MAXIMILL 491

90° MILLING SYSTEM

ENGINEERED SIMPLICITY

CUTTING SOLUTIONS BY
CERATIZIT

www.ceratizit.com

We work hard to make things easy.

It takes a lot of engineering and know-how to make a complicated process simple. But that's what we do. We think ahead, keeping your needs out in front. We're known for innovative solutions, so as the metalworking industry evolves, CERATIZIT will have what you need. And you'll know where to find us – out in front.

NOTE: Keep this catalog handy for future reference and ordering.

MAXIMILL 491:
90° MILLING SYSTEM.
8 CUTTING EDGES.
1 SIMPLE DESIGN.

CERATIZIT – A World of Innovation

- Your reliable single source for unique solutions in cutting tools, solid rod, wear component, and wood and stone applications
- World renowned for exceptional products optimized for hard-to-machine materials and your equipment parameters
- Working to invent new solutions for the challenges of tomorrow

Productivity is our product.

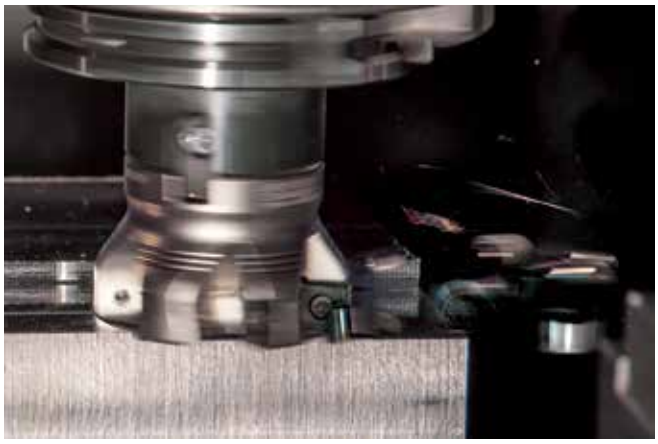
Our business is increasing productivity for your business. We take that very seriously. That's why CERATIZIT products are made so we can guarantee cost efficiency and reliable performance every day.

Contents

MaxiMill 491
The new 90° shoulder milling system

The new MaxiMill 491 shoulder milling system from Cutting Solutions by CERATIZIT features 8 usable cutting edges per insert and provides excellent performance, quality and price-performance ratio.

Thanks to the latest grinding technology, these precision inserts can be produced with tolerance H. This enhances the service life of the cutting edge, allowing top-quality surfaces to be achieved on your component.



Reduced vibration is a particular advantage when it comes to low-power machines and thin-walled, unstable components.

TOOL DETAILS

Quick and easy insert mounting

Long-lasting tool body in new material and “Hard & Tough” coating

Tools available with close or wide pitch

TorxPlus clamping screw profile

Exact 90° profile

Patented system

Chamfered coolant holes suitable for MQL, emulsion and compressed air

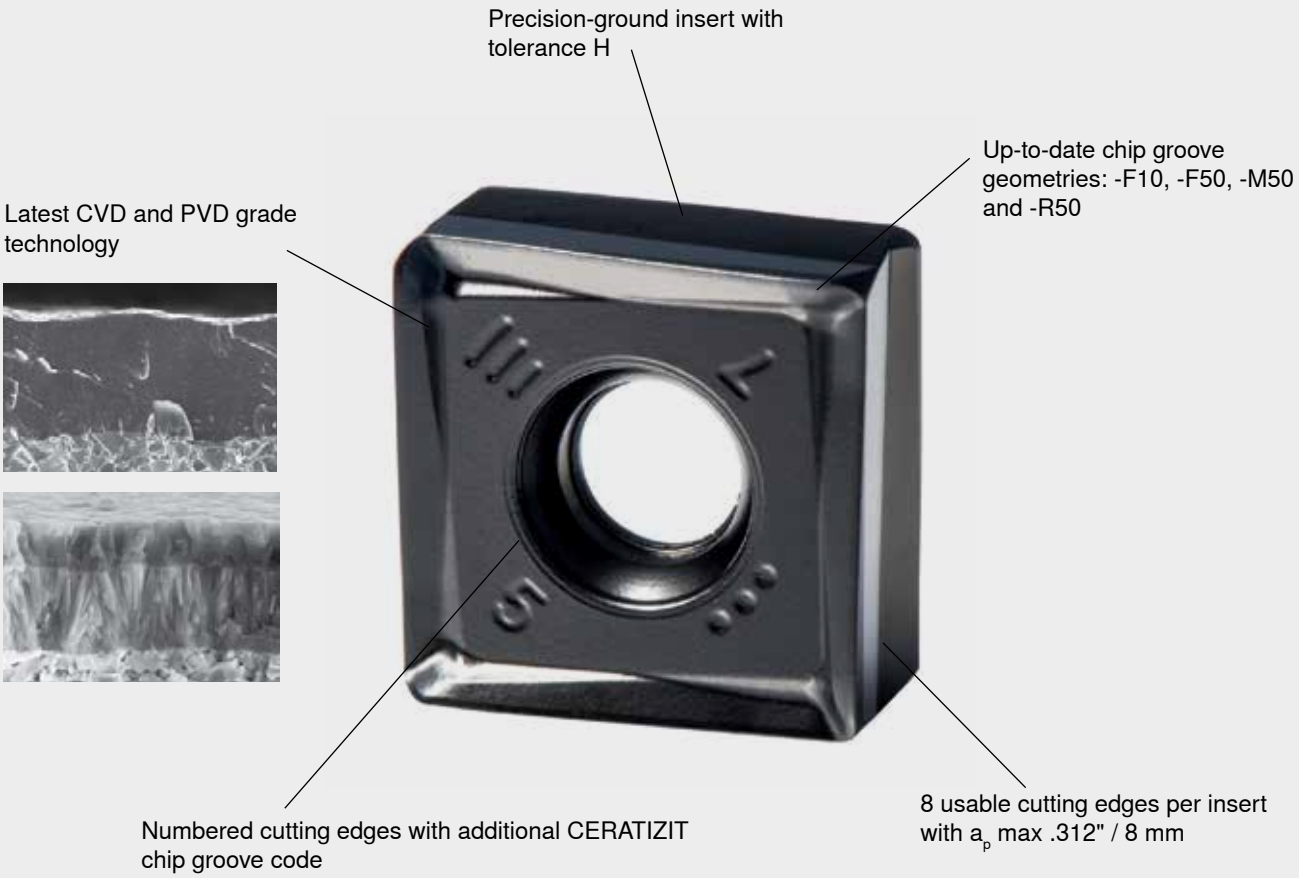
Extended range of sizes and applications

The MaxiMill 491 system offers an extended range of cutter bodies, from 1.5" to 6" in diameter, as well as 32mm to 160mm diameter for metric users. The system uses a 12 mm SNHU insert with 0.031" corner.

Available in shell, shank and threaded-shank styles – with close and wide pitches for each diameter.

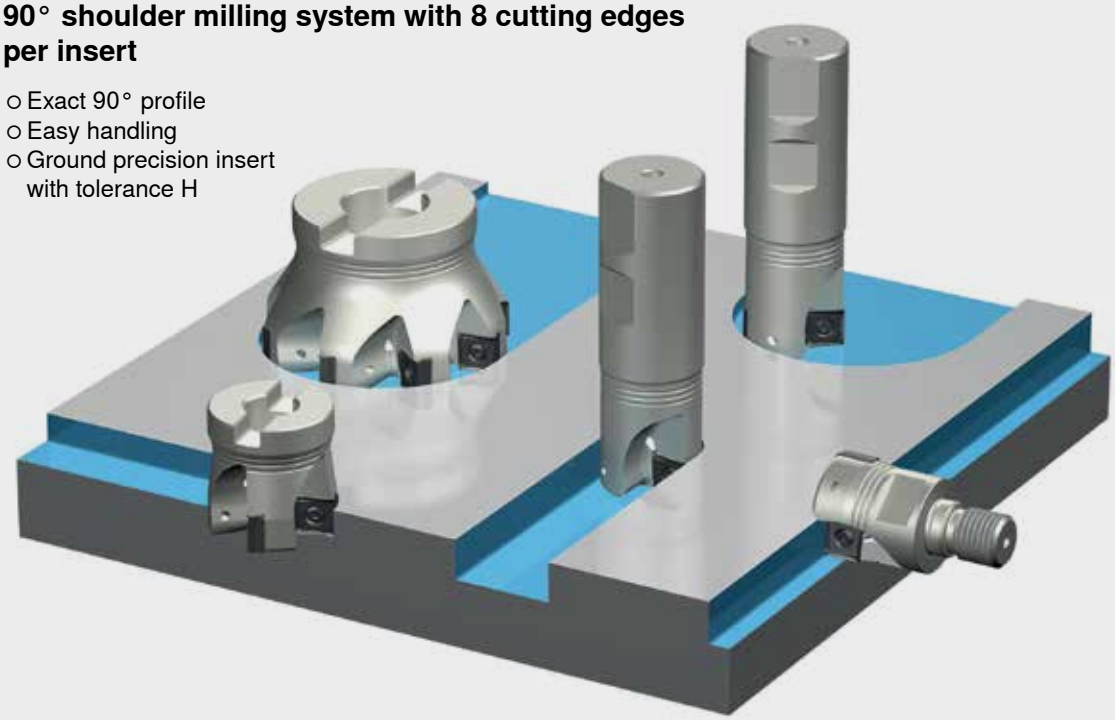
High-performance chip grooves and geometries – -F10, -F50, -M50, -R50 – make these inserts anything but standard. Engineered with the latest grade technologies, they're ideal for applications in steel, cast iron, stainless steel and aluminum in ISO ranges P, K, M and N.

INSERT DETAILS



90° shoulder milling system with 8 cutting edges per insert

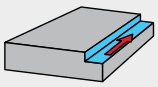
- Exact 90° profile
- Easy handling
- Ground precision insert with tolerance H



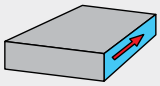
Applications

CERATIZIT puts most of the work where it belongs – in engineering – so you get the most out of it, in these operations:

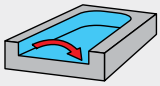
- Shoulder milling
- Face milling
- Peripheral milling
- Slot milling
- Trochoidal slot milling



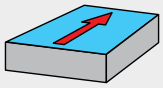
Shoulder milling



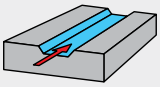
Peripheral milling



Trochoidal slot milling

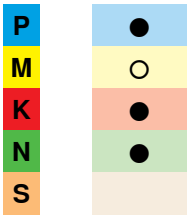


Face milling

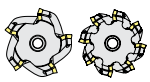


Slot milling

Material groups



Detailed information

Pitch	Ø range	Inserts
	inch: Ø 1.50" to 6.00" metric: Ø 32 to 160 mm	SNHU 12..

System advantages and benefits

Complete finishing and roughing operations with the same insert in aluminum, steel, cast iron and stainless steel. With eight cutting edges per insert and an approach angle of exactly 90°, you get perfect finishes – no further machining needed.

Inserts are available in the latest grade technologies – BLACKSTAR™ and SILVERSTAR™.

Easy use

- Self-positioning insert
- Quick and easy cutter mounting
- Ground precision insert with tolerance H
- Perfect axial run-out precision and concentricity

Long tool life

- Reduced vibration with low-power machines

Reliability

- Outstanding surface quality
- Double positive clearance angle

Very soft cutting action

- 20-30% lower power consumption on the spindle
- Reduced tendency for vibration also with low-power machines
- Extended application range

Large open chip pockets with wide pitch

- Optimal chip evacuation during the milling process

Maximum repeatability, thanks to innovative insert design with generous contact faces

Perfectly adapted chip pockets

Over 2x the tool life!

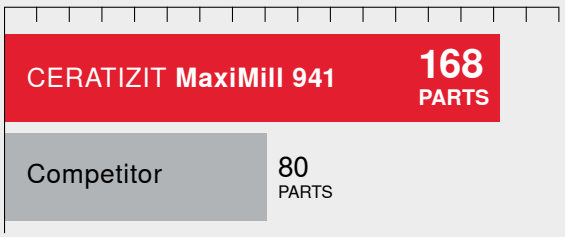
Success example with ISO P forged stainless steel

Cutting data	Competitor	CERATIZIT
Chip groove	PM	M50
Milling cutter	490-063Q22-14H	A491.63.R.06-12
Insert	490R-140408M-PM	SNHU 120408SR-M50
Grade	GC4240	CTPP235
V_c [ft/min]	725–1320	725–1320
V_c [m/min]	220–400	220–400
f_z [in/tooth]	0.006	0.006
f_z [mm/tooth]	.15	.15
ap [inch]	.040–.120	.040–.120
ap [mm]	1–3	1–3
Parts produced [qty]	**80**	**168**

Work piece description: bearing case, linear guidance
Work piece material: 1.7131 / 16MnCr5 (forged)
Coolant: emulsion

The customer was enthusiastic about the surface, optimal chip formation and low power consumption. Considerable cost saving thanks to reduced tool changing time and long tool life.

QUANTITY OF PARTS PRODUCED



The CERATIZIT Designation System
for cutting materials

CTP P235

1 2 3 4 5

1 Manufacturer: CERATIZIT

2 Cutting material

W Uncoated carbide
C CVD coated carbide
P PVD coated carbide
T Uncoated cermet
E Coated cermet
N Uncoated silicon nitride
M Coated silicon nitride
S Mixed ceramic
I Sialon
D PCD
B CBN
L CBN coated
H Sintered HSS

3 Main application (material) Variant 1: number

1 Steel
2 Stainless steel
3 Cast iron
4 Light and non-ferrous metals, non-metals
5 Heat-resistant alloys, titanium
6 Hard materials
7 Universal grade for a variety of application

Main application (material) Variant 2: ISO letter

P Steel
M Stainless steel
K Cast iron
N Light and non-ferrous metals, non-metals
S Hea-resistant alloys, titanium
H Hard materials
X Universal grade for a variety of applications

4 Main applications (machining method)

1 Turning
2 Milling
3 Parting and grooving
4 Drilling
5 Threading
6 Others
7 Universal grade for a variety of applications

5 ISO 513 Application range

For example:
05
10
15
25
35 ISO P35

Grade overview

Extreme tools for extreme materials.

We tailor the properties of CERATIZIT cutting tools with a special powder metallurgical process. The result: carbide grades with outstanding wear and heat resistance under extreme conditions common with difficult-to-machine materials.

The characteristics for each grade will help you decide which is best for your applications.

SILVERSTAR™

The first choice for high cutting performance in interrupted cutting actions or with difficult-to-machine materials.

BLACKSTAR™

Highly wear-resistant, thanks to TiN/TICN/AI2O3 coatings. Exceptional adhesion makes these grades ideal for machining steel and cast iron.

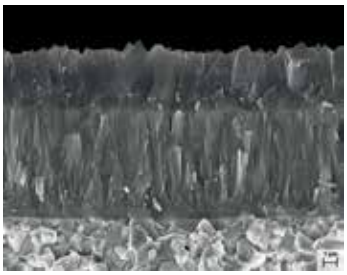
Grade designation	Standard designation ISO	Standard designation ANSI	*Type of cutting material	Application range 01 05 10 15 20 25 30 35 40 45 50	P Steel	M Stainless	K Cast iron	N Non-ferrous metals	S Heat-resistant	H Hard materials
CTCP230 BLACKSTAR™	HC-P30	C6	C		●					
	HC-K25	C2	C				●			
	HC-M25	-	C			○				
CTPP235 SILVERSTAR™	HC-P35	C5	P		●					
	HC-M30	-	P			○				
CTPM240 SILVERSTAR™	HC-M40	-	P			●				
	HC-P40	C5	P		○					
CTCK215 BLACKSTAR™	HC-K15	C3	C				●			
CTPK220 SILVERSTAR™	HC-K20	C2	P				●			
CTWN215	HW-N15	C3	W					●		
	HW-K15	C3	W				●			

● Main application

○ Extended application

Grade descriptions

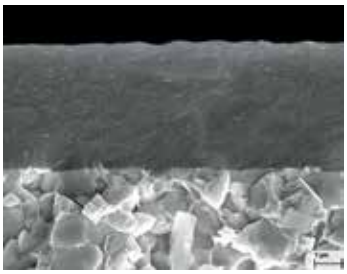
CTCP230 BLACKSTAR™	HC-P30 | HC-K25 | HC-M25	● ● ○



Specification:
Composition: Co 10.5%; mixed carbides 2.0%; WC balance | Grain size: 1-2 μm | Hardness: HV_{30} 1400 | Coating specification: CVD TiCN-Al_2O_3

Recommended application:
First choice for dry machining of steels at high cutting speeds.

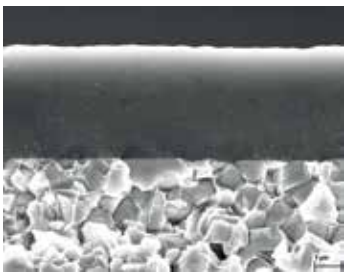
CTPP235 SILVERSTAR™	HC-P35 | HC-M30	● ○



Specification:
Composition: Co 10.5%; mixed carbides 2.0%; WC balance | Grain size: 1-2 μm | Hardness: HV_{30} 1400 | Coating specification: PVD TiAlTaN

Recommended application:
Particularly suitable for the wet machining of steels.

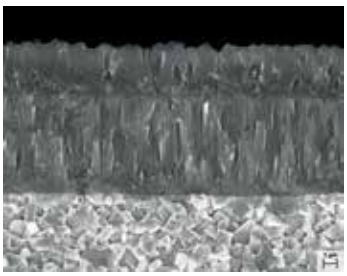
CTPM240 SILVERSTAR™	HC-M40 | HC-P40	● ○



Specification:
Composition: Co 12.5%; mixed carbides 2.0%; WC balance | Grain size: 1 μm | Hardness: HV_{30} 1380 | Coating specification: PVD TiAlTaN

Recommended application:
The first choice for the machining of austenitic steels.

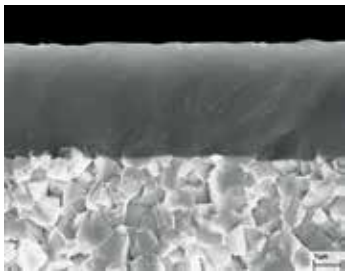
CTCK215 BLACKSTAR™	HC-K15	●



Specification:
Composition: Co 6.0%; mixed carbides 2.0%; WC balance | Grain size: 1 μm | Hardness: HV_{30} 1630 | Coating specification: CVD TiN; MT-TiCN; Al_2O_3

Recommended application:
The first choice for the machining of cast iron at high cutting speeds.

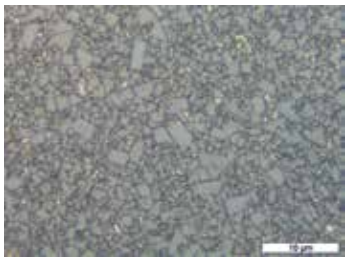
CTPK220 SILVERSTAR™	HC-K20	●



Specification:
Composition: Co 6.0%; mixed carbides 2.0%; WC balance | Grain size: 1 µm | Hardness: HV_{30} 1630 | Coating specification: PVD TiAlTaN

Recommended application:
Optimal for the machining of high-tensile cast iron materials when toughness is required.

CTWN215	HW-N15 | HW-K15	● ●



Specification:
Composition: Co 6.0%; others 0.2%; WC balance | Grain size: submicron | Hardness: HV_{30} 1650

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

Over 75% more parts produced!

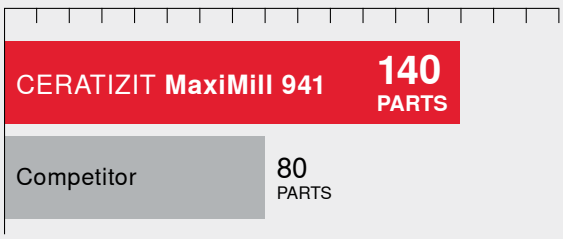
Success example with low alloy carbon steel ST44-2 (1.0256)

Cutting data	Competitor	CERATIZIT
Chip groove	F57	M50
Milling cutter	F4048.B27.063.Z06	A491.63.R.06-12
Insert	SNMX 120512	SNHU 120408SR-M50
Grade	WKP35S	CTPP235
V_c [ft/min]	915	915
V_c [m/min]	277	277
f_z [in/tooth]	.005	.005
f_z [mm/z]	.12	.12
a_p [inch]	.175	.175
a_p [mm]	4.5	4.5
Parts produced [qty]	**80**	**140**

Work piece description: heat exchanger
Work piece material: low alloy carbon steel
Coolant: emulsion

The customer was satisfied with the test result and would like to switch to MaxiMill 491 as soon as possible.

QUANTITY OF PARTS PRODUCED

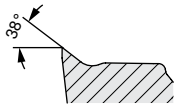


MaxiMill 491 system

Geometry overview

-F10

- Highly positive geometry
- Sharp cutting edge
- Low tendency to adhesion
- First choice for non-ferrous metals



f_z [in]
0.002 – 0.010

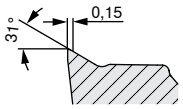
f_z [mm]
0,05 – 0,25

Machining conditions

CTWN215		
CTWN215	**CTWN215**	**CTWN215**

-F50

- Positive geometry
- Finishing and roughing
- First choice for stainless steel materials



f_z [in]
0.004 – 0.008

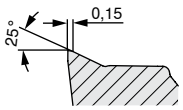
f_z [mm]
0,10 – 0,20

Machining conditions

CTPM240	**CTPM240**	

-M50

- Universal geometry
- Light to medium roughing operations
- First choice for general steel materials



f_z [in]
0.004 – 0.010

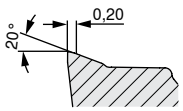
f_z [mm]
0,10 – 0,25

Machining conditions

	CTCP230 CTPP235	**CTPP235** CTCP230
	CTPM240	**CTPM240**

-R50

- Stable geometry
- Roughing
- For heavily interrupted cut
- First choice for cast iron materials



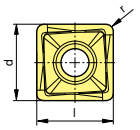
f_z [in]
0.004 – 0.012

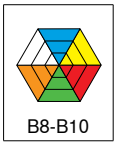
f_z [mm]
0,10 – 0,30

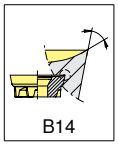
Machining conditions

	CTCK215 CTPK220	**CTPK220** CTCK215

			CTCP230	CTPP235	CTPM240	CTCK215	CTPK220	CTWN215			INCH d [in]	l [in]	s [in]	r [in]	d_1 [in]	METRIC d [mm]	l [mm]	s [mm]	r [mm]	d_1 [mm]
P			●	●	○															
M			○	○	●															
K			●			●	●	●												
N								●												
S																				
H																				
-F10		SNHU 120408FR-F10						●			.476	.476	.195	.032	.172	12.20	12.20	5.00	0.80	4.40
		SNHU 120412FR-F10						●			.476	.476	.195	.032	.172	12.20	12.20	5.00	1.20	4.40
		SNHU 120416FR-F10						●			.476	.476	.195	.032	.172	12.20	12.20	5.00	1.60	4.40
		SNHU 120420FR-F10						●			.476	.476	.195	.032	.172	12.20	12.20	5.00	2.00	4.40
-F50		SNHU 120408SR-F50			●						.476	.476	.195	.032	.172	12.20	12.20	5.00	0.80	4.40
		SNHU 120412SR-F50			●						.476	.476	.195	.032	.172	12.20	12.20	5.00	1.20	4.40
		SNHU 120416SR-F50			●						.476	.476	.195	.032	.172	12.20	12.20	5.00	1.60	4.40
		SNHU 120420SR-F50			●						.476	.476	.195	.032	.172	12.20	12.20	5.00	2.00	4.40
-M50		SNHU 120408SR-M50	●	●	●						.476	.476	.195	.032	.172	12.20	12.20	5.00	0.80	4.40
		SNHU 120412SR-M50		●							.476	.476	.195	.032	.172	12.20	12.20	5.00	1.20	4.40
		SNHU 120416SR-M50		●							.476	.476	.195	.032	.172	12.20	12.20	5.00	1.60	4.40
		SNHU 120420SR-M50		●							.476	.476	.195	.032	.172	12.20	12.20	5.00	2.00	4.40
-R50		SNHU 120408SR-R50				●	●				.476	.476	.195	.032	.172	12.20	12.20	5.00	0.80	4.40
		SNHU 120412SR-R50				●					.476	.476	.195	.032	.172	12.20	12.20	5.00	1.20	4.40
		SNHU 120416SR-R50				●					.476	.476	.195	.032	.172	12.20	12.20	5.00	1.60	4.40
		SNHU 120420SR-R50				●					.476	.476	.195	.032	.172	12.20	12.20	5.00	2.00	4.40
			CTCP230	CTPP235	CTPM240	CTCK215	CTPK220	CTWN215			d	l	s	r	d_1	d	l	s	r	d_1







57% more parts produced!

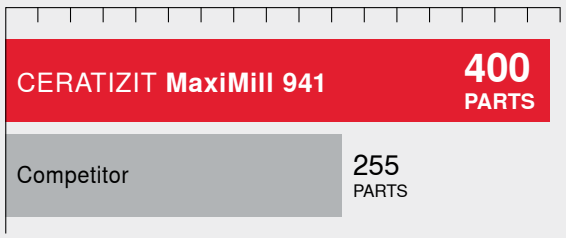
Success example with ISO K

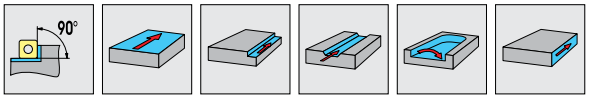
Cutting data	Competitor	CERATIZIT
Chip groove	D18	R50
Milling cutter	R220.43-0080-07SA	A491.80.R.08-12
Insert	OFEN 070405 TN-D18	SNHU 120408SR-M50
Grade	MK1500	CTPP235
V_c [ft/min]	828	828
V_c [m/min]	251	251
f_z [in/tooth]	.006	.006
f_z [mm/Z]	0,16	0,16
a_p [inch]	.120–.160	.120–.160
a_p [mm]	3–4	3–4
Parts produced [qty]	**255**	**400**

Work piece description: base plate of hydraulic pump
Work piece material: 1.6511 / GG25
Coolant: emulsion

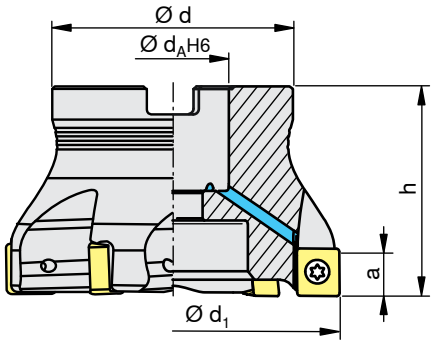
The customer was very enthusiastic about the excellent surface and the system in general.

QUANTITY OF PARTS PRODUCED





A491-12



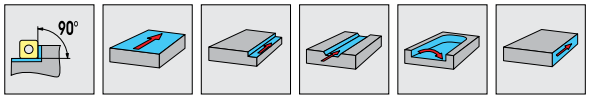
INCH

d_1 [in]	Type, description	h []	d [in]	d_A [in]	a [in]	z	n_{max} [min^{-1}]	[Nm]		
1.50	A491.150.R.03-12-A050-175-EF	1.75	1.50	.50	.312	3	11500	3.2	SNHU 1204..	E01
2.00	A491.200.R.04-12-A075-175-EF	1.75	2.00	.75	.312	4	11500	3.2	SNHU 1204..	E02
2.00	A491.200.R.05-12-A075-175-EF	1.75	2.00	.75	.312	5	9800	3.2	SNHU 1204..	E02
2.50	A491.250.R.05-12-A100-200-EF	2.00	2.50	1.00	.312	5	9800	3.2	SNHU 1204..	E02
2.50	A491.250.R.06-12-A100-200-EF	2.00	2.50	1.00	.312	6	8500	3.2	SNHU 1204..	E02
3.00	A491.300.R.06-12-A100-200-EF	2.00	3.00	1.00	.312	6	8500	3.2	SNHU 1204..	E02
3.00	A491.300.R.08-12-A100-200-EF	2.00	3.00	1.00	.312	8	7400	3.2	SNHU 1204..	E02
4.00	A491.400.R.07-12-A125-200-EF	2.00	4.00	1.25	.312	7	7400	3.2	SNHU 1204..	E02
4.00	A491.400.R.10-12-A125-200-EF	2.00	4.00	1.25	.312	10	6500	3.2	SNHU 1204..	E02
5.00	A491.500.R.08-12-B150-200-EF	2.00	5.00	1.50	.312	8	6500	3.2	SNHU 1204..	E02
5.00	A491.500.R.12-12-B150-200-EF	2.00	5.00	1.50	.312	12	5700	3.2	SNHU 1204..	E02
6.00	A491.600.R.09-12-B150-200-EF	2.00	6.00	1.50	.312	9	5700	3.2	SNHU 1204..	E02
6.00	A491.600.R.13-12-B150-200-EF	2.00	6.00	1.50	.312	13	5000	3.2	SNHU 1204..	E02

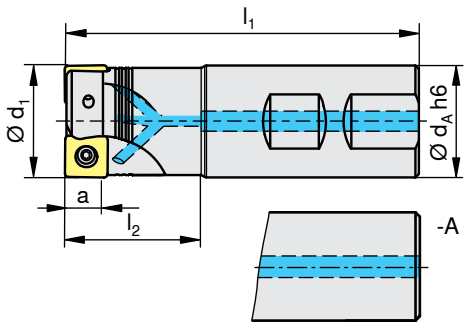
METRIC

d_1 [mm]	Type, description	h [mm]	d [mm]	d_A [mm]	a [mm]	z	n_{max} [min^{-1}]	[Nm]		
40	A491.40.R.03-12	40	38	16	8	3	11500	3.2	SNHU 1204..	E01
40	A491.40.R.04-12	40	38	16	8	4	11500	3.2	SNHU 1204..	E02
50	A491.50.R.04-12	40	43	22	8	4	9800	3.2	SNHU 1204..	E02
50	A491.50.R.05-12	40	43	22	8	5	9800	3.2	SNHU 1204..	E02
63	A491.63.R.05-12	40	48	22	8	5	8500	3.2	SNHU 1204..	E02
63	A491.63.R.06-12	40	48	22	8	6	8500	3.2	SNHU 1204..	E02
80	A491.80.R.06-12	50	58	27	8	6	7400	3.2	SNHU 1204..	E02
80	A491.80.R.08-12	50	58	27	8	8	7400	3.2	SNHU 1204..	E02
100	A491.100.R.07-12	50	78	32	8	7	6500	3.2	SNHU 1204..	E02
100	A491.100.R.10-12	50	78	32	8	10	6500	3.2	SNHU 1204..	E02
125	A491.125.R.08-12	63	88	40	8	8	5700	3.2	SNHU 1204..	E02
125	A491.125.R.12-12	63	88	40	8	12	5700	3.2	SNHU 1204..	E02
160	A491.160.R.09-12	63	98	40	8	9	5000	3.2	SNHU 1204..	E02
160	A491.160.R.14-12	63	98	40	8	14	5000	3.2	SNHU 1204..	E02

E01	11036880	11610311	11450867	8095012000	4425
E02		11610311	11450867	8095012000	



C491-12



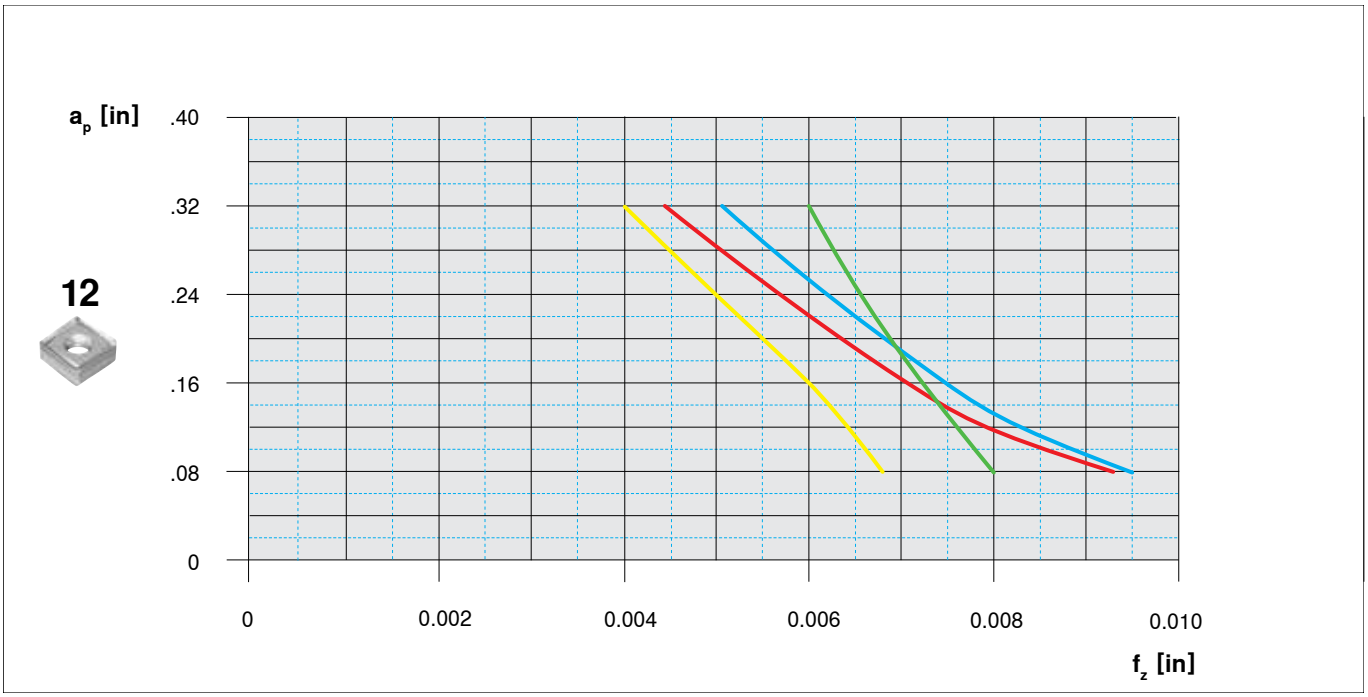
d1 [in]	Type, description	l1 [in]	l2 [in]	dA [in]	a [in]	z	nmax [min-1]	[Nm]		
1.25	C491.125.R.02-12-B-150-EF	4.00	1.5	1.25	.312	2	10200	3.2	SNHU 1204..	E01
1.25	C491.125.R.02-12-A-250-EF-1000	10.00	2.5	1.25	.312	2	13600	3.2	SNHU 1204..	E01

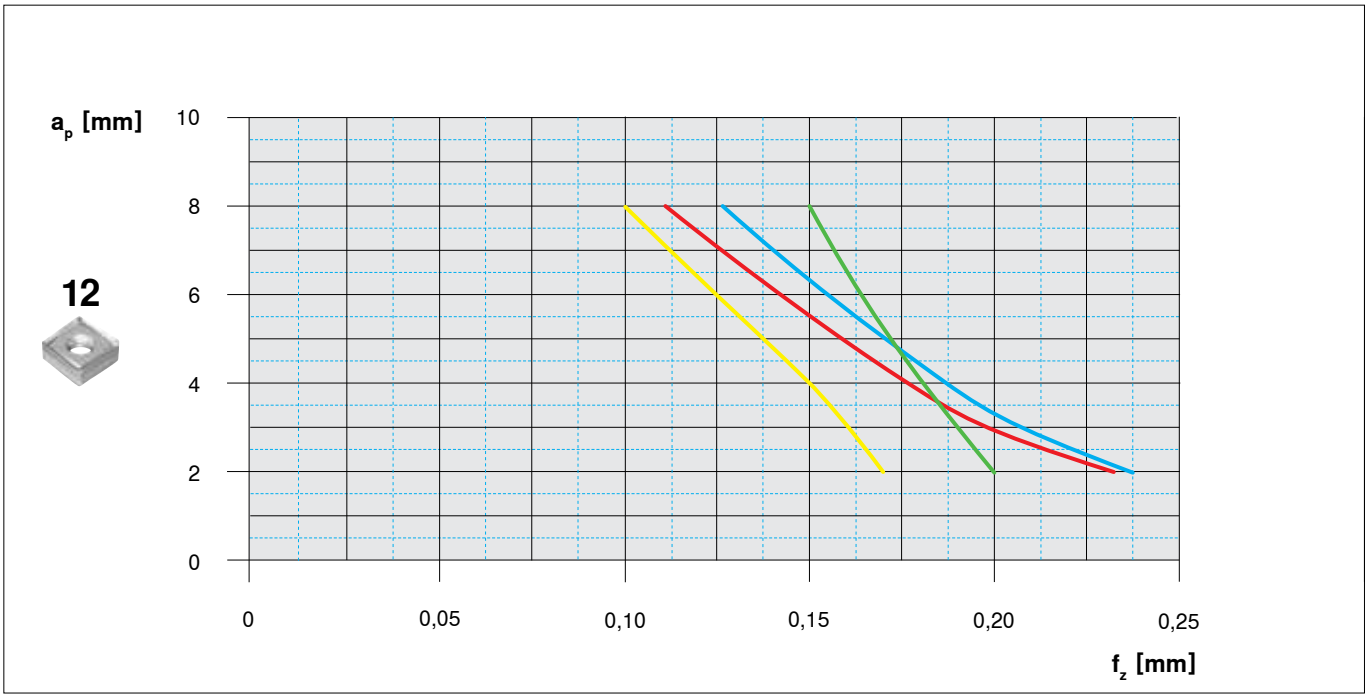
d1 [mm]	Type, description	l1 [mm]	l2 [mm]	dA [mm]	a [mm]	z	nmax [min-1]	[Nm]		
32	C491.32.R.02-12-A-63-250	250	63	32	8	2	10200	3.2	SNHU 1204..	E01
32	C491.32.R.02-12-B-40	102	40	32	8	2	13600	3.2	SNHU 1204..	E01

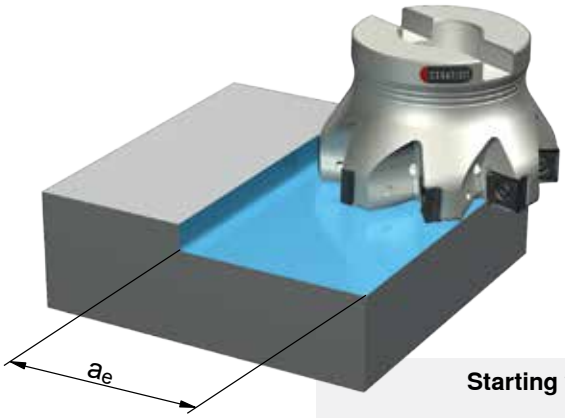
E01	11610311	11450867	8095012000

Materials				Insert		v_c [ft/min]	v_c [m/min]	Coolant
▼	1.2312	40CrMnMoS8-6	1.000 N/mm²	SNHU 120408SR-M50	CTPP235	660	200	dry
▼	1.4571	X6CrNiMoTi17-12-2	600 N/mm²	SNHU 120408SR-F50	CTPM240	460	140	dry
▼	5.1301	EN-GJL-250	HB 180	SNHU 120408SR-R50	CTCK215	825	250	dry
▼	3.4365	Alu	450 N/mm²	SNHU 120408SR-F10	CTCK215	4950	1500	Minimum quantity lubrication

If a_e < 50% use correction list



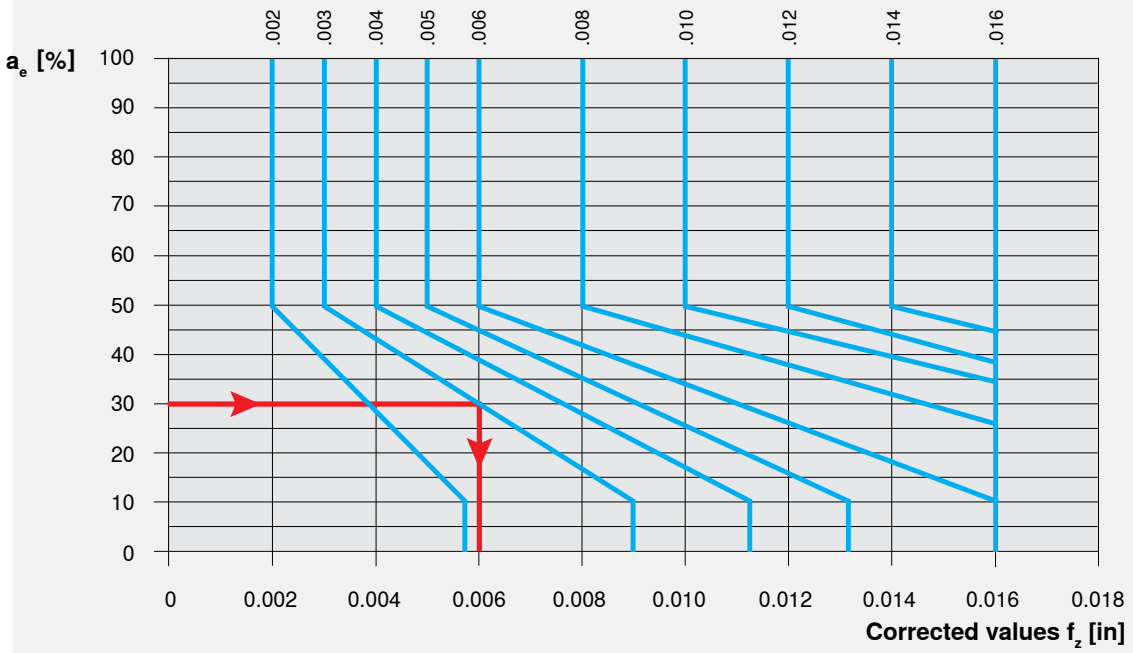




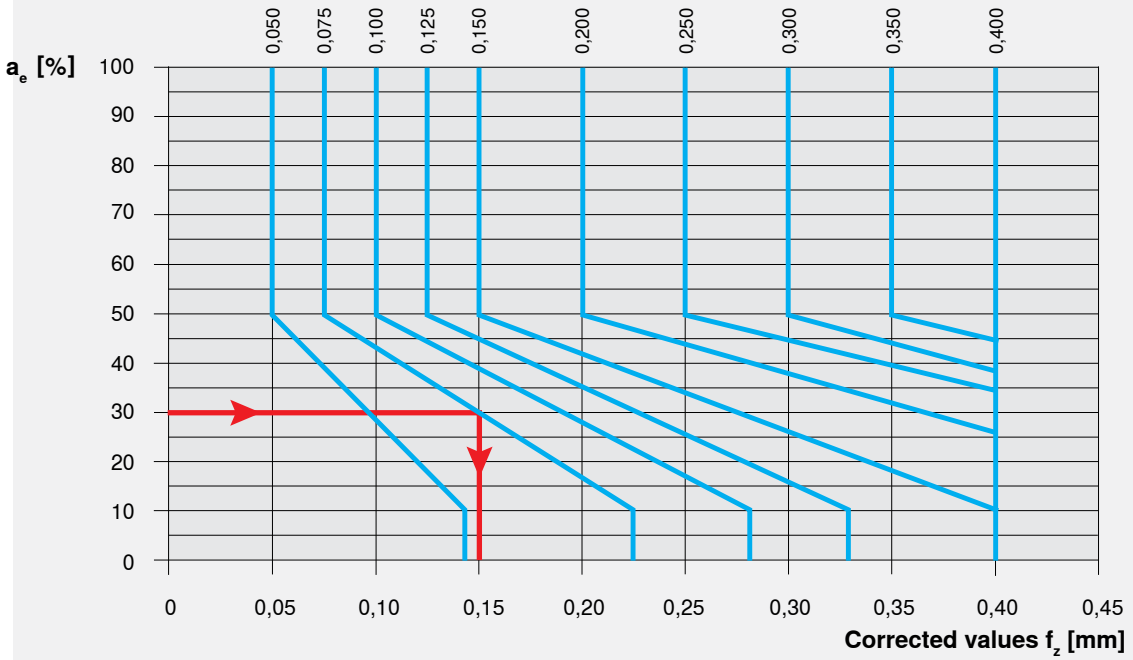
These parameters apply for cutting width (a_e) below 50%

Example:
Starting value [f_z] = 0.003" / 0.075 mm
a_e = 30%
Corrected value [f_z] = 0.006" / 0.15 mm

Starting values f_z [in] from starting parameter diagram



Starting values f_z [mm] from starting parameter diagram



Work piece material		Type of treatment / alloy		VDI 3323 group	Hardness HB
P	Non-alloyed steel	annealed	≤ 0.15 % C	1	125
		annealed	0.15% – 0.45% C	2	150 - 250
		tempered	≥ 0.45% C	3	300
	Low-alloyed steel	annealed		6	180
		tempered		7 / 8	250 - 300
		tempered		9	350
	High-alloyed steel	annealed		10	200
		tempered		11	350
	Stainless steel	annealed	ferritic / martensitic	12	200
		tempered	martensitic	13	325
		heat-treated	ferritic / martensitic	13	200
M	Stainless steel	quenched	austenitic	14	180
		quenched	ferritic / austenitic (duplex)	14	230 - 260
		hardened	austenitc, precipitation hardened (PH)	14	330
K	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	250
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminum wrought alloys	non-hardened		21	60
		hardened		22	100
	Aluminum cast alloys	non-hardened	< 12% Si	23	75
		hardened	< 12% Si	24	90
		non-hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	(110)
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	28	100
	Non-metallic materials		thermosetting plastics	29	–
			fiber-reinforced plastics	29	–
			hard rubber	30	–
S	Heat-resistant alloys	annealed	Fe-based	31	200
		hardened	Fe-based	32	280
		annealed	Ni- or Co-based	33	250
		hardened	Ni- or Co-based 30 - 58 HRC	34	(350)
		cast	Ni- or Co-based 1500 – 2200 N/mm²	35	(320)
	Titanium alloys		pure titanium	36	R_m 440*
			alpha and beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		41	55 HRC

* R_m = ultimate tensile strength, measured in MPa

INCH

CTCP230		CTPP235		CTPM240		CTCK215		CTPK220		CTWN215	
v_c [ft/min]	v_c [ft/min]	v_c [ft/min]	v_c [ft/min]	v_c [ft/min]	v_c [ft/min]	v_c [ft/min]	v_c [ft/min]	v_c [ft/min]	v_c [ft/min]	v_c [ft/min]	v_c [ft/min]
924	500	790	460	725	400	280	150	280	150		
825	445	690	400	625	360	250	135	250	135		
625	365	525	330	460	300	190	110	190	110		
825	445	725	400	660	360	250	135	250	135		
625	360	525	330	460	300	190	110	190	110		
460	330	400	300	330	230	140	100	140	100		
430	300	360	265	360	265	130	90	130	90		
265	200	265	200	265	200	80	60	80	60		
430	300	360	265	360	265	130	90	130	90		
300	200	265	200	265	200	90	60	90	60		
430	300	360	265	360	265	130	90	130	90		
		490	360	560	360						
		490	360	530	360						
		430	300	430	300						
1025	625					1190	690	1055	625	430	430
525	330					725	425	560	330	360	360
660	400					760	460	690	425	430	430
430	265					525	330	460	300	400	400
625	380					825	500	660	400	430	430
525	330					700	430	561	330	360	400
											4950
											3300
											3630
											3300
											925
											1155
											1155
											1055
											1055
										525	525
										790	790

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

	Work piece material	Type of treatment / alloy		VDI 3323 group	Hard-ness HB
P	Non-alloyed steel	annealed	≤ 015 % 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
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		tempered		11	350
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		tempered	martensitic	13	325
		heat-treated	ferritic / martensitic	13	200
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		quenched	ferritic / austenitic (duplex)	14	230 - 260
		hardened	austenitc, precipitation hardened (PH)	14	330
K	Grey cast iron		pearlitic / ferritic	15	180
			pearlitic / martensitic	16	260
	Spheroidal cast iron		ferritic	17	160
			pearlitic	18	250
	Malleable cast iron		ferritic	19	130
			pearlitic	20	230
N	Aluminum wrought alloys	non-hardened		21	60
		hardened		22	100
	Aluminum cast alloys	non-hardened	< 12% Si	23	75
		hardened	< 12% Si	24	90
		non-hardened	> 12% Si	25	130
	Copper and copper alloys (bronze, brass)		machining alloy stock (1% Pb)	26	(110)
			brass, red bronze	27	90
			bronze	28	100
			lead-free copper and electrolytic copper	28	100
	Non-metallic materials		thermosetting plastics	29	–
			fiber-reinforced plastics	29	–
			hard rubber	30	–
S	Heat-resistant alloys	annealed	Fe-based	31	200
		hardened	Fe-based	32	280
		annealed	Ni- or Co-based	33	250
		hardened	Ni- or Co-based 30 – 58 HRC	34	(350)
		cast	Ni- or Co-based 1500 – 2200 N/mm²	35	(320)
	Titanium alloys		pure titanium	36	R_m 440*
			alpha and beta alloys	37	R_m 1050*
H	Tempered steel	hardened and tempered		38	55 HRC
		hardened and tempered		39	60 HRC
	Chilled castings	cast		40	400
	Tempered cast iron	hardened and tempered		41	55 HRC

* R_m = ultimate tensile strength, measured in MPa

METRIC

CTCP230		CTPP235		CTPM240		CTCK215		CTPK220		CTWN215	
v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]	v_c [m/min]
280	150	240	140	220	120						
250	135	210	120	190	110						
190	110	160	100	140	90						
250	135	220	120	200	110						
190	110	160	100	140	90						
140	100	120	90	100	70						
130	90	110	80	110	80						
80	60	80	60	80	60						
130	90	110	80	110	80						
90	60	80	60	80	60						
130	90	110	80	110	80						
		150	110	170	110						
		150	110	160	110						
		130	90	130	90						
310	190					360	210	320	190	130	130
160	100					220	130	170	100	110	110
200	120					230	140	210	130	130	130
130	80					160	100	140	90	120	120
190	115					250	150	200	120	130	130
160	100					210	130	170	100	110	120
											1500
											1000
											1100
											1000
											280
											350
											350
											320
											320
										160	160
										240	240

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

Replacement parts

	Material	Type, description
	11036880	7818267/M8,0x30,0

	Material	Type, description	Key size	Torque moment [Nm]	Torque moment [in.lbs] [lb]
	11450867	DMSD 3,2Nm/SORT 15IP	IP15	3.2	28,3

	Material	Type, description	Key size
	8095012000	SD-T15IP-80mm	T15IP
	4425	S4/SW4	SW4

	Material	Type, description	l [mm]	l [in]	Thread size	Key size
	11610311	M3,5X8,6-15IP/10008749	8.6	.034	M3,5	T15IP

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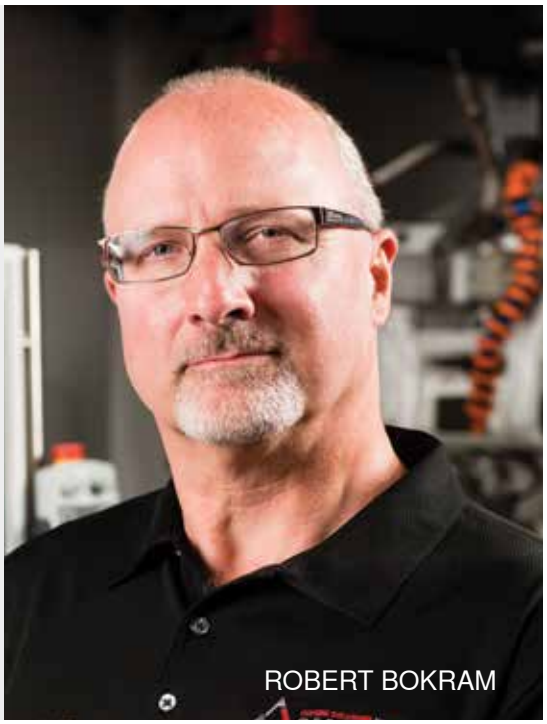

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