hard material matters

CERATIZIT

hard material matters

Tools and inserts for drilling

EN

CERATIZIT – secrets of success

Secrets of success

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

Corporate values

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

Tailored cutting tool solutions

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

Contents

Grade overview

Grade designation	Standard designation	Cutting material	Application range	A Steel	R Stainless	F Cast iron	N Non ferrous metals	S Heat resistant	H Hard materials
CTC1435	HC-P35	C		●					
	HC-M30	C			○				
	HC-K20	C				○			
CTP1340	HC-P40	P		●					
	HC-M35	P			●				
	HC-K35	P					○	○	
GM40	HC-P35	C		●					
	HC-M30	C			●				
H216T	HW-K15	W				●	●		
S40T	HW-P40	W		●					
	HW-M40	W			●				
SR127	HC-P25	C		●					
	HC-M20	C			○				
	HC-K20	C				●			
SR226	HC-P25	C		●					
	HC-K20	C				●			
SR226+	HC-P25	C		●					
	HC-M25	C			○				
	HC-K20	C				●			
U17T	HW-M15	W						○	
	HW-K15	W					●		

Application range: 01 05 10 15 20 25 30 35 40 45 50

● Main application

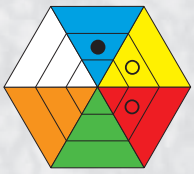
○ Extended application

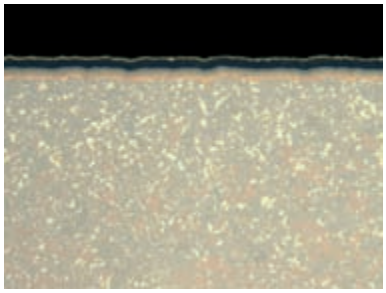
Grade description

Steel

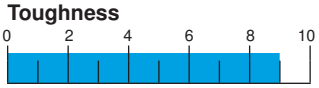
CTC1435

HC-P35
HC-M30
HC-K20

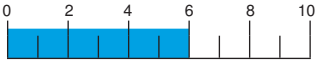




Toughness



Wear resistance



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

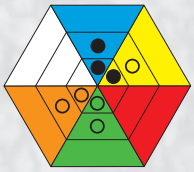
Grain size:
1 - 2 µm

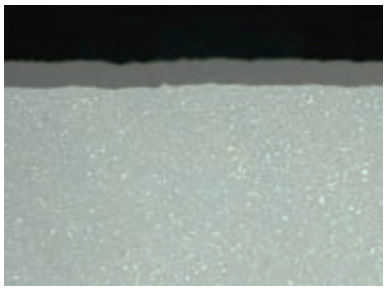
Hardness:
HV 1400

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

CTP1340

HC-P40
HC-M35
HC-K35





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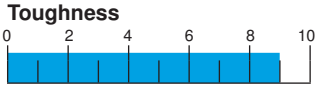

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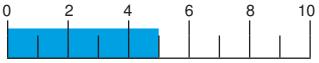


Composition:
Co 9.0%; WC rest

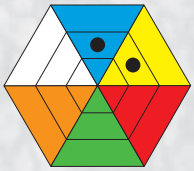
Grain size:
0.7 - 1 µm

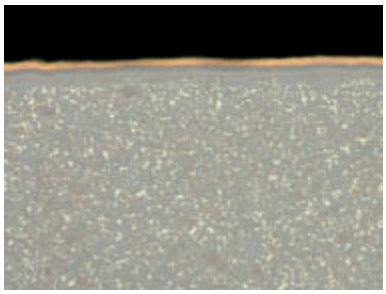
Hardness:
HV 1590

Coating specification:
PVD
TiAlN; 4 µm

GM40

HC-P35
HC-M30





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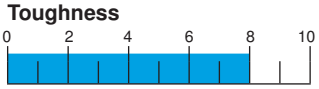

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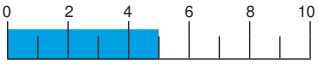


Composition:
Co 11.0%; composite carbides 12.0%; WC rest

Grain size:
1 - 2 µm

Hardness:
HV 1420

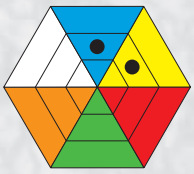
Coating specification:
CVD
TiC + Ti(C,N) + TiN; 5.5 µm

Grade description

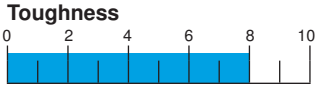
Steel

S40T

HW-P40
HW-M40



Toughness



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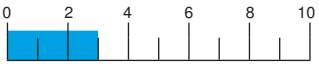


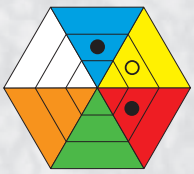
Composition:
Co 11.0%; composite carbides 12.0%; WC rest

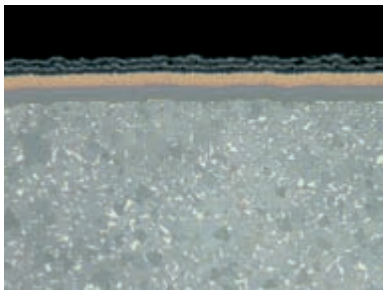
Grain size:
1 - 2 µm

Hardness:
HV 1420

SR127

HC-P25
HC-M20
HC-K20





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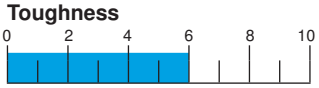

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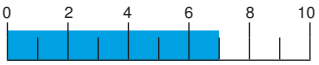


Composition:
Co 6.0%; composite carbides 0.6%; WC rest

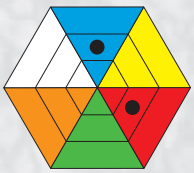
Grain size:
2 µm

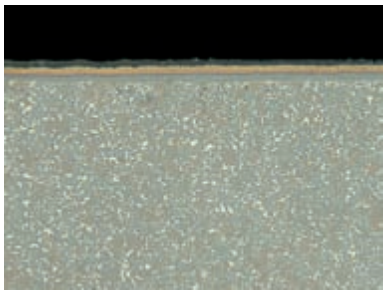
Hardness:
HV 1460

Coating specification:
CVD
Ti(C,N) + TiN + Al_2O_3; 12 µm

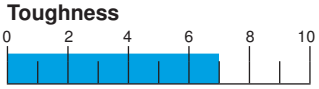
SR226

HC-P25
HC-K20

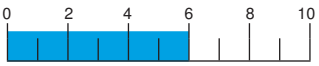




Toughness



Wear resistance



Composition:
Co 11.0%; composite carbides 12.0%; WC rest

Grain size:
1 - 2 µm

Hardness:
HV 1420

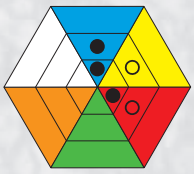
Coating specification:
CVD
Ti(C,N) + TiN + Al_2O_3; 5.5 µm

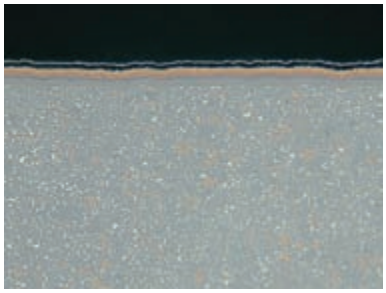
Grade description

Steel

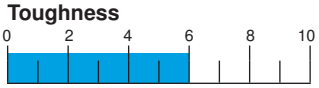
SR226+

HC-P25
HC-M25
HC-K20

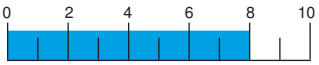




Toughness



Wear resistance



Composition:
Co 9.0%; composite carbides 4.0%; WC rest

Grain size:
1 - 1.5 µm

Hardness:
HV 1510

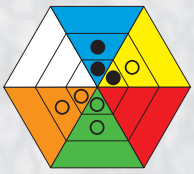
Coating specification:
CVD
Al_2O_3 + TiN + Ti (C,N); 5.5 µm

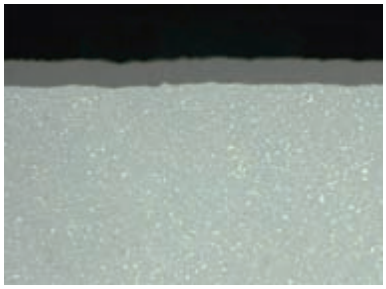
Grade description

Stainless steel

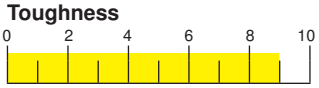
CTP1340

HC-P40
HC-M35
HC-K35

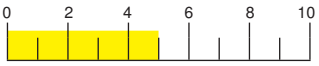




Toughness



Wear resistance



Composition:
Co 9.0%; WC rest

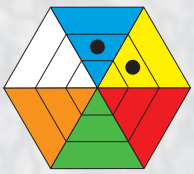
Grain size:
0.7 - 1 µm

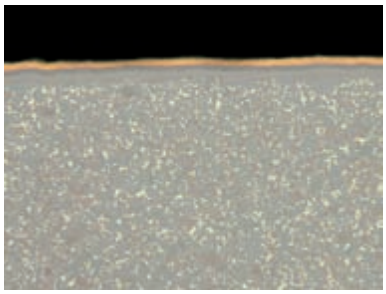
Hardness:
HV 1590

Coating specification:
PVD
TiAlN; 4 µm

GM40

HC-P35
HC-M30





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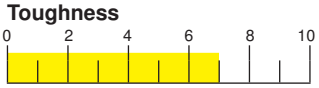

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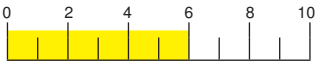


Composition:
Co 11.0%; composite carbides 12.0%; WC rest

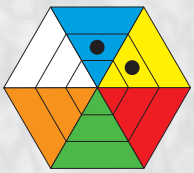
Grain size:
1 - 2 µm

Hardness:
HV 1420

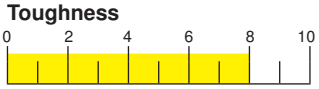
Coating specification:
CVD
TiC + Ti(C,N) + TiN; 5.5 µm

S40T

HW-P40
HW-M40



Toughness



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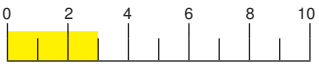


Composition:
Co 11.0%; composite carbides 12.0%; WC rest

Grain size:
1 - 2 µm

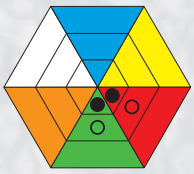
Hardness:
HV 1420

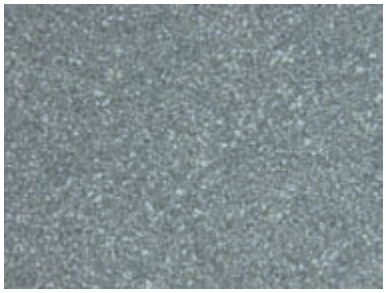
Grade description

Cast iron

H216T

HW-K15





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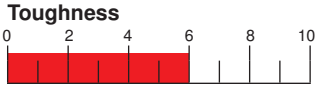

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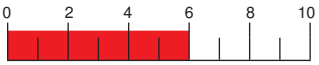


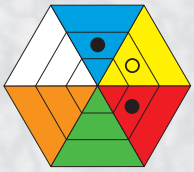
Composition:
Co 6.0%; WC rest

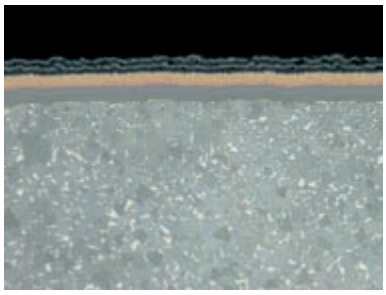
Grain size:
1 µm

Hardness:
HV 1630

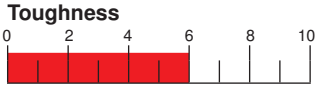
SR127

HC-P25
HC-M20
HC-K20

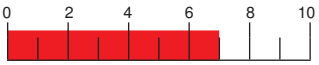




Toughness



Wear resistance



Composition:
Co 6.0%; composite carbides 0.6%; WC rest

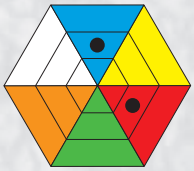
Grain size:
2 µm

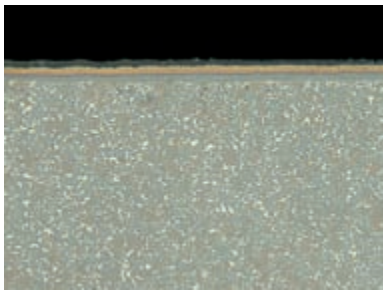
Hardness:
HV 1460

Coating specification:
CVD
$Ti(C,N) + TiN + Al_2O_3$; 12 µm

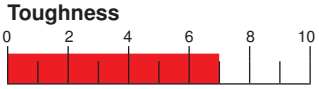
SR226

HC-P25
HC-K20

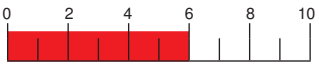




Toughness



Wear resistance



Composition:
Co 11.0%; composite carbides 12.0%; WC rest

Grain size:
1 - 2 µm

Hardness:
HV 1420

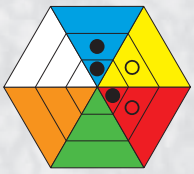
Coating specification:
CVD
$Ti(C,N) + TiN + Al_2O_3$; 5.5 µm

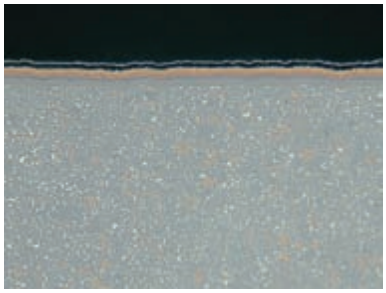
Grade description

Cast iron

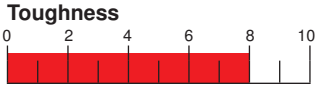
SR226+

HC-P25
HC-M25
HC-K20

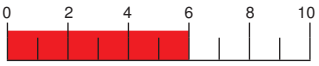




Toughness



Wear resistance



Composition:
Co 9.0%; composite carbides 4.0%; WC rest

Grain size:
1 - 1.5 µm

Hardness:
HV 1510

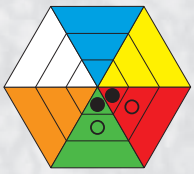
Coating specification:
CVD
Al_2O_3 + TiN + Ti (C,N); 5.5 µm

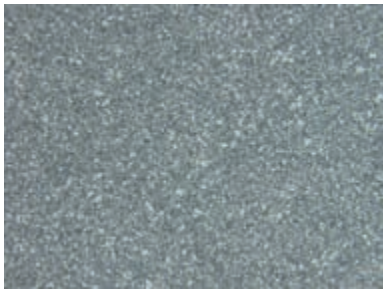
Grade description

Non ferrous metals and non metals

H216T

HW-K15



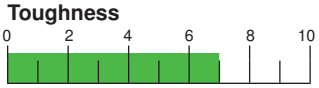


Composition:
Co 6.0%; WC rest

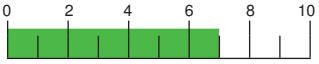
Grain size:
1 µm

Hardness:
HV 1630

Toughness

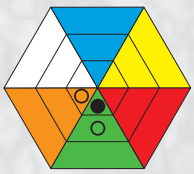


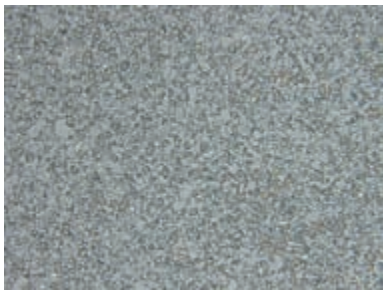
Wear resistance



U17T

HW-M15
HW-K15



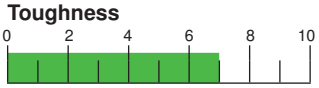


Composition:
Co 6.0%; composite carbides 8.0%; WC rest

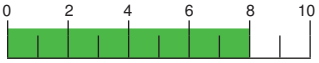
Grain size:
1.5 µm

Hardness:
HV 1570

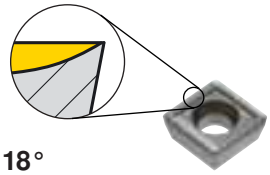
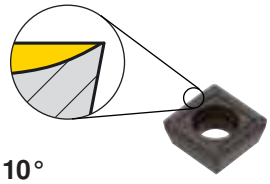
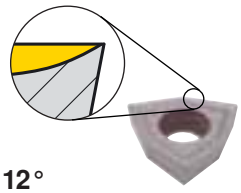
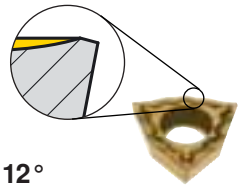
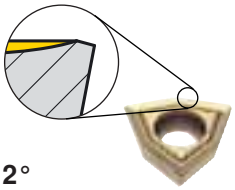
Toughness



Wear resistance



Chip grooves

Chip groove	Material	Machining situation and stability				Machining type F / M / R
 γ = 18°	F30	▼ ▼	✗	✗	✗		F
 γ = 10°	F50	▼ ▼ ▼ ▽ ▽		✗	✗	✗	F M
 γ = 12°	FN	▼ ▽	✗	✗			F
 γ = 12°	-29	▼ ▽ ▼	✗	✗			M
 γ =12°	SN	▼ ▼ ▼	✗	✗	✗		M

MasterGuide:

- ▼ Steel
- ▼ Stainless
- ▼ Cast iron
- ▼ Non ferrous metals
- ▼ Heat resistant
- ▽ Hard materials

- ▼ Main application
- ▽ Extended application

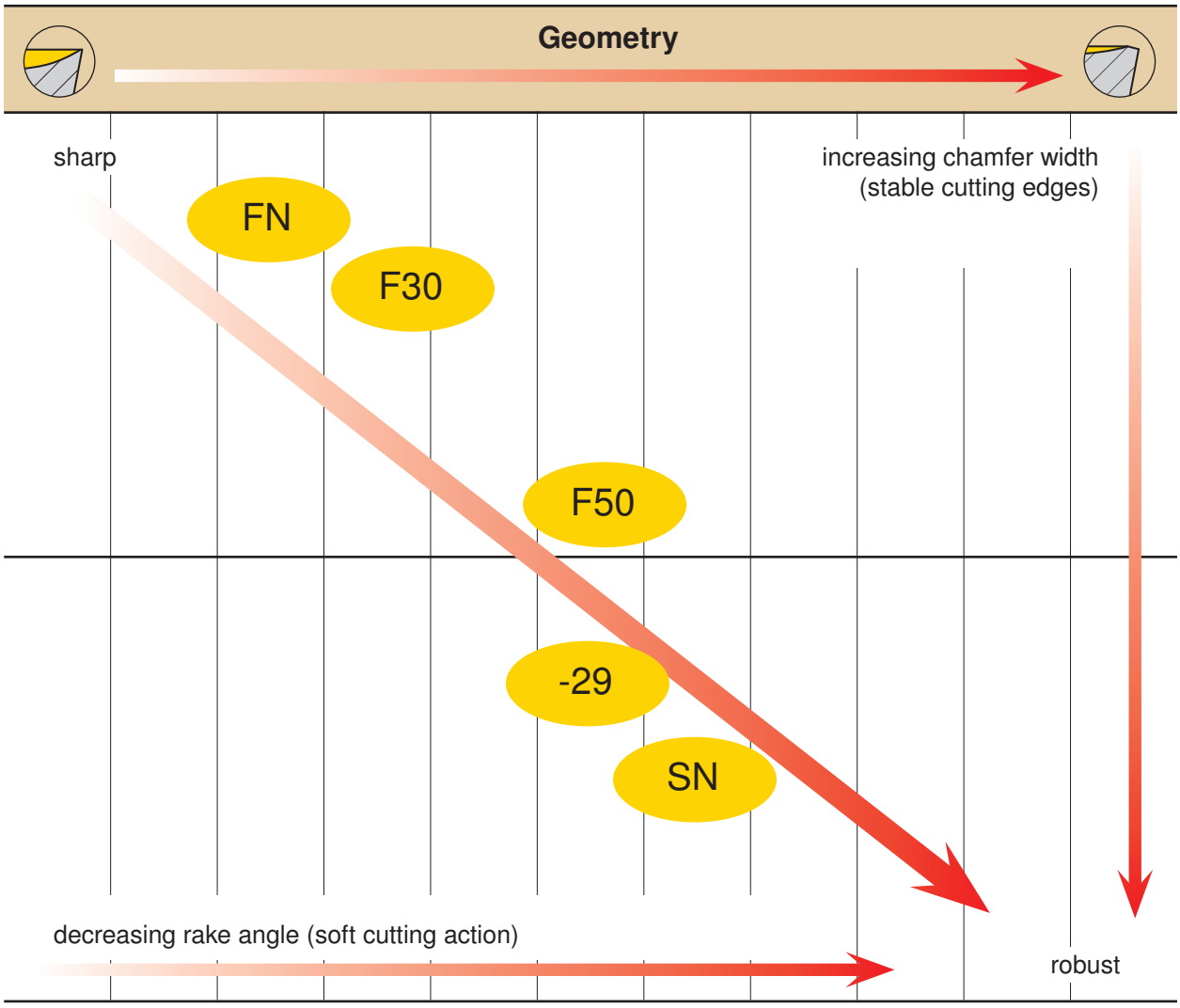
Machining situation and stability:

- ○ excellent
- ○ good
- ◔ acceptable
- ⬡ difficult

Machining type:

F Fine machining
M Medium machining
R Rough machining

Chip grooves

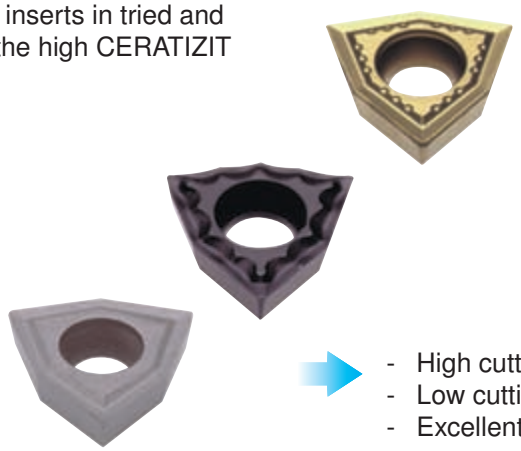


System characteristics
MaxiDrill Classic

Variable application of the insert group in all drilling tools type 2D, 3D and 4D

Advantages

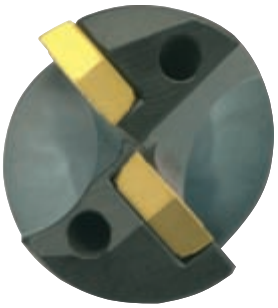
✓ Coated and uncoated inserts in tried and tested geometry and the high CERATIZIT quality



Customer benefits

- High cutting speed
- Low cutting forces
- Excellent swarf control

✓ Optimum compensation of radial forces thanks to specially positioned inserts



- Drill will not wander
- Produces consistent true holes when deep hole drilling

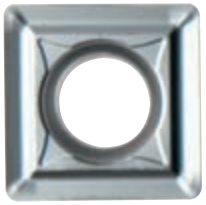
✓ Helical flute with through coolant holes on the drill point

- Maximum system rigidity
- No deviation of tool
- Reduced machining noise
- Optimum chip evacuation

System characteristics
MaxiDrill HFD

Optimized insert design

Inserts for the machining of steel, stainless steel, cast iron and aluminium



- 4 usable cutting edges
- Identical peripheral and central cutting edges
- Stable corner radii (0.4; 0.6; 0.8)
- Stable insert type
- High feed rates can be achieved!

Advantages	Customer benefits
✓ Optimized insert design Reinforced cutting edges and positive chip geometry	→ Stability and long tool life
✓ Tool: Helical tool body, surface hardened and coated with 'hard & tough' coating	→ Long tool life Abrasion resistance
✓ Adapted chip groove geometry for secure chip evacuation	→ Swarf control - secure chip evacuation even when cutting long-chipping materials; holes without scoring caused by return movement
✓ Location face	→ Stable position of holes even under difficult conditions

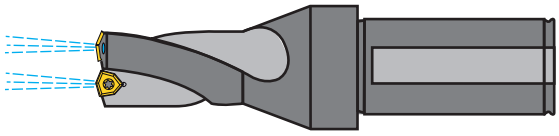
System characteristics

For fixed and rotating applications
Insert drills with helical chip flutes

Classic

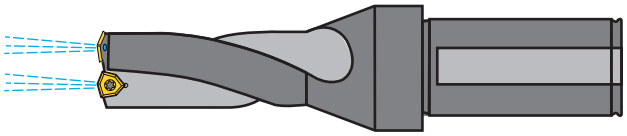
2 x D

Ø
14 – 53 mm



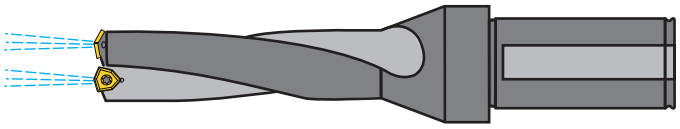
3 x D

Ø
14 – 53 mm



4 x D

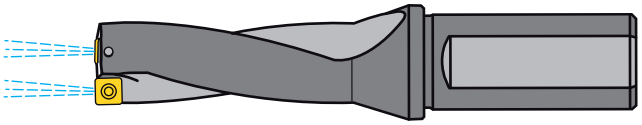
Ø
18 – 50 mm



HFD

3 x D

Ø
14 – 44 mm



Helical chip flutes

- Low deflection
- Possibly occurring transverse forces are absorbed without problems
- Optimum chip evacuation

System characteristics

MaxiDrill Classic or MaxiDrill HFD

MaxiDrill Classic

Ideal for:
- Universal application
- Less stable machines
- Low power machines
- High precision of drilled holes

MaxiDrill HFD

Ideal for:
- High-performance cutting
- Stable machines
- High-power machines
- Stable work holding
- Good surface finish of holes

Application of HFD

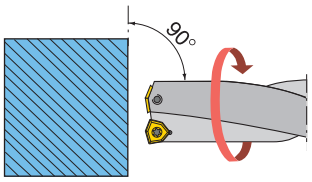
The MaxiDrill HFD drill operates with a controlled deviation of approx. 0.2 mm, this means the measured tool diameter is smaller than the nominal diameter.

Example: drill diameter 22 mm - diameter measured on the tool 21.8 mm.

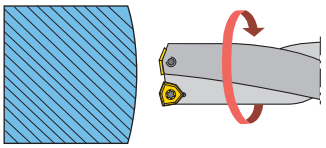
Drilling tolerance - nominal diameter ±0.2 mm

In stationary applications (on lathes) the tool can be deviated max. 0.25 mm.
Example: tool diameter 21 mm / maximum achievable hole diameter 21.5 mm

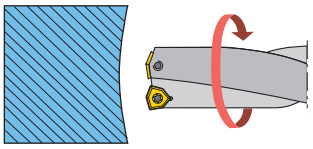
Insert drill with helical chip flutes

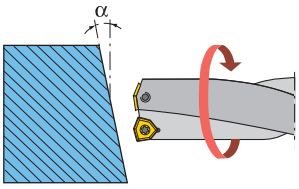


In stable conditions and with a flat surface of the work piece you can drill with maximum feed.

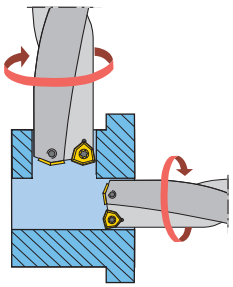


When the drill enters the convex work piece surface the central insert cuts first.

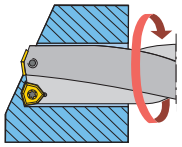




When the drill enters oblique or concave work piece surfaces the peripheral insert cuts first. It is recommended to reduce the feed by approx. 30-50 % for this application.

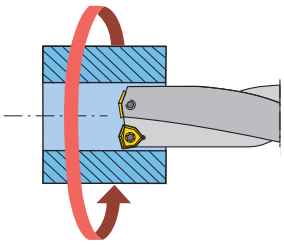


Reduce the feed when the drill enters the transverse hole. With transverse holes you should drill from both sides if possible.

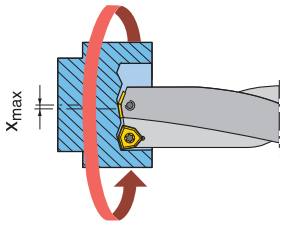


In case of drill exit on oblique work piece surfaces, reduce the feed by 30-50 %.

Insert drills with helical chip flutes



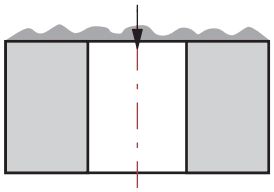
Drilling into solid material



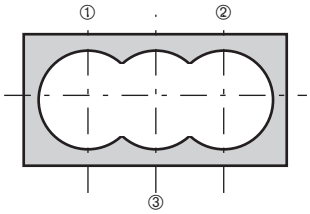
Off-centre drilling into solid material
X_{max} = see page 40

Safety precautions
Using a fixed drill and a rotating work piece in case of bores a sharp disc will result. Safety precautions must be observed. A safety guard has to be provided as protection.

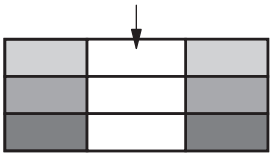
Application of HFD



Drilling on uneven surface (cast iron)



Overlapped work - can chain drill in solid and multiple work pieces



Producing through holes in multiple clamped work pieces

MaxiDrill

WC.. / XO.. 02-07

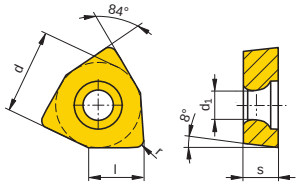
-FN

-29

-SN

(l) [mm]	Type, description	U17T	S40T	SR127	SR226	CTC1435	GM40	d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
02	WCGT 020204SN-29			●				5.50	3.39	2.30	0.40	2.25
	XOMT 020204SN				●		●					
03	WCGT 030204FN	●						6.00	3.97	2.50		2.50
	WCGT 030204SN-29			●		●						
	XOMT 030204SN		●		●		●					
05	WCGT 050304FN	●						8.00	5.29	3.00		2.80
	WCGT 050304SN-29			●		●						
	XOMT 050304SN		●		●		●					
06	WCGT 060304FN	●						10.00	6.62			4.40
	WCGT 060304SN-29			●		●						
	XOMT 060304SN		●		●		●					
07	WCGT 07T304FN	●						12.00	7.94	3.80		
	WCGT 07T304SN-29			●		●						
	XOMT 07T304SN		●		●		●		3.97			

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 WCGT 020204SN-29 SR127

34-39

22-28

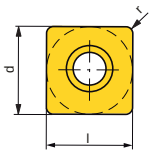
32-33

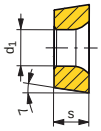
-F30

-F50

(l) [mm]	Type, description	H216T	SR226+	CTP1340				d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
04	SCLT 042204-F30	●						4.80	4.80	2.20	0.40	2.85
	SCLT 042204-F50		●	●								
05	SCLT 052404-F30	●						5.40	5.40	2.40		3.00
	SCLT 052404-F50		●	●								
06	SCLT 062806-F30	●						6.20	6.20	2.80	0.60	3.30
	SCLT 062806-F50		●	●								
07	SCLT 073206-F30	●						7.20	7.20	3.20		3.75
	SCLT 073206-F50		●	●								
08	SCLT 083608-F30	●						8.60	8.60	3.60	0.80	4.50
	SCLT 083608-F50		●	●								
10	SCLT 104208-F30	●						10.00	10.00	4.20		6.00
	SCLT 104208-F50		●	●								
12	SCLT 125008-F30	●						12.30	12.30	5.00		7.30
	SCLT 125008-F50		●	●								

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





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

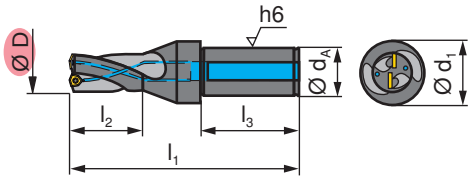
Ordering example: 10 pieces SCLT 042204-F30 H216T


34-39


30-31

MaxiDrill Classic – 2D

Ø 14 – 29 mm



Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
14	2D.140.R.02	R	25	32	114	30	54	WC.. / XO.. 02..
14.5	2D.145.R.02		25	32	115	31	54	
15	2D.150.R.02		25	32	116	32	54	
15.5	2D.155.R.02		25	32	117	33	54	
16	2D.160.R.02		25	32	118	34	54	
16.5	2D.165.R.02		25	32	119	35	54	
17	2D.170.R.02		25	32	120	36	54	
17.5	2D.175.R.02		25	32	121	37	54	
18	2D.180.R.03		25	32	122	38	54	WC.. / XO.. 03..
19	2D.190.R.03		25	32	124	40	54	
20	2D.200.R.03		25	32	126	42	54	
21	2D.210.R.03		25	32	128	44	54	
22	2D.220.R.03		25	32	130	46	54	
23	2D.230.R.03		25	32	132	48	54	
24	2D.240.R.05		25	32	134	50	54	WC.. / XO.. 05..
25	2D.250.R.05		25	32	136	52	54	
26	2D.260.R.05		25	32	138	54	54	
27	2D.270.R.05		25	32	140	56	54	
28	2D.280.R.05		25	32	142	58	54	
29	2D.290.R.05		25	32	144	60	54	
15	2D.150.L.02	L	25	32	116	32	54	WC.. / XO.. 02..
16	2D.160.L.02		25	32	118	34	54	
17	2D.170.L.02		25	32	120	36	54	

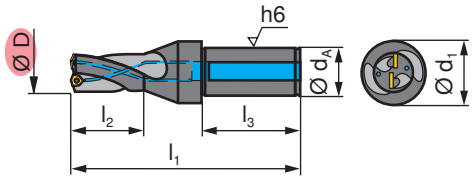
Ordering example: 1 piece 2D.140.R.02

	D [mm]			
WC.. / XO.. 02..	14 - 17.5	7729113/M2,0X4,8/T06		7729112/TORX T06 F
WC.. / XO.. 03..	18 - 23	7722113/M2,2X5/T07	7724105/TORX T07	
WC.. / XO.. 05..	24 - 29	7815101/M2,5X6,0/T08	7724106/TORX T08	

20

MaxiDrill Classic – 2D

Ø 30 – 53 mm



Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
30	2D.300.R.06	R	32	49	150	62	58	
31	2D.310.R.06		32	49	152	64	58	
32	2D.320.R.06		32	49	154	66	58	
34	2D.340.R.06		32	49	158	70	58	WC.. / XO.. 06..
35	2D.350.R.06		32	49	160	72	58	
36	2D.360.R.06		32	49	162	74	58	
37	2D.370.R.06		32	49	164	76	58	
38	2D.380.R.07		32	49	166	78	58	
39	2D.390.R.07		32	49	168	80	58	
40	2D.400.R.07		32	49	170	82	58	
42	2D.420.R.07		32	49	174	86	58	
44	2D.440.R.07		32	49	178	90	58	WC.. / XO.. 07..
46	2D.460.R.07		40	59	197	94	68	
48	2D.480.R.07		40	59	201	98	68	
50	2D.500.R.07		40	59	205	102	68	
53	2D.530.R.07		40	59	211	108	68	

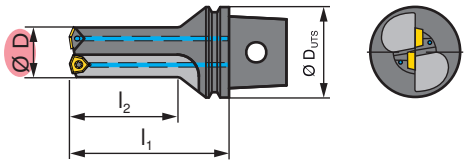
Ordering example: 1 piece 2D.300.R.06

	D [mm]			
WC.. / XO.. 06..	30 - 37	7724103/TORX T15	7815102/M3,5X11,0/T15	
WC.. / XO.. 07..	38 - 53	7724103/TORX T15	7815102/M3,5X11,0/T15	

20

MaxiDrill Classic – UT-2D

Ø 18 – 52 mm



Picture shows right-hand version

D [mm]	Type, description	L	R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]		
18	UT40-2D-180-R03			40	40	95	38		WC.. / XO.. 03..
20	UT40-2D-200-R03			40	40	95	42		
22	UT40-2D-220-R03			40	40	95	46		
24	UT40-2D-240-R05			40	40	105	50		WC.. / XO.. 05..
26	UT40-2D-260-R05			40	40	105	54		
28	UT40-2D-280-R05			40	40	105	58		
30	UT40-2D-300-R06		R	40	40	115	62		WC.. / XO.. 06..
34	UT40-2D-340-R06			40	40	125	70		
38	UT40-2D-380-R06			40	40	125	78		
40	UT40-2D-400-R06			40	40	135	82		
19	UT40-2D-420-R06			40	40	135	86		
46	UT50-2D-460-R07			50	50	167	94		WC.. / XO.. 07..
52	UT50-2D-520-R07			50	50	167	106		

Ordering example: 1 piece UT40-2D-180-R03

	D [mm]			
WC.. / XO.. 03..	18 - 22	7896900/O-RING 40	7722113/M2,2X5/T07	7724105/TORX T07
WC.. / XO.. 05..	24 - 28	7896900/O-RING 40	7815101/M2,5X6,0/T08	7724106/TORX T08
WC.. / XO.. 06..	19 - 40	7896900/O-RING 40	7815102/M3,5X11,0/T15	7724103/TORX T15
WC.. / XO.. 07..	46 - 52	7896940/O-RING 50	7815102/M3,5X11,0/T15	7724103/TORX T15

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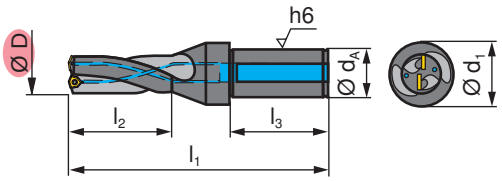
MaxiDrill Classic – 3D

Ø 14 – 23,5 mm



Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
14	3D.140.R.02	R	25	32	128	44	54	WC.. / XO.. 02..
14.5	3D.145.R.02		25	32	129.5	45.5	54	
15	3D.150.R.02		25	32	131	47	54	
15.5	3D.155.R.02		25	32	132.5	48.5	54	
16	3D.160.R.02		25	32	134	50	54	
16.5	3D.165.R.02		25	32	135.5	51.5	54	
17	3D.170.R.02		25	32	137	53	54	
17.5	3D.175.R.02		25	32	138.5	54.5	54	
18	3D.180.R.03		25	32	140	56	54	WC.. / XO.. 03..
18.5	3D.185.R.03		25	32	140.5	57.5	53	
19	3D.190.R.03		25	32	143	59	54	
19.5	3D.195.R.03		25	32	144.5	60.5	54	
20	3D.200.R.03		25	32	146	62	54	
20.5	3D.205.R.03		25	32	147.5	63.5	54	
21	3D.210.R.03		25	32	149	65	54	
21.5	3D.215.R.03		25	32	150.5	66.5	54	
22	3D.220.R.03		25	32	152	68	54	
22.5	3D.225.R.03		25	32	153.5	69.5	54	
23	3D.230.R.03		25	32	155	71	54	
23.5	3D.235.R.03		25	32	156.5	72.5	54	
18	3D.180.L.03	L	25	32	140	56	54	
19	3D.190.L.03		25	32	143	59	54	
20	3D.200.L.03		25	32	146	62	54	
20.5	3D.205.L.03		25	32	147.5	63.5	54	
21	3D.210.L.03		25	32	149	65	54	
21.5	3D.215.L.03		25	32	150.5	66.5	54	
22	3D.220.L.03		25	32	152	68	54	
22.5	3D.225.L.03		25	32	153.5	69.5	54	
23	3D.230.L.03		25	32	155	71	54	

Ordering example: 1 piece 3D.140.R.02

	D [mm]			
WC.. / XO.. 02..	14 - 17.5	7729113/M2,0X4,8/T06		7729112/TORX T06 F
WC.. / XO.. 03..	18 - 23.5	7722113/M2,2X5/T07	7724105/TORX T07	

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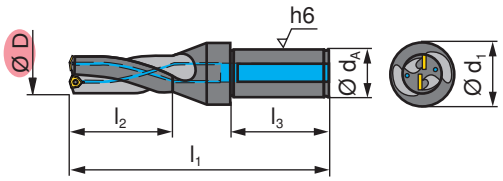
MaxiDrill Classic – 3D

Ø 24 – 29 mm



Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
24	3D.240.R.05		25	32	158	74	54	
24.5	3D.245.R.05		25	32	159.5	75.5	54	
25	3D.250.R.05		25	32	161	77	54	
25.5	3D.255.R.05		25	32	162.5	78.5	54	
26	3D.260.R.05	R	25	32	164	80	54	
26.5	3D.265.R.05		25	32	165.5	81.5	54	
27	3D.270.R.05		25	32	167	83	54	
28	3D.280.R.05		25	32	170	86	54	
29	3D.290.R.05		25	32	173	89	54	
24	3D.240.L.05		25	32	158	74	54	WC.. / XO.. 05..
24.5	3D.245.L.05		25	32	159.5	75.5	54	
25	3D.250.L.05		25	32	161	77	54	
25.5	3D.255.L.05		25	32	162.5	78.5	54	
26	3D.260.L.05	L	25	32	164	80	54	
26.5	3D.265.L.05		25	32	165.5	81.5	54	
27	3D.270.L.05		25	32	167	83	54	
28	3D.280.L.05		25	32	170	86	54	
29	3D.290.L.05		25	32	173	89	54	

Ordering example: 1 piece 3D.240.R.05

	D [mm]			
WC.. / XO.. 05..	24 - 29	7815101/M2,5X6,0/T08	7724106/TORX T08	

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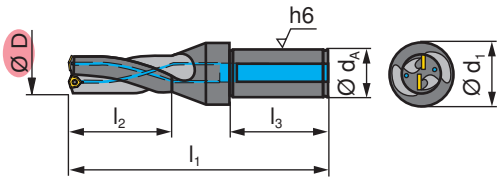
MaxiDrill Classic – 3D

Ø 30 – 37 mm



Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
30	3D.300.R.06	R	32	49	180	92	58	WC.. / XO.. 06..
31	3D.310.R.06		32	49	183	95	58	
32	3D.320.R.06		32	49	186	98	58	
33	3D.330.R.06		32	49	189	101	58	
34	3D.340.R.06		32	49	192	104	58	
35	3D.350.R.06		32	49	195	107	58	
36	3D.360.R.06		32	49	198	110	58	
37	3D.370.R.06		32	49	201	113	58	
30	3D.300.L.06	L	32	49	180	92	58	
31	3D.310.L.06		32	49	183	95	58	
32	3D.320.L.06		32	49	186	98	58	
33	3D.330.L.06		32	49	189	101	58	
34	3D.340.L.06		32	49	192	104	58	
36	3D.360.L.06		32	49	198	110	58	
37	3D.370.L.06		32	49	201	113	58	

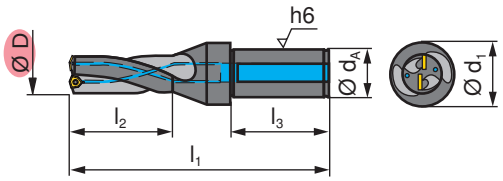
Ordering example: 1 piece 3D.300.R.06

	D [mm]			
WC.. / XO.. 06..	30 - 37	7815102/M3,5X11,0/T15	7724103/TORX T15	

20

MaxiDrill Classic – 3D

Ø 38 – 53 mm



Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
38	3D.380.R.07	R	32	49	204	116	58	WC.. / XO.. 07..
39	3D.390.R.07		32	49	207	119	58	
40	3D.400.R.07		32	49	210	122	58	
41	3D.410.R.07		32	49	213	125	58	
42	3D.420.R.07		32	49	216	128	58	
43	3D.430.R.07		32	49	219	131	58	
44	3D.440.R.07		32	49	222	134	58	
45	3D.450.R.07		40	59	240	137	68	
46	3D.460.R.07		40	59	243	140	68	
47	3D.470.R.07		40	59	246	143	68	
48	3D.480.R.07		40	59	249	146	68	
49	3D.490.R.07		40	59	252	149	68	
50	3D.500.R.07		40	59	255	152	68	
51	3D.510.R.07		40	59	258	155	68	
52	3D.520.R.07		40	59	261	158	68	
53	3D.530.R.07		40	59	264	161	68	
40	3D.400.L.07	L	32	49	210	122	58	
41	3D.410.L.07		32	49	213	125	58	
43	3D.430.L.07		32	49	219	131	58	
47	3D.470.L.07		40	59	246	143	68	
51	3D.510.L.07		40	59	258	155	68	
52	3D.520.L.07		40	59	261	158	68	

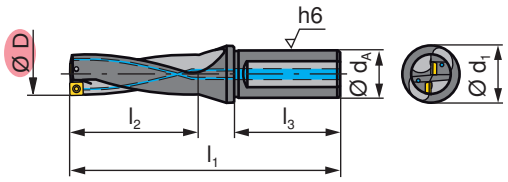
Ordering example: 1 piece 3D.380.R.07

	D [mm]			
WC.. / XO.. 07..	38 - 53	7815102/M3,5X11,0/T15	7724103/TORX T15	

20

MaxiDrill – HFD-3D

Ø 14 – 24,5 mm



Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
14	3D.140.R.04-4	R	20	30	116	42	50	SCLT 04..
14.5	3D.145.R.04-4		20	30	119	45	50	
15	3D.150.R.04-4		20	30	119	45	50	
15.5	3D.155.R.04-4		20	30	122	48	50	
16	3D.160.R.04-4		20	30	122	48	50	
16.5	3D.165.R.05-4		20	30	125	51	50	SCLT 05..
17	3D.170.R.05-4		20	30	125	51	50	
17.5	3D.175.R.05-4		25	30	134	54	56	
18	3D.180.R.05-4		25	30	134	54	56	
18.5	3D.185.R.06-4		25	30	137	57	56	SCLT 06..
19	3D.190.R.06-4		25	30	137	57	56	
19.5	3D.195.R.06-4		25	30	140	60	56	
20	3D.200.R.06-4		25	30	140	60	56	
20.5	3D.205.R.06-4		25	30	143	63	56	
21	3D.210.R.07-4		25	30	143	63	56	SCLT 07..
21.5	3D.215.R.07-4		25	30	146	66	56	
22	3D.220.R.07-4		25	30	146	66	56	
22.5	3D.225.R.07-4		25	30	149	69	56	
23	3D.230.R.07-4		25	30	149	69	56	
23.5	3D.235.R.07-4		32	39	156	72	60	
24	3D.240.R.07-4		32	39	156	72	60	
24.5	3D.245.R.08-4		32	39	159	75	60	SCLT 08..

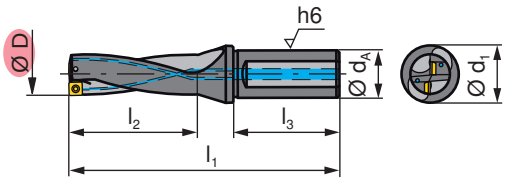
Ordering example: 1 piece 3D.140.R.04-4

	D [mm]			
SCLT 04..	14 - 16	10001230/M1,8X3,8/T06	7883305/TORX T06	
SCLT 05..	16.5 - 18	7815110/M2,0X4,0/T06	7883305/TORX T06	
SCLT 06..	18.5 - 20.5	7722113/M2,2X5/T07	7724105/TORX T07	
SCLT 07..	21 - 24	7815101/M2,5X6,0/T08	7724106/TORX T08	
SCLT 08..	24.5	7883203/M3,0X7,3/T08	7724106/TORX T08	

21

MaxiDrill – HFD-3D

Ø 25 – 44 mm



Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
25	3D.250.R.08-4	R	32	39	159	75	60	SCLT 08..
25.5	3D.255.R.08-4		32	39	162	78	60	
26	3D.260.R.08-4		32	39	162	78	60	
26.5	3D.265.R.08-4		32	39	165	81	60	
27	3D.270.R.08-4		32	39	165	81	60	
28	3D.280.R.08-4		32	39	168	84	60	
29	3D.290.R.10-4		32	39	171	87	60	SCLT 10..
30	3D.300.R.10-4		32	39	179	90	60	
31	3D.310.R.10-4		32	39	182	93	60	
32	3D.320.R.10-4		32	39	185	96	60	
33	3D.330.R.10-4		40	50	196	99	68	
34	3D.340.R.10-4		40	50	199	102	68	
35	3D.350.R.12-4		40	50	202	105	68	SCLT 12..
36	3D.360.R.12-4		40	50	205	108	68	
37	3D.370.R.12-4		40	50	218	111	68	
38	3D.380.R.12-4		40	50	221	114	68	
39	3D.390.R.12-4		40	50	224	117	68	
40	3D.400.R.12-4		40	50	227	120	68	
41	3D.410.R.12-4		40	50	230	123	68	
42	3D.420.R.12-4		40	50	233	126	68	
43	3D.430.R.12-4		40	50	236	129	68	
44	3D.440.R.12-4		40	50	239	132	68	

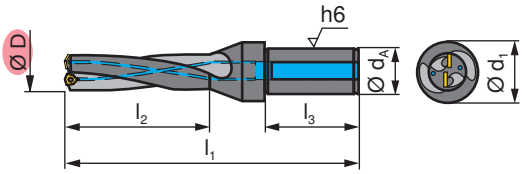
Ordering example: 1 piece 3D.250.R.08-4

	D [mm]			
SCLT 08..	25 - 28	7883203/M3,0X7,3/T08	7724106/TORX T08	
SCLT 10..	29 - 34	7722111/M3,5X7,2/T15	7724103/TORX T15	
SCLT 12..	35 - 44	7822114/M4,5X10,5/T20	7724104/TORX T20	

21

MaxiDrill Classic – 4D

Ø 18 – 29 mm



Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
18	4D.180.R.03		25	32	158	74	54	
18.5	4D.185.R.03		25	32	160	76	54	
19	4D.190.R.03		25	32	162	78	54	
19.5	4D.195.R.03		25	32	164	80	54	
20	4D.200.R.03		25	32	166	82	54	
20.5	4D.205.R.03		25	32	168	84	54	
21	4D.210.R.03		25	32	170	86	54	WC.. / XO.. 03..
21.5	4D.215.R.03		25	32	172	88	54	
22	4D.220.R.03		25	32	174	90	54	
22.5	4D.225.R.03		25	32	176	92	54	
23	4D.230.R.03	R	25	32	178	94	54	
23.5	4D.235.R.03		25	32	180	96	54	
24	4D.240.R.05		25	32	182	98	54	
24.5	4D.245.R.05		25	32	184	100	54	
25	4D.250.R.05		25	32	186	102	54	
25.5	4D.255.R.05		25	32	188	104	54	
26	4D.260.R.05		25	32	190	106	54	WC.. / XO.. 05..
26.5	4D.265.R.05		25	32	192	108	54	
27	4D.270.R.05		25	32	194	110	54	
28	4D.280.R.05		25	32	198	114	54	
29	4D.290.R.05		25	32	202	118	54	

Ordering example: 1 piece 4D.180.R.03

	D [mm]			
WC.. / XO.. 03..	18 - 23.5	7722113/M2,2X5/T07	7724105/TORX T07	
WC.. / XO.. 05..	24 - 29	7815101/M2,5X6,0/T08	7724106/TORX T08	

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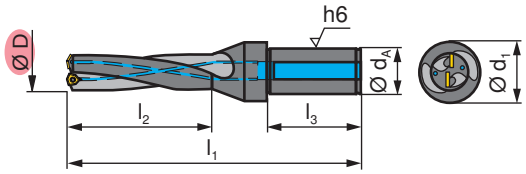
MaxiDrill Classic – 4D

Ø 30 – 50 mm



Picture shows right-hand version

D [mm]	Type, description	L / R	d_A [mm]	d_1 [mm]	l_1 [mm]	l_2 [mm]	l_3 [mm]	
30	4D.300.R.06		32	49	210	122	58	
31	4D.310.R.06		32	49	214	126	58	
32	4D.320.R.06		32	49	218	130	58	
33	4D.330.R.06		32	49	222	134	58	
34	4D.340.R.06		32	49	226	138	58	WC.. / XO.. 06..
35	4D.350.R.06		32	49	230	142	58	
36	4D.360.R.06		32	49	234	146	58	
37	4D.370.R.06		32	49	238	150	58	
38	4D.380.R.07		32	49	242	154	58	
39	4D.390.R.07		32	49	246	158	58	
40	4D.400.R.07	R	32	49	250	162	58	
41	4D.410.R.07		32	49	254	166	58	
42	4D.420.R.07		32	49	258	170	58	
43	4D.430.R.07		32	49	262	174	58	
44	4D.440.R.07		32	49	266	178	58	WC.. / XO.. 07..
45	4D.450.R.07		40	59	285	182	68	
46	4D.460.R.07		40	59	289	186	68	
47	4D.470.R.07		40	59	293	190	68	
48	4D.480.R.07		40	59	297	194	68	
49	4D.490.R.07		40	59	301	198	68	
50	4D.500.R.07		40	59	305	202	68	

Ordering example: 1 piece 4D.300.R.06

	D [mm]			
WC.. / XO.. 06..	30 - 37	7815102/M3,5X11,0/T15	7724103/TORX T15	
WC.. / XO.. 07..	38 - 50	7815102/M3,5X11,0/T15	7724103/TORX T15	

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Cutting data
MaxiDrill Classic

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ 0,15% C	1	125
		annealed	0,15% - 0,45% C	2	150 - 250
		tempered	≥ 0,45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% 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

* Rm = ultimate tensile strength, measured in MPa

Cutting data
MaxiDrill Classic

	Drill diameter (mm)				
	Ø 14 - 17,5	Ø 18 - 23,5	Ø 24 - 29	Ø 30 - 42	Ø 38 - 53
N/mm²	f (mm/rev.)	f (mm/rev.)	f (mm/rev.)	f (mm/rev.)	f (mm/rev.)
420	–	–	–	–	–
500 - 850	0,03 - 0,10	0,05 - 0,12	0,08 - 0,12	0,08 - 0,15	0,1 - 0,25
1000	0,03 - 0,10	0,05 - 0,12	0,08 - 0,12	0,08 - 0,15	0,1 - 0,25
600	0,03 - 0,10	0,05 - 0,14	0,08 - 0,14	0,10 - 0,17	0,1 - 0,20
850 - 1000	0,03 - 0,10	0,05 - 0,14	0,08 - 0,14	0,10 - 0,17	0,1 - 0,20
1180	0,03 - 0,10	0,05 - 0,14	0,08 - 0,14	0,10 - 0,17	0,1 - 0,20
680	00,3 - 0,10	0,05 - 0,14	0,08 - 0,14	0,10 - 0,17	0,1 - 0,20
1180	00,3 - 0,10	0,05 - 0,14	0,08 - 0,14	0,10 - 0,17	0,1 - 0,20
–	0,03 - 0,10	0,04 - 0,14	0,08 - 0,16	0,10 - 0,18	0,12 - 0,20
–	0,03 - 0,10	0,04 - 0,14	0,08 - 0,16	0,10 - 0,18	0,12 - 0,20
1100	0,03 - 0,10	0,04 - 0,14	0,08 - 0,16	0,10 - 0,18	0,12 - 0,20
–	0,03 - 0,10	0,04 - 0,12	0,08 - 0,14	0,10 - 0,16	0,1 - 0,18
–	0,03 - 0,10	0,04 - 0,12	0,08 - 0,14	0,10 - 0,16	0,1 - 0,18
–	0,03 - 0,10	0,04 - 0,12	0,08 - 0,14	0,10 - 0,16	0,1 - 0,18
–	0,04 - 0,12	0,06 - 0,16	0,12 - 0,18	0,14 - 0,22	0,15 - 0,25
–	0,04 - 0,12	0,06 - 0,16	0,12 - 0,18	0,14 - 0,22	0,15 - 0,25
–	0,04 - 0,10	0,08 - 0,14	0,12 - 0,18	0,14 - 0,20	0,15 - 0,22
–	0,04 - 0,10	0,08 - 0,14	0,12 - 0,18	0,14 - 0,20	0,15 - 0,22
–	0,04 - 0,12	0,08 - 0,16	0,10 - 0,18	0,12 - 0,20	0,15 - 0,25
–	0,04 - 0,12	0,08 - 0,16	0,10 - 0,18	0,12 - 0,20	0,15 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,06 - 0,16	0,10 - 0,18	0,12 - 0,22	0,14 - 0,25
–	–	0,05 - 0,10	0,08 - 0,12	0,10 - 0,15	0,10 - 0,20
–	–	0,05 - 0,10	0,08 - 0,12	0,10 - 0,15	0,10 - 0,20
–	–	0,05 - 0,10	0,08 - 0,12	0,10 - 0,15	0,10 - 0,20
–	–	0,04 - 0,08	0,06 - 0,10	0,08 - 0,12	0,09 - 0,14
–	–	0,04 - 0,08	0,06 - 0,10	0,08 - 0,12	0,09 - 0,14
–	–	0,04 - 0,08	0,06 - 0,10	0,08 - 0,12	0,09 - 0,14
–	–	0,04 - 0,08	0,06 - 0,10	0,08 - 0,12	0,09 - 0,14
–	–	0,04 - 0,08	0,06 - 0,10	0,08 - 0,12	0,09 - 0,14
–	–	0,05 - 0,12	0,08 - 0,12	0,10 - 0,15	0,1 - 0,20
–	–	0,05 - 0,12	0,08 - 0,12	0,10 - 0,15	0,1 - 0,20
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–

Cutting data
MaxiDrill HFD

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
A	Non alloyed steel	annealed	≤ 0,15% C	1	125
		annealed	0,15% - 0,45% C	2	150 - 250
		tempered	≥ 0,45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% 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

* Rm = ultimate tensile strength, measured in MPa

Cutting data

MaxiDrill HFD

	Drill diameter (mm)						
	Ø 14 - 15,9	Ø 16 - 17,5	Ø 18 - 21,5	Ø 22 - 27	Ø 28	Ø 29 - 33	Ø 34 - 44
N/mm^2	f (mm/rev.)	f (mm/rev.)	f (mm/rev.)	f (mm/rev.)	f (mm/rev.)	f (mm/rev.)	f (mm/rev.)
420	–	0,09 - 0,15	0,09 - 0,15	0,11 - 0,17	0,11 - 0,17	0,11 - 0,17	0,11 - 0,17
500 - 850	0,09 - 0,15	0,11 - 0,17	0,13 - 0,19	0,17 - 0,23	0,17 - 0,23	0,22 - 0,28	0,22 - 0,28
1000	0,09 - 0,15	0,11 - 0,17	0,13 - 0,19	0,17 - 0,23	0,17 - 0,23	0,22 - 0,28	0,22 - 0,28
600	0,09 - 0,15	0,11 - 0,17	0,13 - 0,19	0,17 - 0,23	0,17 - 0,23	0,19 - 0,25	0,19 - 0,25
850 - 1000	0,07 - 0,13	0,09 - 0,15	0,11 - 0,17	0,15 - 0,21	0,15 - 0,21	0,15 - 0,21	0,17 - 0,23
1180	0,07 - 0,13	0,09 - 0,15	0,11 - 0,17	0,15 - 0,21	0,15 - 0,21	0,15 - 0,21	0,17 - 0,23
680	0,09 - 0,15	0,11 - 0,17	0,13 - 0,19	0,17 - 0,23	0,17 - 0,23	0,17 - 0,23	0,17 - 0,23
1180	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,11 - 0,17	0,11 - 0,17	0,11 - 0,17	0,11 - 0,17
–	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,11 - 0,17	0,11 - 0,17	0,11 - 0,17	0,11 - 0,17
–	0,05 - 0,11	0,05 - 0,11	0,09 - 0,15	0,13 - 0,19	0,13 - 0,19	0,13 - 0,19	0,17 - 0,23
1100	0,05 - 0,11	0,05 - 0,11	0,09 - 0,15	0,13 - 0,19	0,13 - 0,19	0,13 - 0,19	0,17 - 0,23
–	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,11 - 0,17	0,11 - 0,17	0,11 - 0,17	0,09 - 0,15
–	0,03 - 0,09	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15
–	0,05 - 0,11	0,05 - 0,11	0,09 - 0,15	0,11 - 0,17	0,11 - 0,17	0,11 - 0,17	0,11 - 0,17
–	0,13 - 0,19	0,13 - 0,19	0,22 - 0,28	0,27 - 0,33	0,27 - 0,33	0,27 - 0,33	0,27 - 0,33
–	0,11 - 0,17	0,13 - 0,19	0,15 - 0,21	0,22 - 0,28	0,22 - 0,28	0,22 - 0,28	0,22 - 0,28
–	0,11 - 0,17	0,13 - 0,19	0,15 - 0,21	0,17 - 0,23	0,17 - 0,23	0,17 - 0,23	0,22 - 0,28
–	0,11 - 0,17	0,13 - 0,19	0,15 - 0,21	0,19 - 0,25	0,19 - 0,25	0,19 - 0,25	0,22 - 0,28
–	0,11 - 0,17	0,13 - 0,19	0,15 - 0,21	0,19 - 0,25	0,19 - 0,25	0,19 - 0,25	0,22 - 0,28
–	0,11 - 0,17	0,13 - 0,19	0,15 - 0,21	0,19 - 0,25	0,19 - 0,25	0,19 - 0,25	0,22 - 0,28
–	0,05 - 0,11	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15	0,12 - 0,18
–	0,07 - 0,13	0,09 - 0,15	0,11 - 0,17	0,13 - 0,19	0,13 - 0,19	0,13 - 0,19	0,13 - 0,19
–	0,07 - 0,13	0,09 - 0,15	0,11 - 0,17	0,13 - 0,19	0,13 - 0,19	0,13 - 0,19	0,13 - 0,19
–	0,07 - 0,13	0,09 - 0,15	0,11 - 0,17	0,17 - 0,23	0,17 - 0,23	0,17 - 0,23	0,17 - 0,23
–	0,07 - 0,13	0,09 - 0,15	0,11 - 0,17	0,17 - 0,23	0,17 - 0,23	0,17 - 0,23	0,19 - 0,25
–	0,05 - 0,11	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15	0,12 - 0,18
–	0,09 - 0,15	0,11 - 0,17	0,13 - 0,19	0,22 - 0,28	0,17 - 0,23	0,17 - 0,23	0,17 - 0,23
–	0,09 - 0,15	0,11 - 0,17	0,13 - 0,19	0,22 - 0,28	0,17 - 0,23	0,17 - 0,23	0,17 - 0,23
–	0,09 - 0,15	0,11 - 0,17	0,13 - 0,19	0,22 - 0,28	0,17 - 0,23	0,17 - 0,23	0,22 - 0,28
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–
–	0,03 - 0,09	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15
–	0,03 - 0,09	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15
–	0,03 - 0,09	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15
–	0,03 - 0,09	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15
–	0,03 - 0,09	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15
–	0,03 - 0,09	0,05 - 0,11	0,07 - 0,13	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15	0,09 - 0,15
–	–	–	–	–	–	–	–
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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	0,15% - 0,45% C	2	150 - 250
		tempered	≥ 0,45% C	3	300
	Low alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High alloyed steel	annealed		10	200
		tempered		11	350
	Corrosion resistant steel	annealed	ferritic	12	200
		tempered	martensitic	13	325
R	Stainless steel	annealed	ferritic / martensitic	14	200
		quenched	austenitic	14	180
		quenched	duplex	14	230 - 260
		hardened	martensitic / austenitic	14	330
F	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	–
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminium wrought alloys	non hardened		21	60
		hardened		22	100
	Aluminium cast alloys	non hardened	< 12% 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

* Rm = ultimate tensile strength, measured in MPa

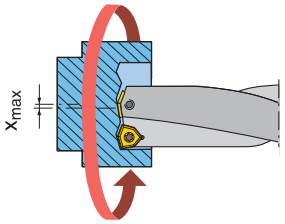
Cutting data
Grades, material

Uncoated carbide			Coated carbide					
H216T v_c [m/min]	U17T v_c [m/min]	S40T v_c [m/min]	SR127 v_c [m/min]	SR226 v_c [m/min]	SR226+ v_c [m/min]	CTC1435 v_c [m/min]	CTP1340 v_c [m/min]	GM40 v_c [m/min]
–	–	–	–	150 - 280	220 - 300	220 - 300	–	220 - 300
–	–	–	–	120 - 200	210 - 290	180 - 250	–	180 - 250
–	–	–	–	100 - 180	200 - 250	180 - 250	200 - 250	180 - 250
–	–	–	–	120 - 200	180 - 200	200 - 280	180 - 200	200 - 280
–	–	–	–	90 - 160	150 - 200	180 - 220	150 - 180	180 - 220
–	–	–	–	80 - 140	–	120 - 200	–	120 - 200
–	–	–	–	110 - 180	150 - 200	140 - 220	150 - 180	140 - 220
–	–	–	–	80 - 140	120 - 170	120 - 160	120 - 170	120 - 160
–	–	–	–	–	–	180 - 250	180 - 200	180 - 250
–	–	–	–	–	–	100 - 150	180 - 200	100 - 150
–	60 - 150	–	–	–	–	180 - 250	100 - 140	180 - 250
–	60 - 150	–	–	–	–	180 - 250	150 - 180	180 - 250
–	50 - 100	–	–	–	–	100 - 140	80 - 140	100 - 140
–	30 - 100	–	–	–	–	80 - 140	80 - 140	80 - 140
100 - 150	–	–	100 - 150	100 - 150	200 - 300	–	–	–
100 - 150	–	–	100 - 150	100 - 150	180 - 290	–	–	–
100 - 140	–	–	100 - 140	100 - 140	140 - 210	–	–	–
100 - 140	–	–	100 - 140	100 - 140	120 - 200	–	–	–
100 - 162	–	–	100 - 162	100 - 160	160 - 230	–	–	–
100 - 160	–	–	100 - 160	100 - 160	160 - 230	–	–	–
200 - 500	–	200 - 500	100 - 500	100 - 500	–	–	–	–
200 - 500	–	200 - 500	100 - 300	100 - 300	–	–	–	–
200 - 500	–	200 - 500	100 - 500	100 - 500	–	–	–	–
200 - 500	–	200 - 500	100 - 300	100 - 300	–	–	–	–
200 - 500	–	200 - 500	100 - 300	100 - 300	–	–	–	–
180 - 240	–	250 - 350	100 - 500	100 - 500	–	–	–	–
180 - 240	–	180 - 240	100- 500	100 - 500	–	–	–	–
180 - 240	–	180 - 240	100 - 300	100 - 300	–	–	–	–
180 - 240	–	180 - 240	100 - 300	100 - 300	–	–	–	–
–	–	50 - 180	80 - 180	80 - 180	–	–	–	–
–	–	50 - 150	60 - 150	60 - 150	–	–	–	–
–	–	50 - 200	100 - 250	100 - 250	–	–	–	–
–	20 - 40	–	–	–		20 - 80	–	–
–	20 - 40	–	–	–	–	20 - 80	–	–
–	20 - 40	–	–	–	–	20 - 80	–	–
–	20 - 40	–	–	–	–	20 - 80	–	–
–	20 - 40	–	–	–	–	20 - 80	–	–
40 - 120	30 - 80	40 - 120	50 - 120	50 - 120	–	40 - 100	40 - 100	–
40 - 100	30 - 80	40 - 120	30 - 50	30 - 50	–	40 - 100	40 - 80	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–

Off-centre drilling

Maximum offset 'X' when offset drilling into solid material for fixed applications

Ø [mm]	Classic	X_{max} [mm]	HFD	X_{max} [mm]
14	02	2.0	04	0,25
15	02	1.8	04	0,25
16	02	1.5	04	0,25
17	02	1.2	05	0,25
18	03	2,0	05	0,25
19	03	1.8	06	0,25
20	03	1.6	06	0,25
21	03	1.3	07	0,25
22	03	1.0	07	0,25
23	03	0.8	07	0,25
24	05	2.3	07	0,25
25	05	2.2	08	0,25
26	05	2.0	08	0,25
27	05	1.8	08	0,25
28	05	1.6	08	0,25
29	05	1.5	10	0,25
30	06	3.2	10	0,25
31	06	3.2	10	0,25
32	06	3.2	10	0,25
33	06	3.0	10	0,25
34	06	2.7	10	0,25
35	06	2.5	12	0,25
36	06	2.2	12	0,25
37	06	1.9	12	0,25
38	06	1.6	12	0,25
39	06	1.4	12	0,25
40	06	1.2	12	0,25
41	06	1.0	12	0,25
42	06	0.6	12	0,25
38	07	3.5	12	0,25
39	07	3.3	12	0,25
40	07	3.0	12	0,25
41	07	2.8	12	0,25
42	07	2.5	12	0,25
43	07	2.3	12	0,25
44	07	2.0	12	0,25
45	07	1.9		
46	07	1.8		
47	07	1.5		
48	07	1.4		
49	07	1.2		
50	07	1.0		



Permissible feed rates for X_{max}:
f x 0.05 - 0.08 mm/rev.

With the maximum offset X_{max} the hole becomes
$D_{max} = D + 2X_{max}$

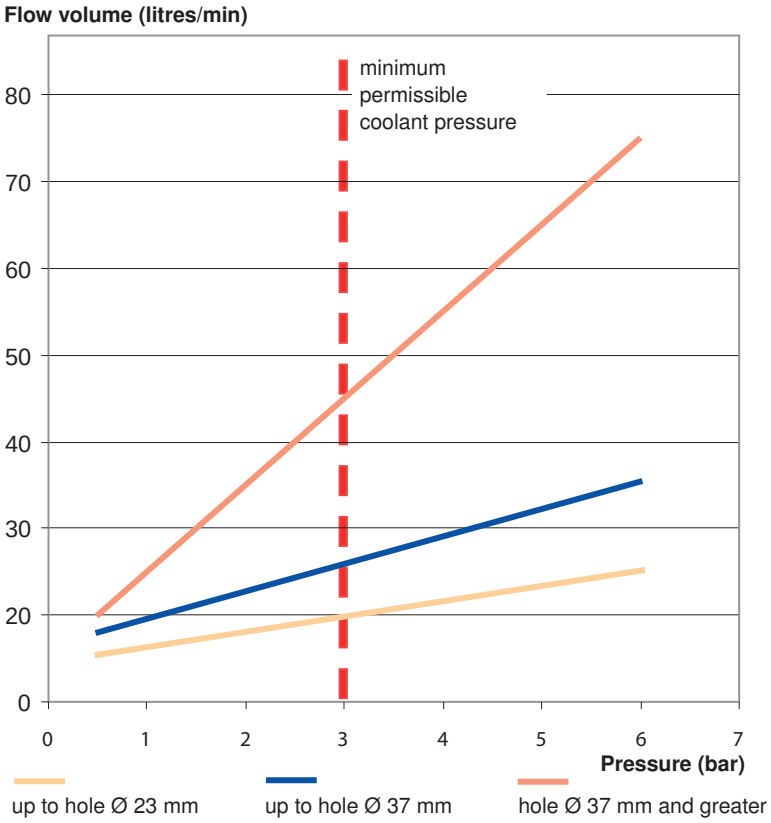
for example for D = 38 mm, X_{max} = 1.6 mm
$D_{max} = D + 3.2 = 41.2$ mm

Please note:

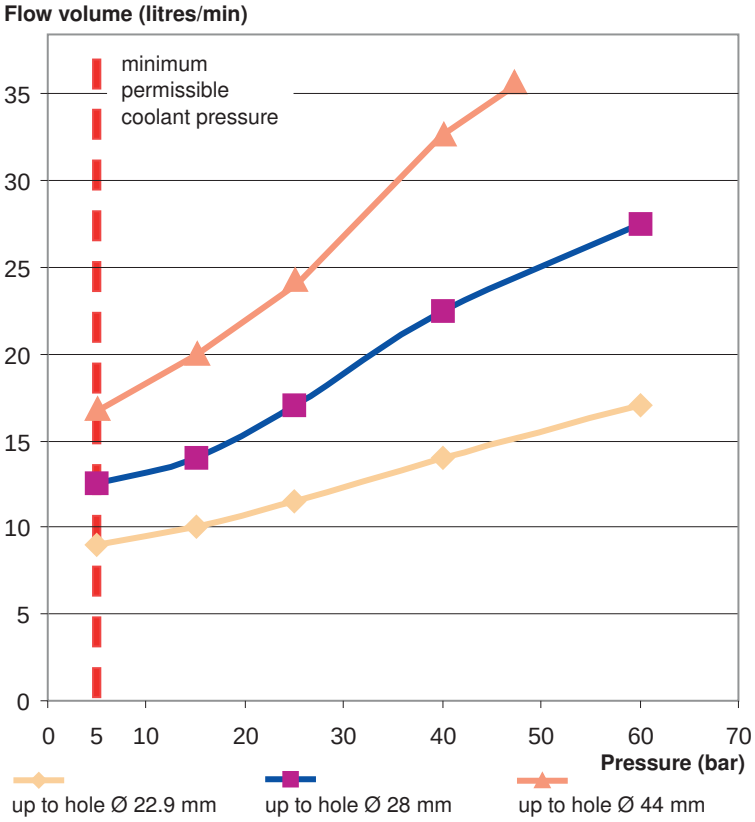
When drilling off-centre the radial forces are not compensated, which results in instability.

Coolant pressure

MaxiDrill Classic – recommended coolant pressure and coolant flow



MaxiDrill HFD – recommended coolant pressure and coolant flow



Formula collection

Formula collection for MaxiDrill tools

Revolution number

$$n = \frac{vc \cdot 1000}{\pi \cdot D} \quad [min^{-1}]$$

Cutting speed

$$v_c = \frac{\pi \cdot D \cdot n}{1000} \quad [m/min]$$

Feed rate

$$f \quad [mm/rev.]$$

Feed rate

$$v_f = f \cdot n \quad [m/min]$$

Machining cross section

$$A_T = \frac{\pi \cdot D^2}{4} \quad [mm^2]$$

Metal removal rate

$$Q = \frac{vf \cdot AT}{1000} \quad [cm^3/min]$$

Specific cutting force

k_c = see table [N/mm²]

Power requirements

$$P_c = \frac{Q}{60 \cdot 1000 \cdot \eta} \cdot k_c \quad [kW]$$

Torque moment

$$M_c = \frac{f \cdot kc}{1000} \cdot \frac{D^2}{8} \quad [Nm]$$

Feed force (approx.)

$$F_f \approx 0{,}7 \frac{D}{2} \cdot f \cdot k_c \quad [N]$$

Drilling time

$$T_c = \frac{L + h}{vf} \quad [min]$$

Clearance

h [mm]

Drilling depth

L [mm]

Material	Specific cutting force k_c (N/mm²)
St 37.11; St 42.11	1740
St 50.11	1950
St 60.11	2070
St 70.11	2220
C 35, C 45, Ck 45	2060/2175
C 60, Ck 60	2090
16 Mn Cr 5	2060
18 Cr Ni 6	2220
34 Cr Mo 4	2190
50 Cr V 4	2175
tempered 100 Cr 6	2335
Mn, Cr Ni alloyed steel	2335
Cr Mo alloyed steel	2570
Corrosion resistant steel	2530
Hot working steel	2570
Nitriding steel	2570
GS 45	1570
GS 52	1765
GG 22, GG 25	1140
GGG 42	1370
Aluminium cast alloys	640

Please note! The k_c-values depend on the feed. Therefore the table contains their upper limit values. The calculated power is possibly higher than the power actually needed (~ 10 - 20%).

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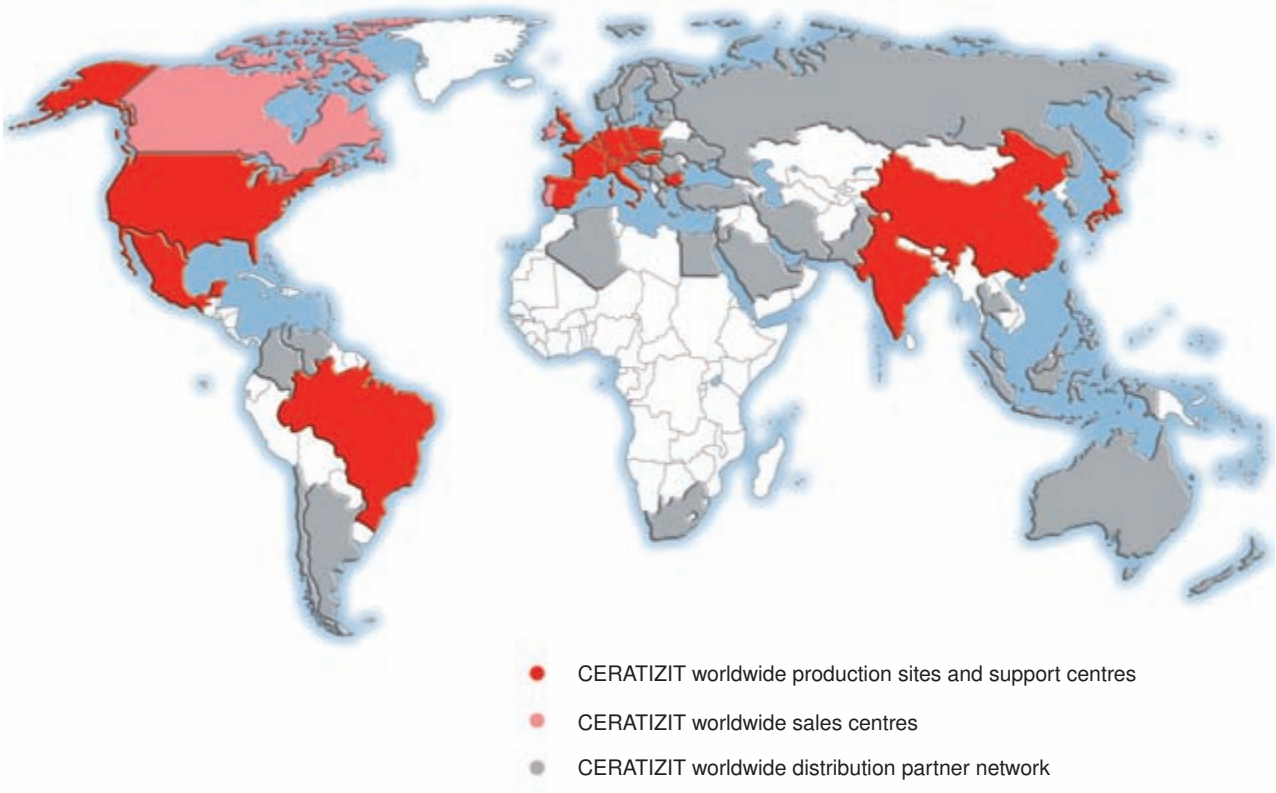

CERATIZIT worldwide

Parent company in Luxembourg

CERATIZIT Luxembourg Sàrl
Route de Holzem 101
L-8232 Mamer
Tel.: +352 312 085-1
Fax: +352 311 911
E-mail: info@ceratizit.com
www.ceratizit.com

Contact for further information:

CERATIZIT Austria Gesellschaft m.b.H.
A-6600 Reutte/Tyrol
Tel.: +43 (5672) 200-0
Fax: +43 (5672) 200-502
E-mail: info.austria@ceratizit.com
www.ceratizit.com

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