



Solid carbide drills and milling cutters

Supplementary volume 2019

MILLER
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INNOVATIVE PRODUCTION STRATEGIES FOR YOUR COMPETITIVE ADVANTAGE IN TECHNOLOGY

Miller GmbH & Co. KG, Präzisionswerkzeuge in Altenstadt produces solid carbide precision tools for drilling and milling with resounding success and an innovative production strategy.

The greatest strengths of MILLER are its extensive range of standard products with application-specific catalogue tools as well as its high degree of flexibility in developing outstanding complex special tools made of solid carbide.



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**Basic Line:**

Universal tools, broad application area, low procurement costs

**Performance Line:**

High-performance tools, broad application area, high productivity in series production manufacturing

**Expert Line:**

Specialist tools for selected applications, maximum precision and productivity

PRODUCT OVERVIEW

New solid carbide drills

Miller is completing the range of highly cost-effective triple edge drills with the new Tritan-Drill-Uni-Plus and the Tritan-Step-Drill-Steel. The Tritan-Drill-Uni-Plus with its universal cutting edge geometry is the perfect tool for cost-effective machining operations in a very broad range of applications. Thanks to its high-performance coating, significantly higher tool lives can be obtained. It is possible to drill highly efficiently to a depth of 12xD using the Tritan-Drill-Steel extensions. The perfectly matched Tritan-Spot-Drill-Steel was developed for pilot drilling.

Significantly higher feed rates can be achieved due to the convex cutting edge shape on the Tritan-Drill-Steel. The self-centring chisel edge makes possible pilot drilling at an angle and ensures the best stability in the process.

The upgrade MEGA-Quadro-Drill-Plus impresses due to its improved point thinning, a new coating, as well as improved edge rounding.



Drilling using solid carbide

Perfor-
mance
LINE



MEGA-Quadro-Drill-Plus

Four guiding chamfers for maximum bore quality, concentricity and positioning accuracy.

- New coating, improved web thinning
- Optimised edge rounding results in significant improvement in tool life

Ø range: 3.00 – 20.00 mm

Drilling depth:

3xD 5xD 8xD 12xD

P K

Perfor-
mance
LINE



Tritan-Drill

Drilling with three cutting edges for all materials and applications.

- Tritan-Step-Drill-Steel for the production of stepped bores for tapping bores
- Tritan-Spot-Drill-Steel as pilot tool especially for the Tritan-Drill-Steel
- Tritan-Drill-Uni-Plus - optimally match to the machining of steel and cast iron
- Tritan-Drill-Alu and Tritan-Drill-Iron as application-specific custom solutions for the respective material groups

Ø range: 3.00 – 20.00 mm

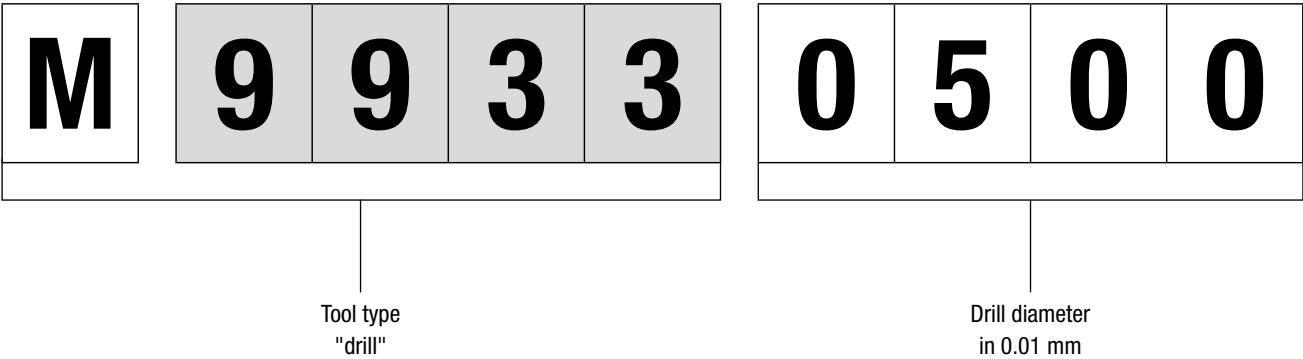
Drilling depth:

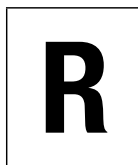
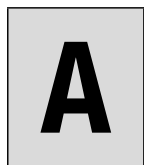
3xD 5xD 8xD 12xD

P M K N

Designation key

Solid carbide drill





Shank form

- A Cylindrical shank
DIN 6535 HA
- B Cylindrical shank
DIN 6535 HB
- E Cylindrical shank
DIN 6535 HE

Coating

- A Mx11
- E MxF | Mx8
- H MxA
- J MxB
- K Mx2
- M MxH
- P MxM
- Q Diamond coating
- R MxP
- U Uncoated
- V Mx5
- W Mx4

Other coatings on request.

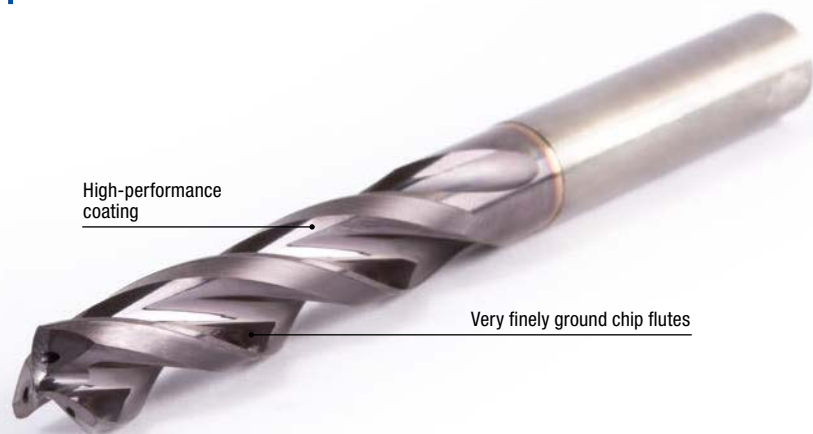
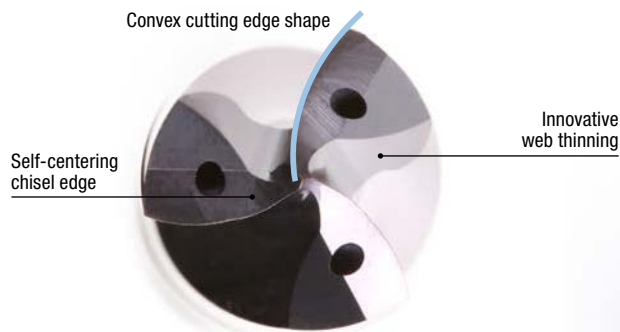
"Spike" becomes "Tritan"

In the supplementary volume 2019, you will find the triple edge drill programme from Miller under the new name "Tritan-Drill".



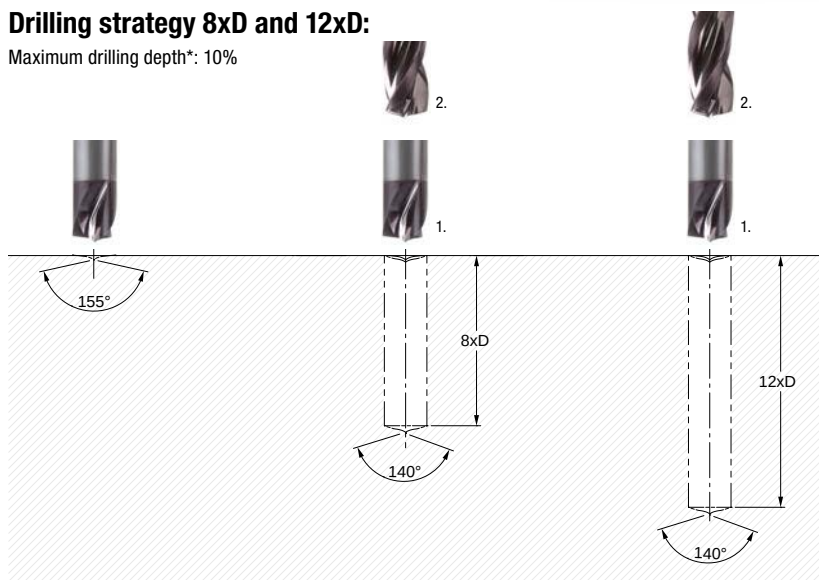
Tritan-Drill-Steel and Tritan-Spot-Drill-Steel

Significantly more cost-effective drilling of steel



Drilling strategy 8xD and 12xD:

Maximum drilling depth*: 10%



* % of nominal Ø

AT A GLANCE

- Additions to programme:
 - Tritan-Drill-Steel 8xD (M9938)
 - Tritan-Drill-Steel 12xD (M9942)
 - Tritan-Spot-Drill-Steel (M9930)
- Pilot drill perfectly matched to the Tritan-Drill-Steel: Tritan-Spot-Drill-Steel
- Also suitable for challenging drilling situations
- In the diameter range from 4.00 to 20.00 mm

ADVANTAGES

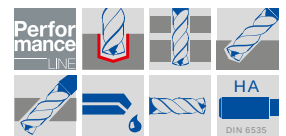
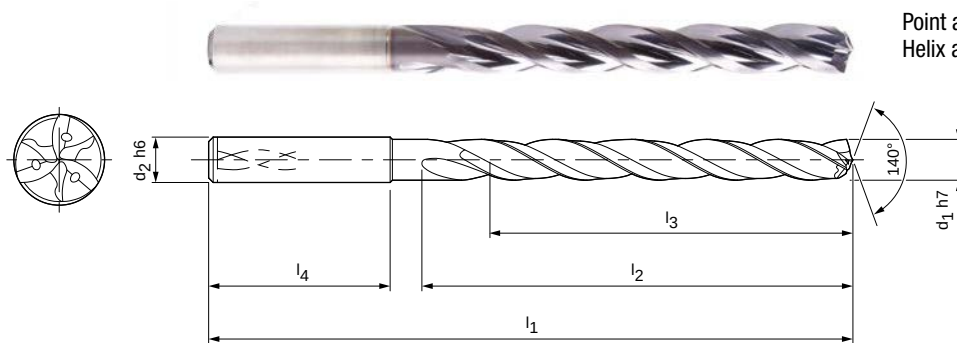
- Robust tool with stable cutting edges
- No oscillating movements during machining
- Long tool life
- Significantly higher feed rates
- Quick chip removal

Tritan-Drill-Steel

Solid carbide twist drill
M9938 (8xD), internal coolant supply

Design:

Drill diameter: 4.00 – 20.00 mm
Bore tolerance: $\geq IT 9$
Coating: MxP
Number of cutting edges: 3
Number of guiding chamfers: 3
Point geometry: Specific lead geometry
Point angle: 140°
Helix angle: 30°



Dimensions							
d ₁ h7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
4,00	6	81	43	36	36	M9938-0400AR	30866502
4,10	6	81	43	36	36	M9938-0410AR	30866503
4,20	6	81	43	36	36	M9938-0420AR	30866504
4,30	6	81	43	36	36	M9938-0430AR	30866505
4,40	6	81	43	36	36	M9938-0440AR	30866506
4,50	6	81	43	36	36	M9938-0450AR	30866507
4,60	6	81	43	36	36	M9938-0460AR	30866508
4,70	6	81	43	36	36	M9938-0470AR	30866509
4,80	6	95	57	48	36	M9938-0480AR	30866510
4,90	6	95	57	48	36	M9938-0490AR	30866511
5,00	6	95	57	48	36	M9938-0500AR	30862021
5,10	6	95	57	48	36	M9938-0510AR	30862022
5,20	6	95	57	48	36	M9938-0520AR	30862023
5,30	6	95	57	48	36	M9938-0530AR	30862024
5,40	6	95	57	48	36	M9938-0540AR	30862025
5,50	6	95	57	48	36	M9938-0550AR	30862026
5,60	6	95	57	48	36	M9938-0560AR	30862027
5,70	6	95	57	48	36	M9938-0570AR	30862028
5,80	6	95	57	48	36	M9938-0580AR	30862029
5,90	6	95	57	48	36	M9938-0590AR	30862030
6,00	6	95	57	48	36	M9938-0600AR	30862031
6,10	8	114	76	64	36	M9938-0610AR	30862032
6,20	8	114	76	64	36	M9938-0620AR	30862033
6,30	8	114	76	64	36	M9938-0630AR	30862034
6,40	8	114	76	64	36	M9938-0640AR	30862035
6,50	8	114	76	64	36	M9938-0650AR	30862036
6,60	8	114	76	64	36	M9938-0660AR	30862037
6,70	8	114	76	64	36	M9938-0670AR	30862038
6,80	8	114	76	64	36	M9938-0680AR	30862039
6,90	8	114	76	64	36	M9938-0690AR	30862040
7,00	8	114	76	64	36	M9938-0700AR	30862041
7,10	8	114	76	64	36	M9938-0710AR	30862042
7,20	8	114	76	64	36	M9938-0720AR	30862043
7,30	8	114	76	64	36	M9938-0730AR	30862044
7,40	8	114	76	64	36	M9938-0740AR	30862045
7,50	8	114	76	64	36	M9938-0750AR	30862046

Tritan-Drill-Steel | Solid carbide twist drills M9938 (8xD), internal coolant supply

Dimensions							
d ₁ h7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
7,60	8	114	76	64	36	M9938-0760AR	30862047
7,70	8	114	76	64	36	M9938-0770AR	30862048
7,80	8	114	76	64	36	M9938-0780AR	30862049
7,90	8	114	76	64	36	M9938-0790AR	30862050
8,00	8	114	76	64	36	M9938-0800AR	30862051
8,10	10	142	95	80	40	M9938-0810AR	30862052
8,20	10	142	95	80	40	M9938-0820AR	30862053
8,30	10	142	95	80	40	M9938-0830AR	30862054
8,40	10	142	95	80	40	M9938-0840AR	30862055
8,50	10	142	95	80	40	M9938-0850AR	30862056
8,60	10	142	95	80	40	M9938-0860AR	30862057
8,70	10	142	95	80	40	M9938-0870AR	30862058
8,80	10	142	95	80	40	M9938-0880AR	30862059
8,90	10	142	95	80	40	M9938-0890AR	30862060
9,00	10	142	95	80	40	M9938-0900AR	30862061
9,10	10	142	95	80	40	M9938-0910AR	30862062
9,20	10	142	95	80	40	M9938-0920AR	30862063
9,30	10	142	95	80	40	M9938-0930AR	30862064
9,40	10	142	95	80	40	M9938-0940AR	30862065
9,50	10	142	95	80	40	M9938-0950AR	30862066
9,60	10	142	95	80	40	M9938-0960AR	30862067
9,70	10	142	95	80	40	M9938-0970AR	30862068
9,80	10	142	95	80	40	M9938-0980AR	30862069
9,90	10	142	95	80	40	M9938-0990AR	30862070
10,00	10	142	95	80	40	M9938-1000AR	30862071
10,10	12	162	114	96	45	M9938-1010AR	30862072
10,20	12	162	114	96	45	M9938-1020AR	30862073
10,30	12	162	114	96	45	M9938-1030AR	30862074
10,40	12	162	114	96	45	M9938-1040AR	30862075
10,50	12	162	114	96	45	M9938-1050AR	30862076
10,60	12	162	114	96	45	M9938-1060AR	30862077
10,70	12	162	114	96	45	M9938-1070AR	30862078
10,80	12	162	114	96	45	M9938-1080AR	30862079
10,90	12	162	114	96	45	M9938-1090AR	30862080
11,00	12	162	114	96	45	M9938-1100AR	30862081
11,10	12	162	114	96	45	M9938-1110AR	30862082
11,20	12	162	114	96	45	M9938-1120AR	30862083
11,30	12	162	114	96	45	M9938-1130AR	30862084
11,40	12	162	114	96	45	M9938-1140AR	30862085
11,50	12	162	114	96	45	M9938-1150AR	30862086
11,60	12	162	114	96	45	M9938-1160AR	30862087
11,70	12	162	114	96	45	M9938-1170AR	30862088
11,80	12	162	114	96	45	M9938-1180AR	30862089
11,90	12	162	114	96	45	M9938-1190AR	30862090
12,00	12	162	114	96	45	M9938-1200AR	30862091
12,20	14	178	133	112	45	M9938-1220AR	30862092
12,50	14	178	133	112	45	M9938-1250AR	30862093
12,80	14	178	133	112	45	M9938-1280AR	30862094
13,00	14	178	133	112	45	M9938-1300AR	30862095
13,20	14	178	133	112	45	M9938-1320AR	30862096
13,50	14	178	133	112	45	M9938-1350AR	30862097
13,80	14	178	133	112	45	M9938-1380AR	30862098
14,00	14	178	133	112	45	M9938-1400AR	30862099
14,20	16	203	152	128	48	M9938-1420AR	30862100
14,50	16	203	152	128	48	M9938-1450AR	30862101
14,80	16	203	152	128	48	M9938-1480AR	30862102
15,00	16	203	152	128	48	M9938-1500AR	30862103

Tritan-Drill-Steel | Solid carbide twist drills M9938 (8xD), internal coolant supply

Dimensions							
d ₁ h7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
15,20	16	203	152	128	48	M9938-1520AR	30862104
15,50	16	203	152	128	48	M9938-1550AR	30862105
15,80	16	203	152	128	48	M9938-1580AR	30862106
16,00	16	203	152	128	48	M9938-1600AR	30862107
16,20	18	222	171	144	48	M9938-1620AR	30862108
16,50	18	222	171	144	48	M9938-1650AR	30862109
16,80	18	222	171	144	48	M9938-1680AR	30862110
17,00	18	222	171	144	48	M9938-1700AR	30862111
17,20	18	222	171	144	48	M9938-1720AR	30862112
17,50	18	222	171	144	48	M9938-1750AR	30862113
17,80	18	222	171	144	48	M9938-1780AR	30862114
18,00	18	222	171	144	48	M9938-1800AR	30862115
18,20	20	243	190	160	50	M9938-1820AR	30862116
18,50	20	243	190	160	50	M9938-1850AR	30862117
18,80	20	243	190	160	50	M9938-1880AR	30862118
19,00	20	243	190	160	50	M9938-1900AR	30862119
19,20	20	243	190	160	50	M9938-1920AR	30862120
19,50	20	243	190	160	50	M9938-1950AR	30862121
19,80	20	243	190	160	50	M9938-1980AR	30862122
20,00	20	243	190	160	50	M9938-2000AR	30862123

Dimensions in mm.

For cutting data recommendation, see end of section.

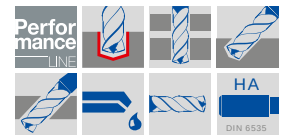
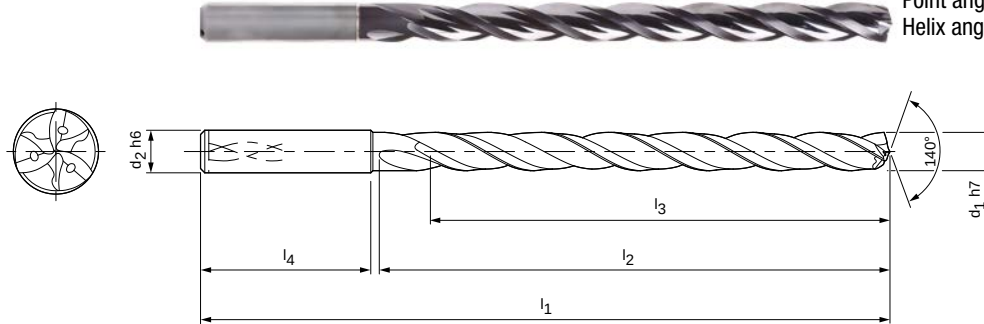
Special designs and other coatings on request.

Tritan-Drill-Steel

Solid carbide twist drill
M9942 (12xD), internal coolant supply

Design:

Drill diameter: 4.00 – 20.00 mm
Bore tolerance: $\geq IT 9$
Coating: MxP
Number of cutting edges: 3
Number of guiding chamfers: 3
Point geometry: Specific lead geometry
Point angle: 140°
Helix angle: 30°



Dimensions							
$d_1 h7$	$d_2 h6$	l_1	l_2	l_3	l_4	Order designation	Order No.
4,00	6	102	64	58	36	M9942-0400AR	30866512
4,10	6	102	64	58	36	M9942-0410AR	30866513
4,20	6	102	64	58	36	M9942-0420AR	30866514
4,30	6	102	64	58	36	M9942-0430AR	30866515
4,40	6	102	64	58	36	M9942-0440AR	30866516
4,50	6	102	64	58	36	M9942-0450AR	30866517
4,60	6	102	64	58	36	M9942-0460AR	30866518
4,70	6	102	64	58	36	M9942-0470AR	30866519
4,80	6	116	78	70	36	M9942-0480AR	30866520
4,90	6	116	78	70	36	M9942-0490AR	30866521
5,00	6	116	78	70	36	M9942-0500AR	30862124
5,10	6	116	78	70	36	M9942-0510AR	30862125
5,20	6	116	78	70	36	M9942-0520AR	30862126
5,30	6	116	78	70	36	M9942-0530AR	30862127
5,40	6	116	78	70	36	M9942-0540AR	30862128
5,50	6	116	78	70	36	M9942-0550AR	30862129
5,60	6	116	78	70	36	M9942-0560AR	30862130
5,70	6	116	78	70	36	M9942-0570AR	30862131
5,80	6	116	78	70	36	M9942-0580AR	30862132
5,90	6	116	78	70	36	M9942-0590AR	30862133
6,00	6	116	78	70	36	M9942-0600AR	30862134
6,10	8	146	108	94	36	M9942-0610AR	30862135
6,20	8	146	108	94	36	M9942-0620AR	30862136
6,30	8	146	108	94	36	M9942-0630AR	30862137
6,40	8	146	108	94	36	M9942-0640AR	30862138
6,50	8	146	108	94	36	M9942-0650AR	30862139
6,60	8	146	108	94	36	M9942-0660AR	30862140
6,70	8	146	108	94	36	M9942-0670AR	30862141
6,80	8	146	108	94	36	M9942-0680AR	30862142
6,90	8	146	108	94	36	M9942-0690AR	30862143
7,00	8	146	108	94	36	M9942-0700AR	30862144
7,10	8	146	108	94	36	M9942-0710AR	30862145
7,20	8	146	108	94	36	M9942-0720AR	30862146
7,30	8	146	108	94	36	M9942-0730AR	30862147
7,40	8	146	108	94	36	M9942-0740AR	30862148
7,50	8	146	108	94	36	M9942-0750AR	30862149

Tritan-Drill-Steel | Solid carbide twist drills M9942 (12xD), internal coolant supply

Dimensions							
d ₁ h7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
7,60	8	146	108	94	36	M9942-0760AR	30862150
7,70	8	146	108	94	36	M9942-0770AR	30862151
7,80	8	146	108	94	36	M9942-0780AR	30862152
7,90	8	146	108	94	36	M9942-0790AR	30862154
8,00	8	146	108	94	36	M9942-0800AR	30862155
8,10	10	162	120	110	40	M9942-0810AR	30862156
8,20	10	162	120	110	40	M9942-0820AR	30862157
8,30	10	162	120	110	40	M9942-0830AR	30862158
8,40	10	162	120	110	40	M9942-0840AR	30862159
8,50	10	162	120	110	40	M9942-0850AR	30862160
8,60	10	162	120	110	40	M9942-0860AR	30862161
8,70	10	162	120	110	40	M9942-0870AR	30862162
8,80	10	162	120	110	40	M9942-0880AR	30862163
8,90	10	162	120	110	40	M9942-0890AR	30862164
9,00	10	162	120	110	40	M9942-0900AR	30862165
9,10	10	162	120	110	40	M9942-0910AR	30862166
9,20	10	162	120	110	40	M9942-0920AR	30862167
9,30	10	162	120	110	40	M9942-0930AR	30862168
9,40	10	162	120	110	40	M9942-0940AR	30862169
9,50	10	162	120	110	40	M9942-0950AR	30862170
9,60	10	162	120	110	40	M9942-0960AR	30862171
9,70	10	162	120	110	40	M9942-0970AR	30862172
9,80	10	162	120	110	40	M9942-0980AR	30862173
9,90	10	162	120	110	40	M9942-0990AR	30862174
10,00	10	162	120	110	40	M9942-1000AR	30862175
10,10	12	204	156	142	45	M9942-1010AR	30862176
10,20	12	204	156	142	45	M9942-1020AR	30862177
10,30	12	204	156	142	45	M9942-1030AR	30862178
10,40	12	204	156	142	45	M9942-1040AR	30862179
10,50	12	204	156	142	45	M9942-1050AR	30862180
10,60	12	204	156	142	45	M9942-1060AR	30862181
10,70	12	204	156	142	45	M9942-1070AR	30862182
10,80	12	204	156	142	45	M9942-1080AR	30862183
10,90	12	204	156	142	45	M9942-1090AR	30862185
11,00	12	204	156	142	45	M9942-1100AR	30862186
11,10	12	204	156	142	45	M9942-1110AR	30862187
11,20	12	204	156	142	45	M9942-1120AR	30862188
11,30	12	204	156	142	45	M9942-1130AR	30862189
11,40	12	204	156	142	45	M9942-1140AR	30862190
11,50	12	204	156	142	45	M9942-1150AR	30862191
11,60	12	204	156	142	45	M9942-1160AR	30862192
11,70	12	204	156	142	45	M9942-1170AR	30862193
11,80	12	204	156	142	45	M9942-1180AR	30862194
11,90	12	204	156	142	45	M9942-1190AR	30862195
12,00	12	204	156	142	45	M9942-1200AR	30862196
12,20	14	230	182	166	45	M9942-1220AR	30862197
12,50	14	230	182	166	45	M9942-1250AR	30862198
12,80	14	230	182	166	45	M9942-1280AR	30862199
13,00	14	230	182	166	45	M9942-1300AR	30862200
13,20	14	230	182	166	45	M9942-1320AR	30862201
13,50	14	230	182	166	45	M9942-1350AR	30862202
13,80	14	230	182	166	45	M9942-1380AR	30862203
14,00	14	230	182	166	45	M9942-1400AR	30862204
14,20	16	260	208	192	48	M9942-1420AR	30862205
14,50	16	260	208	192	48	M9942-1450AR	30862206
14,80	16	260	208	192	48	M9942-1480AR	30862207
15,00	16	260	208	192	48	M9942-1500AR	30862208

Continued on next page.

Tritan-Drill-Steel | Solid carbide twist drills M9942 (12xD), internal coolant supply

Dimensions							
d ₁ h7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
15,20	16	260	208	192	48	M9942-1520AR	30862209
15,50	16	260	208	192	48	M9942-1550AR	30862210
15,80	16	260	208	192	48	M9942-1580AR	30862211
16,00	16	260	208	192	48	M9942-1600AR	30862212
16,20	18	285	234	216	48	M9942-1620AR	30862213
16,50	18	285	234	216	48	M9942-1650AR	30862214
16,80	18	285	234	216	48	M9942-1680AR	30862215
17,00	18	285	234	216	48	M9942-1700AR	30862216
17,20	18	285	234	216	48	M9942-1720AR	30862217
17,50	18	285	234	216	48	M9942-1750AR	30862218
17,80	18	285	234	216	48	M9942-1780AR	30862219
18,00	18	285	234	216	48	M9942-1800AR	30862220
18,20	20	310	258	240	50	M9942-1820AR	30862221
18,50	20	310	258	240	50	M9942-1850AR	30862222
18,80	20	310	258	240	50	M9942-1880AR	30862223
19,00	20	310	258	240	50	M9942-1900AR	30862224
19,20	20	310	258	240	50	M9942-1920AR	30862225
19,50	20	310	258	240	50	M9942-1950AR	30862226
19,80	20	310	258	240	50	M9942-1980AR	30862227
20,00	20	310	258	240	50	M9942-2000AR	30862228

Dimensions in mm.

For cutting data recommendation, see end of section.

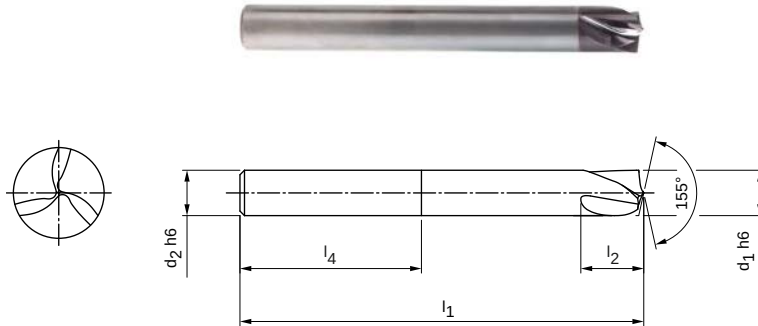
Special designs and other coatings on request.

Tritan-Spot-Drill-Steel

Solid carbide NC pilot drills
M9930, external coolant supply

Design:

Drill diameter: 4.00 – 20.00 mm
Shank form: HA (DIN 6535)
Coating: MxP
Number of cutting edges: 3
Point angle: 155°
Note: Special NC pilot drill for Tritan-Drill-Steel.



Dimensions						
d ₁ h6	d ₂ h6	l ₁	l ₂	l ₄	Order designation	Order No.
4,00	4	55	6	28	M9930-0400AR	30894971
5,00	6	62	7	36	M9930-0500AR	30894972
6,00	6	66	9	36	M9930-0600AR	30894973
8,00	8	79	11	36	M9930-0800AR	30894974
10,00	10	89	14	40	M9930-1000AR	30894975
12,00	12	102	17	45	M9930-1200AR	30894976
16,00	16	115	23	48	M9930-1600AR	30894977
20,00	20	131	28	50	M9930-2000AR	30894978

Pilot drilling depths

d ₁ h6	d ₂ h6	l ₁	l ₂	l ₄	Maximum pilot drilling depth *	Minimum pilot drilling depth **
4,00	4	55	6	28	0,40	0,24
5,00	6	62	7	36	0,50	0,30
6,00	6	66	9	36	0,60	0,36
8,00	8	79	11	36	0,80	0,48
10,00	10	89	14	40	1,00	0,60
12,00	12	102	17	45	1,20	0,72
16,00	16	115	23	48	1,60	0,96
20,00	20	131	28	50	2,00	1,20

* 10 % of nominal Ø

** 6 % of nominal Ø

Dimensions in mm.

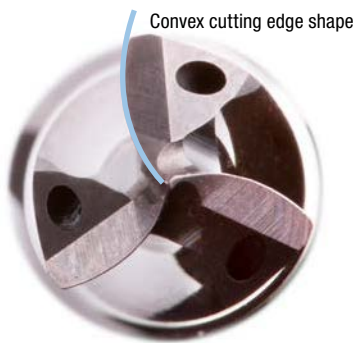
For cutting data recommendation, see end of section.

Special designs and other coatings on request.

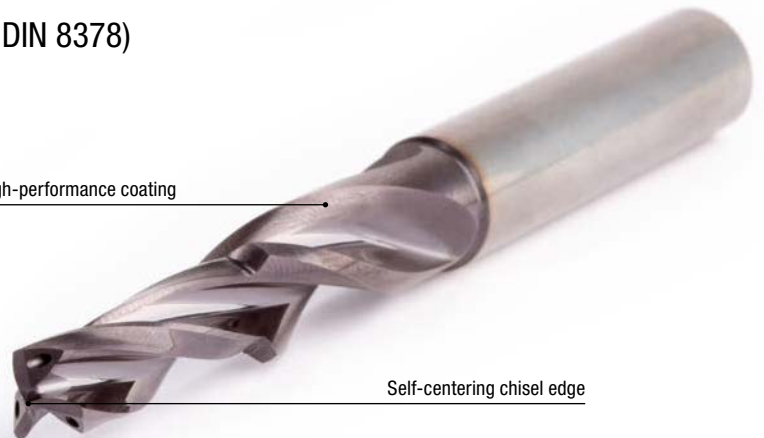


Tritan-Step-Drill-Steel

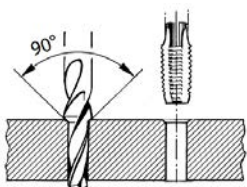
Economical core hole tapping (in accordance with DIN 8378)



High-performance coating



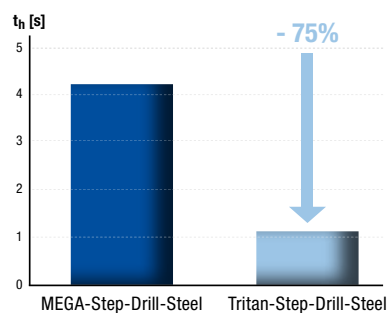
Economical core hole tapping



Core hole bore M10
42CrMoS4
 l_B : 25.50 mm

MEGA-Step-Drill-Steel ø 8.5

v_c : 70 m/min
 f_u : 0.16 mm/rev
 t_h : 4.3 sec



Tritan-Step-Drill-Steel ø 8.5

v_c : 115 m/min
 f_u : 0.4 mm/rev
 t_h : 1.1 sec

AT A GLANCE

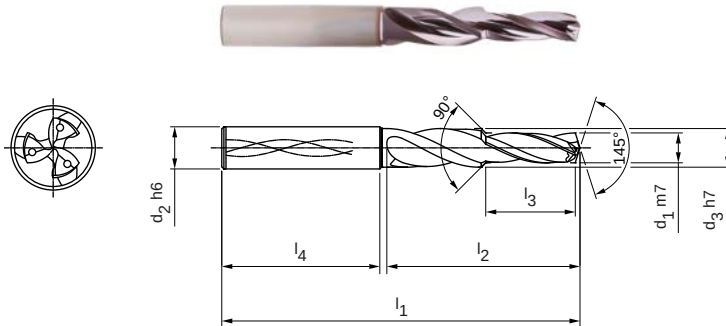
- Tritan-Drill triple cutting edge technology also as step drill (M9913)
- Specially adapted to steel machining
- For thread sizes M5 to M16

ADVANTAGES

- Robust tool with stable cutting edges
- No oscillating movements during machining
- Long tool life
- Significantly higher feed rates
- Quick chip removal

Tritan-Step-Drill-Steel

Solid carbide step drill for core hole tapping
M9913, internal coolant supply



Design:

Drill diameter:	4.25 – 14.15 mm
Bore tolerance:	IT 9 (achievable)
Coating:	MxP
Number of cutting edges:	3
Number of guiding chamfers:	3
Point geometry:	Specific lead geometry
Point angle:	145°
Helix angle:	30°
Note:	For thread core hole bore with countersink 90°.



Dimensions									
For thread	d ₁ m7	d ₃ h7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
M5	4,25	5,5	6	66	28	13,6	36	M9913-0425AR	31049914
M6	5,10	6,6	8	79	41	16,5	36	M9913-0510AR	31049917
M8	6,85	8,8	10	89	47	21	40	M9913-0685AR	31049918
M8x1	7,10	8,8	10	89	47	21	40	M9913-0710AR	31067858
M10	8,60	11	12	102	55	25,5	45	M9913-0860AR	31049919
M10x1	9,10	11	12	102	55	25,5	45	M9913-0910AR	31067873
M12	10,35	13,2	14	107	60	30	45	M9913-1035AR	31049921
M16	14,15	17,6	18	123	73	38,5	48	M9913-1415AR	31049922

Dimensions in mm.

For cutting data recommendation, see end of section.

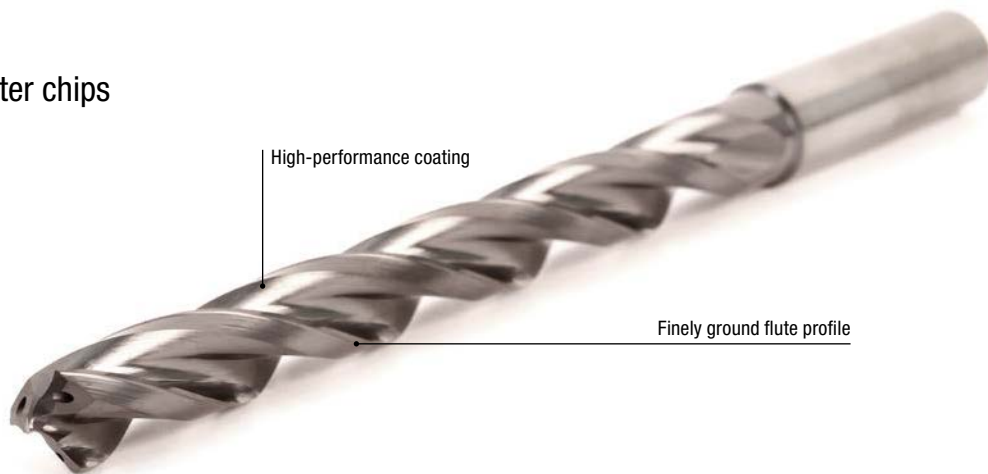
Special designs and other coatings on request.

"Spike" becomes "Tritan"

In the supplementary volume 2019, you will find the triple edge drill programme from Miller under the new name "Tritan-Drill".

Tritan-Drill-Uni-Plus

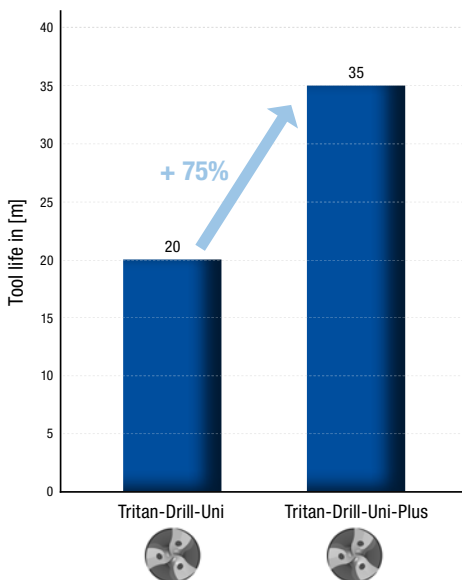
Reliable chip transport thanks to shorter chips



Benchmark - V4A

(X5CrNiMo 17 12 2)

Ø: 8.50 mm
v_c: 60 m/min
f: 0.30 mm/rev



Chip formation in V4A

Tritan-Drill-Uni-Plus



AT A GLANCE

- Upgrade to the MEGA-Spike-Drill-Uni drill
- Higher wear resistance due to innovative coating (MxP)
- Optimised groove profile for 8xD designs
- Finely ground flute profile
- In the diameter range 4.00 to 20.00 mm
- Designs:
 - Tritan-Drill-Uni-Plus 5xD (M9535P)
 - Tritan-Drill-Uni-Plus 8xD (M9538P)

ADVANTAGES

- Improved chip transport
- Cost-effective machining
- Higher feeds
- Increased tool life

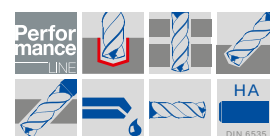
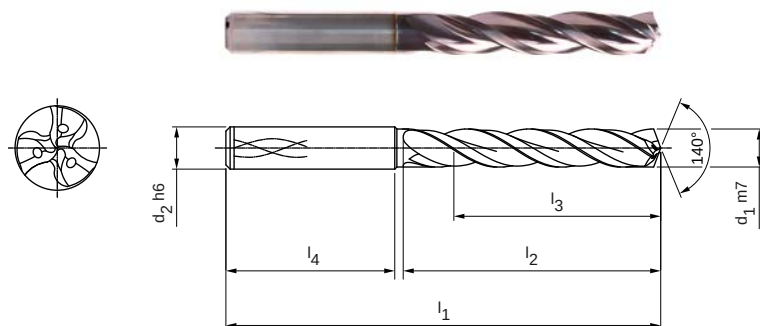
Tritan-Drill-Uni-Plus

Solid carbide twist drill

M9535P (5xD), internal coolant supply, successor product to the MEGA-Spike-Drill-Uni (M9535)

Design:

Drill diameter:	4.00 – 20.00 mm
Bore tolerance:	IT 9 (achievable)
Coating:	MxP
Number of cutting edges:	3
Number of guiding chamfers:	3
Point geometry:	Specific lead geometry
Point angle:	140°
Helix angle:	30°



Dimensions							
d ₁ m7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
4,00	6	74	36	29	36	M9535P-0400AR	31006315
4,10	6	74	36	29	36	M9535P-0410AR	31006305
4,20	6	74	36	29	36	M9535P-0420AR	31006306
4,30	6	74	36	29	36	M9535P-0430AR	31006307
4,40	6	74	36	29	36	M9535P-0440AR	31006308
4,50	6	74	36	29	36	M9535P-0450AR	31006309
4,60	6	74	36	29	36	M9535P-0460AR	31006320
4,70	6	74	36	29	36	M9535P-0470AR	31006321
4,80	6	82	44	35	36	M9535P-0480AR	31006322
4,90	6	82	44	35	36	M9535P-0490AR	31006323
5,00	6	82	44	35	36	M9535P-0500AR	31006324
5,10	6	82	44	35	36	M9535P-0510AR	31006325
5,20	6	82	44	35	36	M9535P-0520AR	31006326
5,30	6	82	44	35	36	M9535P-0530AR	31006327
5,40	6	82	44	35	36	M9535P-0540AR	31006328
5,50	6	82	44	35	36	M9535P-0550AR	31006329
5,55	6	82	44	35	36	M9535P-0555AR	31006330
5,60	6	82	44	35	36	M9535P-0560AR	31006331
5,70	6	82	44	35	36	M9535P-0570AR	31006332
5,80	6	82	44	35	36	M9535P-0580AR	31006333
5,90	6	82	44	35	36	M9535P-0590AR	31006334
6,00	6	82	44	35	36	M9535P-0600AR	31006335
6,10	8	91	53	43	36	M9535P-0610AR	31006336
6,20	8	91	53	43	36	M9535P-0620AR	31006337
6,30	8	91	53	43	36	M9535P-0630AR	31006338
6,40	8	91	53	43	36	M9535P-0640AR	31006339
6,50	8	91	53	43	36	M9535P-0650AR	31006340
6,60	8	91	53	43	36	M9535P-0660AR	31006341
6,70	8	91	53	43	36	M9535P-0670AR	31006342
6,80	8	91	53	43	36	M9535P-0680AR	31006343
6,90	8	91	53	43	36	M9535P-0690AR	31006344
7,00	8	91	53	43	36	M9535P-0700AR	31006345
7,10	8	91	53	43	36	M9535P-0710AR	31006346
7,20	8	91	53	43	36	M9535P-0720AR	31006347
7,30	8	91	53	43	36	M9535P-0730AR	31006348
7,40	8	91	53	43	36	M9535P-0740AR	31006349

Continued on next page.

Tritan-Drill-Uni-Plus | Solid carbide twist drills M9535P (5xD), internal coolant supply

Dimensions							
d ₁ m7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
7,50	8	91	53	43	36	M9535P-0750AR	31006350
7,60	8	91	53	43	36	M9535P-0760AR	31006351
7,70	8	91	53	43	36	M9535P-0770AR	31006352
7,80	8	91	53	43	36	M9535P-0780AR	31006353
7,90	8	91	53	43	36	M9535P-0790AR	31006354
8,00	8	91	53	43	36	M9535P-0800AR	31006355
8,10	10	103	61	49	40	M9535P-0810AR	31006356
8,20	10	103	61	49	40	M9535P-0820AR	31006357
8,30	10	103	61	49	40	M9535P-0830AR	31006358
8,40	10	103	61	49	40	M9535P-0840AR	31006359
8,50	10	103	61	49	40	M9535P-0850AR	31006360
8,60	10	103	61	49	40	M9535P-0860AR	31006361
8,70	10	103	61	49	40	M9535P-0870AR	31006362
8,80	10	103	61	49	40	M9535P-0880AR	31006363
8,90	10	103	61	49	40	M9535P-0890AR	31006364
9,00	10	103	61	49	40	M9535P-0900AR	31006365
9,10	10	103	61	49	40	M9535P-0910AR	31006366
9,20	10	103	61	49	40	M9535P-0920AR	31006367
9,30	10	103	61	49	40	M9535P-0930AR	31006368
9,40	10	103	61	49	40	M9535P-0940AR	31006369
9,50	10	103	61	49	40	M9535P-0950AR	31006370
9,60	10	103	61	49	40	M9535P-0960AR	31006371
9,70	10	103	61	49	40	M9535P-0970AR	31006372
9,80	10	103	61	49	40	M9535P-0980AR	31006373
9,90	10	103	61	49	40	M9535P-0990AR	31006374
10,00	10	103	61	49	40	M9535P-1000AR	31006376
10,10	12	118	71	56	45	M9535P-1010AR	31006377
10,20	12	118	71	56	45	M9535P-1020AR	31006378
10,30	12	118	71	56	45	M9535P-1030AR	31006379
10,40	12	118	71	56	45	M9535P-1040AR	31006380
10,50	12	118	71	56	45	M9535P-1050AR	31006381
10,60	12	118	71	56	45	M9535P-1060AR	31006382
10,70	12	118	71	56	45	M9535P-1070AR	31006383
10,80	12	118	71	56	45	M9535P-1080AR	31006384
10,90	12	118	71	56	45	M9535P-1090AR	31006385
11,00	12	118	71	56	45	M9535P-1100AR	31006386
11,10	12	118	71	56	45	M9535P-1110AR	31006387
11,20	12	118	71	56	45	M9535P-1120AR	31006388
11,30	12	118	71	56	45	M9535P-1130AR	31006389
11,40	12	118	71	56	45	M9535P-1140AR	31006390
11,50	12	118	71	56	45	M9535P-1150AR	31006391
11,60	12	118	71	56	45	M9535P-1160AR	31006392
11,70	12	118	71	56	45	M9535P-1170AR	31006393
11,80	12	118	71	56	45	M9535P-1180AR	31006394
11,90	12	118	71	56	45	M9535P-1190AR	31006395
12,00	12	118	71	56	45	M9535P-1200AR	31006396
12,50	14	124	77	60	45	M9535P-1250AR	31006397
12,80	14	124	77	60	45	M9535P-1280AR	31006398
13,00	14	124	77	60	45	M9535P-1300AR	31006399
13,50	14	124	77	60	45	M9535P-1350AR	31006400
13,80	14	124	77	60	45	M9535P-1380AR	31006401
14,00	14	124	77	60	45	M9535P-1400AR	31006402
14,50	16	133	83	63	48	M9535P-1450AR	31006403
14,80	16	133	83	63	48	M9535P-1480AR	31006404
15,00	16	133	83	63	48	M9535P-1500AR	31006405
15,50	16	133	83	63	48	M9535P-1550AR	31006406
15,80	16	133	83	63	48	M9535P-1580AR	31006407

Tritan-Drill-Uni-Plus | Solid carbide twist drills M9535P (5xD), internal coolant supply

Dimensions							
d ₁ m7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
16,00	16	133	83	63	48	M9535P-1600AR	31006408
16,50	18	143	93	71	48	M9535P-1650AR	31006409
16,80	18	143	93	71	48	M9535P-1680AR	31006410
17,00	18	143	93	71	48	M9535P-1700AR	31006411
17,50	18	143	93	71	48	M9535P-1750AR	31006412
17,80	18	143	93	71	48	M9535P-1780AR	31006413
18,00	18	143	93	71	48	M9535P-1800AR	31006414
18,50	20	153	101	77	50	M9535P-1850AR	31006415
18,80	20	153	101	77	50	M9535P-1880AR	31006416
19,00	20	153	101	77	50	M9535P-1900AR	31006417
19,50	20	153	101	77	50	M9535P-1950AR	31006418
19,80	20	153	101	77	50	M9535P-1980AR	31006419
20,00	20	153	101	77	50	M9535P-2000AR	31006420

Dimensions in mm.

For cutting data recommendation, see end of section.

Special designs and other coatings on request.

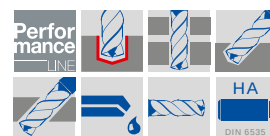
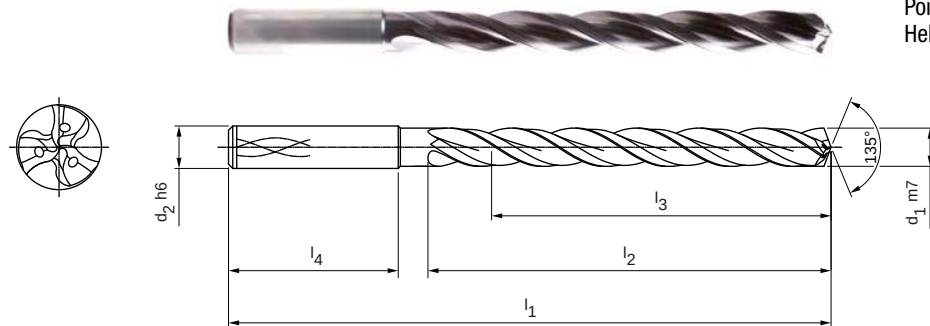
Tritan-Drill-Uni-Plus

Solid carbide twist drill

M9538P (8xD), internal coolant supply, successor product to the MEGA-Spike-Drill-Uni (M9538)

Design:

Drill diameter:	4.00 – 20.00 mm
Bore tolerance:	IT 9 (achievable)
Coating:	MxP
Number of cutting edges:	3
Number of guiding chamfers:	3
Point geometry:	Specific lead geometry
Point angle:	135°
Helix angle:	30°



Dimensions							
d ₁ m7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
4,00	6	81	43	36	36	M9538P-0400AR	31005253
4,10	6	81	43	36	36	M9538P-0410AR	31005254
4,20	6	81	43	36	36	M9538P-0420AR	31005255
4,30	6	81	43	36	36	M9538P-0430AR	31005256
4,40	6	81	43	36	36	M9538P-0440AR	31005257
4,50	6	81	43	36	36	M9538P-0450AR	31005258
4,60	6	81	43	36	36	M9538P-0460AR	31005259
4,70	6	81	43	36	36	M9538P-0470AR	31005260
4,80	6	95	57	48	36	M9538P-0480AR	31005261
4,90	6	95	57	48	36	M9538P-0490AR	31005262
5,00	6	95	57	48	36	M9538P-0500AR	31005263
5,10	6	95	57	48	36	M9538P-0510AR	31005264
5,20	6	95	57	48	36	M9538P-0520AR	31005265
5,30	6	95	57	48	36	M9538P-0530AR	31005266
5,40	6	95	57	48	36	M9538P-0540AR	31005267
5,50	6	95	57	48	36	M9538P-0550AR	31005268
5,55	6	95	57	48	36	M9538P-0555AR	31005269
5,60	6	95	57	48	36	M9538P-0560AR	31005270
5,70	6	95	57	48	36	M9538P-0570AR	31005271
5,80	6	95	57	48	36	M9538P-0580AR	31005272
5,90	6	95	57	48	36	M9538P-0590AR	31005273
6,00	6	95	57	48	36	M9538P-0600AR	31005274
6,10	8	114	76	64	36	M9538P-0610AR	31005275
6,20	8	114	76	64	36	M9538P-0620AR	31005276
6,30	8	114	76	64	36	M9538P-0630AR	31005277
6,40	8	114	76	64	36	M9538P-0640AR	31005278
6,50	8	114	76	64	36	M9538P-0650AR	31005279
6,60	8	114	76	64	36	M9538P-0660AR	31005280
6,70	8	114	76	64	36	M9538P-0670AR	31005281
6,80	8	114	76	64	36	M9538P-0680AR	31005282
6,90	8	114	76	64	36	M9538P-0690AR	31005283
7,00	8	114	76	64	36	M9538P-0700AR	31005284
7,10	8	114	76	64	36	M9538P-0710AR	31005285
7,20	8	114	76	64	36	M9538P-0720AR	31005286
7,30	8	114	76	64	36	M9538P-0730AR	31005287
7,40	8	114	76	64	36	M9538P-0740AR	31005288

Tritan-Drill-Uni-Plus | Solid carbide twist drills M9538P (8xD), internal coolant supply

Dimensions							
d ₁ m7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
7,50	8	114	76	64	36	M9538P-0750AR	31005289
7,60	8	114	76	64	36	M9538P-0760AR	31005290
7,70	8	114	76	64	36	M9538P-0770AR	31005291
7,80	8	114	76	64	36	M9538P-0780AR	31005292
7,90	8	114	76	64	36	M9538P-0790AR	31005293
8,00	8	114	76	64	36	M9538P-0800AR	31005294
8,10	10	142	95	80	40	M9538P-0810AR	31005295
8,20	10	142	95	80	40	M9538P-0820AR	31005296
8,30	10	142	95	80	40	M9538P-0830AR	31005297
8,40	10	142	95	80	40	M9538P-0840AR	31005298
8,50	10	142	95	80	40	M9538P-0850AR	31005299
8,60	10	142	95	80	40	M9538P-0860AR	31005300
8,70	10	142	95	80	40	M9538P-0870AR	31005301
8,80	10	142	95	80	40	M9538P-0880AR	31005302
8,90	10	142	95	80	40	M9538P-0890AR	31005303
9,00	10	142	95	80	40	M9538P-0900AR	31005304
9,10	10	142	95	80	40	M9538P-0910AR	31005305
9,20	10	142	95	80	40	M9538P-0920AR	31005306
9,30	10	142	95	80	40	M9538P-0930AR	31005307
9,40	10	142	95	80	40	M9538P-0940AR	31005308
9,50	10	142	95	80	40	M9538P-0950AR	31005309
9,60	10	142	95	80	40	M9538P-0960AR	31005310
9,70	10	142	95	80	40	M9538P-0970AR	31005311
9,80	10	142	95	80	40	M9538P-0980AR	31005312
9,90	10	142	95	80	40	M9538P-0990AR	31005313
10,00	10	142	95	80	40	M9538P-1000AR	31005314
10,10	12	162	114	96	45	M9538P-1010AR	31005315
10,20	12	162	114	96	45	M9538P-1020AR	31005316
10,30	12	162	114	96	45	M9538P-1030AR	31005317
10,40	12	162	114	96	45	M9538P-1040AR	31005318
10,50	12	162	114	96	45	M9538P-1050AR	31005319
10,60	12	162	114	96	45	M9538P-1060AR	31005320
10,70	12	162	114	96	45	M9538P-1070AR	31005321
10,80	12	162	114	96	45	M9538P-1080AR	31005322
10,90	12	162	114	96	45	M9538P-1090AR	31005323
11,00	12	162	114	96	45	M9538P-1100AR	31005324
11,10	12	162	114	96	45	M9538P-1110AR	31005325
11,20	12	162	114	96	45	M9538P-1120AR	31005326
11,30	12	162	114	96	45	M9538P-1130AR	31005327
11,40	12	162	114	96	45	M9538P-1140AR	31005328
11,50	12	162	114	96	45	M9538P-1150AR	31005329
11,60	12	162	114	96	45	M9538P-1160AR	31005330
11,70	12	162	114	96	45	M9538P-1170AR	31005331
11,80	12	162	114	96	45	M9538P-1180AR	31005332
11,90	12	162	114	96	45	M9538P-1190AR	31005333
12,00	12	162	114	96	45	M9538P-1200AR	31005334
12,50	14	178	133	112	45	M9538P-1250AR	31005335
12,80	14	178	133	112	45	M9538P-1280AR	31005336
13,00	14	178	133	112	45	M9538P-1300AR	31005337
13,50	14	178	133	112	45	M9538P-1350AR	31005338
13,80	14	178	133	112	45	M9538P-1380AR	31005339
14,00	14	178	133	112	45	M9538P-1400AR	31005340
14,50	16	203	152	128	48	M9538P-1450AR	31005341
14,80	16	203	152	128	48	M9538P-1480AR	31005342
15,00	16	203	152	128	48	M9538P-1500AR	31005343
15,50	16	203	152	128	48	M9538P-1550AR	31005344
15,80	16	203	152	128	48	M9538P-1580AR	31005345

Continued on next page.

Tritan-Drill-Uni-Plus | Solid carbide twist drills M9538P (8xD), internal coolant supply

Dimensions							
d ₁ m7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
16,00	16	203	152	128	48	M9538P-1600AR	31005346
16,50	18	222	171	144	48	M9538P-1650AR	31005347
16,80	18	222	171	144	48	M9538P-1680AR	31005348
17,00	18	222	171	144	48	M9538P-1700AR	31005349
17,50	18	222	171	144	48	M9538P-1750AR	31005350
17,80	18	222	171	144	48	M9538P-1780AR	31005351
18,00	18	222	171	144	48	M9538P-1800AR	31005352
18,50	20	243	190	160	50	M9538P-1850AR	31005353
18,80	20	243	190	160	50	M9538P-1880AR	31005354
19,00	20	243	190	160	50	M9538P-1900AR	31005355
19,50	20	243	190	160	50	M9538P-1950AR	31005356
19,80	20	243	190	160	50	M9538P-1980AR	31005357
20,00	20	243	190	160	50	M9538P-2000AR	31005358

Dimensions in mm.

For cutting data recommendation, see end of section.

Special designs and other coatings on request.

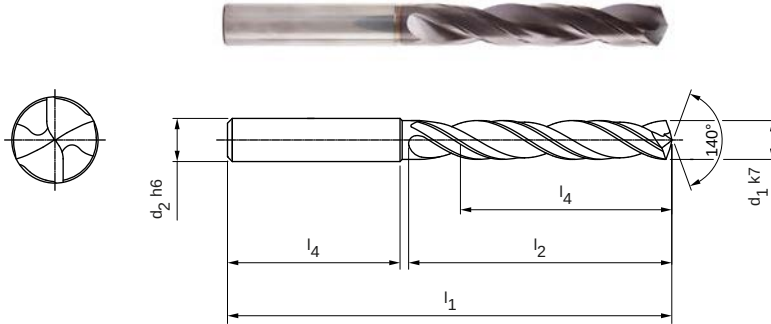
MEGA-Quadro-Drill-Plus

Solid carbide twist drill

M2075P (5xD), external coolant supply, successor product to the MEGA-Quadro-Drill (M2075)

Design:

Drill diameter:	3.00 – 20.00 mm
Bore tolerance:	≥ IT 8
Coating:	MxP
Number of cutting edges:	2
Number of guiding chamfers:	4
Point geometry:	Specific lead geometry
Point angle:	140°
Helix angle:	30°



Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
3,00	6	66	28	23	36	M2075P-0300AR	31011581
3,10	6	66	28	23	36	M2075P-0310AR	31011582
3,20	6	66	28	23	36	M2075P-0320AR	31011584
3,30	6	66	28	23	36	M2075P-0330AR	31011585
3,40	6	66	28	23	36	M2075P-0340AR	31011586
3,50	6	66	28	23	36	M2075P-0350AR	31011587
3,60	6	66	28	23	36	M2075P-0360AR	31011588
3,70	6	66	28	23	36	M2075P-0370AR	31011589
3,80	6	74	36	29	36	M2075P-0380AR	31011590
3,90	6	74	36	29	36	M2075P-0390AR	31011591
4,00	6	74	36	29	36	M2075P-0400AR	31011592
4,10	6	74	36	29	36	M2075P-0410AR	31011593
4,20	6	74	36	29	36	M2075P-0420AR	31011594
4,30	6	74	36	29	36	M2075P-0430AR	31011595
4,40	6	74	36	29	36	M2075P-0440AR	31011596
4,50	6	74	36	29	36	M2075P-0450AR	31011597
4,60	6	74	36	29	36	M2075P-0460AR	31011598
4,70	6	74	36	29	36	M2075P-0470AR	31011599
4,80	6	82	44	35	36	M2075P-0480AR	31011600
4,90	6	82	44	35	36	M2075P-0490AR	31011601
5,00	6	82	44	35	36	M2075P-0500AR	31011602
5,10	6	82	44	35	36	M2075P-0510AR	31011603
5,20	6	82	44	35	36	M2075P-0520AR	31011604
5,30	6	82	44	35	36	M2075P-0530AR	31011605
5,40	6	82	44	35	36	M2075P-0540AR	31011606
5,50	6	82	44	35	36	M2075P-0550AR	31011607
5,60	6	82	44	35	36	M2075P-0560AR	31011608
5,70	6	82	44	35	36	M2075P-0570AR	31011609
5,80	6	82	44	35	36	M2075P-0580AR	31011610
5,90	6	82	44	35	36	M2075P-0590AR	31011611
6,00	6	82	44	35	36	M2075P-0600AR	31011612
6,10	8	91	53	43	36	M2075P-0610AR	31011613
6,20	8	91	53	43	36	M2075P-0620AR	31011614
6,30	8	91	53	43	36	M2075P-0630AR	31011615
6,40	8	91	53	43	36	M2075P-0640AR	31011616
6,50	8	91	53	43	36	M2075P-0650AR	31011617

Continued on next page.

MEGA-Quadro-Drill-Plus | Solid carbide twist drills M2075P (5xD), external coolant supply

Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
6,60	8	91	53	43	36	M2075P-0660AR	31011618
6,70	8	91	53	43	36	M2075P-0670AR	31011619
6,80	8	91	53	43	36	M2075P-0680AR	31011620
6,90	8	91	53	43	36	M2075P-0690AR	31011621
7,00	8	91	53	43	36	M2075P-0700AR	31011622
7,10	8	91	53	43	36	M2075P-0710AR	31011623
7,20	8	91	53	43	36	M2075P-0720AR	31011624
7,30	8	91	53	43	36	M2075P-0730AR	31011625
7,40	8	91	53	43	36	M2075P-0740AR	31011626
7,50	8	91	53	43	36	M2075P-0750AR	31011627
7,60	8	91	53	43	36	M2075P-0760AR	31011628
7,70	8	91	53	43	36	M2075P-0770AR	31011629
7,80	8	91	53	43	36	M2075P-0780AR	31011630
7,90	8	91	53	43	36	M2075P-0790AR	31011631
8,00	8	91	53	43	36	M2075P-0800AR	31011632
8,10	10	103	61	49	40	M2075P-0810AR	31011633
8,20	10	103	61	49	40	M2075P-0820AR	31011634
8,30	10	103	61	49	40	M2075P-0830AR	31011635
8,40	10	103	61	49	40	M2075P-0840AR	31011636
8,50	10	103	61	49	40	M2075P-0850AR	31011637
8,60	10	103	61	49	40	M2075P-0860AR	31011638
8,70	10	103	61	49	40	M2075P-0870AR	31011639
8,80	10	103	61	49	40	M2075P-0880AR	31011640
8,90	10	103	61	49	40	M2075P-0890AR	31011641
9,00	10	103	61	49	40	M2075P-0900AR	31011642
9,10	10	103	61	49	40	M2075P-0910AR	31011643
9,20	10	103	61	49	40	M2075P-0920AR	31011644
9,30	10	103	61	49	40	M2075P-0930AR	31011645
9,40	10	103	61	49	40	M2075P-0940AR	31011646
9,50	10	103	61	49	40	M2075P-0950AR	31011647
9,60	10	103	61	49	40	M2075P-0960AR	31011648
9,70	10	103	61	49	40	M2075P-0970AR	31011649
9,80	10	103	61	49	40	M2075P-0980AR	31011650
9,90	10	103	61	49	40	M2075P-0990AR	31011651
10,00	10	103	61	49	40	M2075P-1000AR	31011652
10,10	12	118	71	56	45	M2075P-1010AR	31011653
10,20	12	118	71	56	45	M2075P-1020AR	31011654
10,30	12	118	71	56	45	M2075P-1030AR	31011655
10,40	12	118	71	56	45	M2075P-1040AR	31011656
10,50	12	118	71	56	45	M2075P-1050AR	31011657
10,60	12	118	71	56	45	M2075P-1060AR	31011658
10,70	12	118	71	56	45	M2075P-1070AR	31011659
10,80	12	118	71	56	45	M2075P-1080AR	31011660
10,90	12	118	71	56	45	M2075P-1090AR	31011661
11,00	12	118	71	56	45	M2075P-1100AR	31011662
11,10	12	118	71	56	45	M2075P-1110AR	31011663
11,20	12	118	71	56	45	M2075P-1120AR	31011664
11,30	12	118	71	56	45	M2075P-1130AR	31011665
11,40	12	118	71	56	45	M2075P-1140AR	31011666
11,50	12	118	71	56	45	M2075P-1150AR	31011667
11,60	12	118	71	56	45	M2075P-1160AR	31011668
11,70	12	118	71	56	45	M2075P-1170AR	31011669
11,80	12	118	71	56	45	M2075P-1180AR	31011670
11,90	12	118	71	56	45	M2075P-1190AR	31011671
12,00	12	118	71	56	45	M2075P-1200AR	31011672
12,50	14	124	77	60	45	M2075P-1250AR	31011673
12,80	14	124	77	60	45	M2075P-1280AR	31011674

MEGA-Quadro-Drill-Plus | Solid carbide twist drills M2075P (5xD), external coolant supply

Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
13,00	14	124	77	60	45	M2075P-1300AR	31011675
13,50	14	124	77	60	45	M2075P-1350AR	31011676
13,80	14	124	77	60	45	M2075P-1380AR	31011677
14,00	14	124	77	60	45	M2075P-1400AR	31011678
14,50	16	133	83	63	48	M2075P-1450AR	31011679
14,80	16	133	83	63	48	M2075P-1480AR	31011680
15,00	16	133	83	63	48	M2075P-1500AR	31011681
15,50	16	133	83	63	48	M2075P-1550AR	31011682
15,80	16	133	83	63	48	M2075P-1580AR	31011683
16,00	16	133	83	63	48	M2075P-1600AR	31011684
16,50	18	143	93	71	48	M2075P-1650AR	31011685
16,80	18	143	93	71	48	M2075P-1680AR	31011686
17,00	18	143	93	71	48	M2075P-1700AR	31011687
17,50	18	143	93	71	48	M2075P-1750AR	31011688
17,80	18	143	93	71	48	M2075P-1780AR	31011689
18,00	18	143	93	71	48	M2075P-1800AR	31011690
18,50	20	153	101	77	50	M2075P-1850AR	31011691
18,80	20	153	101	77	50	M2075P-1880AR	31011692
19,00	20	153	101	77	50	M2075P-1900AR	31011693
19,50	20	153	101	77	50	M2075P-1950AR	31011694
19,80	20	153	101	77	50	M2075P-1980AR	31011695
20,00	20	153	101	77	50	M2075P-2000AR	31011696

Dimensions in mm.

For cutting data recommendation, see end of section.

Special designs and other coatings on request.

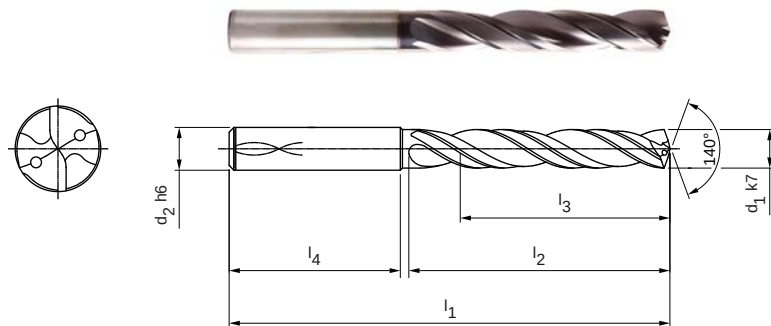
MEGA-Quadro-Drill-Plus

Solid carbide twist drill

M2175P (5xD), internal coolant supply, successor product to the MEGA-Quadro-Drill (M2175)

Design:

Drill diameter:	3.00 – 20.00 mm
Bore tolerance:	≥ IT 8
Coating:	MxP
Number of cutting edges:	2
Number of guiding chamfers:	4
Point geometry:	Specific lead geometry
Point angle:	140°
Helix angle:	30°



Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
3,00	6	66	28	23	36	M2175P-0300AR	31006454
3,10	6	66	28	23	36	M2175P-0310AR	31006455
3,20	6	66	28	23	36	M2175P-0320AR	31006456
3,30	6	66	28	23	36	M2175P-0330AR	31006457
3,40	6	66	28	23	36	M2175P-0340AR	31006458
3,50	6	66	28	23	36	M2175P-0350AR	31006459
3,60	6	66	28	23	36	M2175P-0360AR	31006460
3,70	6	66	28	23	36	M2175P-0370AR	31006461
3,80	6	74	36	29	36	M2175P-0380AR	31006462
3,90	6	74	36	29	36	M2175P-0390AR	31006463
4,00	6	74	36	29	36	M2175P-0400AR	31006464
4,10	6	74	36	29	36	M2175P-0410AR	31006465
4,20	6	74	36	29	36	M2175P-0420AR	31006466
4,30	6	74	36	29	36	M2175P-0430AR	31006467
4,40	6	74	36	29	36	M2175P-0440AR	31006468
4,50	6	74	36	29	36	M2175P-0450AR	31006469
4,60	6	74	36	29	36	M2175P-0460AR	31006470
4,70	6	74	36	29	36	M2175P-0470AR	31006471
4,80	6	82	44	35	36	M2175P-0480AR	31006472
4,90	6	82	44	35	36	M2175P-0490AR	31006473
5,00	6	82	44	35	36	M2175P-0500AR	31006474
5,10	6	82	44	35	36	M2175P-0510AR	31006475
5,20	6	82	44	35	36	M2175P-0520AR	31006476
5,30	6	82	44	35	36	M2175P-0530AR	31006477
5,40	6	82	44	35	36	M2175P-0540AR	31006478
5,50	6	82	44	35	36	M2175P-0550AR	31006479
5,60	6	82	44	35	36	M2175P-0560AR	31006480
5,70	6	82	44	35	36	M2175P-0570AR	31006481
5,80	6	82	44	35	36	M2175P-0580AR	31006482
5,90	6	82	44	35	36	M2175P-0590AR	31006483
6,00	6	82	44	35	36	M2175P-0600AR	31006484
6,10	8	91	53	43	36	M2175P-0610AR	31006485
6,20	8	91	53	43	36	M2175P-0620AR	31006486
6,30	8	91	53	43	36	M2175P-0630AR	31006487
6,40	8	91	53	43	36	M2175P-0640AR	31006488
6,50	8	91	53	43	36	M2175P-0650AR	31006489

MEGA-Quadro-Drill-Plus | Solid carbide twist drills M2175P (5xD), internal coolant supply

Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
6,60	8	91	53	43	36	M2175P-0660AR	31006490
6,70	8	91	53	43	36	M2175P-0670AR	31006491
6,80	8	91	53	43	36	M2175P-0680AR	31006492
6,90	8	91	53	43	36	M2175P-0690AR	31006493
7,00	8	91	53	43	36	M2175P-0700AR	31006494
7,10	8	91	53	43	36	M2175P-0710AR	31006495
7,20	8	91	53	43	36	M2175P-0720AR	31006496
7,30	8	91	53	43	36	M2175P-0730AR	31006497
7,40	8	91	53	43	36	M2175P-0740AR	31006498
7,50	8	91	53	43	36	M2175P-0750AR	31006499
7,60	8	91	53	43	36	M2175P-0760AR	31006500
7,70	8	91	53	43	36	M2175P-0770AR	31006501
7,80	8	91	53	43	36	M2175P-0780AR	31006502
7,90	8	91	53	43	36	M2175P-0790AR	31006503
8,00	8	91	53	43	36	M2175P-0800AR	31006504
8,10	10	103	61	49	40	M2175P-0810AR	31006505
8,20	10	103	61	49	40	M2175P-0820AR	31006506
8,30	10	103	61	49	40	M2175P-0830AR	31006507
8,40	10	103	61	49	40	M2175P-0840AR	31006508
8,50	10	103	61	49	40	M2175P-0850AR	31006509
8,60	10	103	61	49	40	M2175P-0860AR	31006510
8,70	10	103	61	49	40	M2175P-0870AR	31006511
8,80	10	103	61	49	40	M2175P-0880AR	31006512
8,90	10	103	61	49	40	M2175P-0890AR	31006513
9,00	10	103	61	49	40	M2175P-0900AR	31006514
9,10	10	103	61	49	40	M2175P-0910AR	31006515
9,20	10	103	61	49	40	M2175P-0920AR	31006516
9,30	10	103	61	49	40	M2175P-0930AR	31006517
9,40	10	103	61	49	40	M2175P-0940AR	31006518
9,50	10	103	61	49	40	M2175P-0950AR	31006519
9,60	10	103	61	49	40	M2175P-0960AR	31006520
9,70	10	103	61	49	40	M2175P-0970AR	31006521
9,80	10	103	61	49	40	M2175P-0980AR	31006522
9,90	10	103	61	49	40	M2175P-0990AR	31006523
10,00	10	103	61	49	40	M2175P-1000AR	31006524
10,10	12	118	71	56	45	M2175P-1010AR	31006525
10,20	12	118	71	56	45	M2175P-1020AR	31006526
10,30	12	118	71	56	45	M2175P-1030AR	31006527
10,40	12	118	71	56	45	M2175P-1040AR	31006529
10,50	12	118	71	56	45	M2175P-1050AR	31006530
10,60	12	118	71	56	45	M2175P-1060AR	31006531
10,70	12	118	71	56	45	M2175P-1070AR	31006532
10,80	12	118	71	56	45	M2175P-1080AR	31006533
10,90	12	118	71	56	45	M2175P-1090AR	31006534
11,00	12	118	71	56	45	M2175P-1100AR	31006535
11,10	12	118	71	56	45	M2175P-1110AR	31006536
11,20	12	118	71	56	45	M2175P-1120AR	31006537
11,30	12	118	71	56	45	M2175P-1130AR	31006538
11,40	12	118	71	56	45	M2175P-1140AR	31006539
11,50	12	118	71	56	45	M2175P-1150AR	31006540
11,60	12	118	71	56	45	M2175P-1160AR	31006541
11,70	12	118	71	56	45	M2175P-1170AR	31006542
11,80	12	118	71	56	45	M2175P-1180AR	31006543
11,90	12	118	71	56	45	M2175P-1190AR	31006544
12,00	12	118	71	56	45	M2175P-1200AR	31006545
12,50	14	124	77	60	45	M2175P-1250AR	31006546
12,80	14	124	77	60	45	M2175P-1280AR	31006547

Continued on next page.

MEGA-Quadro-Drill-Plus I Solid carbide twist drills M2175P (5xD), internal coolant supply

Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
13,00	14	124	77	60	45	M2175P-1300AR	31006548
13,50	14	124	77	60	45	M2175P-1350AR	31006549
13,80	14	124	77	60	45	M2175P-1380AR	31006550
14,00	14	124	77	60	45	M2175P-1400AR	31006551
14,50	16	133	83	63	48	M2175P-1450AR	31006552
14,80	16	133	83	63	48	M2175P-1480AR	31006553
15,00	16	133	83	63	48	M2175P-1500AR	31006554
15,50	16	133	83	63	48	M2175P-1550AR	31006555
15,80	16	133	83	63	48	M2175P-1580AR	31006556
16,00	16	133	83	63	48	M2175P-1600AR	31006557
16,50	18	143	93	71	48	M2175P-1650AR	31006558
16,80	18	143	93	71	48	M2175P-1680AR	31006559
17,00	18	143	93	71	48	M2175P-1700AR	31006560
17,50	18	143	93	71	48	M2175P-1750AR	31006561
17,80	18	143	93	71	48	M2175P-1780AR	31006562
18,00	18	143	93	71	48	M2175P-1800AR	31006563
18,50	20	153	101	77	50	M2175P-1850AR	31006564
18,80	20	153	101	77	50	M2175P-1880AR	31006565
19,00	20	153	101	77	50	M2175P-1900AR	31006567
19,50	20	153	101	77	50	M2175P-1950AR	31006568
19,80	20	153	101	77	50	M2175P-1980AR	31006569
20,00	20	153	101	77	50	M2175P-2000AR	31006570

Dimensions in mm.

For cutting data recommendation, see end of section.

Special designs and other coatings on request.

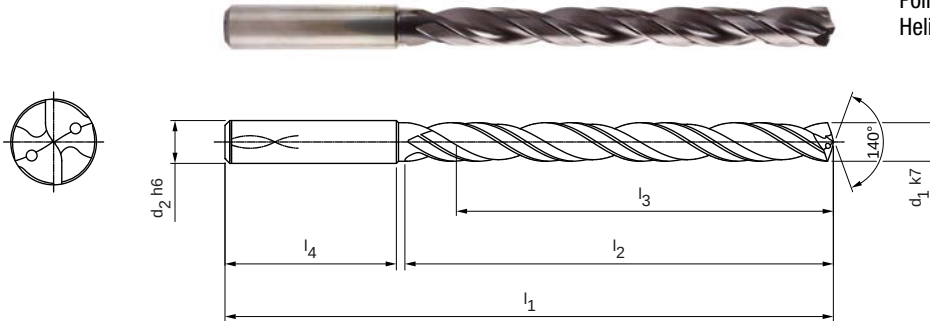
MEGA-Quadro-Drill-Plus

Solid carbide twist drill

M2178P (8xD), internal coolant supply, successor product to the MEGA-Quadro-Drill (M2178)

Design:

Drill diameter:	3.00 – 20.00 mm
Bore tolerance:	≥ IT 8
Coating:	MxP
Number of cutting edges:	2
Number of guiding chamfers:	4
Point geometry:	Specific lead geometry
Point angle:	140°
Helix angle:	30°



Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
3,00	6	72	34	29	36	M2178P-0300AR	31006571
3,10	6	72	34	29	36	M2178P-0310AR	31006572
3,20	6	72	34	29	36	M2178P-0320AR	31006573
3,30	6	72	34	29	36	M2178P-0330AR	31006574
3,40	6	72	34	29	36	M2178P-0340AR	31006575
3,50	6	72	34	29	36	M2178P-0350AR	31006576
3,60	6	72	34	29	36	M2178P-0360AR	31006577
3,70	6	72	34	29	36	M2178P-0370AR	31006578
3,80	6	81	43	36	36	M2178P-0380AR	31006579
3,90	6	81	43	36	36	M2178P-0390AR	31006580
4,00	6	81	43	36	36	M2178P-0400AR	31006581
4,10	6	81	43	36	36	M2178P-0410AR	31006582
4,20	6	81	43	36	36	M2178P-0420AR	31006583
4,30	6	81	43	36	36	M2178P-0430AR	31006584
4,40	6	81	43	36	36	M2178P-0440AR	31006585
4,50	6	81	43	36	36	M2178P-0450AR	31006586
4,60	6	81	43	36	36	M2178P-0460AR	31006587
4,70	6	81	43	36	36	M2178P-0470AR	31006588
4,80	6	95	57	48	36	M2178P-0480AR	31006589
4,90	6	95	57	48	36	M2178P-0490AR	31006590
5,00	6	95	57	48	36	M2178P-0500AR	31006591
5,10	6	95	57	48	36	M2178P-0510AR	31006592
5,20	6	95	57	48	36	M2178P-0520AR	31006593
5,30	6	95	57	48	36	M2178P-0530AR	31006594
5,40	6	95	57	48	36	M2178P-0540AR	31006595
5,50	6	95	57	48	36	M2178P-0550AR	31006596
5,60	6	95	57	48	36	M2178P-0560AR	31006597
5,70	6	95	57	48	36	M2178P-0570AR	31006598
5,80	6	95	57	48	36	M2178P-0580AR	31006599
5,90	6	95	57	48	36	M2178P-0590AR	31006600
6,00	6	95	57	48	36	M2178P-0600AR	31006601
6,10	8	114	76	64	36	M2178P-0610AR	31006602
6,20	8	114	76	64	36	M2178P-0620AR	31006603
6,30	8	114	76	64	36	M2178P-0630AR	31006604
6,40	8	114	76	64	36	M2178P-0640AR	31006605
6,50	8	114	76	64	36	M2178P-0650AR	31006606

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MEGA-Quadro-Drill-Plus | Solid carbide twist drills M2178P (8xD), internal coolant supply

Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
6,60	8	114	76	64	36	M2178P-0660AR	31006608
6,70	8	114	76	64	36	M2178P-0670AR	31006609
6,80	8	114	76	64	36	M2178P-0680AR	31006610
6,90	8	114	76	64	36	M2178P-0690AR	31006611
7,00	8	114	76	64	36	M2178P-0700AR	31006612
7,10	8	114	76	64	36	M2178P-0710AR	31006613
7,20	8	114	76	64	36	M2178P-0720AR	31006614
7,30	8	114	76	64	36	M2178P-0730AR	31006615
7,40	8	114	76	64	36	M2178P-0740AR	31006616
7,50	8	114	76	64	36	M2178P-0750AR	31006617
7,60	8	114	76	64	36	M2178P-0760AR	31006618
7,70	8	114	76	64	36	M2178P-0770AR	31006619
7,80	8	114	76	64	36	M2178P-0780AR	31006620
7,90	8	114	76	64	36	M2178P-0790AR	31006621
8,00	8	114	76	64	36	M2178P-0800AR	31006622
8,10	10	142	95	80	40	M2178P-0810AR	31006623
8,20	10	142	95	80	40	M2178P-0820AR	31006624
8,30	10	142	95	80	40	M2178P-0830AR	31006625
8,40	10	142	95	80	40	M2178P-0840AR	31006626
8,50	10	142	95	80	40	M2178P-0850AR	31006627
8,60	10	142	95	80	40	M2178P-0860AR	31006628
8,70	10	142	95	80	40	M2178P-0870AR	31006629
8,80	10	142	95	80	40	M2178P-0880AR	31006630
8,90	10	142	95	80	40	M2178P-0890AR	31006631
9,00	10	142	95	80	40	M2178P-0900AR	31006632
9,10	10	142	95	80	40	M2178P-0910AR	31006633
9,20	10	142	95	80	40	M2178P-0920AR	31006634
9,30	10	142	95	80	40	M2178P-0930AR	31006635
9,40	10	142	95	80	40	M2178P-0940AR	31006636
9,50	10	142	95	80	40	M2178P-0950AR	31006637
9,60	10	142	95	80	40	M2178P-0960AR	31006638
9,70	10	142	95	80	40	M2178P-0970AR	31006639
9,80	10	142	95	80	40	M2178P-0980AR	31006640
9,90	10	142	95	80	40	M2178P-0990AR	31006641
10,00	10	142	95	80	40	M2178P-1000AR	31006642
10,10	12	162	114	96	45	M2178P-1010AR	31006643
10,20	12	162	114	96	45	M2178P-1020AR	31006644
10,30	12	162	114	96	45	M2178P-1030AR	31006645
10,40	12	162	114	96	45	M2178P-1040AR	31006646
10,50	12	162	114	96	45	M2178P-1050AR	31006647
10,60	12	162	114	96	45	M2178P-1060AR	31006648
10,70	12	162	114	96	45	M2178P-1070AR	31006649
10,80	12	162	114	96	45	M2178P-1080AR	31006650
10,90	12	162	114	96	45	M2178P-1090AR	31006651
11,00	12	162	114	96	45	M2178P-1100AR	31006652
11,10	12	162	114	96	45	M2178P-1110AR	31006654
11,20	12	162	114	96	45	M2178P-1120AR	31006655
11,30	12	162	114	96	45	M2178P-1130AR	31006656
11,40	12	162	114	96	45	M2178P-1140AR	31006657
11,50	12	162	114	96	45	M2178P-1150AR	31006658
11,60	12	162	114	96	45	M2178P-1160AR	31006659
11,70	12	162	114	96	45	M2178P-1170AR	31006660
11,80	12	162	114	96	45	M2178P-1180AR	31006661
11,90	12	162	114	96	45	M2178P-1190AR	31006662
12,00	12	162	114	96	45	M2178P-1200AR	31006663
12,50	14	178	133	112	45	M2178P-1250AR	31006664
12,80	14	178	133	112	45	M2178P-1280AR	31006665

MEGA-Quadro-Drill-Plus | Solid carbide twist drills M2178P (8xD), internal coolant supply

Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
13,00	14	178	133	112	45	M2178P-1300AR	31006666
13,50	14	178	133	112	45	M2178P-1350AR	31006667
13,80	14	178	133	112	45	M2178P-1380AR	31006668
14,00	14	178	133	112	45	M2178P-1400AR	31006669
14,50	16	203	152	128	48	M2178P-1450AR	31006670
14,80	16	203	152	128	48	M2178P-1480AR	31006671
15,00	16	203	152	128	48	M2178P-1500AR	31006672
15,50	16	203	152	128	48	M2178P-1550AR	31006673
15,80	16	203	152	128	48	M2178P-1580AR	31006674
16,00	16	203	152	128	48	M2178P-1600AR	31006675
16,50	18	222	171	144	48	M2178P-1650AR	31006676
16,80	18	222	171	144	48	M2178P-1680AR	31006677
17,00	18	222	171	144	48	M2178P-1700AR	31006678
17,50	18	222	171	144	48	M2178P-1750AR	31006679
17,80	18	222	171	144	48	M2178P-1780AR	31006680
18,00	18	222	171	144	48	M2178P-1800AR	31006681
18,50	20	243	190	160	50	M2178P-1850AR	31006682
18,80	20	243	190	160	50	M2178P-1880AR	31006683
19,00	20	243	190	160	50	M2178P-1900AR	31006684
19,50	20	243	190	160	50	M2178P-1950AR	31006685
19,80	20	243	190	160	50	M2178P-1980AR	31006686
20,00	20	243	190	160	50	M2178P-2000AR	31006687

Dimensions in mm.

For cutting data recommendation, see end of section.

Special designs and other coatings on request.

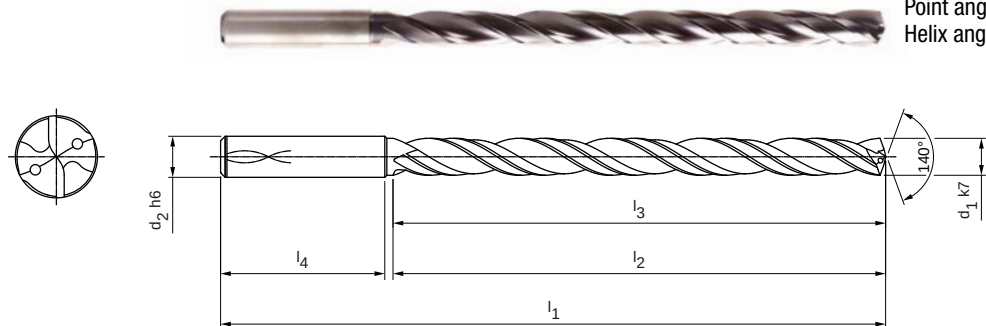
MEGA-Quadro-Drill-Plus

Solid carbide twist drill

M2182P (12xD), internal coolant supply, successor product to the MEGA-Quadro-Drill (M2182)

Design:

Drill diameter:	3.00 – 20.00 mm
Bore tolerance:	≥ IT 8
Coating:	MxP
Number of cutting edges:	2
Number of guiding chamfers:	4
Point geometry:	Specific lead geometry
Point angle:	140°
Helix angle:	30°



Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
3,00	6	92	54	48	36	M2182P-0300AR	31005359
3,10	6	92	54	48	36	M2182P-0310AR	31005360
3,20	6	92	54	48	36	M2182P-0320AR	31005361
3,30	6	92	54	48	36	M2182P-0330AR	31005362
3,40	6	92	54	48	36	M2182P-0340AR	31005363
3,50	6	92	54	48	36	M2182P-0350AR	31005364
3,60	6	92	54	48	36	M2182P-0360AR	31005365
3,70	6	92	54	48	36	M2182P-0370AR	31005366
3,80	6	102	64	58	36	M2182P-0380AR	31005367
3,90	6	102	64	58	36	M2182P-0390AR	31005368
4,00	6	102	64	58	36	M2182P-0400AR	31005369
4,10	6	102	64	58	36	M2182P-0410AR	31005370
4,20	6	102	64	58	36	M2182P-0420AR	31005371
4,30	6	102	64	58	36	M2182P-0430AR	31005372
4,40	6	102	64	58	36	M2182P-0440AR	31005373
4,50	6	102	64	58	36	M2182P-0450AR	31005374
4,60	6	102	64	58	36	M2182P-0460AR	31005375
4,70	6	102	64	58	36	M2182P-0470AR	31005376
4,80	6	116	78	70	36	M2182P-0480AR	31005377
4,90	6	116	78	70	36	M2182P-0490AR	31005378
5,00	6	116	78	70	36	M2182P-0500AR	31005379
5,10	6	116	78	70	36	M2182P-0510AR	31005380
5,20	6	116	78	70	36	M2182P-0520AR	31005381
5,30	6	116	78	70	36	M2182P-0530AR	31005382
5,40	6	116	78	70	36	M2182P-0540AR	31005383
5,50	6	116	78	70	36	M2182P-0550AR	31005384
5,60	6	116	78	70	36	M2182P-0560AR	31005385
5,70	6	116	78	70	36	M2182P-0570AR	31005386
5,80	6	116	78	70	36	M2182P-0580AR	31005387
5,90	6	116	78	70	36	M2182P-0590AR	31005388
6,00	6	116	78	70	36	M2182P-0600AR	31005389
6,10	8	146	108	94	36	M2182P-0610AR	31005390
6,20	8	146	108	94	36	M2182P-0620AR	31005391
6,30	8	146	108	94	36	M2182P-0630AR	31005392
6,40	8	146	108	94	36	M2182P-0640AR	31005393
6,50	8	146	108	94	36	M2182P-0650AR	31005394

MEGA-Quadro-Drill-Plus | Solid carbide twist drills M2182P (12xD), internal coolant supply

Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
6,60	8	146	108	94	36	M2182P-0660AR	31005395
6,70	8	146	108	94	36	M2182P-0670AR	31005396
6,80	8	146	108	94	36	M2182P-0680AR	31005397
6,90	8	146	108	94	36	M2182P-0690AR	31005398
7,00	8	146	108	94	36	M2182P-0700AR	31005399
7,10	8	146	108	94	36	M2182P-0710AR	31005400
7,20	8	146	108	94	36	M2182P-0720AR	31005401
7,30	8	146	108	94	36	M2182P-0730AR	31005402
7,40	8	146	108	94	36	M2182P-0740AR	31005403
7,50	8	146	108	94	36	M2182P-0750AR	31005404
7,60	8	146	108	94	36	M2182P-0760AR	31005405
7,70	8	146	108	94	36	M2182P-0770AR	31005406
7,80	8	146	108	94	36	M2182P-0780AR	31005407
7,90	8	146	108	94	36	M2182P-0790AR	31005408
8,00	8	146	108	94	36	M2182P-0800AR	31005409
8,10	10	162	120	110	40	M2182P-0810AR	31005410
8,20	10	162	120	110	40	M2182P-0820AR	31005411
8,30	10	162	120	110	40	M2182P-0830AR	31005412
8,40	10	162	120	110	40	M2182P-0840AR	31005413
8,50	10	162	120	110	40	M2182P-0850AR	31005414
8,60	10	162	120	110	40	M2182P-0860AR	31005415
8,70	10	162	120	110	40	M2182P-0870AR	31005416
8,80	10	162	120	110	40	M2182P-0880AR	31005417
8,90	10	162	120	110	40	M2182P-0890AR	31005418
9,00	10	162	120	110	40	M2182P-0900AR	31005419
9,10	10	162	120	110	40	M2182P-0910AR	31005420
9,20	10	162	120	110	40	M2182P-0920AR	31005421
9,30	10	162	120	110	40	M2182P-0930AR	31005422
9,40	10	162	120	110	40	M2182P-0940AR	31005423
9,50	10	162	120	110	40	M2182P-0950AR	31005424
9,60	10	162	120	110	40	M2182P-0960AR	31005425
9,70	10	162	120	110	40	M2182P-0970AR	31005426
9,80	10	162	120	110	40	M2182P-0980AR	31005427
9,90	10	162	120	110	40	M2182P-0990AR	31005428
10,00	10	162	120	110	40	M2182P-1000AR	31005429
10,10	12	204	156	142	45	M2182P-1010AR	31005430
10,20	12	204	156	142	45	M2182P-1020AR	31005431
10,30	12	204	156	142	45	M2182P-1030AR	31005432
10,40	12	204	156	142	45	M2182P-1040AR	31005433
10,50	12	204	156	142	45	M2182P-1050AR	31005434
10,60	12	204	156	142	45	M2182P-1060AR	31005435
10,70	12	204	156	142	45	M2182P-1070AR	31005436
10,80	12	204	156	142	45	M2182P-1080AR	31005437
10,90	12	204	156	142	45	M2182P-1090AR	31005438
11,00	12	204	156	142	45	M2182P-1100AR	31005439
11,10	12	204	156	142	45	M2182P-1110AR	31005440
11,20	12	204	156	142	45	M2182P-1120AR	31005441
11,30	12	204	156	142	45	M2182P-1130AR	31005442
11,40	12	204	156	142	45	M2182P-1140AR	31005443
11,50	12	204	156	142	45	M2182P-1150AR	31005444
11,60	12	204	156	142	45	M2182P-1160AR	31005445
11,70	12	204	156	142	45	M2182P-1170AR	31005446
11,80	12	204	156	142	45	M2182P-1180AR	31005447
11,90	12	204	156	142	45	M2182P-1190AR	31005448
12,00	12	204	156	142	45	M2182P-1200AR	31005449
12,50	14	230	182	166	45	M2182P-1250AR	31005450
12,80	14	230	182	166	45	M2182P-1280AR	31005451

Continued on next page.

MEGA-Quadro-Drill-Plus I Solid carbide twist drills M2182P (12xD), internal coolant supply

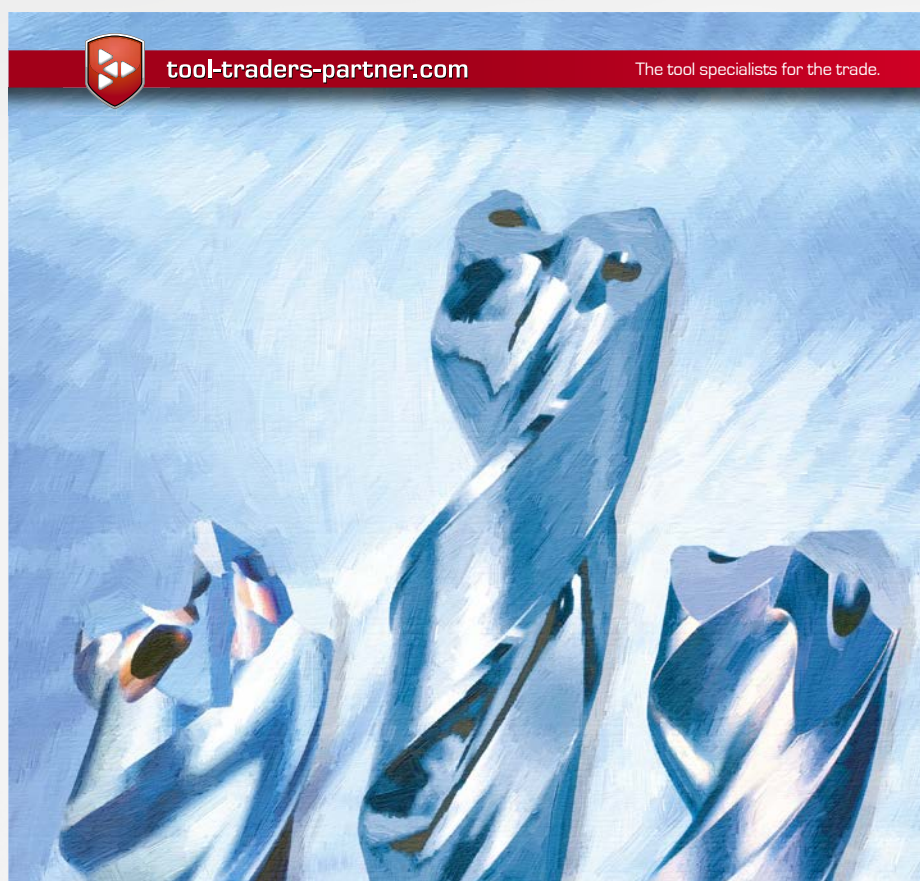
Dimensions							
d ₁ k7	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Order designation	Order No.
13,00	14	230	182	166	45	M2182P-1300AR	31005452
13,50	14	230	182	166	45	M2182P-1350AR	31005453
13,80	14	230	182	166	45	M2182P-1380AR	31005454
14,00	14	230	182	166	45	M2182P-1400AR	31005455
14,50	16	260	208	192	48	M2182P-1450AR	31005456
14,80	16	260	208	192	48	M2182P-1480AR	31005457
15,00	16	260	208	192	48	M2182P-1500AR	31005458
15,50	16	260	208	192	48	M2182P-1550AR	31005459
15,80	16	260	208	192	48	M2182P-1580AR	31005460
16,00	16	260	208	192	48	M2182P-1600AR	31005461
16,50	18	285	234	216	48	M2182P-1650AR	31005462
16,80	18	285	234	216	48	M2182P-1680AR	31005463
17,00	18	285	234	216	48	M2182P-1700AR	31005464
17,50	18	285	234	216	48	M2182P-1750AR	31005465
17,80	18	285	234	216	48	M2182P-1780AR	31005466
18,00	18	285	234	216	48	M2182P-1800AR	31005467
18,50	20	310	258	240	50	M2182P-1850AR	31005468
18,80	20	310	258	240	50	M2182P-1880AR	31005469
19,00	20	310	258	240	50	M2182P-1900AR	31005470
19,50	20	310	258	240	50	M2182P-1950AR	31005471
19,80	20	310	258	240	50	M2182P-1980AR	31005472
20,00	20	310	258	240	50	M2182P-2000AR	31005473

Dimensions in mm.

For cutting data recommendation, see end of section.

Special designs and other coatings on request.

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Standard programme
Solid carbide drills

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Standard-Programm - Gesamtpreislste | Standard Programme - Common Price List
Bohren und Fräsen | Drilling and Milling

MILLER
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Gültig ab 01. Januar 2018 | Valid from 1 January 2018

Cutting data recommendation for solid carbide drills

Feed and cutting speed

Tritan-Drill-Uni-Plus | M9535P, 9538P

MMG*		Material	Strength/hardness [N/mm ²] [HRC]	
P	P1	P1.1 Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700 N/mm ²	
		P1.2 Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200 N/mm ²	
	P2	P2.1 Nitrided, case hardened and heat-treated steels, alloy	< 900 N/mm ²	
		P2.2 Nitrided, case hardened and heat-treated steels, alloy	< 1400 N/mm ²	
	P3	P3.1 Tool, bearing, spring and high-speed steels	< 900 N/mm ²	
		P3.2 Tool, bearing, spring and high-speed steels	< 1500 N/mm ²	
	P4	P4.1 Stainless steels, ferritic and martensitic		
	P5	P5.1 Cast steel		
	P6	P6.1 Stainless cast steel, ferritic and martensitic		
M	M1	M1.1 Stainless steels, austenitic	< 700 N/mm ²	
		M1.2 Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm ²	
	M2	M2.1 Stainless cast steel, austenitic	< 700 N/mm ²	
	M3	M3.1 Stainless cast steel, ferritic/austenitic (duplex)	< 1000 N/mm ²	
K	K1	K1.1 Cast iron with lamellar graphite (grey cast iron), GJL	< 300 N/mm ²	
		K2.1 Cast iron with spheroidal graphite, GJS	< 500 N/mm ²	
		K2.2 Cast iron with spheroidal graphite, GJS	500-800 N/mm ²	
	K2	K2.3 Cast iron with spheroidal graphite, GJS	> 800 N/mm ²	
		K3.1 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500 N/mm ²	
		K3.2 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500 N/mm ²	
N	N1	N1.1 Aluminium, non-alloy and alloy < 3 % Si		
		N1.2 Aluminium, alloy ≤ 7 % Si		
		N1.3 Aluminium, alloy > 7-12 % Si		
		N1.4 Aluminium, alloy > 12 % Si		
	N2	N2.1 Copper, non-alloy and low-alloy	< 300 N/mm ²	
		N2.2 Copper, alloy	> 300 N/mm ²	
		N2.3 Brass, bronze, gunmetal	< 1200 N/mm ²	
	N3	N3.1 Graphite		
	N4	N4.1 Plastic, thermoplastics		
		N4.2 Plastic, thermosets		
		N4.3 Plastic, foams		

	Cutting speed v_c [m/min]				Feed f [mm] for drill diameter [mm]					
	Internal cooling	External cooling	MQL	Air	4.00	5.50	7.50	10.50	14.50	20.00
	115	105	105		0.22	0.27	0.33	0.41	0.51	0.60
	105	85	85		0.27	0.33	0.41	0.52	0.63	0.75
	115	100	100		0.26	0.32	0.39	0.49	0.60	0.71
	80	70	70		0.22	0.26	0.32	0.39	0.48	0.56
	85	75	75		0.23	0.28	0.35	0.44	0.54	0.64
	70	65	65		0.19	0.24	0.29	0.36	0.44	0.52
	70	50	60		0.15	0.19	0.23	0.29	0.35	0.42
	115	100	100		0.26	0.32	0.39	0.49	0.60	0.71
	70	50	60		0.15	0.19	0.23	0.29	0.35	0.42
	55	35	35		0.11	0.14	0.17	0.22	0.27	0.32
	50	30	30		0.10	0.12	0.15	0.19	0.23	0.27
	55	35	35		0.11	0.14	0.17	0.22	0.27	0.32
	50	30	30		0.10	0.12	0.15	0.19	0.23	0.27
	140	100	100	100	0.31	0.40	0.51	0.66	0.83	1.00
	185	115	140	140	0.31	0.39	0.49	0.62	0.77	0.92
	115	85	85		0.27	0.34	0.42	0.54	0.66	0.79
	70	45	60		0.15	0.18	0.22	0.27	0.33	0.39
	105	90	90		0.30	0.37	0.46	0.58	0.71	0.85
	90	80	80		0.25	0.30	0.37	0.46	0.57	0.67
	345	230	290		0.22	0.27	0.33	0.41	0.51	0.60
	290	205	230		0.27	0.34	0.42	0.54	0.66	0.79
	255	175	205		0.27	0.34	0.42	0.54	0.66	0.79
	205	140	175		0.27	0.34	0.42	0.54	0.66	0.79
	140	105			0.21	0.26	0.32	0.40	0.50	0.59
	230	185	185	140	0.31	0.40	0.51	0.66	0.83	1.00

The cutting data stated are indicative.

The optimal data for the specific machining case should be determined in trials or during the machining.

Cutting data recommendation for solid carbide drills

Feed and cutting speed

Tritan-Drill-Steel | M9938, 9942

Tritan-Step-Drill-Steel | M9913

MMG*		Material	Strength/hardness [N/mm ²] [HRC]	
P	P1	P1.1 Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700 N/mm ²	
		P1.2 Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200 N/mm ²	
	P2	P2.1 Nitrided, case hardened and heat-treated steels, alloy	< 900 N/mm ²	
		P2.2 Nitrided, case hardened and heat-treated steels, alloy	< 1400 N/mm ²	
	P3	P3.1 Tool, bearing, spring and high-speed steels	< 900 N/mm ²	
		P3.2 Tool, bearing, spring and high-speed steels	< 1500 N/mm ²	
	P4	P4.1 Stainless steels, ferritic and martensitic		
	P5	P5.1 Cast steel		
	P6	P6.1 Stainless cast steel, ferritic and martensitic		
M	M1	M1.1 Stainless steels, austenitic	< 700 N/mm ²	
		M1.2 Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm ²	
	M2	M2.1 Stainless cast steel, austenitic	< 700 N/mm ²	
	M3	M3.1 Stainless cast steel, ferritic/austenitic (duplex)	< 1000 N/mm ²	
K	K1	K1.1 Cast iron with lamellar graphite (grey cast iron), GJL	< 300 N/mm ²	
		K2.1 Cast iron with spheroidal graphite, GJS	< 500 N/mm ²	
	K2	K2.2 Cast iron with spheroidal graphite, GJS	500-800 N/mm ²	
		K2.3 Cast iron with spheroidal graphite, GJS	> 800 N/mm ²	
	K3	K3.1 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500 N/mm ²	
		K3.2 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500 N/mm ²	

Tritan-Spot-Drill-Steel | M9930

MMG*		Material	Strength/hardness [N/mm ²] [HRC]	
P	P1	P1.1 Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700 N/mm ²	
		P1.2 Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200 N/mm ²	
	P2	P2.1 Nitrided, case hardened and heat-treated steels, alloy	< 900 N/mm ²	
		P2.2 Nitrided, case hardened and heat-treated steels, alloy	< 1400 N/mm ²	
	P3	P3.1 Tool, bearing, spring and high-speed steels	< 900 N/mm ²	
		P3.2 Tool, bearing, spring and high-speed steels	< 1500 N/mm ²	
	P4	P4.1 Stainless steels, ferritic and martensitic		
	P5	P5.1 Cast steel		
	P6	P6.1 Stainless cast steel, ferritic and martensitic		
M	M1	M1.1 Stainless steels, austenitic	< 700 N/mm ²	
		M1.2 Stainless steels, ferritic/austenitic (duplex)	< 1000 N/mm ²	
	M2	M2.1 Stainless cast steel, austenitic	< 700 N/mm ²	
	M3	M3.1 Stainless cast steel, ferritic/austenitic (duplex)	< 1000 N/mm ²	
K	K1	K1.1 Cast iron with lamellar graphite (grey cast iron), GJL	< 300 N/mm ²	
		K2.1 Cast iron with spheroidal graphite, GJS	< 500 N/mm ²	
	K2	K2.2 Cast iron with spheroidal graphite, GJS	500-800 N/mm ²	
		K2.3 Cast iron with spheroidal graphite, GJS	> 800 N/mm ²	

* MILLER machining groups

	Cutting speed v_c [m/min]				Feed f [mm] for drill diameter [mm]					
	Internal cooling	External cooling	MQL	Air	4.00	5.50	7.50	10.50	14.50	20.00
	115	105	105		0.24	0.29	0.36	0.45	0.56	0.66
	105	85	85		0.30	0.37	0.45	0.57	0.70	0.83
	115	100	100		0.28	0.35	0.43	0.54	0.66	0.78
	80	70	70		0.24	0.29	0.35	0.43	0.52	0.62
	85	75	75		0.25	0.31	0.38	0.48	0.59	0.70
	70	65	65		0.21	0.26	0.32	0.40	0.48	0.57
	70	50	60		0.17	0.21	0.25	0.32	0.39	0.46
	115	100	100		0.28	0.35	0.43	0.54	0.66	0.78
	70	50	60		0.17	0.21	0.25	0.32	0.39	0.46
	55	35	35		0.11	0.14	0.17	0.22	0.27	0.32
	50	30	30		0.10	0.12	0.15	0.19	0.23	0.27
	55	35	35		0.11	0.14	0.17	0.22	0.27	0.32
	50	30	30		0.10	0.12	0.15	0.19	0.23	0.27
	140	100	100	100	0.34	0.44	0.56	0.73	0.91	1.10
	185	115	140	140	0.34	0.43	0.54	0.68	0.85	1.01
	115	85	85		0.30	0.38	0.47	0.59	0.73	0.87
	70	45	60		0.17	0.20	0.25	0.31	0.37	0.44
	105	90	90		0.32	0.40	0.50	0.64	0.79	0.94
	90	80	80		0.27	0.33	0.41	0.51	0.62	0.74

	Cutting speed v_c [m/min]				Feed f [mm] for drill diameter [mm]				
	Internal cooling	External cooling	MQL	Air	8.00	10.00	12.00	16.00	20.00
		160			0.080	0.097	0.113	0.141	0.164
		130			0.075	0.090	0.105	0.132	0.153
		145			0.080	0.097	0.113	0.141	0.164
		100			0.067	0.081	0.094	0.118	0.136
		95			0.076	0.092	0.107	0.134	0.155
		80			0.069	0.084	0.098	0.122	0.142
		65			0.053	0.065	0.075	0.094	0.109
		95			0.077	0.094	0.109	0.136	0.158
		65			0.037	0.045	0.053	0.066	0.076
		45			0.047	0.056	0.066	0.082	0.095
		40			0.039	0.047	0.055	0.068	0.079
		50			0.051	0.061	0.071	0.089	0.104
		45			0.040	0.048	0.056	0.071	0.082
		175			0.133	0.161	0.188	0.235	0.273
		160			0.113	0.137	0.160	0.200	0.232
		130			0.093	0.113	0.132	0.165	0.191
		70			0.053	0.065	0.075	0.094	0.109

The cutting data stated are indicative.

The optimal data for the specific machining case should be determined in trials or during the machining.

Cutting data recommendation for solid carbide drills

Feed and cutting speed

MEGA-Quadro-Drill-Plus | M2075P, 2175P, 2178P, 2182P

MMG*		Material	Strength/hardness [N/mm ²] [HRC]	
P	P1	P1.1 Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700 N/mm ²	
		P1.2 Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200 N/mm ²	
	P2	P2.1 Nitrided, case hardened and heat-treated steels, alloy	< 900 N/mm ²	
		P2.2 Nitrided, case hardened and heat-treated steels, alloy	< 1400 N/mm ²	
	P3	P3.1 Tool, bearing, spring and high-speed steels	< 900 N/mm ²	
		P3.2 Tool, bearing, spring and high-speed steels	< 1500 N/mm ²	
	P4	P4.1 Stainless steels, ferritic and martensitic		
	P5	P5.1 Cast steel		
	P6	P6.1 Stainless cast steel, ferritic and martensitic		
K	K1	K1.1 Cast iron with lamellar graphite (grey cast iron), GJL	< 300 N/mm ²	
		K2.1 Cast iron with spheroidal graphite, GJS	< 500 N/mm ²	
	K2	K2.2 Cast iron with spheroidal graphite, GJS	500-800 N/mm ²	
		K2.3 Cast iron with spheroidal graphite, GJS	> 800 N/mm ²	
	K3	K3.1 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500 N/mm ²	
		K3.2 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500 N/mm ²	

	Cutting speed v_c [m/min]				Feed f [mm] for drill diameter [mm]					
	Internal cooling	External cooling	MQL	Air	3.00	4.50	6.50	9.50	14.00	20.00
	110	100	100		0.10	0.13	0.16	0.21	0.27	0.33
	100	85	85		0.13	0.16	0.21	0.27	0.34	0.41
	110	95	95		0.12	0.15	0.19	0.25	0.32	0.39
	75	65	65		0.10	0.13	0.16	0.20	0.26	0.31
	85	70	70		0.11	0.14	0.17	0.23	0.29	0.35
	65	60	60		0.09	0.12	0.15	0.19	0.24	0.29
	65	50	55		0.07	0.09	0.12	0.15	0.19	0.23
	110	95	95		0.12	0.15	0.19	0.25	0.32	0.39
	65	50	55		0.07	0.09	0.12	0.15	0.19	0.23
	130	95	95	95	0.14	0.19	0.25	0.34	0.45	0.55
	175	110	130	130	0.14	0.18	0.24	0.32	0.41	0.51
	110	85	85		0.12	0.16	0.21	0.28	0.36	0.43
	65	45	55		0.09	0.12	0.15	0.19	0.24	0.29
	100	90	90		0.13	0.18	0.23	0.30	0.38	0.47
	90	75	75		0.12	0.15	0.19	0.24	0.31	0.37

The cutting data stated are indicative.

The optimal data for the specific machining case should be determined in trials or during the machining.





MILLING

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Shoulder milling – finishing

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**Basic Line:**

Universal tools, broad application area, low procurement costs

**Performance Line:**

High-performance tools, broad application area, high productivity in series production manufacturing

**Expert Line:**

Specialist tools for selected applications, maximum precision and productivity

PRODUCT OVERVIEW

End mills cutters with fixed cutting edges

New milling cutters for roughing, finishing and especially for milling pockets and parallel key grooves make the machining of steel, stainless steel and cast iron even more cost-effective.

The finishing end mill OptiMill-Uni-HPC-Finish with seven cutting edges impresses with short machining times and highest surface quality. The stable core diameter significantly increases the tool stiffness and consequently prevents the displacement of the tool. In this way highest surface quality can be produced reliably even with cutting lengths up to $5xD$. With the new high-performance roughing end mill OptiMill-Uni-Wave, grooves can be milled with a slot depth of up to $2xD$. The newly developed roughing profile significantly reduces the radial forces on the tool. As a consequence significantly higher cutting data can be used.

To save time-consuming ramping processes or pilot bores while milling pockets, Miller has developed the solid carbide milling cutter OptiMill-Uni-HPC-Pocket. The new short version with corner radius is particularly suitable for milling parallel key grooves in accordance with DIN6885.



Groove milling and general applications	Shoulder milling – roughing	Shoulder milling – finishing
		
OptiMill-Uni-HPC-Pocket - Universal machining of steel, stainless steel and cast iron - Face geometry with integrated drill tip - Suitable for ramping up to 45°, for helix milling and for grooving - Ramping and plunging depth up to 2xD possible Performance LINE Ø range: 3.80 - 20.00 mm Design:  P M K	OptiMill-Uni-Wave - Optimal chip removal due to short, tightly rolled chips - Cost-effective machining times due to significantly higher cutting data - Low radial forces due to newly developed roughing profile - High-performance roughing end mill for groove milling up to 2xD Performance LINE Ø range: 4.00 - 25.00 mm Design:  P M K	OptiMill-Uni-HPC-Finish - Seven cutting edges, individually adapted substrate - Shorter machining times due to significantly higher total feed - Adapted groove profile for optimal chip removal - In the lengths 2, 3, 4 and 5xD Performance LINE Ø range: 4.00 - 25.00 mm Design:  P M K
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Designation key

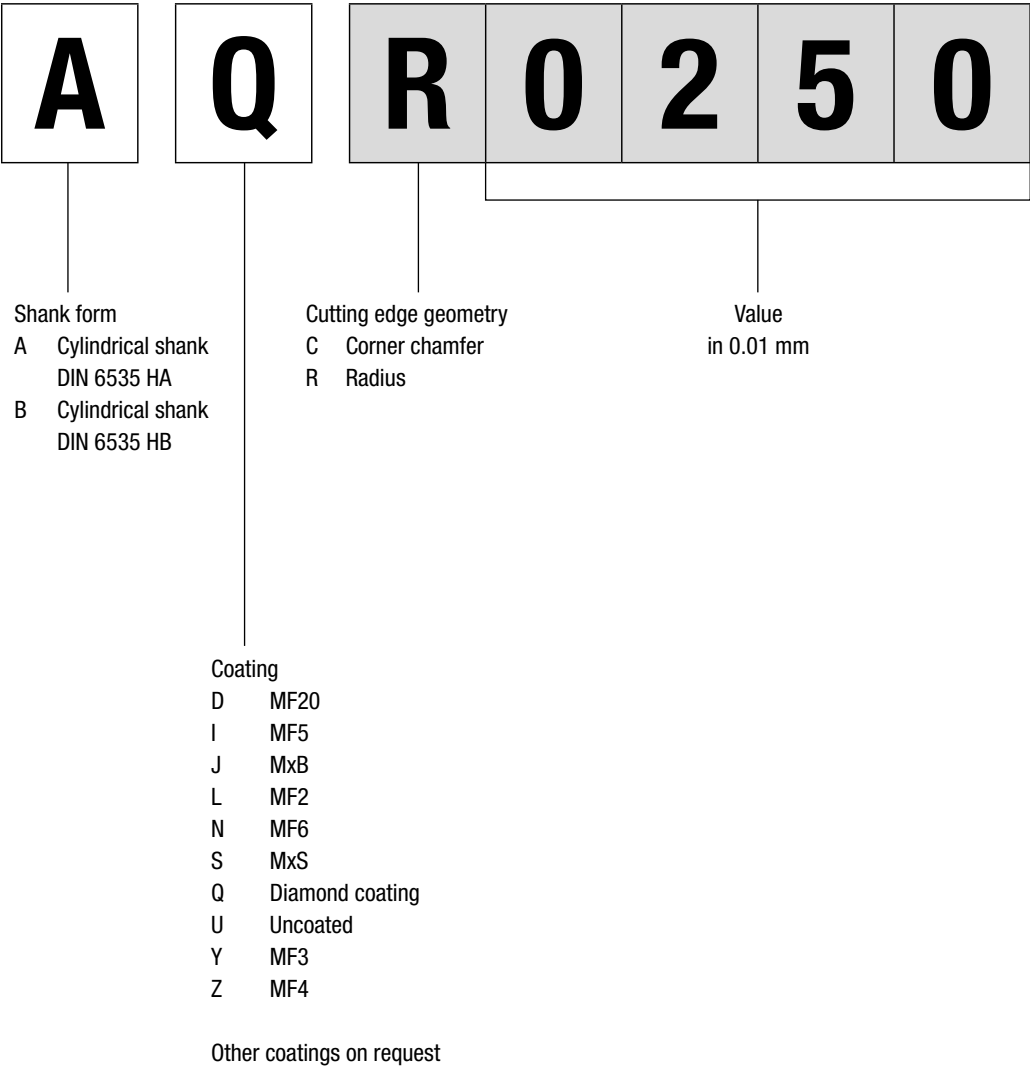
End mills with fixed cutting edges

M	7	2	2	8

Tool type

1	0	0	0

End mill diameter
in 0.01 mm



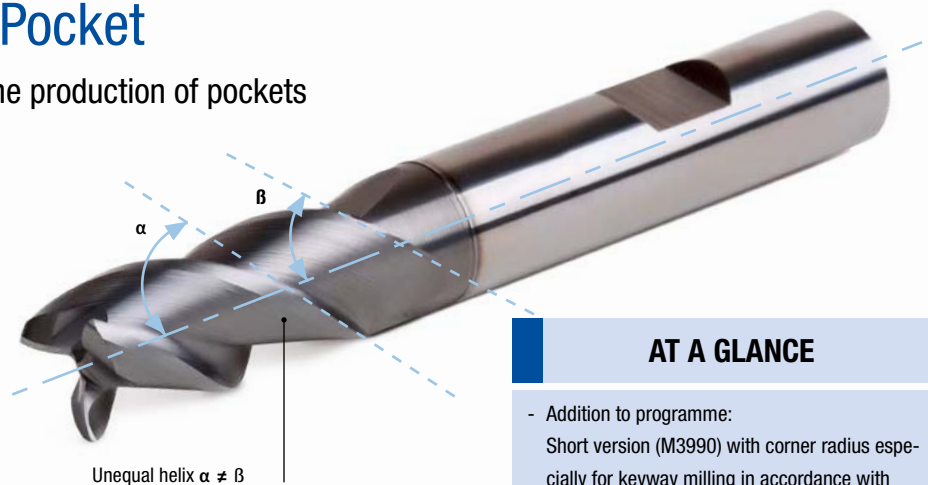


OptiMill®-Uni-HPC-Pocket

High cost-effectiveness during the production of pockets



Drill tip



Unequal helix $\alpha \neq \beta$

AT A GLANCE

- Addition to programme:
Short version (M3990) with corner radius especially for keyway milling in accordance with DIN 6885
- Universal machining of steel, stainless steel and cast iron
- Face geometry with integrated drill tip
- Suitable for ramping at up to 45°
- For helix milling and plunging
- Designs:
 - Short (M3990)
 - Long (M3993)
 - Overlong (M3991)
- In the diameter range from 3.80 to 20.00 mm

Milling keyways in accordance with DIN 6885*

Machining strategy 1



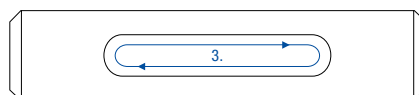
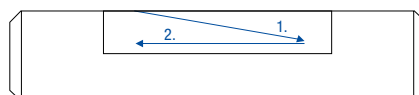
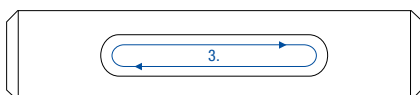
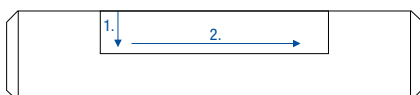
1. Plunging on slot depth
2. Groove milling on slot length
3. Finishing the slot



Machining strategy 2



1. Ramping on slot depth
2. Groove milling on slot length
3. Finishing the slot



* Example recommendation: For slot width $b = 12.00$ mm, use end mill with $\varnothing = 11.70$ mm

ADVANTAGES

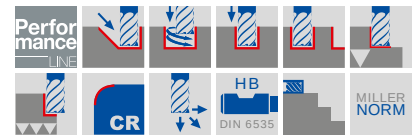
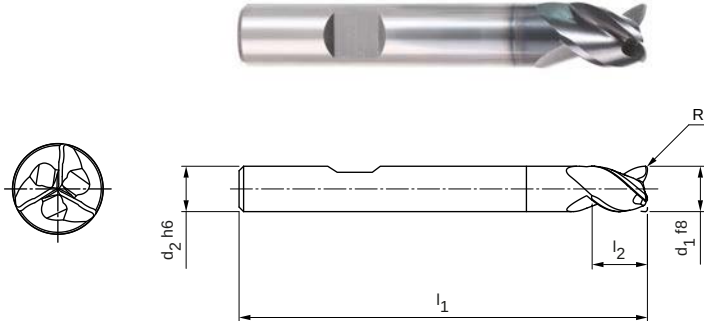
- Pilot bore drilling and tool changing are eliminated
- Point thinning with three large chip flutes for optimum discharge of the chips
- Long tool lives thanks to special cutting edge preparation, wear-resistant coating and ductile carbide substrate

OptiMill®-Uni-HPC-Pocket

Short design
M3990

Design:

Milling cutter diameter: 3.80 - 20.00 mm
Coating: MF2
Number of cutting edges: 3
Point geometry: Specific lead geometry
Helix angle: 42°
Dimensions: DIN 6527 - short
Special features: Face geometry with integrated drill tip. Ideal for ramping up to 45°, for helix milling and for plunging.



Dimensions					z	Order designation	Order No.
d ₁ f8	d ₂ h6	l ₁	l ₂	R			
3,80	6	54	5	0,12	3	M3990-0380BL	31019864
4,00	6	54	5	0,12	3	M3990-0400BL	31019865
4,80	6	54	6	0,20	3	M3990-0480BL	31019866
5,00	6	54	6	0,20	3	M3990-0500BL	31019868
5,70	6	54	7	0,20	3	M3990-0570BL	30866568
6,00	6	54	7	0,20	3	M3990-0600BL	30866569
6,70	8	58	8	0,20	3	M3990-0670BL	30866570
7,00	8	58	8	0,20	3	M3990-0700BL	30866571
7,70	8	58	9	0,20	3	M3990-0770BL	30866572
8,00	8	58	9	0,20	3	M3990-0800BL	30866573
8,70	10	66	10	0,32	3	M3990-0870BL	30866574
9,00	10	66	10	0,32	3	M3990-0900BL	30866575
9,70	10	66	11	0,32	3	M3990-0970BL	30866576
10,00	10	66	11	0,32	3	M3990-1000BL	30866577
11,70	12	73	12	0,32	3	M3990-1170BL	30866578
12,00	12	73	12	0,32	3	M3990-1200BL	30866579
13,70	14	75	14	0,32	3	M3990-1370BL	30866580
14,00	14	75	14	0,32	3	M3990-1400BL	30869103
15,50	16	82	16	0,32	3	M3990-1550BL	30866581
16,00	16	82	16	0,32	3	M3990-1600BL	30866582
17,50	18	84	18	0,32	3	M3990-1750BL	30866583
18,00	18	84	18	0,32	3	M3990-1800BL	30866584
19,50	20	92	20	0,50	3	M3990-1950BL	30866585
20,00	20	92	20	0,50	3	M3990-2000BL	30866586

Corner radius especially for keyway milling in accordance with DIN 6885.

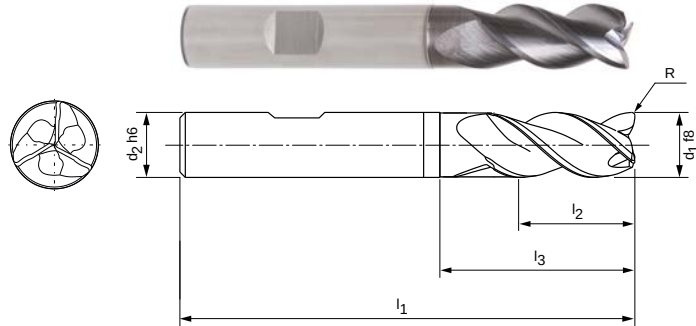
Dimensions in mm.

For cutting data recommendation, see end of section.

Special designs and other coatings on request.

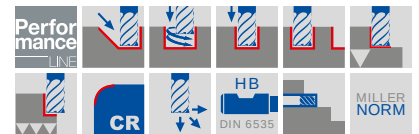
OptiMill®-Uni-HPC-Pocket

Long design with neck
M3993



Design:

Milling cutter diameter: 3.80 - 20.00 mm
Coating: MF2
Number of cutting edges: 3
Point geometry: Specific lead geometry
Helix angle: 42°
Dimensions: Similar to DIN 6527 – long
Special features: Face geometry with integrated drill tip. Ideal for ramping up to 45°, for helix milling and for plunging.



Dimensions						z	Order designation	Order No.
d ₁ f8	d ₂ h6	l ₁	l ₂	l ₃	R			
3,80	6	57	10	-	0,19	3	M3993-0380BL	31019870
4,00	6	57	11	-	0,20	3	M3993-0400BL	31019871
4,80	6	57	11	-	0,24	3	M3993-0480BL	31019872
5,00	6	57	13	-	0,25	3	M3993-0500BL	31019873
5,70	6	57	13	19	0,29	3	M3993-0570BL	30787991
6,00	6	57	13	19	0,30	3	M3993-0600BL	30787992
6,70	8	63	16	25	0,34	3	M3993-0670BL	30787993
7,00	8	63	16	25	0,35	3	M3993-0700BL	30787994
7,70	8	63	19	25	0,39	3	M3993-0770BL	30787995
8,00	8	63	19	25	0,40	3	M3993-0800BL	30787996
8,70	10	72	22	30	0,44	3	M3993-0870BL	30787997
9,00	10	72	22	30	0,45	3	M3993-0900BL	30787998
9,70	10	72	22	30	0,49	3	M3993-0970BL	30787999
10,00	10	72	22	30	0,50	3	M3993-1000BL	30788000
11,70	12	83	26	36	0,59	3	M3993-1170BL	30788001
12,00	12	83	26	36	0,60	3	M3993-1200BL	30788002
13,70	14	83	26	36	0,69	3	M3993-1370BL	30788003
14,00	14	83	26	36	0,70	3	M3993-1400BL	30788004
15,50	16	92	31	42	0,78	3	M3993-1550BL	30788005
16,00	16	92	31	42	0,80	3	M3993-1600BL	30788006
17,50	18	92	31	42	0,88	3	M3993-1750BL	30788007
18,00	18	92	31	42	0,90	3	M3993-1800BL	30788008
19,50	20	104	41	52	0,98	3	M3993-1950BL	30788009
20,00	20	104	41	52	1,00	3	M3993-2000BL	30788010

Dimensions in mm.

For cutting data recommendation, see end of section.

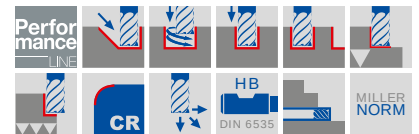
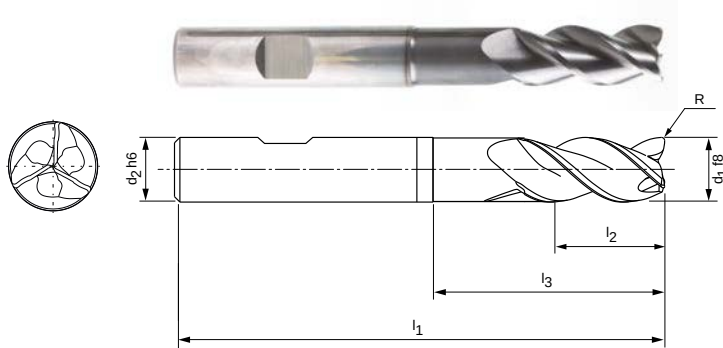
Special designs and other coatings on request.

OptiMill®-Uni-HPC-Pocket

Overlong design with neck
M3991

Design:

Milling cutter diameter: 5.70 - 20.00 mm
Coating: MF2
Number of cutting edges: 3
Helix angle: 42°
Special features: Face geometry with integrated drill tip. Ideal for ramping up to 45°, for helix milling and for plunging.



Dimensions						z	Order designation	Order No.
d ₁ f8	d ₂ h6	l ₁	l ₂	l ₃	R			
5,70	6	62	13	24	0,29	3	M3991-0570BL	30787924
6,00	6	62	13	24	0,30	3	M3991-0600BL	30787927
6,70	8	68	16	30	0,34	3	M3991-0670BL	30787928
7,00	8	68	16	30	0,35	3	M3991-0700BL	30787929
7,70	8	68	21	30	0,39	3	M3991-0770BL	30787930
8,00	8	68	21	30	0,40	3	M3991-0800BL	30787931
8,70	10	80	22	38	0,44	3	M3991-0870BL	30787932
9,00	10	80	22	38	0,45	3	M3991-0900BL	30787933
9,70	10	80	22	38	0,49	3	M3991-0970BL	30787934
10,00	10	80	22	38	0,50	3	M3991-1000BL	30787935
11,70	12	93	26	46	0,59	3	M3991-1170BL	30787936
12,00	12	93	26	46	0,60	3	M3991-1200BL	30787937
13,70	14	99	26	52	0,69	3	M3991-1370BL	30787938
14,00	14	99	26	52	0,70	3	M3991-1400BL	30787939
15,50	16	108	36	58	0,78	3	M3991-1550BL	30787940
16,00	16	108	36	58	0,80	3	M3991-1600BL	30787941
17,50	18	117	36	67	0,88	3	M3991-1750BL	30787942
18,00	18	117	36	67	0,90	3	M3991-1800BL	30787943
19,50	20	126	41	74	0,98	3	M3991-1950BL	30787944
20,00	20	126	41	74	1,00	3	M3991-2000BL	30787945

Dimensions in mm.

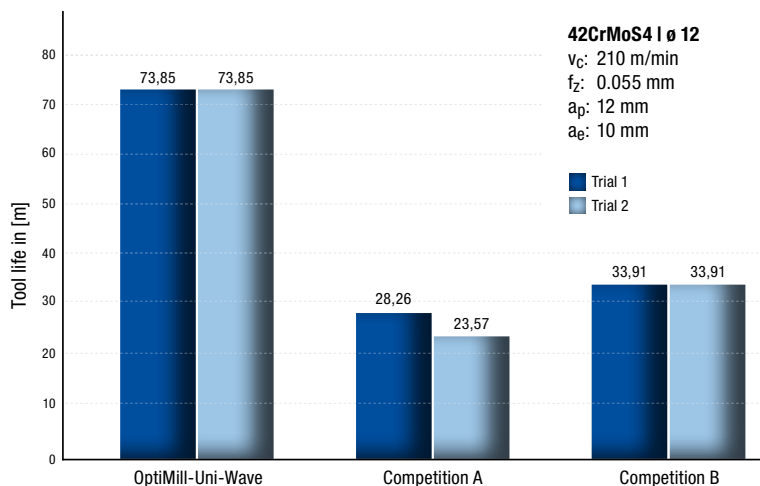
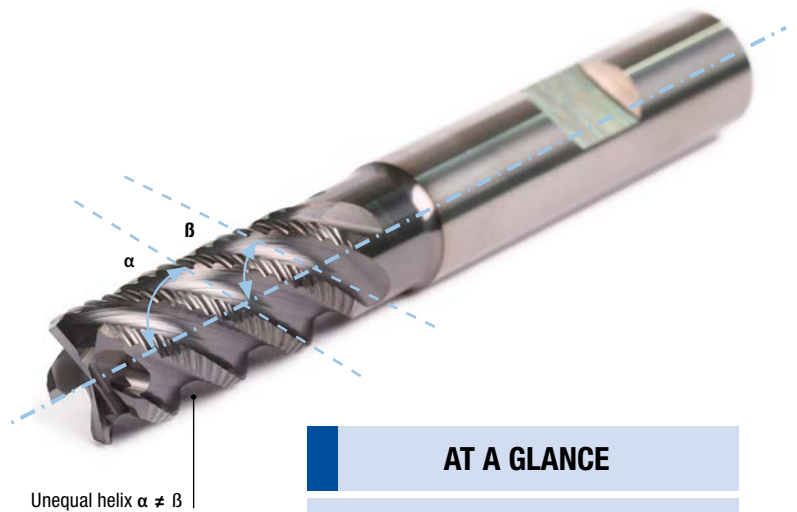
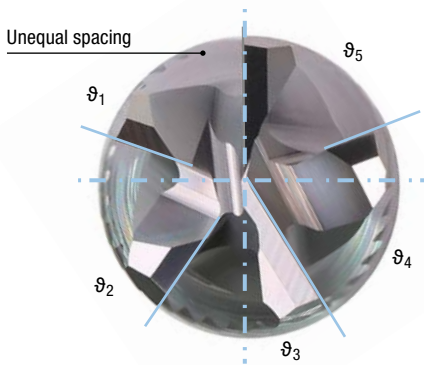
For cutting data recommendation, see end of section.

Special designs and other coatings on request.



OptiMill®-Uni-Wave

Fast and cost-effective for full slots



AT A GLANCE

- Addition to programme: short version (M3980)
- High-performance roughing end mill for full slot milling
- Suitable for many materials
- New knurl geometry
- Unequal spacing of the five cutting edges
- Designs:
 - Short (M3980)
 - Long (M3985)
- In the diameter range from 4.00 to 25.00 mm

ADVANTAGES

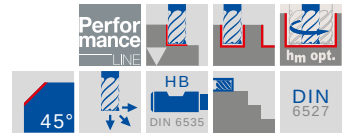
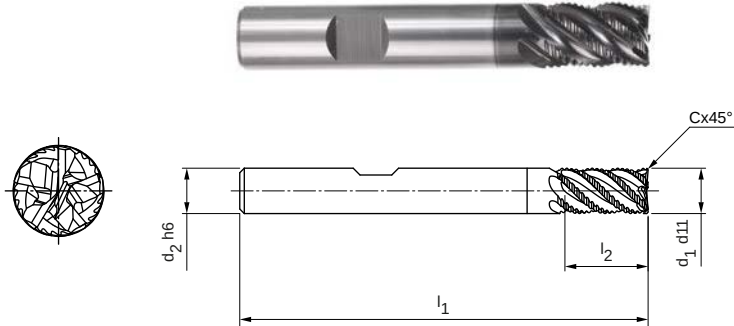
- Significantly higher performance as well as fewer oscillations and vibrations compared to existing HPC roughing milling cutters
- Extreme machining rates
- Long tool lives
- Highly cost-effective machining

OptiMill®-Uni-Wave

Short design
M3980

Design:

Milling cutter diameter: 4.00 - 25.00 mm
Coating: MF2
Number of cutting edges: 5
Helix angle: ~41.5°
Special features: Unequal spacing. Newly developed roughing profile.



Dimensions					z	Order designation	Order No.
d ₁ d ₁₁	d ₂ h ₆	l ₁	l ₂	C x 45°			
4,00	6	54	8	0,20	5	M3980-0400BL	30866544
5,00	6	54	9	0,25	5	M3980-0500BL	30866545
6,00	6	54	10	0,30	5	M3980-0600BL	30866546
7,00	8	58	11	0,35	5	M3980-0700BL	30866547
8,00	8	58	12	0,40	5	M3980-0800BL	30866548
9,00	10	66	13	0,45	5	M3980-0900BL	30866549
10,00	10	66	14	0,50	5	M3980-1000BL	30866550
12,00	12	73	16	0,60	5	M3980-1200BL	30866551
14,00	14	75	18	0,70	5	M3980-1400BL	30866552
16,00	16	82	22	0,80	5	M3980-1600BL	30866553
18,00	18	84	24	0,90	5	M3980-1800BL	30866554
20,00	20	92	26	1,00	5	M3980-2000BL	30866555
25,00	25	105	32	1,25	5	M3980-2500BL	30882076

Dimensions in mm.

For cutting data recommendation, see end of section.

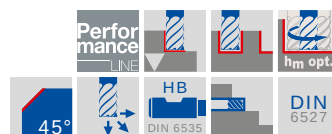
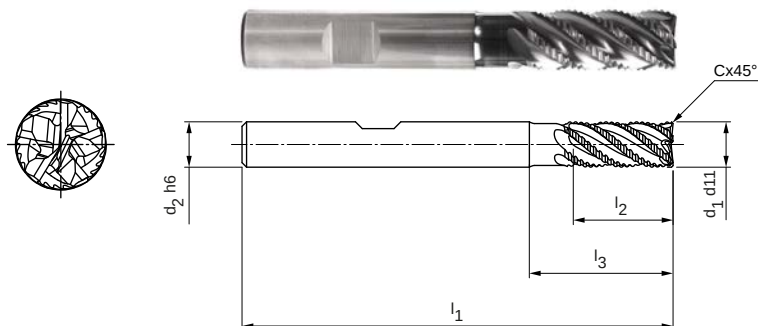
Special designs and other coatings on request.

OptiMill®-Uni-Wave

Long design with neck
M3985

Design:

Milling cutter diameter: 4.00 - 25.00 mm
Coating: MF2
Number of cutting edges: 5
Helix angle: ~41.5°
Special features: Unequal spacing. Newly developed roughing profile.



Dimensions						z	Order designation	Order No.
d ₁ d11	d ₂ h6	l ₁	l ₂	l ₃	C x 45°			
4,00	6	57	11	19	0,20	5	M3985-0400BL	30837662
5,00	6	57	13	19	0,25	5	M3985-0500BL	30837663
6,00	6	57	13	19	0,30	5	M3985-0600BL	30837664
7,00	8	63	16	25	0,35	5	M3985-0700BL	30837665
8,00	8	63	19	25	0,40	5	M3985-0800BL	30837666
9,00	10	72	19	30	0,45	5	M3985-0900BL	30837667
10,00	10	72	22	30	0,50	5	M3985-1000BL	30837668
12,00	12	83	26	36	0,60	5	M3985-1200BL	30837669
14,00	14	83	26	36	0,70	5	M3985-1400BL	30837670
16,00	16	92	32	42	0,80	5	M3985-1600BL	30837671
18,00	18	92	32	42	0,90	5	M3985-1800BL	30837672
20,00	20	104	38	52	1,00	5	M3985-2000BL	30837673
25,00	25	125	50	65	1,25	5	M3985-2500BL	30882074

Dimensions in mm.

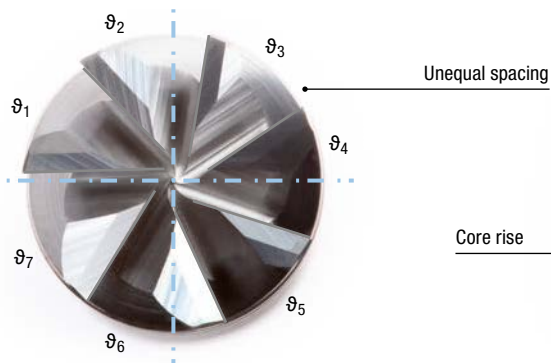
For cutting data recommendation, see end of section.

Special designs and other coatings on request.



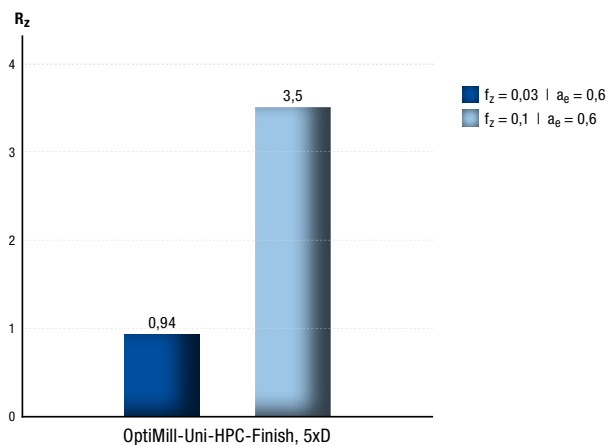
OptiMill®-Uni-HPC-Finish

Highest surface quality at large cutting depths



Roughness at machining 42CrMoS4

$v_c = 260 \text{ m/min}$



AT A GLANCE

- New high-performance finishing end mills
- Adapted flute profile with 7 cutting edges
- New substrate with toughness and bending strength
- Material removal rates of up to $a_p = 5xD$ possible
- Designs:
 - 2xD (M3917-2D)
 - 3xD (M3917-3D)
 - 4xD (M3917-4D)
 - 5xD (M3917-5D)
- In the diameter range from 4.00 to 25.00 mm

ADVANTAGES

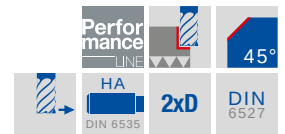
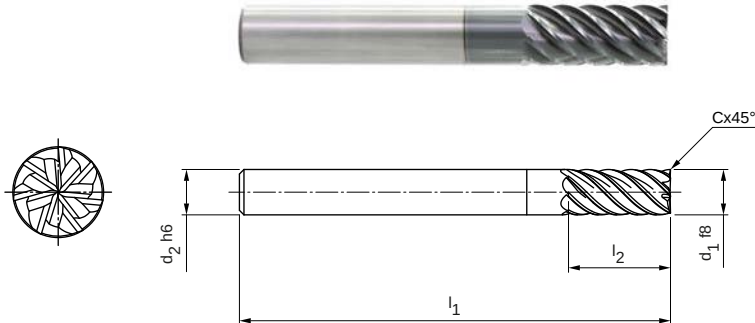
- Less vibration
- Smoother running
- Maximum v_f with optimum chip transport at the same time
- Usage of the complete cutting edge length
- Highest cost-effectiveness

OptiMill®-Uni-HPC-Finish

Design 2xD
M3917

Design:

Milling cutter diameter: 4.00 - 25.00 mm
Coating: MF3
Number of cutting edges: 7
Helix angle: 45°
Special features: Unequal spacing



Dimensions					z	Order designation	Order No.
d ₁ f8	d ₂ h6	l ₁	l ₂	C x 45°			
4,00	6	57	11	0,04	7	M3917-2D-0400AY-C0004	30887629
5,00	6	57	13	0,05	7	M3917-2D-0500AY-C0005	30887631
6,00	6	57	13	0,06	7	M3917-2D-0600AY-C0006	30887632
8,00	8	63	19	0,08	7	M3917-2D-0800AY-C0008	30887633
10,00	10	72	22	0,10	7	M3917-2D-1000AY-C0010	30887634
12,00	12	83	26	0,12	7	M3917-2D-1200AY-C0012	30887635
14,00	14	83	26	0,14	7	M3917-2D-1400AY-C0014	30887636
16,00	16	92	32	0,16	7	M3917-2D-1600AY-C0016	30887637
18,00	18	92	32	0,18	7	M3917-2D-1800AY-C0018	30887638
20,00	20	104	41	0,20	7	M3917-2D-2000AY-C0020	30887639
25,00	25	125	50	0,25	7	M3917-2D-2500AY-C0025	30887640

Dimensions in mm.

For cutting data recommendation, see end of section.

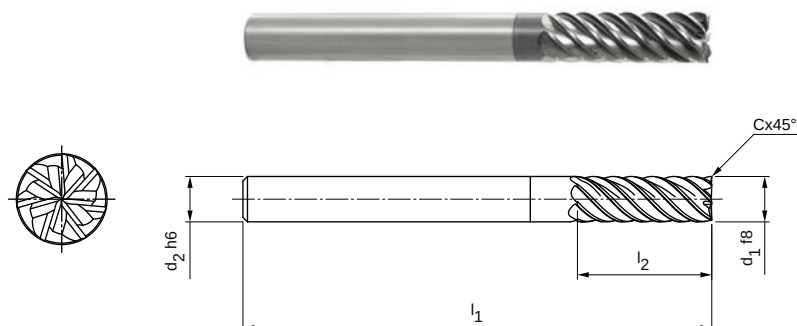
Special designs and other coatings on request.

OptiMill®-Uni-HPC-Finish

Design 3xD
M3917

Design:

Milling cutter diameter: 4.00 - 25.00 mm
Coating: MF3
Number of cutting edges: 7
Helix angle: 45°
Special features: Unequal spacing



Dimensions					z	Order designation	Order No.
d ₁ f8	d ₂ h6	l ₁	l ₂	C x 45°			
4,00	6	62	16	0,04	7	M3917-3D-0400AY-C0004	30887641
5,00	6	62	17	0,05	7	M3917-3D-0500AY-C0005	30887642
6,00	6	62	18	0,06	7	M3917-3D-0600AY-C0006	30887643
8,00	8	68	24	0,08	7	M3917-3D-0800AY-C0008	30887644
10,00	10	80	30	0,10	7	M3917-3D-1000AY-C0010	30887645
12,00	12	93	36	0,12	7	M3917-3D-1200AY-C0012	30887646
14,00	14	99	42	0,14	7	M3917-3D-1400AY-C0014	30887647
16,00	16	108	48	0,16	7	M3917-3D-1600AY-C0016	30887648
18,00	18	117	54	0,18	7	M3917-3D-1800AY-C0018	30887649
20,00	20	126	60	0,20	7	M3917-3D-2000AY-C0020	30887650
25,00	25	150	75	0,25	7	M3917-3D-2500AY-C0025	30887651

Dimensions in mm.

For cutting data recommendation, see end of section.

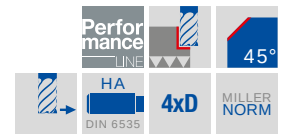
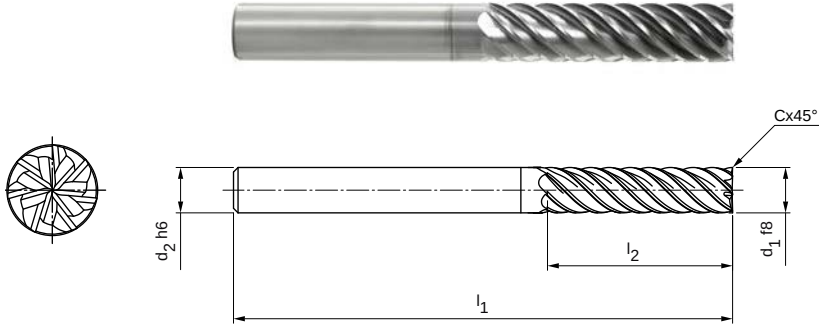
Special designs and other coatings on request.

OptiMill®-Uni-HPC-Finish

Design 4xD
M3917

Design:

Milling cutter diameter: 6.00 - 25.00 mm
Coating: MF3
Number of cutting edges: 7
Helix angle: 45°
Special features: Unequal spacing



Dimensions					z	Order designation	Order No.
d ₁ f8	d ₂ h6	l ₁	l ₂	C x 45°			
6,00	6	66	24	0,06	7	M3917-4D-0600AY-C0006	30887652
8,00	8	74	32	0,08	7	M3917-4D-0800AY-C0008	30887653
10,00	10	89	40	0,10	7	M3917-4D-1000AY-C0010	30887654
12,00	12	100	48	0,12	7	M3917-4D-1200AY-C0012	30887655
14,00	14	108	56	0,14	7	M3917-4D-1400AY-C0014	30887656
16,00	16	123	64	0,16	7	M3917-4D-1600AY-C0016	30887657
18,00	18	130	72	0,18	7	M3917-4D-1800AY-C0018	30887658
20,00	20	140	80	0,20	7	M3917-4D-2000AY-C0020	30887659
25,00	25	170	100	0,25	7	M3917-4D-2500AY-C0025	30887660

Dimensions in mm.

For cutting data recommendation, see end of section.

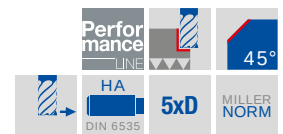
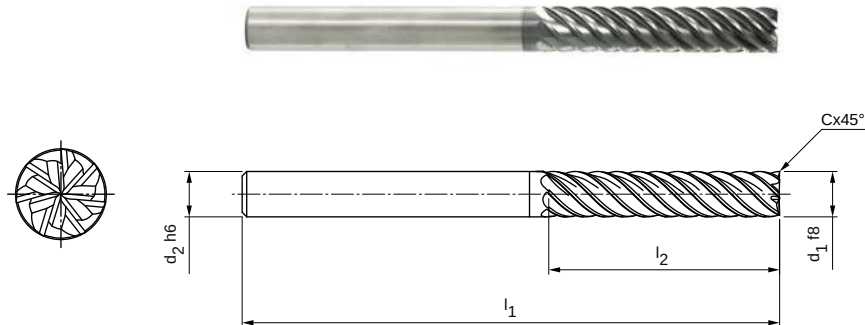
Special designs and other coatings on request.

OptiMill®-Uni-HPC-Finish

Design 5xD
M3917

Design:

Milling cutter diameter: 8.00 - 25.00 mm
Coating: MF3
Number of cutting edges: 7
Helix angle: 45°
Special features: Unequal spacing



Dimensions					z	Order designation	Order No.
d ₁ f8	d ₂ h6	l ₁	l ₂	C x 45°			
8,00	8	81	40	0,08	7	M3917-5D-0800AY-C0008	30887661
10,00	10	96	50	0,10	7	M3917-5D-1000AY-C0010	30887662
12,00	12	112	60	0,12	7	M3917-5D-1200AY-C0012	30887663
14,00	14	122	70	0,14	7	M3917-5D-1400AY-C0014	30887664
16,00	16	136	80	0,16	7	M3917-5D-1600AY-C0016	30887665
18,00	18	147	90	0,18	7	M3917-5D-1800AY-C0018	30887666
20,00	20	160	100	0,20	7	M3917-5D-2000AY-C0020	30887667
25,00	25	195	125	0,25	7	M3917-5D-2500AY-C0025	30887668

Dimensions in mm.

For cutting data recommendation, see end of section.

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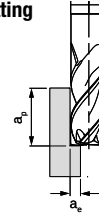
Gültig ab 01. Januar 2018 | Valid from 1 January 2018

Cutting data recommendation for shoulder milling cutters

Feed and cutting speed

Tool length/correction factor:	
Length	f_z & v_c
Short	1
Long	1
Overlong	0.8
Extra long	-

Part-contact cutting



$$a_p = 1.5 \times D$$

$$a_e = 0.25 \times D$$

OptiMill-Uni-HPC-Pocket | M3990, 3991, 3993

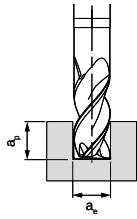
MMG*			Material	Strength/ hardness [N/mm²] [HRC]	Cooling			v _c [m/min]	f _z [mm/tooth]						
					MQL/air	Dry	Wet		Milling cutter diameter [mm]						
									6.00	8.00	10.00	12.00	16.00	20.00	
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700	✓	✓	✓	445	0.070	0.090	0.109	0.127	0.158	0.184	
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200	✓	✓	✓	365	0.065	0.084	0.101	0.118	0.148	0.171	
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloy	< 900	✓	✓	✓	405	0.070	0.090	0.109	0.127	0.158	0.184	
		P2.2	Nitrided, case hardened and heat-treated steels, alloy	< 1400	✓		✓	285	0.058	0.075	0.091	0.106	0.132	0.153	
	P3	P3.1	Tool, bearing, spring and high-speed steels	< 900	✓	✓	✓	265	0.066	0.085	0.103	0.120	0.151	0.174	
		P3.2	Tool, bearing, spring and high-speed steels	< 1500	✓		✓	225	0.060	0.078	0.094	0.110	0.137	0.159	
	P4	P4.1	Stainless steels, ferritic and martensitic		✓		✓	180	0.046	0.060	0.072	0.084	0.106	0.122	
	P5	P5.1	Cast steel				✓	270	0.067	0.087	0.105	0.122	0.153	0.177	
P6	P6.1	Stainless cast steel, ferritic and martensitic				✓	180	0.033	0.042	0.051	0.059	0.074	0.086		
M	M1	M1.1	Stainless steels, austenitic	< 700	✓		✓	120	0.041	0.052	0.063	0.074	0.092	0.107	
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000			✓	115	0.034	0.043	0.053	0.061	0.077	0.089	
	M2	M2.1	Stainless cast steel, austenitic	< 700	✓		✓	135	0.044	0.057	0.069	0.080	0.100	0.116	
	M3	M3.1	Stainless cast steel, ferritic/austenitic (duplex)	< 1000			✓	120	0.035	0.045	0.054	0.063	0.079	0.092	
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	✓	✓	✓	485	0.116	0.149	0.181	0.211	0.264	0.306	
		K2.1	Cast iron with spheroidal graphite, GJS	< 500	✓	✓	✓	445	0.099	0.127	0.154	0.179	0.224	0.260	
	K2	K2.2	Cast iron with spheroidal graphite, GJS	500-800	✓	✓	✓	365	0.081	0.105	0.127	0.148	0.185	0.214	
		K2.3	Cast iron with spheroidal graphite, GJS	> 800	✓	✓	✓	200	0.046	0.060	0.072	0.084	0.106	0.122	
	K3	K3.1	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500	✓	✓	✓	325	0.081	0.105	0.127	0.148	0.185	0.214	
		K3.2	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500	✓	✓	✓	305	0.070	0.090	0.109	0.127	0.158	0.184	

Note:

The cutting data stated are indicative.

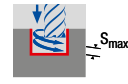
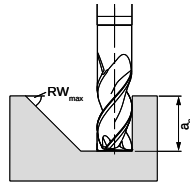
The optimal data for the specific machining case should be determined in trials or during the machining.

Full cut



$$a_p = 1 \times D$$

$$a_e = 1 \times D$$



	v_c [m/min]	f_z [mm/tooth]						Ramping	Helix milling			Drilling
		Milling cutter diameter [mm]						RW_{max}	S_{max}	EW_{max}		f_z factor
		6.00	8.00	10.00	12.00	16.00	20.00			G = 1.5	G = 1.8	
	220	0.041	0.053	0.064	0.075	0.093	0.108	45°	0.75xD	25°	16°	0.90
	180	0.038	0.049	0.060	0.070	0.087	0.101	45°	0.75xD	25°	16°	0.80
	200	0.041	0.053	0.064	0.075	0.093	0.108	45°	0.75xD	25°	16°	0.80
	140	0.034	0.044	0.053	0.062	0.078	0.090	45°	0.75xD	25°	16°	0.70
	130	0.039	0.050	0.061	0.071	0.089	0.103	30°	0.5xD	18°	11°	0.80
	110	0.036	0.046	0.056	0.065	0.081	0.094	30°	0.5xD	18°	11°	0.70
	90	0.027	0.035	0.043	0.050	0.062	0.072	15°	0.5xD	18°	11°	
	135	0.040	0.051	0.062	0.072	0.090	0.105	30°	0.5xD	18°	11°	
	90	0.019	0.025	0.030	0.035	0.044	0.051	15°	0.5xD	18°	11°	
	60	0.024	0.031	0.037	0.044	0.054	0.063	15°	0.5xD	18°	11°	
	55	0.020	0.026	0.031	0.036	0.045	0.052	15°	0.5xD	18°	11°	
	65	0.026	0.033	0.041	0.047	0.059	0.069	15°	0.5xD	18°	11°	
	60	0.021	0.026	0.032	0.037	0.047	0.054	15°	0.5xD	18°	11°	
	240	0.068	0.088	0.107	0.124	0.156	0.180	45°	0.75xD	25°	16°	0.80
	220	0.058	0.075	0.091	0.106	0.132	0.153	45°	0.75xD	25°	16°	0.80
	180	0.048	0.062	0.075	0.087	0.109	0.126	45°	0.75xD	25°	16°	0.80
	100	0.027	0.035	0.043	0.050	0.062	0.072	45°	0.75xD	25°	16°	0.80
	160	0.048	0.062	0.075	0.087	0.109	0.126	45°	0.75xD	25°	16°	0.80
	150	0.041	0.053	0.064	0.075	0.093	0.108	45°	0.75xD	25°	16°	0.80

Terminology:

RW_{max} = Maximum angle of the ramp

S_{max} = Maximum pitch on the helix

G = Ratio of circular pocket $\emptyset$ on plunging to the tool $\emptyset$

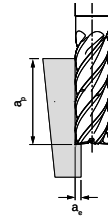
Example: Tool $\emptyset$ 12 mm at G=1.5 gives pocket $\emptyset$ of 18 mm

EW_{max} = Pitch angle of the helix (given by G and S_{max})

Cutting data recommendation for shoulder milling cutters

Feed and cutting speed

Trochoidal milling



OptiMill-Uni-Wave | M3980, 3985

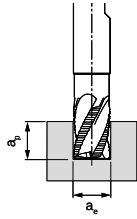
MMG*			Material	Strength/ hardness [N/mm²] [HRC]	Cooling			v _c [m/min]	f _z [mm/tooth] in % of D	a _e [mm] in % of D	h _m [mm] in % of D	
					MQL/air	Dry	Wet					
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700	✓	✓	✓	On request				
		P1.2	Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200	✓	✓	✓					
	P2	P2.1	Nitrided, case hardened and heat-treated steels, alloy	< 900	✓	✓	✓					
		P2.2	Nitrided, case hardened and heat-treated steels, alloy	< 1400	✓		✓					
	P3	P3.1	Tool, bearing, spring and high-speed steels	< 900	✓	✓	✓					
		P3.2	Tool, bearing, spring and high-speed steels	< 1500	✓		✓					
	P4	P4.1	Stainless steels, ferritic and martensitic		✓		✓					
	P5	P5.1	Cast steel				✓					
P6	P6.1	Stainless cast steel, ferritic and martensitic				✓						
M	M1	M1.1	Stainless steels, austenitic	< 700	✓		✓	On request				
		M1.2	Stainless steels, ferritic/austenitic (duplex)	< 1000			✓					
	M2	M2.1	Stainless cast steel, austenitic	< 700	✓		✓					
	M3	M3.1	Stainless cast steel, ferritic/austenitic (duplex)	< 1000			✓					
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), GJL	< 300	✓	✓	✓	On request				
		K2.1	Cast iron with spheroidal graphite, GJS	< 500	✓	✓	✓					
	K2	K2.2	Cast iron with spheroidal graphite, GJS	500-800	✓	✓	✓					
		K2.3	Cast iron with spheroidal graphite, GJS	> 800	✓	✓	✓					
	K3	K3.1	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500	✓	✓	✓					
		K3.2	Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500	✓	✓	✓					

Note:

The cutting data stated are indicative.

The optimal data for the specific machining case should be determined in trials or during the machining.

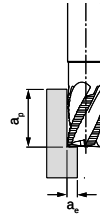
Groove milling



$$a_p = 1 \times D$$

$$a_e = 1 \times D$$

Roughing



$$a_p = 1.5 \times D$$

$$a_e = 0.25 \times D$$

	v _c [m/min]	f _z [mm/tooth]							v _c [m/min]	f _z [mm/tooth]						
		Milling cutter diameter [mm]								Milling cutter diameter [mm]						
		6.00	8.00	10.00	12.00	16.00	20.00	25.00		6.00	8.00	10.00	12.00	16.00	20.00	25.00
	200	0.036	0.046	0.056	0.066	0.082	0.095	0.106	405	0.061	0.079	0.096	0.111	0.139	0.162	0.179
	160	0.034	0.043	0.053	0.061	0.077	0.089	0.098	330	0.057	0.074	0.089	0.104	0.130	0.151	0.167
	180	0.036	0.046	0.056	0.066	0.082	0.095	0.106	370	0.061	0.079	0.096	0.111	0.139	0.162	0.179
	125	0.030	0.039	0.047	0.055	0.068	0.079	0.088	260	0.051	0.066	0.080	0.093	0.116	0.135	0.149
	115	0.034	0.044	0.054	0.062	0.078	0.090	0.100	240	0.058	0.075	0.091	0.106	0.132	0.153	0.170
	100	0.031	0.040	0.049	0.057	0.071	0.083	0.091	200	0.053	0.068	0.083	0.097	0.121	0.140	0.155
	80	0.024	0.031	0.038	0.044	0.055	0.063	0.070	165	0.041	0.053	0.064	0.074	0.093	0.108	0.119
	120	0.035	0.045	0.054	0.063	0.079	0.092	0.102	245	0.059	0.076	0.092	0.108	0.135	0.156	0.173
	80	0.017	0.022	0.026	0.031	0.038	0.044	0.049	165	0.029	0.037	0.045	0.052	0.065	0.075	0.084
	55	0.021	0.027	0.033	0.038	0.048	0.056	0.062	110	0.036	0.046	0.056	0.065	0.081	0.094	0.104
	50	0.017	0.022	0.027	0.032	0.040	0.046	0.051	105	0.030	0.038	0.046	0.054	0.067	0.078	0.087
	60	0.023	0.029	0.036	0.042	0.052	0.060	0.067	120	0.039	0.050	0.061	0.071	0.088	0.102	0.113
	55	0.018	0.023	0.028	0.033	0.041	0.048	0.053	110	0.031	0.039	0.048	0.056	0.070	0.081	0.090
	215	0.060	0.077	0.094	0.109	0.137	0.159	0.176	440	0.102	0.131	0.159	0.186	0.232	0.269	0.298
	200	0.051	0.066	0.080	0.093	0.116	0.135	0.149	405	0.087	0.112	0.135	0.158	0.198	0.229	0.254
	160	0.042	0.054	0.066	0.077	0.096	0.111	0.123	330	0.072	0.092	0.112	0.130	0.163	0.189	0.209
	90	0.024	0.031	0.038	0.044	0.055	0.063	0.070	185	0.041	0.053	0.064	0.074	0.093	0.108	0.119
	145	0.042	0.054	0.066	0.077	0.096	0.111	0.123	295	0.072	0.092	0.112	0.130	0.163	0.189	0.209
	135	0.036	0.046	0.056	0.066	0.082	0.095	0.106	275	0.061	0.079	0.096	0.111	0.139	0.162	0.179

Cutting data recommendation for shoulder milling cutters

Feed and cutting speed

Factors for tool lengths 3xD/4xD/5xD **

Max. machining depth a_p	a_e max.	Correction factor	
		v_c	f_z
3xD	0,1xD	0,9	0,9
4xD	0,05xD	0,9	0,7
5xD	0,05xD	0,8	0,6

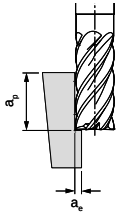
OptiMill-Uni-HPC-Finish | M3917

MMG*		Material	Strength/hardness [N/mm ²] [HRC]	Cooling			
				MQL/air	Dry	Wet	
P	P1	P1.1 Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 700	✓	✓	✓	
		P1.2 Structural, free-cutting, case hardened and heat-treated steels, non-alloy	< 1200	✓	✓	✓	
	P2	P2.1 Nitrided, case hardened and heat-treated steels, alloy	< 900	✓	✓	✓	
		P2.2 Nitrided, case hardened and heat-treated steels, alloy	< 1400	✓	✓	✓	
	P3	P3.1 Tool, bearing, spring and high-speed steels	< 900	✓	✓	✓	
		P3.2 Tool, bearing, spring and high-speed steels	< 1500	✓		✓	
	P4	P4.1 Stainless steels, ferritic and martensitic		✓		✓	
	P5	P5.1 Cast steel				✓	
	P6	P6.1 Stainless cast steel, ferritic and martensitic				✓	
M	M1	M1.1 Stainless steels, austenitic	< 700	✓		✓	
		M1.2 Stainless steels, ferritic/austenitic (duplex)	< 1000			✓	
	M2	M2.1 Stainless cast steel, austenitic	< 700	✓		✓	
	M3	M3.1 Stainless cast steel, ferritic/austenitic (duplex)	< 1000			✓	
K	K1	K1.1 Cast iron with lamellar graphite (grey cast iron), GJL	< 300	✓	✓	✓	
		K2.1 Cast iron with spheroidal graphite, GJS	< 500	✓	✓	✓	
	K2	K2.2 Cast iron with spheroidal graphite, GJS	500-800	✓	✓	✓	
		K2.3 Cast iron with spheroidal graphite, GJS	> 800	✓	✓	✓	
	K3	K3.1 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	< 500	✓	✓	✓	
		K3.2 Cast iron with spheroidal graphite, GJV; malleable cast iron, GJM	> 500	✓	✓	✓	

* MILLER machining groups

** For very good surface finish results, the feed must be further reduced!

Finishing



$$a_p = 1.5xD$$

$$a_e = 0.1xD$$

	v_c [m/min]	f_z [mm/tooth]							
		Milling cutter diameter [mm]							
		4.00	6.00	8.00	10.00	12.00	16.00	20.00	25.00
	475	0.040	0.057	0.074	0.089	0.104	0.130	0.151	0.167
	390	0.038	0.053	0.069	0.083	0.097	0.122	0.141	0.156
	430	0.040	0.057	0.074	0.089	0.104	0.130	0.151	0.167
	300	0.034	0.048	0.061	0.074	0.087	0.109	0.126	0.139
	280	0.038	0.054	0.070	0.085	0.099	0.124	0.143	0.159
	240	0.035	0.050	0.064	0.077	0.090	0.113	0.131	0.145
	195	0.027	0.038	0.049	0.060	0.069	0.087	0.101	0.111
	290	0.039	0.055	0.071	0.086	0.101	0.126	0.146	0.162
	195	0.019	0.027	0.034	0.042	0.049	0.061	0.070	0.078
	130	0.023	0.033	0.043	0.052	0.061	0.076	0.088	0.098
	120	0.019	0.028	0.036	0.043	0.050	0.063	0.073	0.081
	145	0.025	0.036	0.047	0.057	0.066	0.083	0.096	0.106
	130	0.020	0.029	0.037	0.045	0.052	0.065	0.075	0.084
	520	0.067	0.095	0.123	0.149	0.174	0.217	0.252	0.279
	475	0.057	0.081	0.104	0.127	0.147	0.185	0.214	0.237
	390	0.047	0.067	0.086	0.104	0.121	0.152	0.176	0.195
	215	0.027	0.038	0.049	0.060	0.069	0.087	0.101	0.111
	345	0.047	0.067	0.086	0.104	0.121	0.152	0.176	0.195
	325	0.040	0.057	0.074	0.089	0.104	0.130	0.151	0.167

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