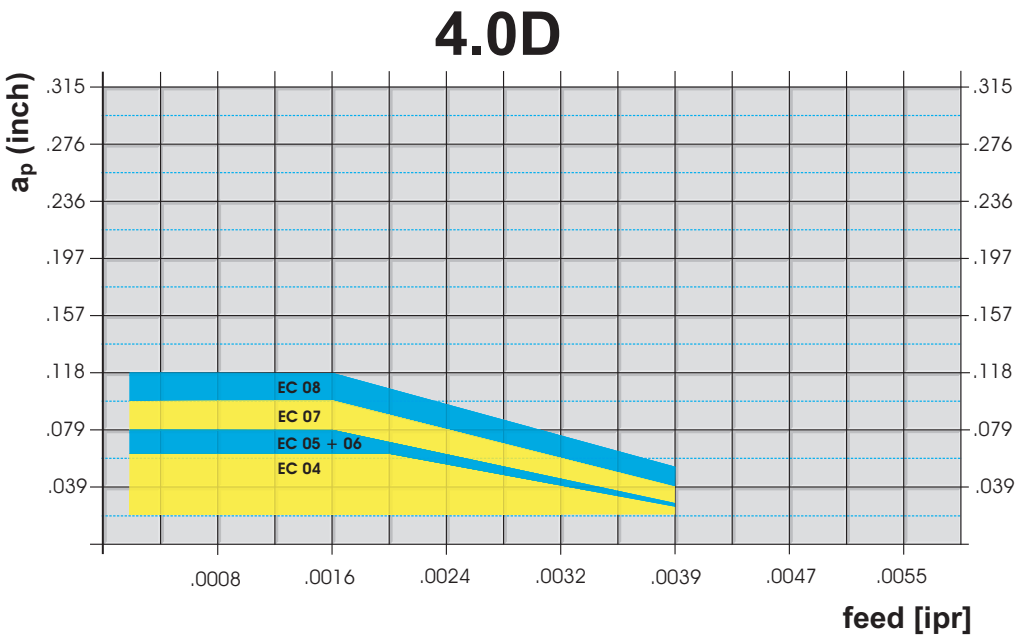
2.25D



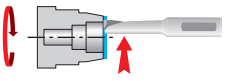
EcoCut Mini
Depth of cut / feed rate

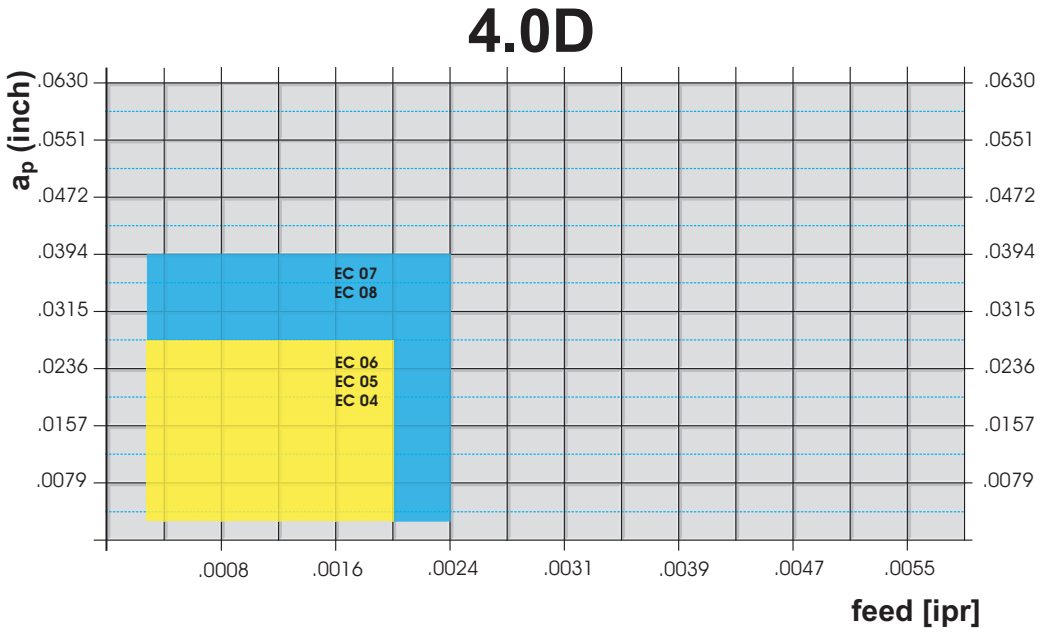
Longitudinal turning





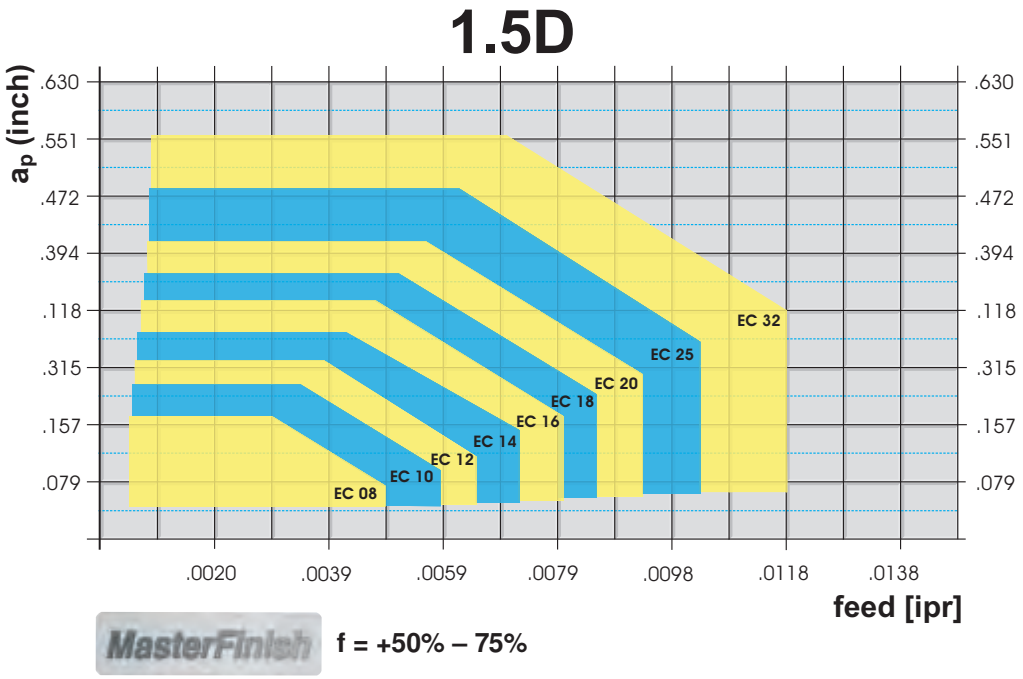
Face turning





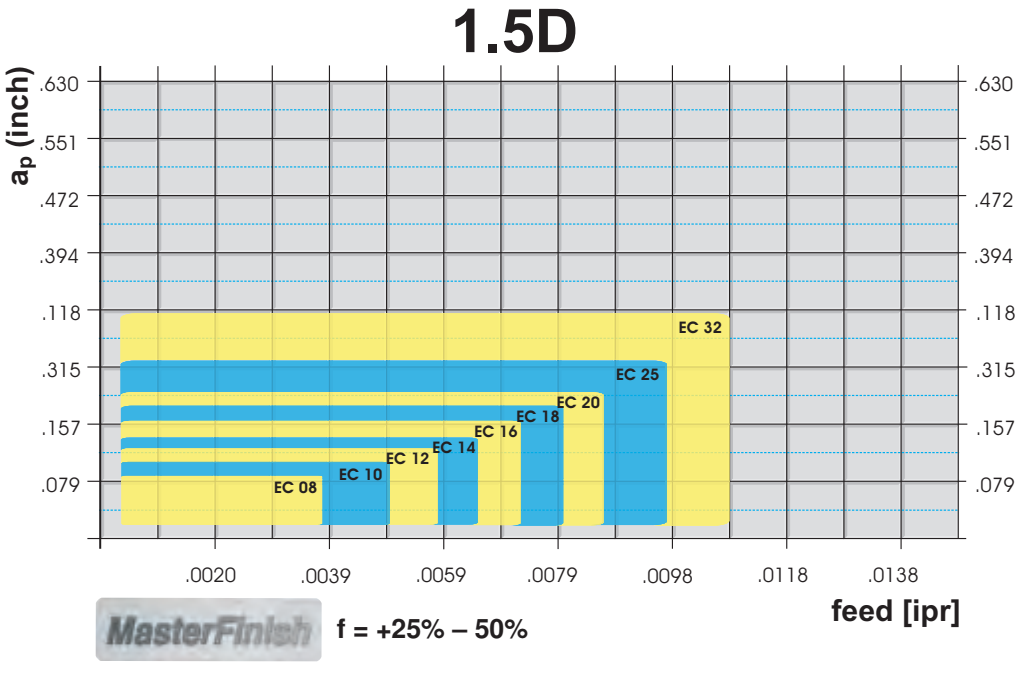
EcoCut Classic
Depth of cut / feed rate

Longitudinal turning



MasterFinish f = +50% – 75%

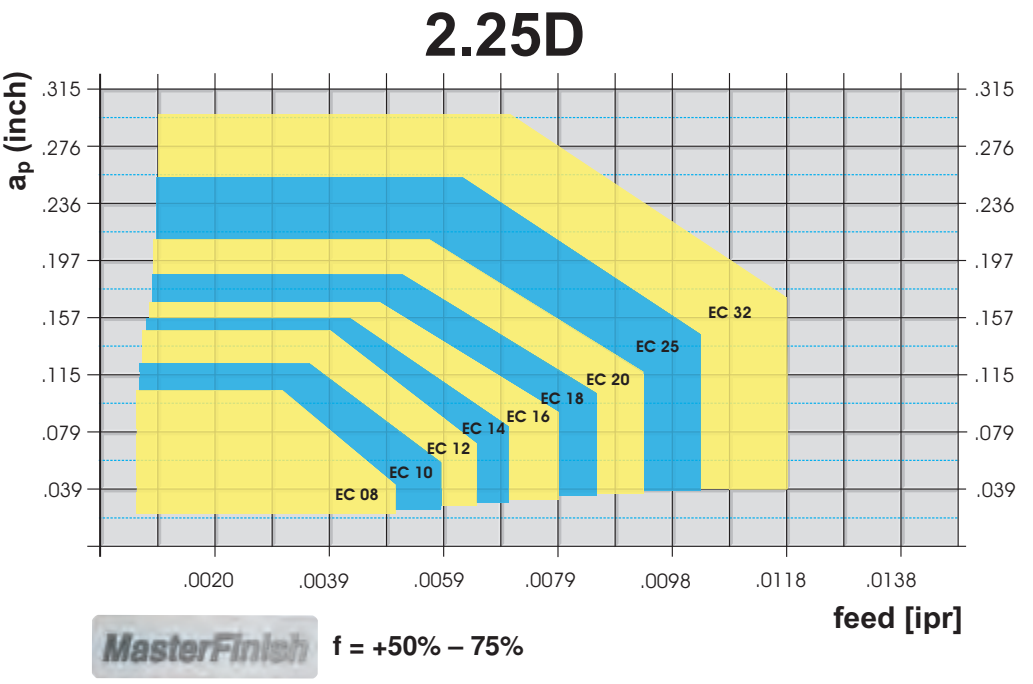
Face turning



MasterFinish f = +25% – 50%

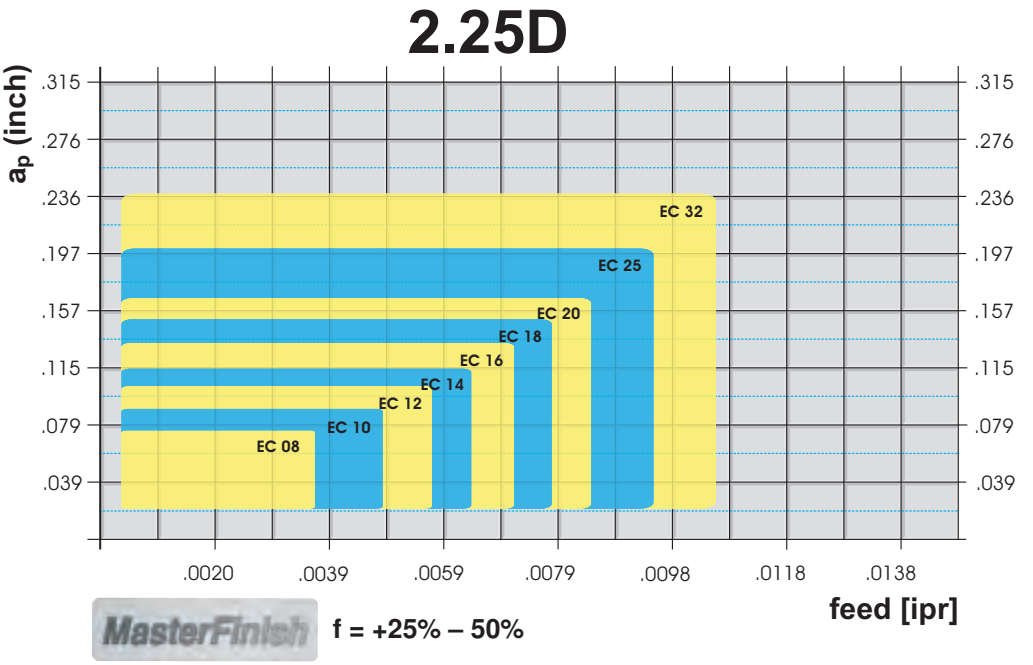
EcoCut Classic
Depth of cut / feed rate

Longitudinal turning



MasterFinish f = +50% – 75%

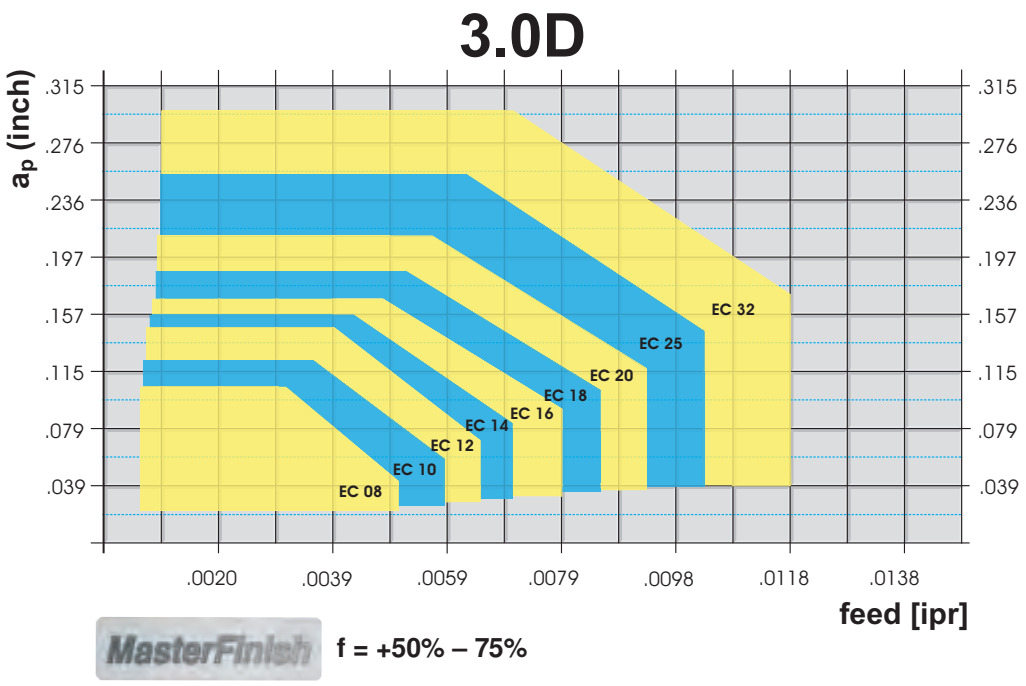
Face turning



MasterFinish f = +25% – 50%

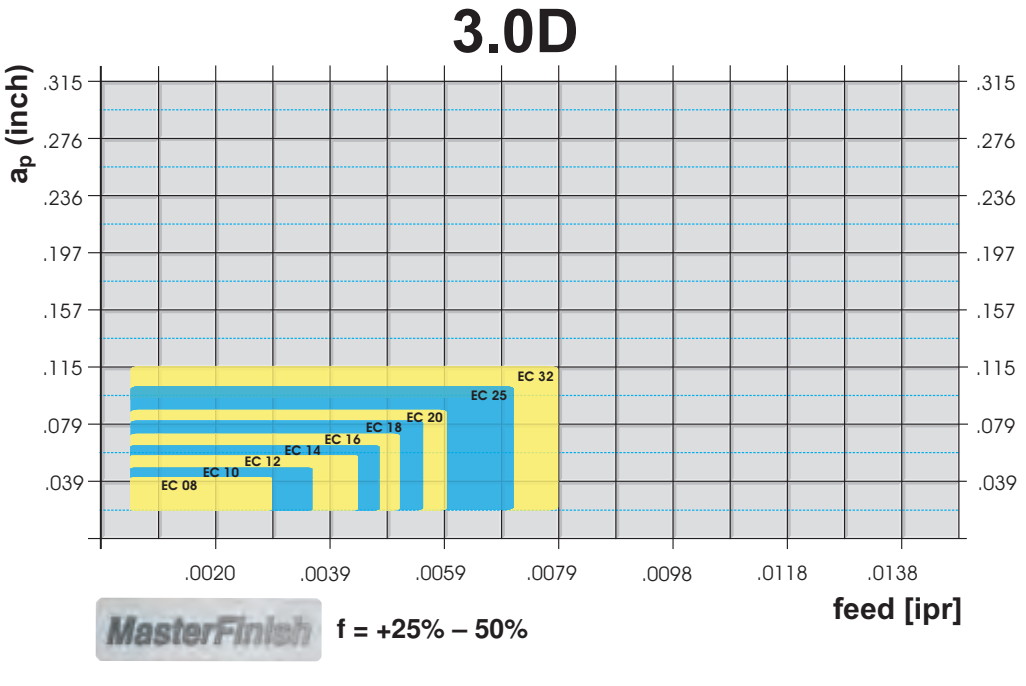
EcoCut Classic
Depth of cut / feed rate

Longitudinal turning



MasterFinish f = +50% – 75%

Face turning

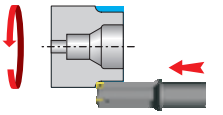


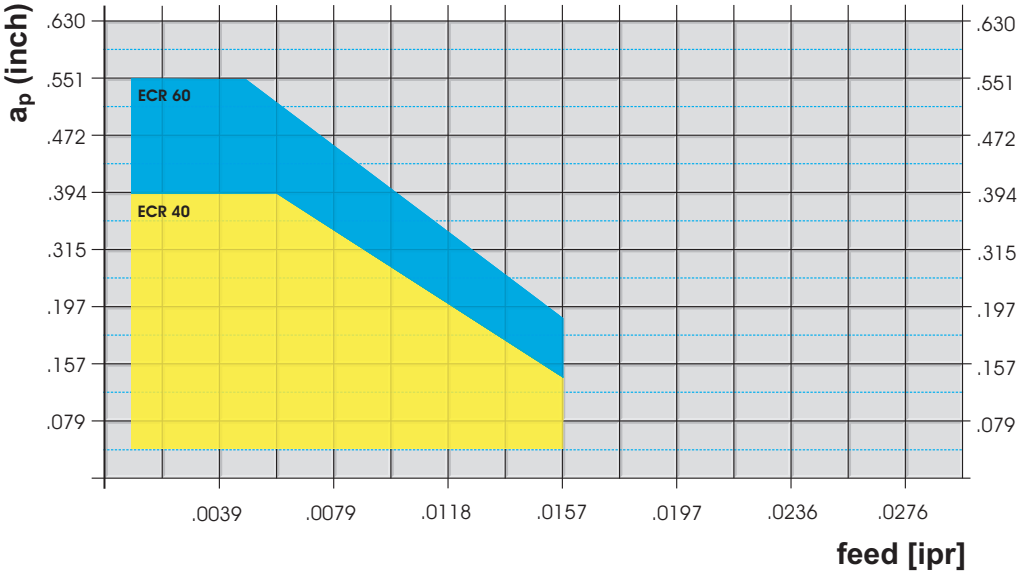
MasterFinish f = +25% – 50%

EcoCut Rebore

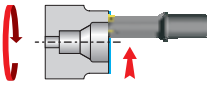
Depth of cut / feed rate

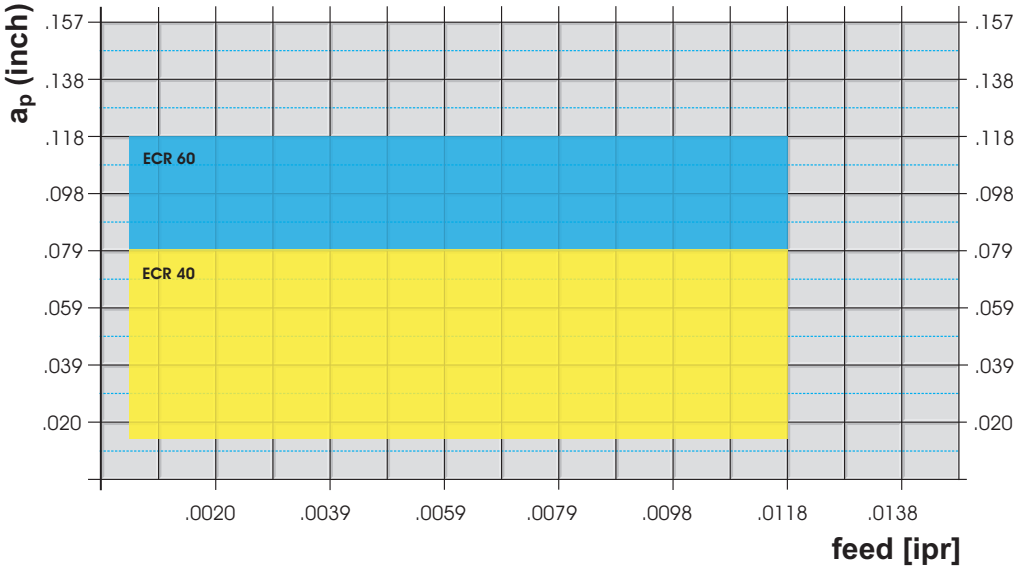
Longitudinal turning





Face turning

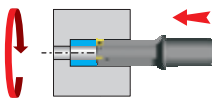


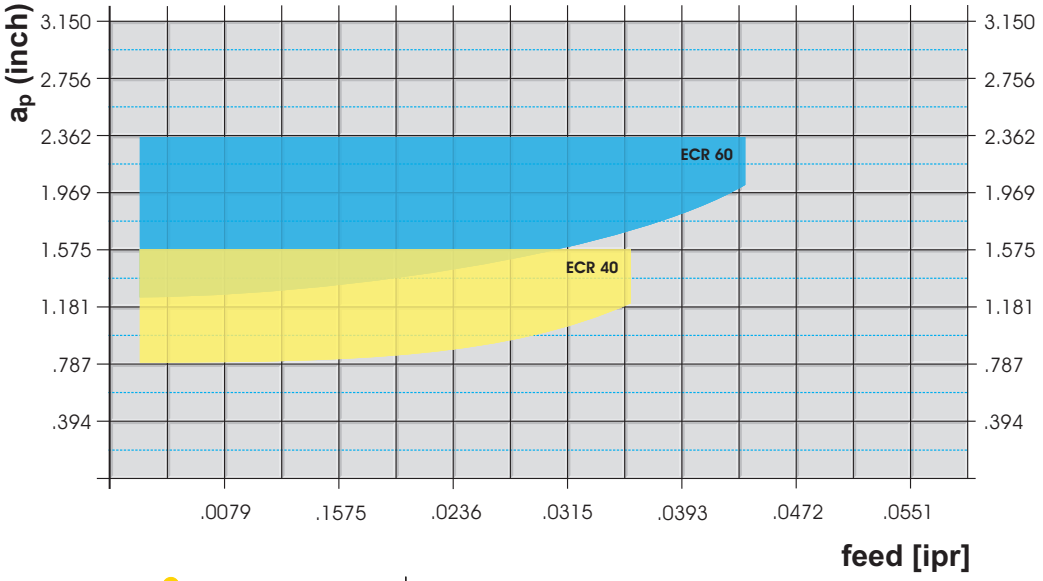


EcoCut Rebore

Depth of cut / feed rate

Counterboring



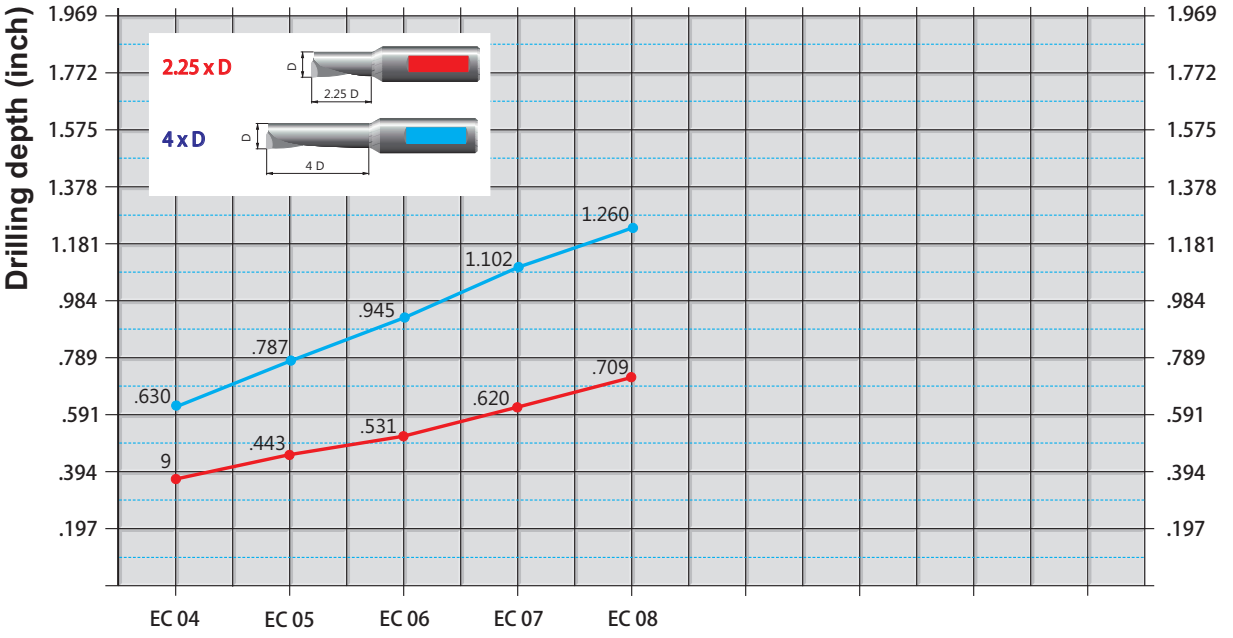


Tools	Initial bore
Ø 1.575 inch	Ø min = .797 inch
Ø 2.362 inch	Ø min = 1.260 inch

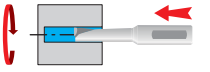
EcoCut Mini

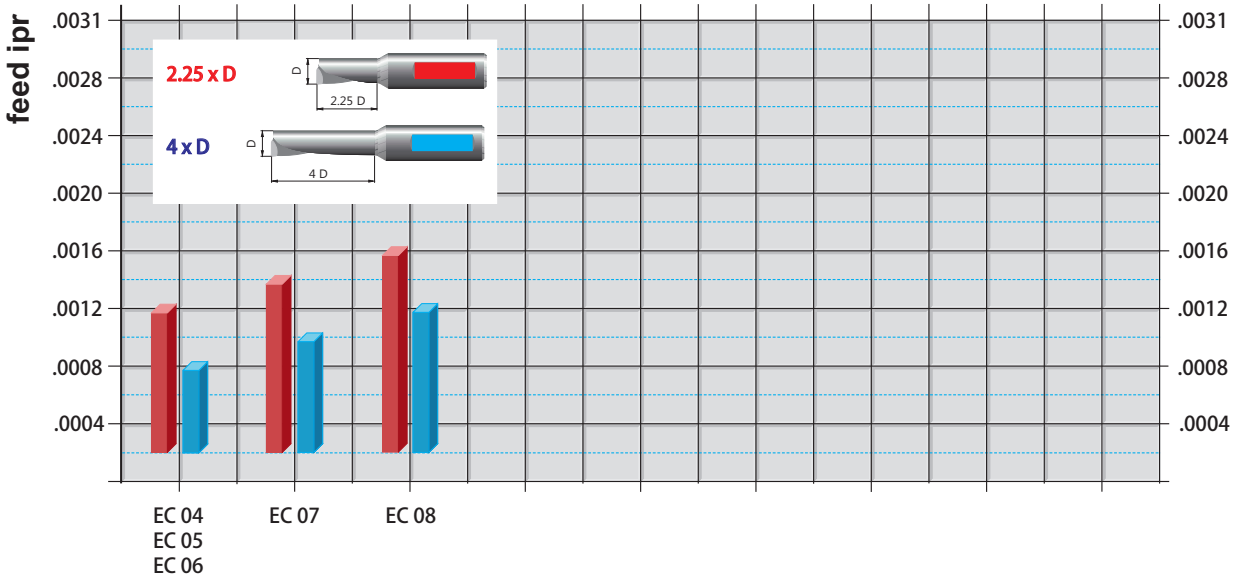
Drilling depth / feed rate

Drilling depth



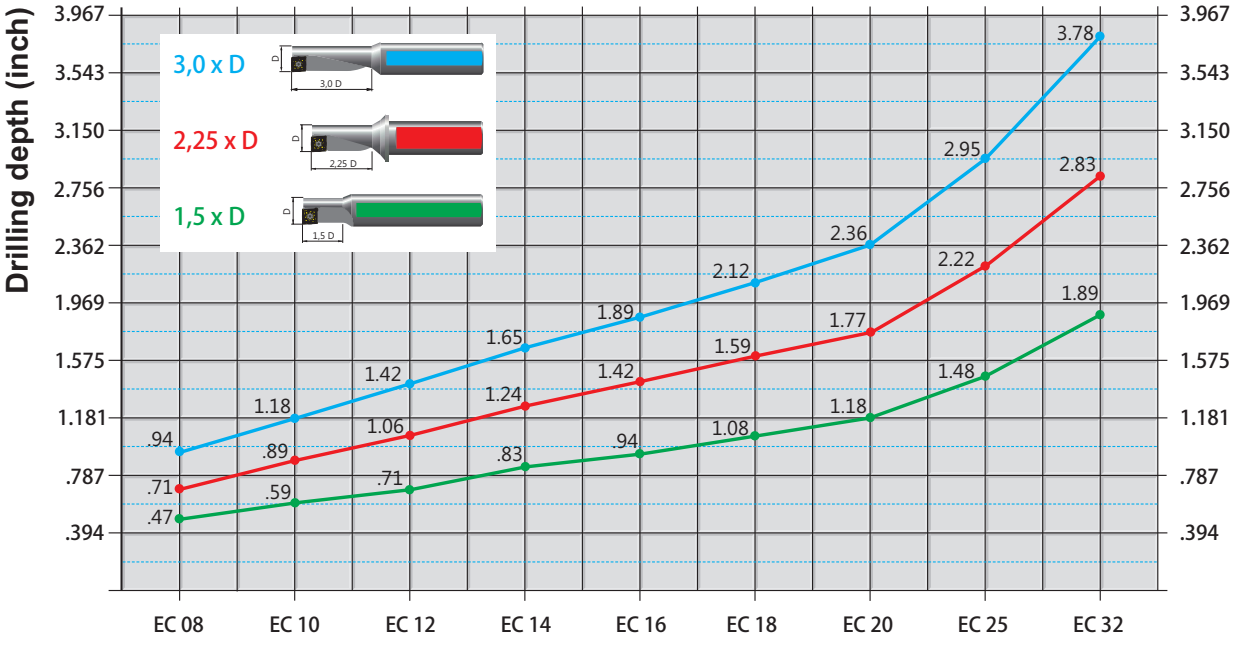
Drilling feed rate



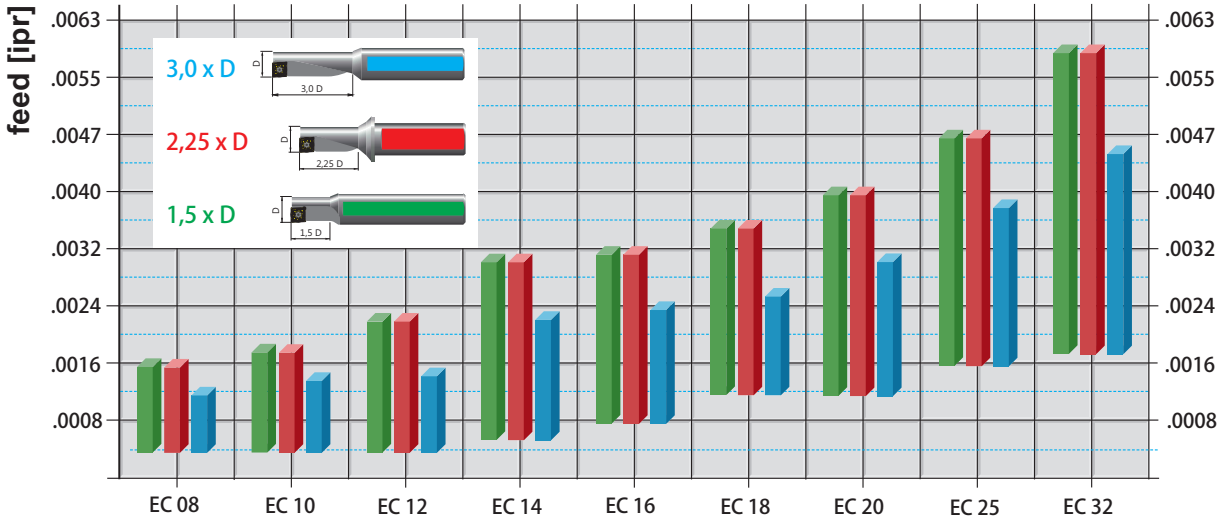


EcoCut Classic
Drilling depth / feed rate

Drilling depth

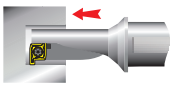


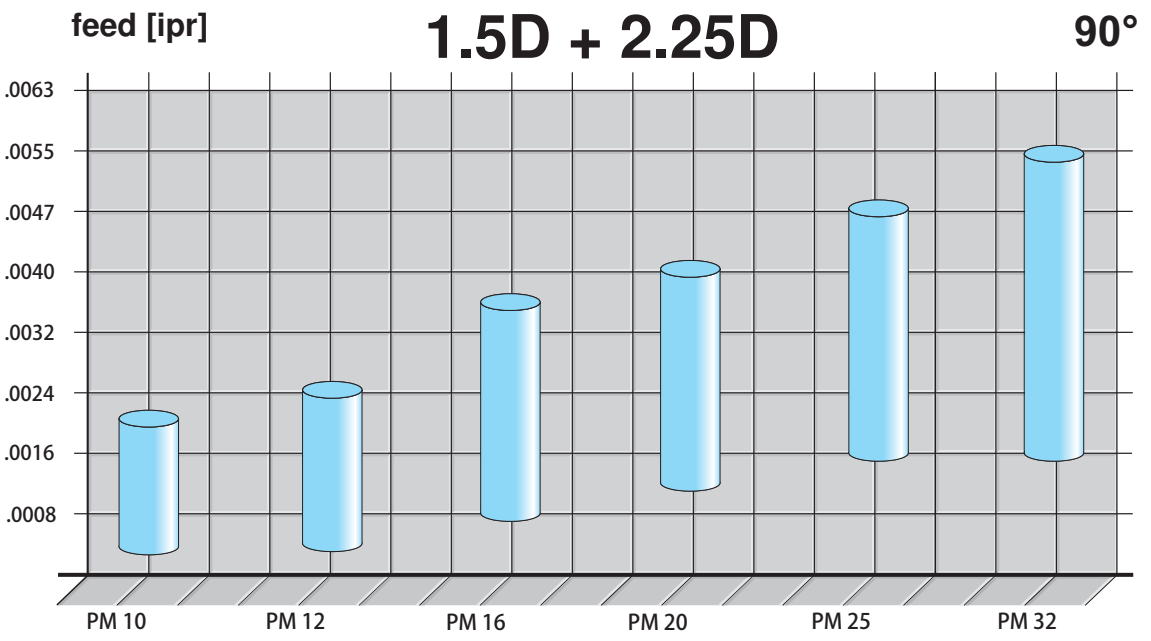
Drilling feed rate



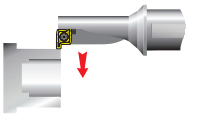
MasterFinish f = +20% – 30%

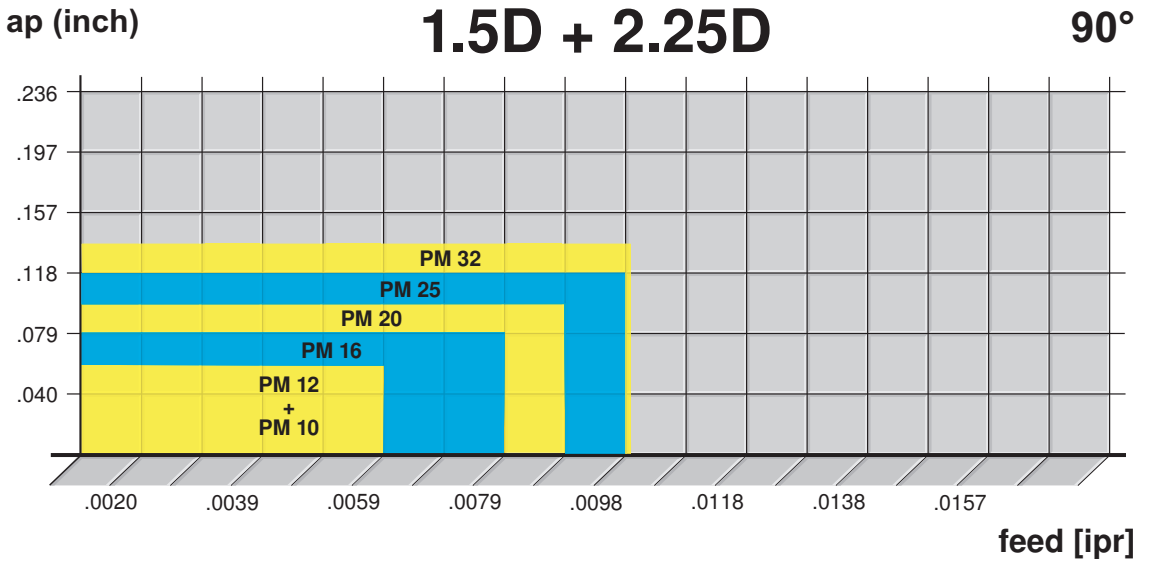
Drilling



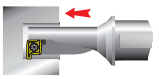


Face turning

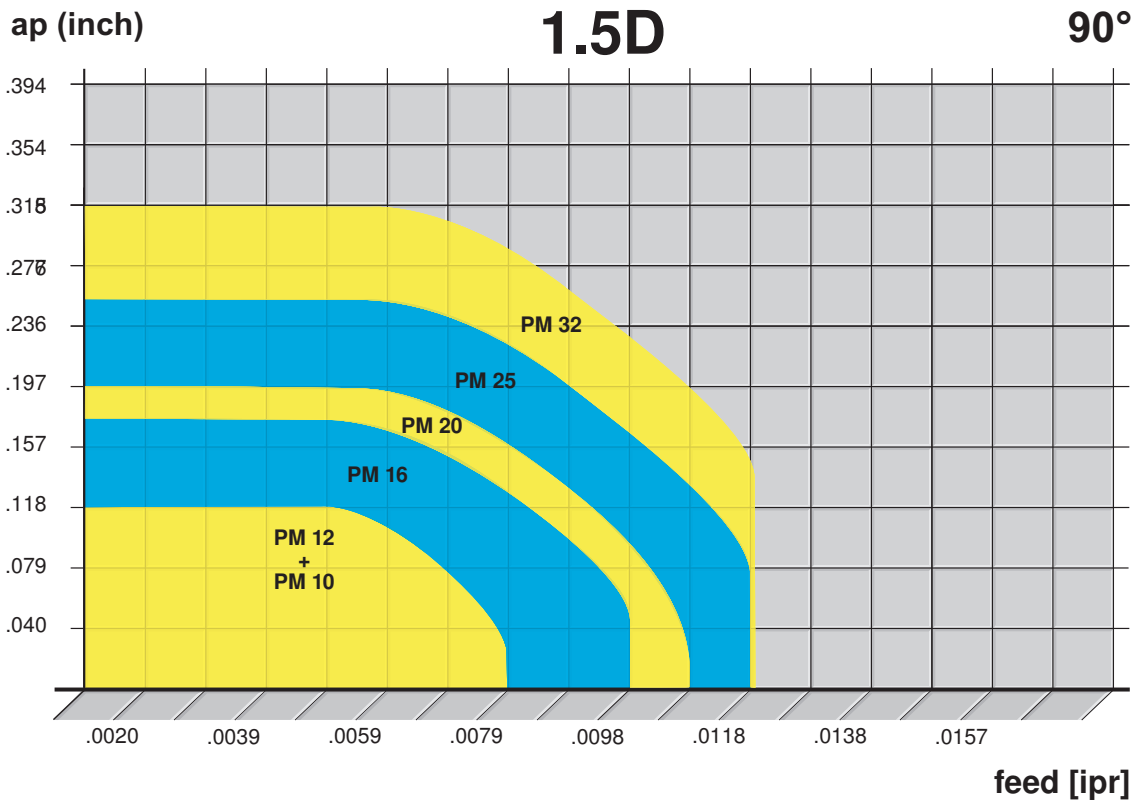


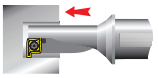


Longitudinal turning

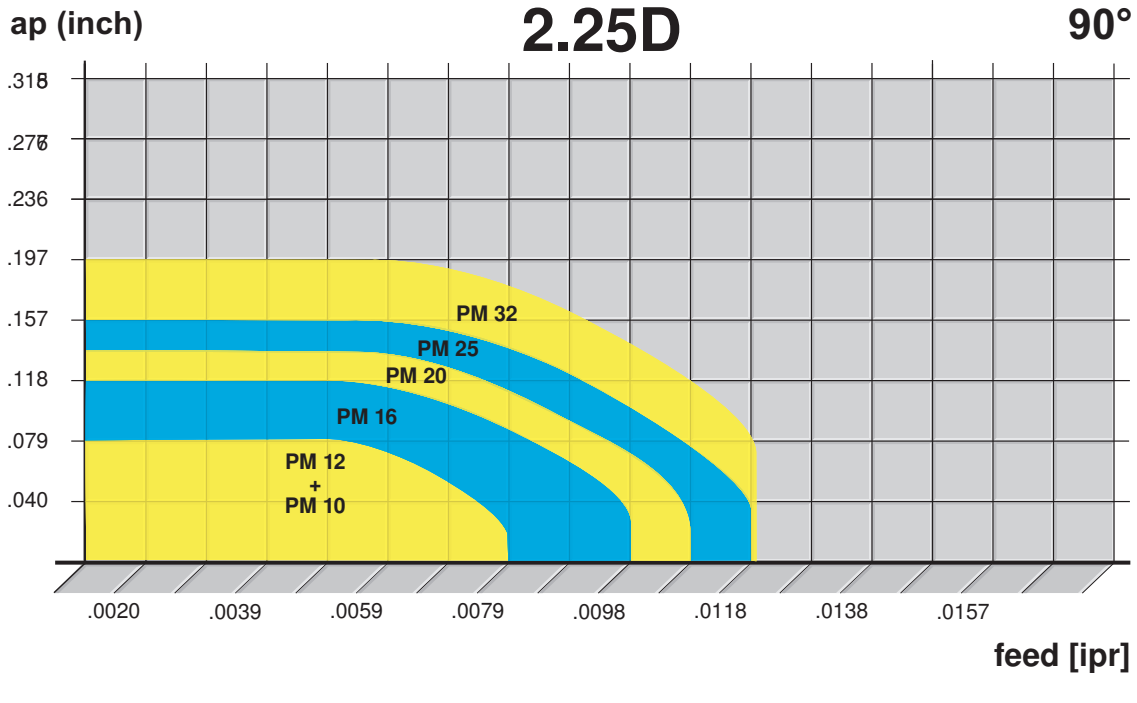


1.5D

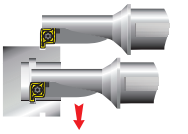


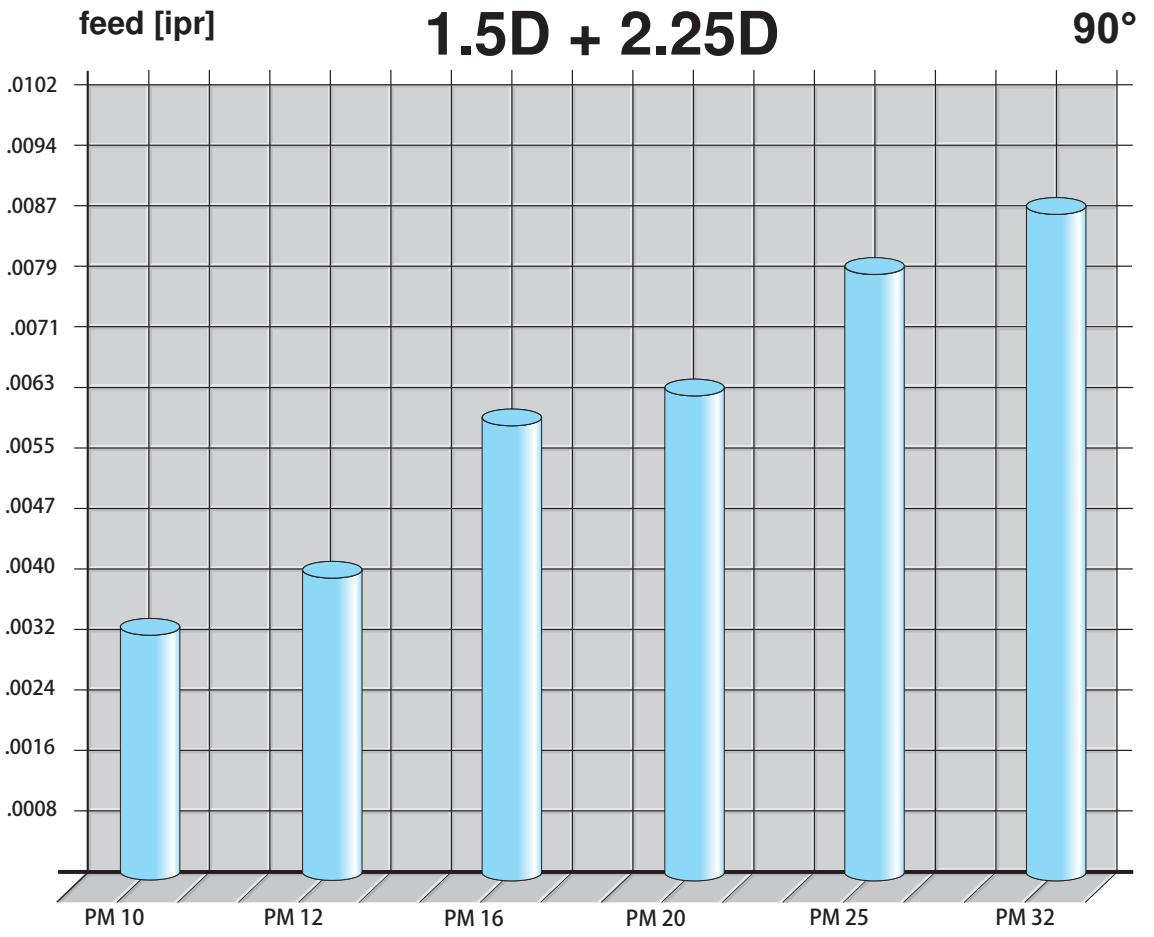


2.25D



Radial grooving - internal + external

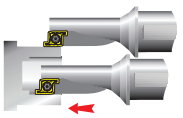


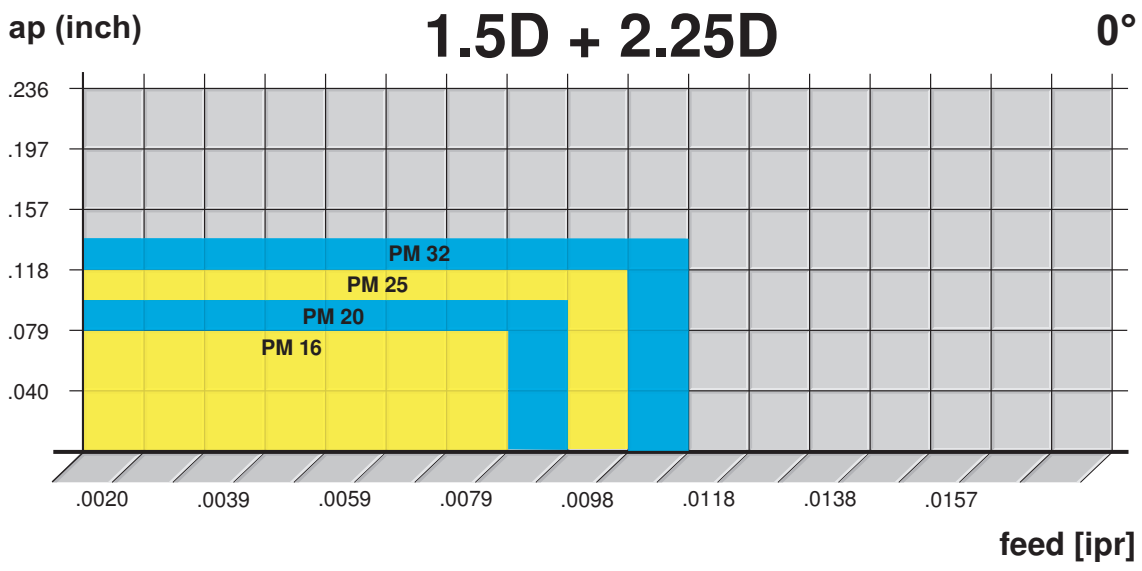


ProfileMaster

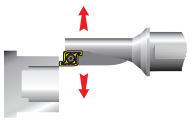
Depth of cut / feed rate

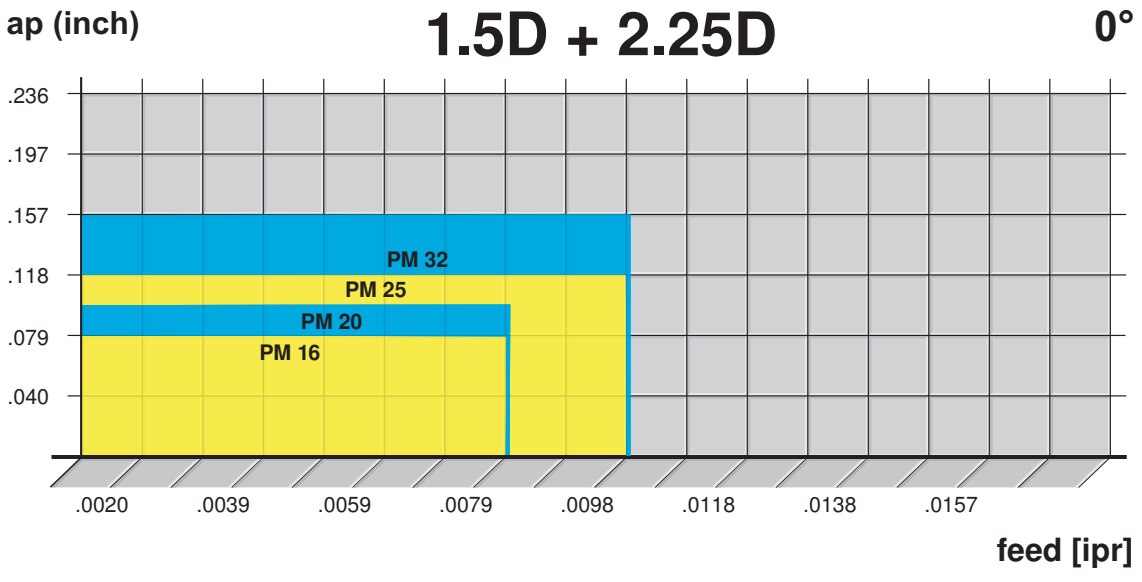
Longitudinal turning



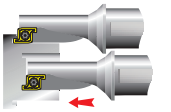


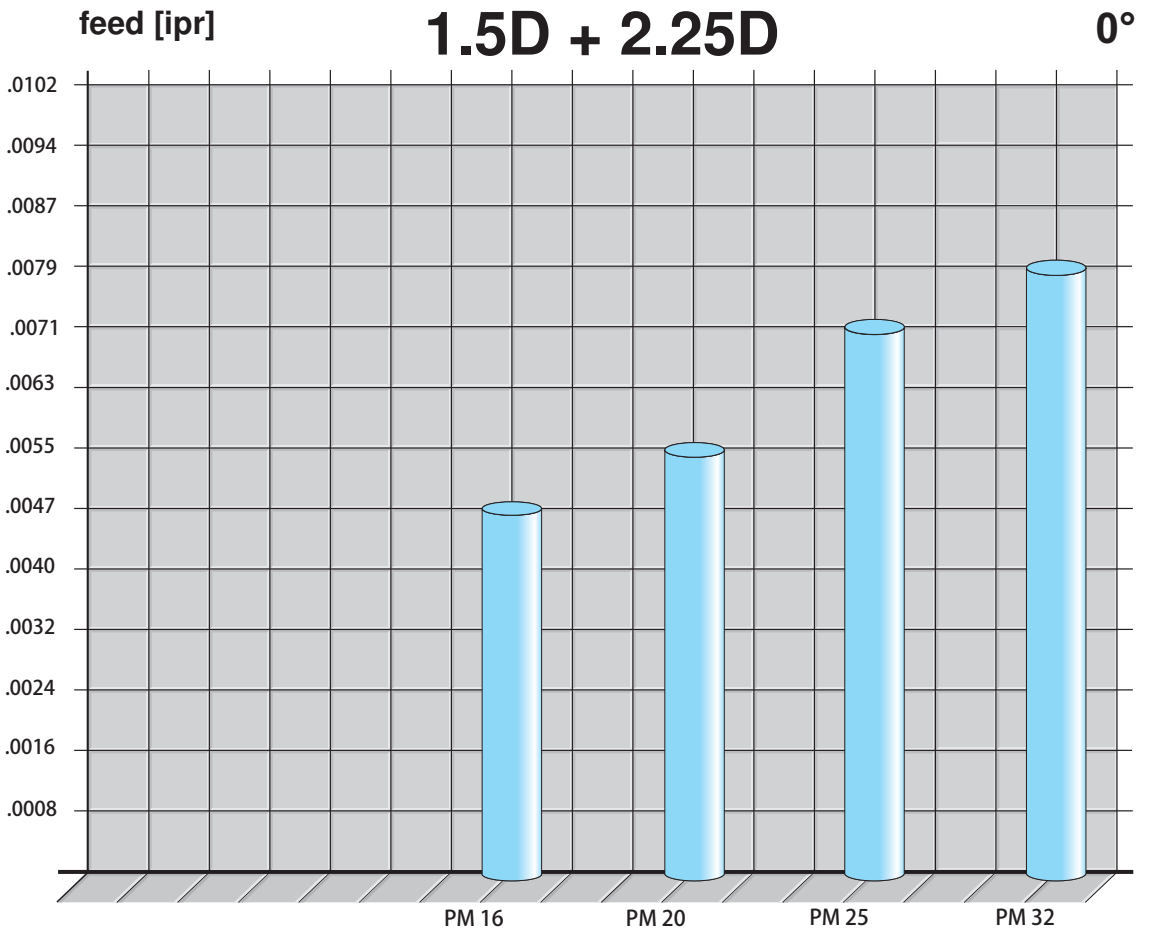
Face turning





Axial grooving - internal + external

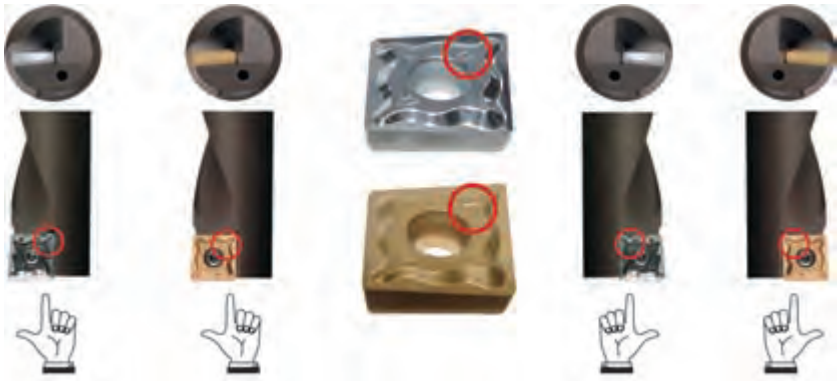




With PM 10 and PM 12 axial grooving is not possible.

Mounting of the insert

For tools Ø .315 inch right-hand or left-hand inserts are required. From Ø .394 - 1.260 inch neutral inserts are utilized.

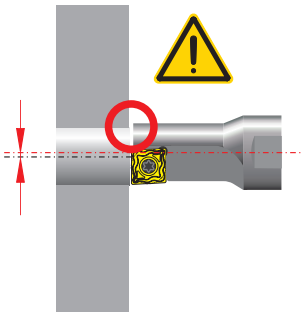


Left-hand tool

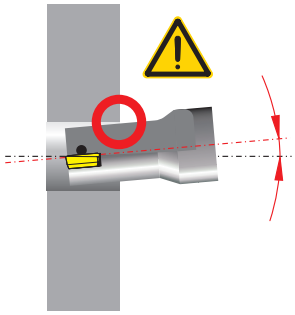
Right-hand tool

Axial displacement of the machine

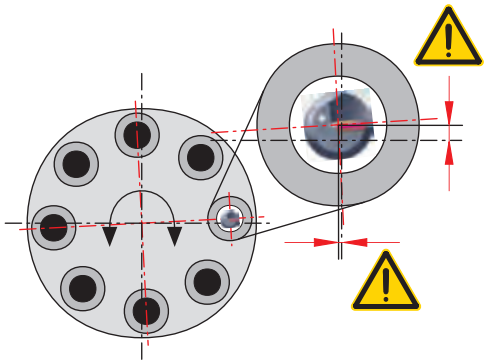
Displacement in x-direction



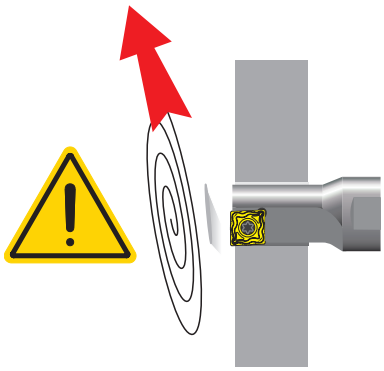
Angular error



Turret position error

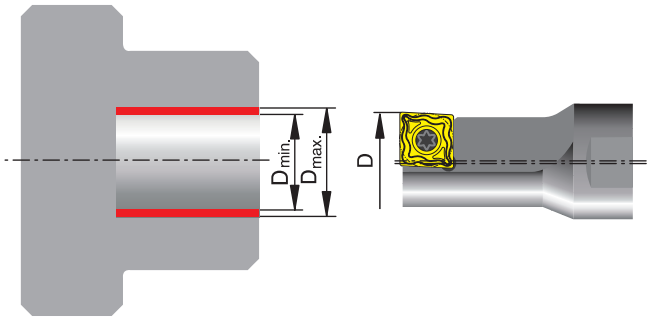


Through hole



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

Off-center drilling



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

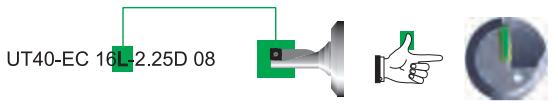
Type of tool	Nominal tool D (inch)	Work piece bore diameter D_{min} (inch)	Work piece bore diameter D_{max} (inch)
EC 04 L/R - 2.25D	.157	.154	.166
EC 05 L/R - 2.25D	.197	.193	.205
EC 06 L/R - 2.25D	.236	.232	.244
EC 07 L/R - 2.25D	.276	.272	.283
EC 08 L/R - 2.25D	.315	.311	.323
EC 08 L/R - ... 04	.315	.309	.327
EC 10 L/R - ... 05	.394	.388	.413
EC 12 L/R - ... 06	.472	.467	.492
EC 14 L/R - ... 07	.551	.546	.571
EC 16 L/R - ... 08	.630	.624	.650
EC 18 L/R - ... 09	.709	.703	.728
EC 20 L/R - ... 10	.787	.780	.807
EC 25 L/R - ... 13	.984	.976	1.016
EC 32 L/R - ... 17	1.260	1.252	1.299

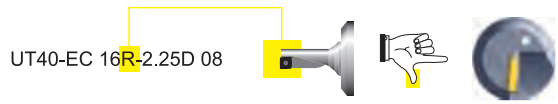
Solid carbide

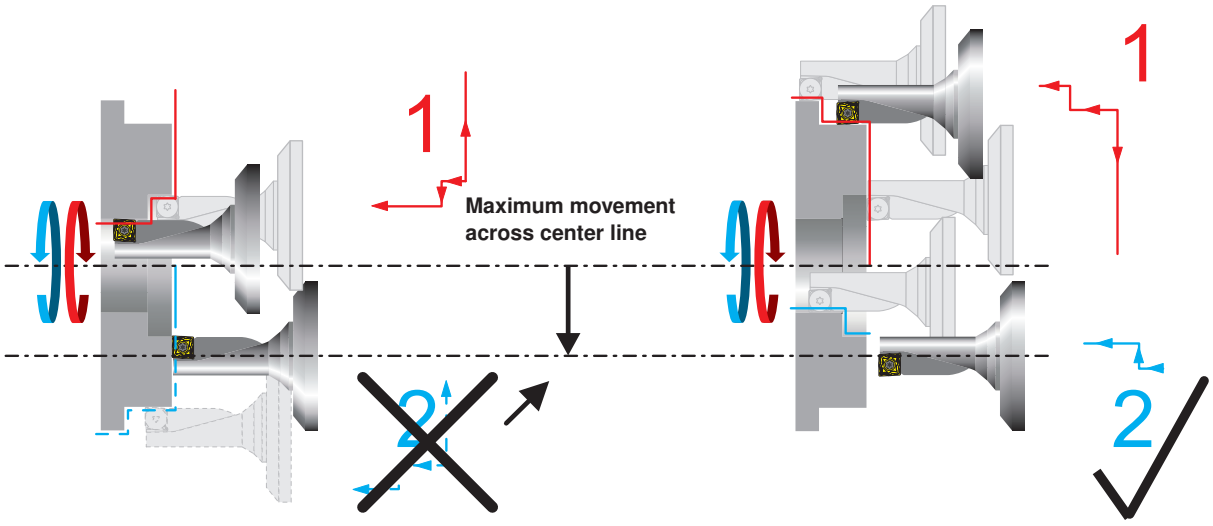
Machining across center line

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

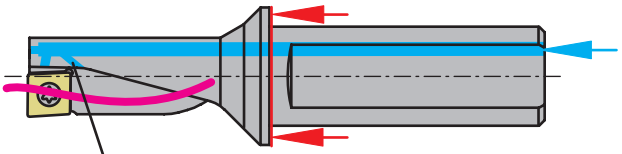
Solution:
Use a right-hand EcoCut tool.







Chip booster / coolant pressure

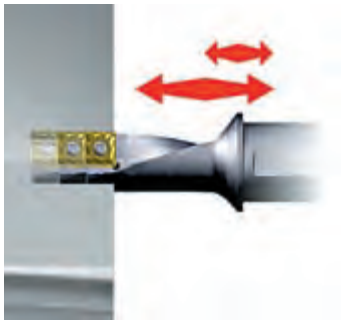


Internal coolant supply (chip booster)

Helical chip pocket (stability)

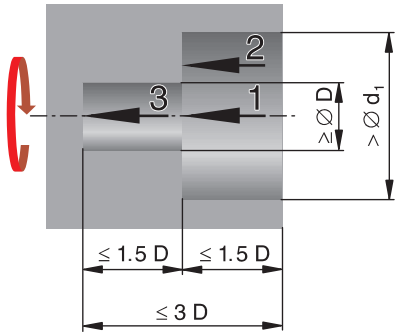
Axial abutment face (stability)

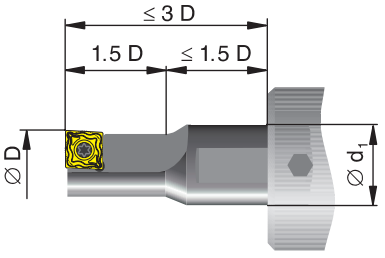
EcoCut offers an innovative detail solution for **range 2.25D**, namely additional bidirectional coolant supply for better chip evacuation. An additional **backwards directed coolant stream** improves chip transportation from the flute area. Minimum coolant pressure required 22 - 44 psi.



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





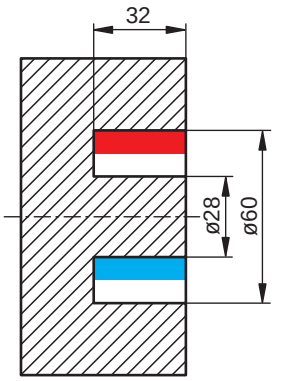
With a stepped bore approach EcoCut tools EC.. 1.5D can be machined with holes of up to three times the nominal diameter (see picture). Operation sequences 1, 2 and 3 respectively should be followed.

EcoCut
Application recommendations

Material:
Machining steel 9SMn20

Insert:
XCNT080304EN GM40

Cutting data:
n = 1500 rpm
f = .05 [ipr]

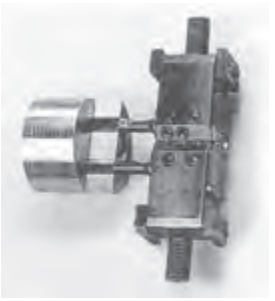


EC16L-2,25D08
v_c = 928 sfm

EC16R-2,25D08
v_c = 433 sfm

Special tool

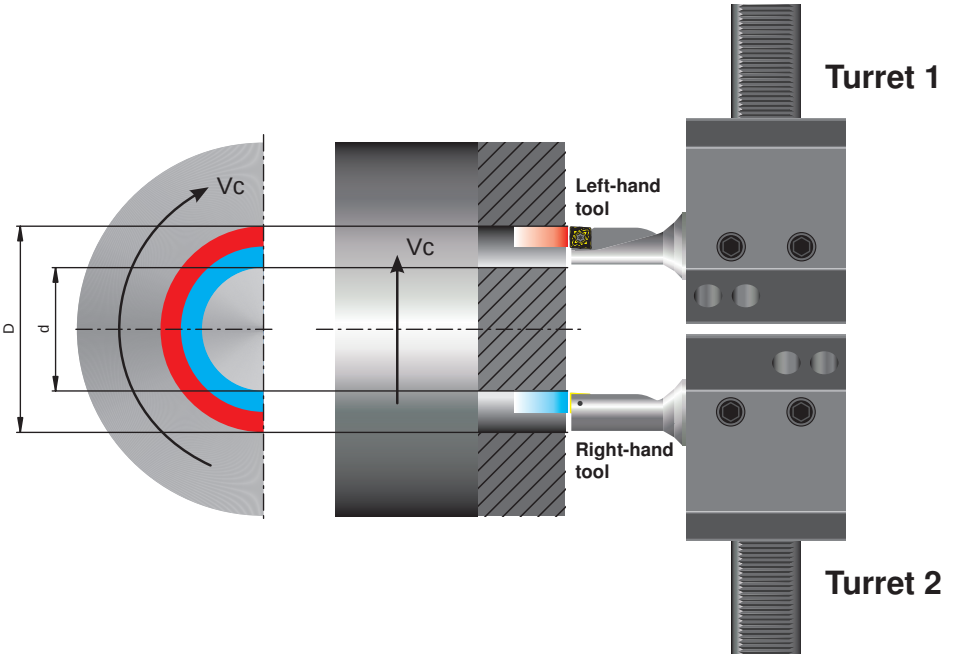
Machining time: **120 s**



CERATIZIT EcoCut

Machining time: **20 s**

Time saving: ***83%***

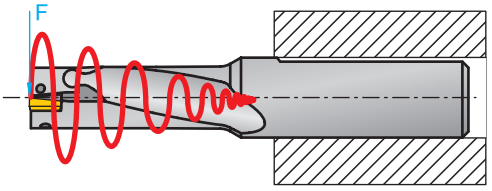


The advantages of DENSIMET compared to steel

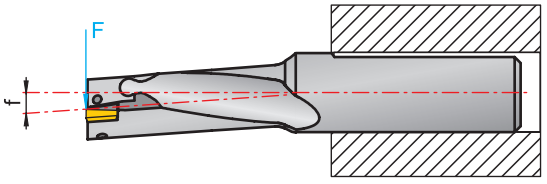
The new generation of our EcoCut 3.0D series with the new designation offers maximized performance. The tools are classified with the new designation **"EC .. R/L-3.0D .. H"** and have particularly been developed for bigger drilling depths and maximum precision requirements. The material used here is 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/mm²)	Density (g/mm³)
Steel	210 000	7,85
DENSIMET	360 000	17,50

Vibration-damping



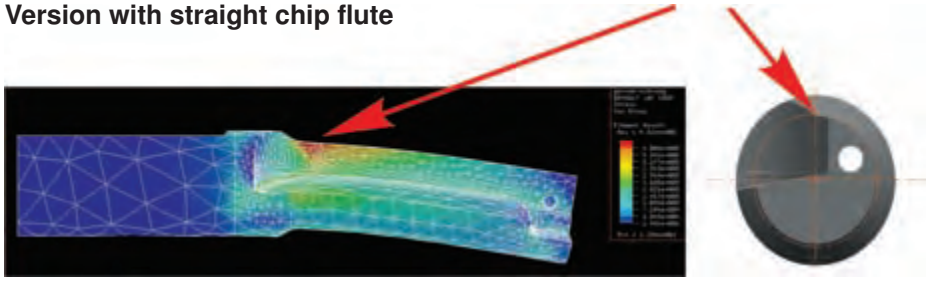
40% lower deflection than steel



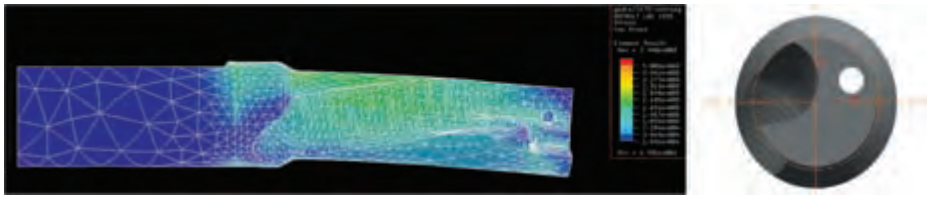
The new chip flute design

Maximum tension

Version with straight chip flute



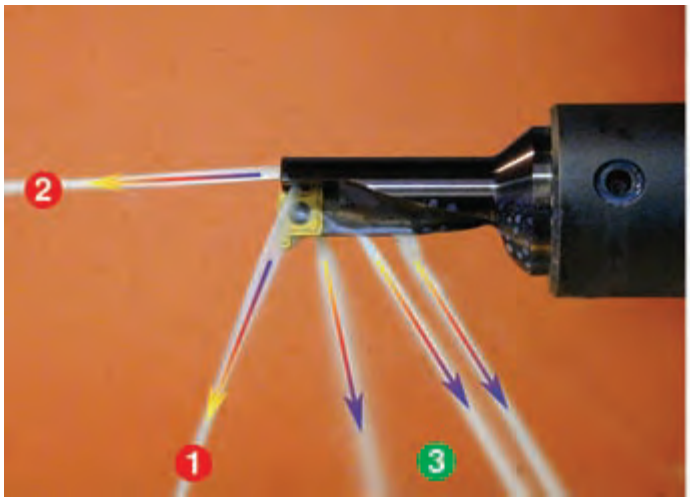
Version with helical chip flute



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

Coolant supply

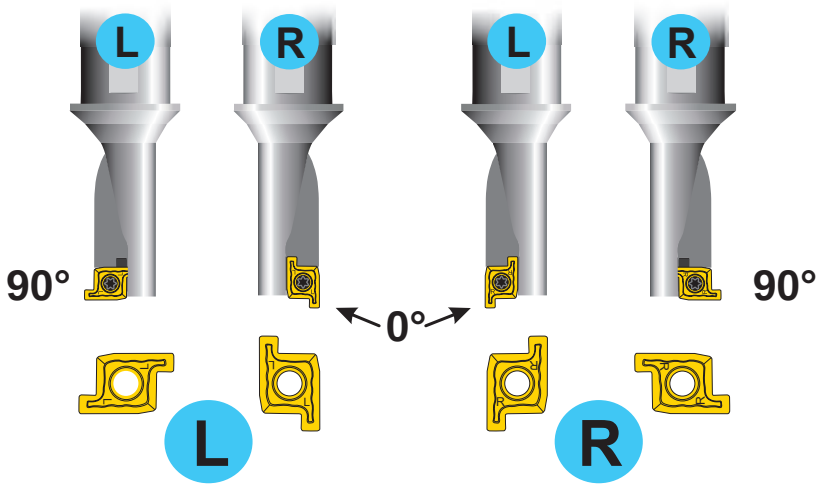
ProfileMaster is equipped with a unique coolant and chip removal system.



1. Cooling of the inserts
2. General coolant stream
3. Chipbooster prevents chips from getting stuck between tool and work piece

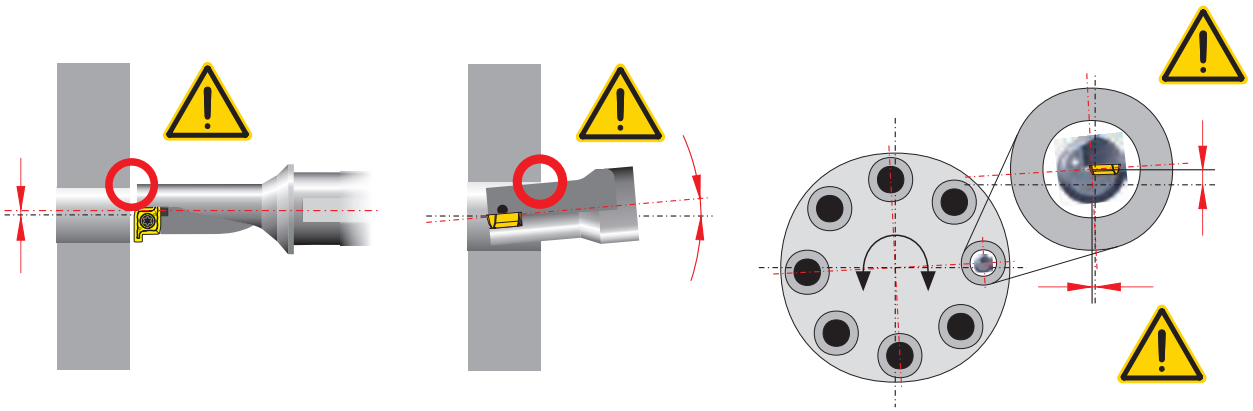
In order to guarantee efficient chip evacuation from a hole, a minimum coolant pressure of 44 - 87 psi (optimum 102 - 145 psi) is required.

Mounting of the insert

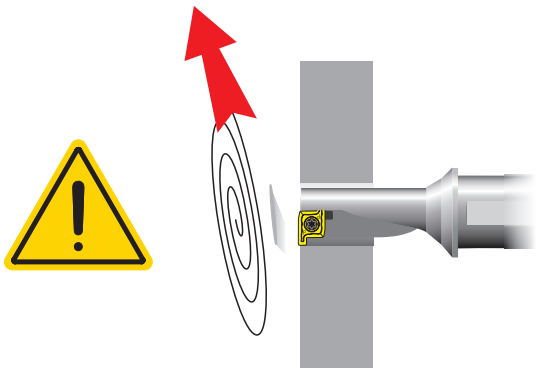


Axial displacement of the machine

Displacement in x-direction **Angular error** **Turret position error**

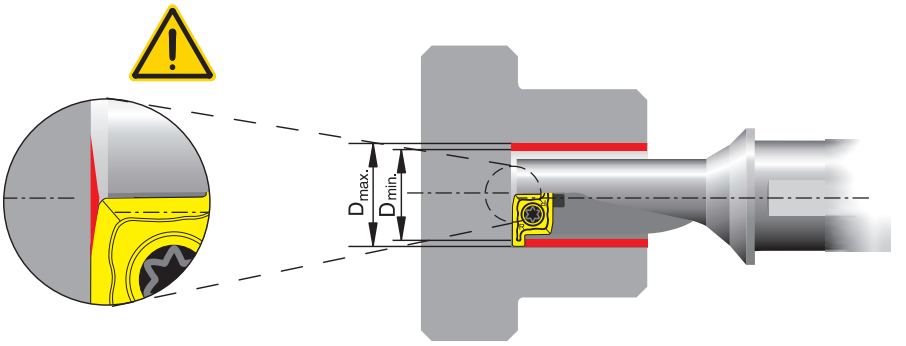


Through hole



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

Off-center drilling



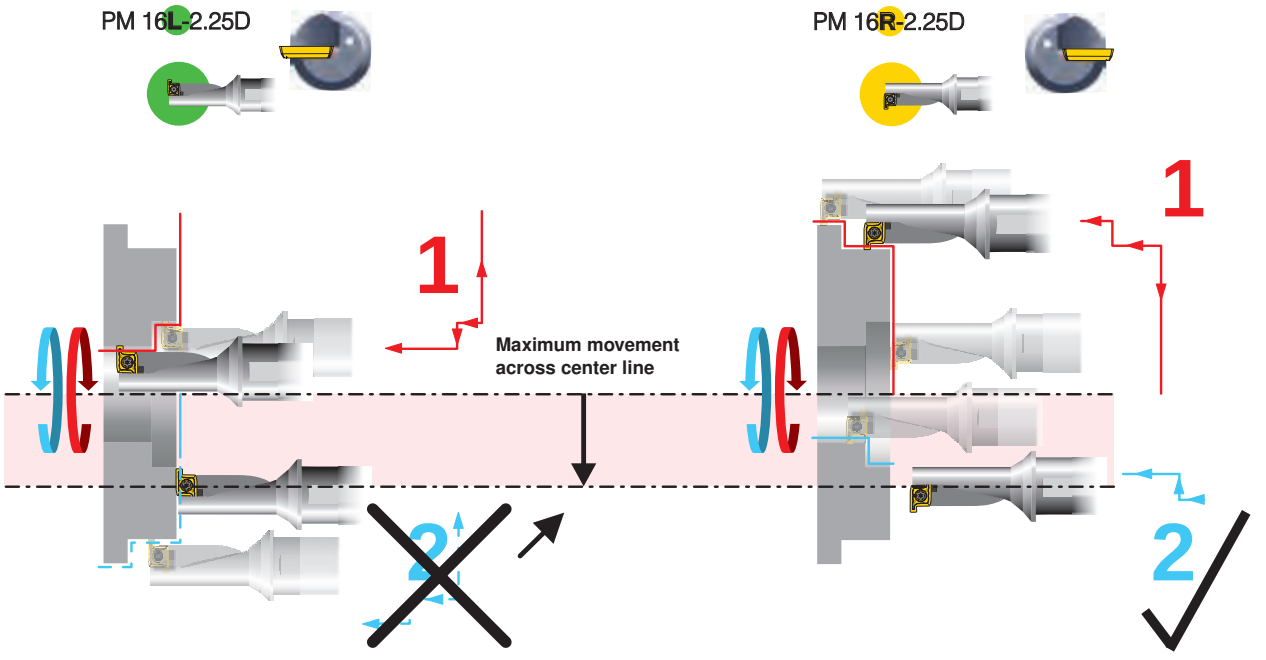
Due to the special construction of ProfileMaster tools and inserts off-center drilling is possible. Thus desired devations from the tool's nominal diameter can be obtained (see table below).

Type of tool	Nominal tool diameter D (inch)	Drilling diameter (work piece) D_{min} (inch)	Drilling diameter (work piece) D_{max} (inch)
PM 10R/L ...	.394	.388	.472
PM 12R/L ...	.472	.467	.591
PM 16R/L ...	.630	.624	.748
PM 20R/L ...	.787	.780	.945
PM 25R/L ...	.984	.976	1.142
PM 32R/L ...	1.260	1.252	1.496

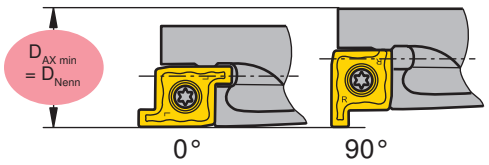
Machining across center line

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

Solution:
Use a right-hand ProfileMaster tool.

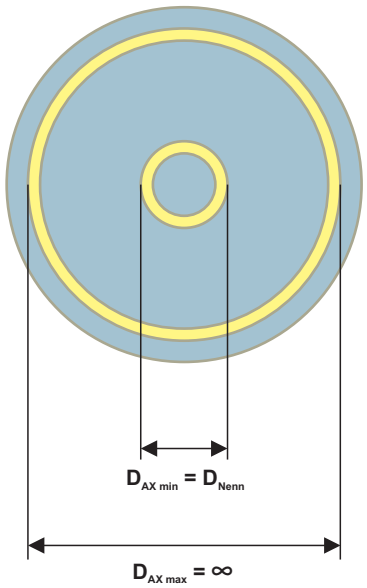


Axial grooving - axial application 0°

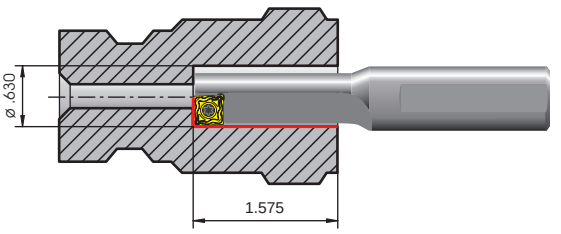


D_{Nenn} inch	D_{AXmin} inch	D_{AXmax} inch
.630	.630	∞
.787	.787	∞
.984	.984	∞
1.260	1.260	∞

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



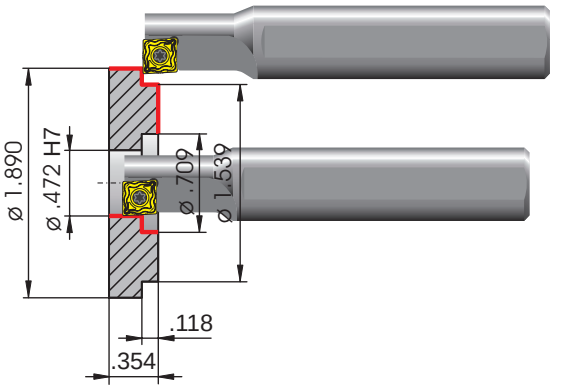
Criteria:
> Deep hole with 90° shoulder with only one tool

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

Technical data:

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

Cutting data:
> Drilling
v_c = 577 sfm
f = .0024 inch/rev.
a_p = Ø .630 inch



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

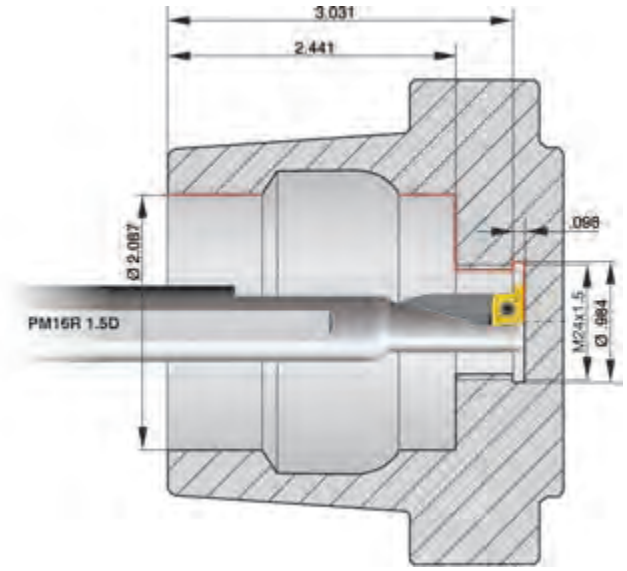
Result:
> 1 tool instead of 3
> Machining time reduced by 45%
> 2 additional tools in the turret

Technical data:

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

Cutting parameters:
> Drilling
v_c = 492 sfm
f = .0012 inch
> Boring
v_c = 492 sfm
f = .0039 inch
> Face turning
v_c = 656 sfm
f = .0039 inch
> Ext. turning
v_c = 492 sfm
f = .0039 inch

ProfileMaster
Machining examples



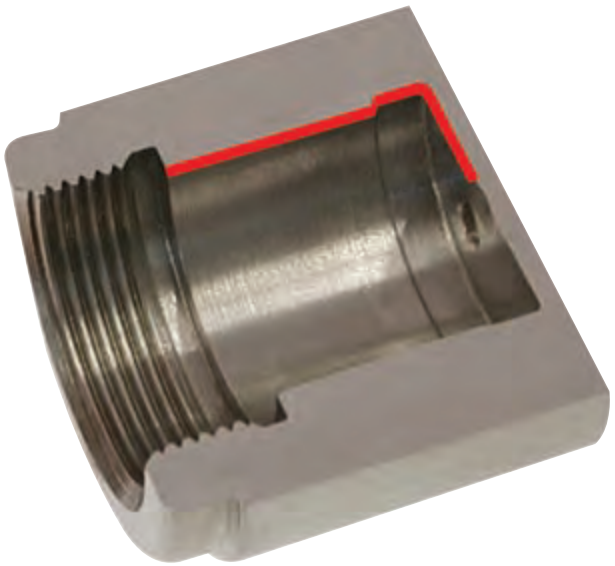
Criteria:
> Problems due to lack of turret positions
> Optimization of machining time

Result:
> Only 1 tool instead of 2
> 1 free turret position

Technical data:

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

Cutting parameters:
v_c = 492 sfm
f = .0059 inch/rev.
a_p = .0394 inch



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 = 344 sfm	v_c = 344 sfm
a_p = .0118-.197 inch	a_p = .0118-.197 inch
$f_{turning}$ = .0059 inch	$f_{turning}$ = .0039 inch
$f_{grooving}$ = .0024 inch	$f_{grooving}$ = .0024 inch

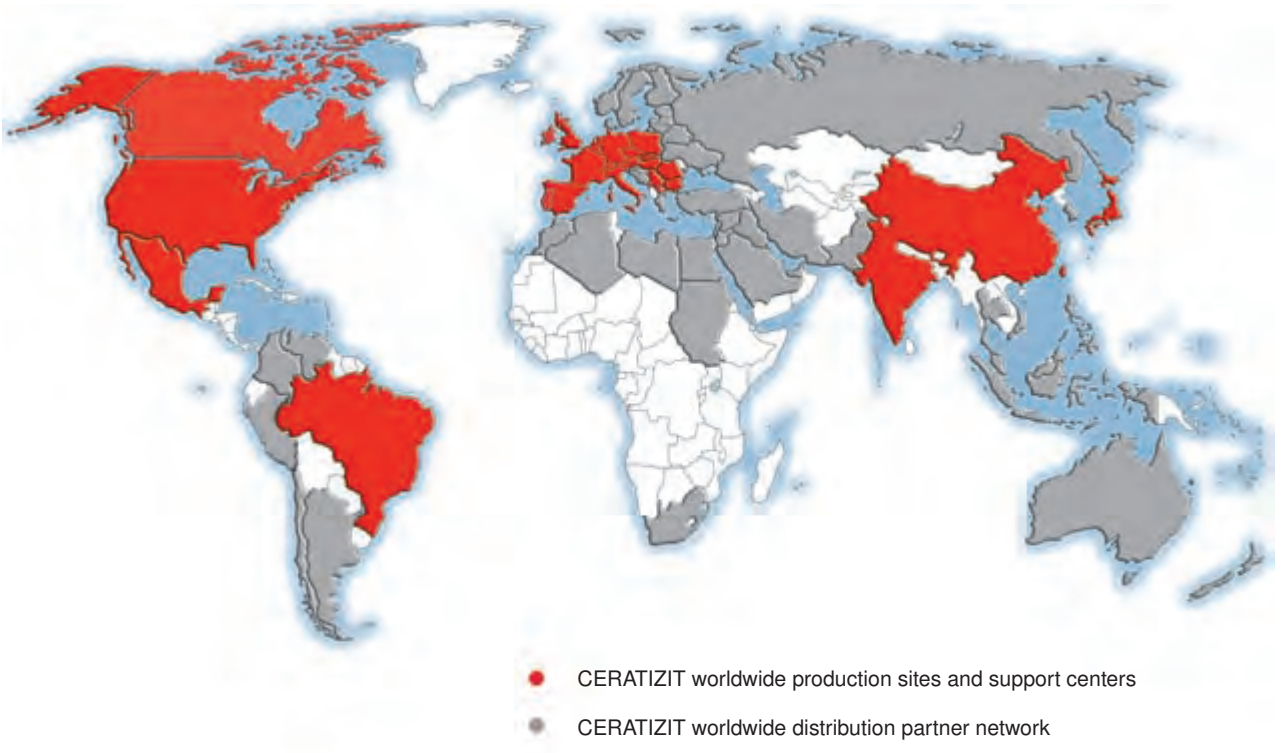
CERATIZIT worldwide

CERATIZIT worldwide

- Production sites in the three big economic areas with a worldwide network of CERATIZIT sales and support engineers plus many CERATIZIT distribution partners guarantee customer vicinity.
- We maintain the dialog with our customers and strive for long-term partnerships.

Find your personal distribution partner at:

www.ceratizit.com



CERATIZIT worldwide

Contact for further information:

CERATIZIT USA
11530 Stephens
USA-Warren, MI 48089
Toll free: 1-800-783-2280
Tel.: 1-586-759-2280
Fax: 1-586-759-1657
E-mail: info.usa@ceratizit.com
www.ceratizit.com

www.ceratizit.com - just a click.

7001400
MA-PRO-0282-USA-06/12-U