



Your technology partner for cost-effective machining

MICRO DRILLING

MICRO-Drill-Steel

Durchmesser ab 0,80 mm mit Innenkühlung bohren

Der MICRO-Drill-Steel wurde speziell für die effiziente Bearbeitung kleiner Bohrungen in Stahl entwickelt. Er bietet dank seiner vier Führungsfasen optimale Führungseigenschaften und Stabilität. Die Geometrie und die Nutform mit Kernverjüngung ermöglicht idealen Spanabtransport, auch bei zähen Stählen. Höchste Performance und Standwege sind dank neuer Schneidstoffkombination und angepasster Mikrogeometrien gewährleistet.

1 Vier Führungsfasen

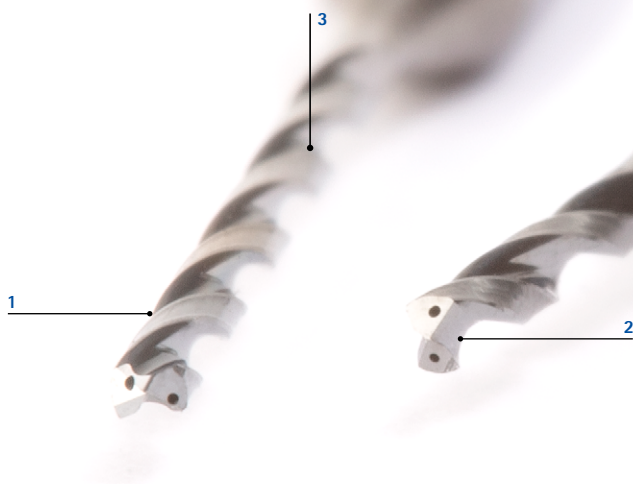
- Für verbesserte Führungseigenschaften und Stabilität

2 Nutform mit Kernverjüngung

- Idealer Abtransport der Späne auch bei zähen Stahlwerkstoffen

3 Neue Schneidstoffkombination

- Höchste Performance
- Verbesserter Standweg



Merkmale

Baumaße:

- Schneidenanzahl: 2
- Schaftform: HA
- Innere Kühlmittelzufuhr

Lagerhaltige Vorzugsbaureihe:

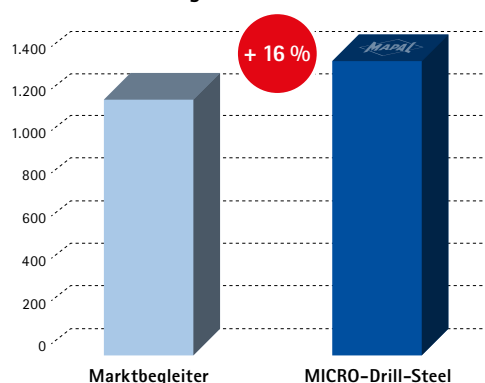
- $\varnothing$ -Bereich: 0,80 bis 2,80 mm

Konfigurierbare Merkmale:

- $\varnothing$ -Bereich: 0,80 bis 2,99 mm

Standzeitvergleich MICRO-Drill-Steel

Anzahl der Bohrungen:



MICRO-Drill-Steel 5xD
 Werkstoff: ST52 (1.0570)
 Werkzeug- $\varnothing$: 1,00 mm
 v_c : 60 m/min
 f_u : 0,030 mm/U

MICRO-Deep-Drill

Tiefbohrer auch für kleinste Durchmesser

Die Geometrie des Micro-Deep-Drill wurde speziell auf den kleinen Durchmesserbereich angepasst. Dank neu gestalteter Spannuten und besonderem Stirnanschliff sind höchste Vorschübe und Schnittgeschwindigkeiten beim Tiefbohren realisierbar. Dank der innovativen Kühlkanalführung sind die Bohrer auch für den Einsatz der Minimalmengenschmierung geeignet. Trotz Längen bis 30xD gelangt das Gas-Öl-Gemisch prozesssicher bis an die Schneiden. Statt einer Vollbeschichtung sind die neuen Werkzeuge für mehr Wirtschaftlichkeit lediglich am Kopf beschichtet.

1 Kopfbeschichtung

- Wirtschaftliche Beschichtung für mehr Standzeit

2 Innovative Kühlkanalführung

- Geeignet für Minimalmengenschmierung

3 Neu gestaltete Spannuten

- Höchste Vorschübe und Schnittgeschwindigkeiten



Merkmale

Baumaße:

- Schneidenanzahl: 2
- Schaftform: HA
- Innere Kühlmittelzufuhr

Lagerhaltige Vorzugsbaureihe:

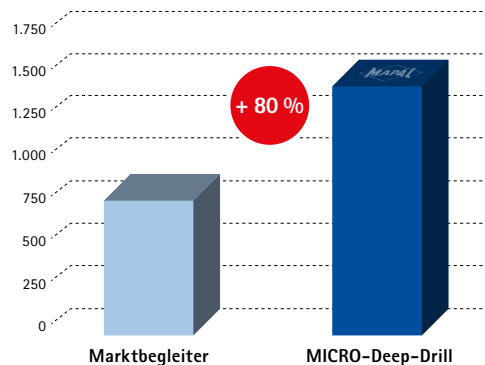
- $\varnothing$ -Bereich: 1,00 bis 2,90 mm

Konfigurierbare Merkmale:

- $\varnothing$ -Bereich: 1,00 bis 2,99 mm

Standzeitvergleich MICRO-Deep-Drill

Anzahl der Bohrungen:



MICRO-Deep-Drill 30xD
 Werkstoff: 42CrMo4
 Nenn- $\varnothing$: 2,50 mm
 v_c : 80 m/min
 f_u : 0,060 mm/U

MICRO-Step-Drill-Steel

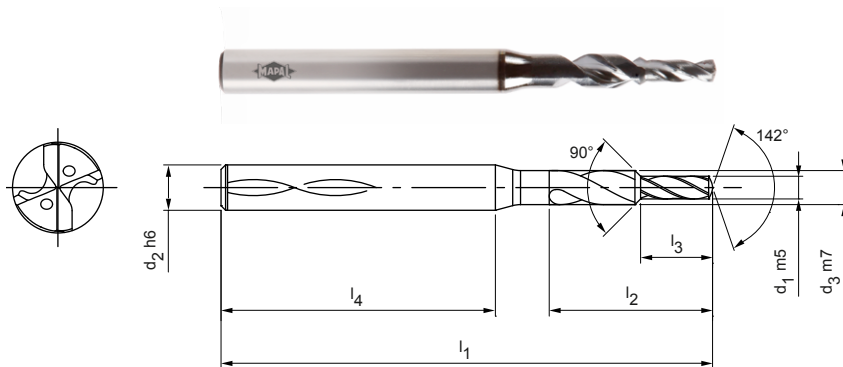
Solid carbide step drill
SCD581, internal coolant supply

Design:

Drill diameter: 1.00 – 3.00 mm
Bore tolerance: IT9 (achievable)
Cutting material: HP246
Number of cutting edges: 2
Number of guiding chamfers: 2
Tip angle: 142°

Application:

Pilot drill specially adapted to MICRO-Deep-Drill.
Can be used to a maximum of < 3.00 mm diameter
with countersink step for optimum insertion of
the following deep drill.



Dimensions							Shank form HA	
d ₁ m5	d ₂ h6	d ₃ m7	l ₁	l ₂	l ₃	l ₄	Specification	Order No.
1,00	3,00	1,50	50	7,2	3,0	38	SCD581-0100-2-2-142HA-HP246	31080870
1,10	3,00	1,65	50	7,9	3,3	37,5	SCD581-0110-2-2-142HA-HP246	31080871
1,20	3,00	1,80	50	8,6	3,6	36,9	SCD581-0120-2-2-142HA-HP246	31080872
1,30	3,00	1,95	50	9,4	3,9	36,3	SCD581-0130-2-2-142HA-HP246	31080873
1,40	3,00	2,10	50	10,1	4,2	35,7	SCD581-0140-2-2-142HA-HP246	31080874
1,50	3,00	2,25	50	10,8	4,5	35,1	SCD581-0150-2-2-142HA-HP246	31080875
1,60	3,00	2,40	50	11,5	4,8	34,6	SCD581-0160-2-2-142HA-HP246	31080876
1,70	3,00	2,55	50	12,2	5,1	34	SCD581-0170-2-2-142HA-HP246	31080877
1,80	3,00	2,70	50	13,0	5,4	33,4	SCD581-0180-2-2-142HA-HP246	31080878
1,90	4,00	2,85	55	13,7	5,7	35,9	SCD581-0190-2-2-142HA-HP246	31080879
2,00	4,00	3,00	55	14,4	6,0	35,3	SCD581-0200-2-2-142HA-HP246	31080880
2,10	4,00	3,15	55	15,1	6,3	34,8	SCD581-0210-2-2-142HA-HP246	31080881
2,20	4,00	3,30	55	15,8	6,6	34,2	SCD581-0220-2-2-142HA-HP246	31080882
2,30	4,00	3,45	55	16,6	6,9	33,6	SCD581-0230-2-2-142HA-HP246	31080883
2,40	4,00	3,60	55	17,3	7,2	33	SCD581-0240-2-2-142HA-HP246	31080884
2,50	4,00	3,75	55	18,0	7,5	32,4	SCD581-0250-2-2-142HA-HP246	31080885
2,60	6,00	3,90	66	18,7	7,8	39,1	SCD581-0260-2-2-142HA-HP246	31080886
2,70	6,00	4,05	66	19,4	8,1	38,5	SCD581-0270-2-2-142HA-HP246	31080887
2,80	6,00	4,20	66	20,2	8,4	37,9	SCD581-0280-2-2-142HA-HP246	31080888
2,90	6,00	4,35	66	20,9	8,7	37,4	SCD581-0290-2-2-142HA-HP246	31080889
3,00	6,00	4,50	66	21,6	9,0	36,8	SCD581-0300-2-2-142HA-HP246	31080890

Dimensions in mm.

For recommended cutting values, see page 12/13.

Special designs and other coatings on request.

MICRO-Drill-Steel

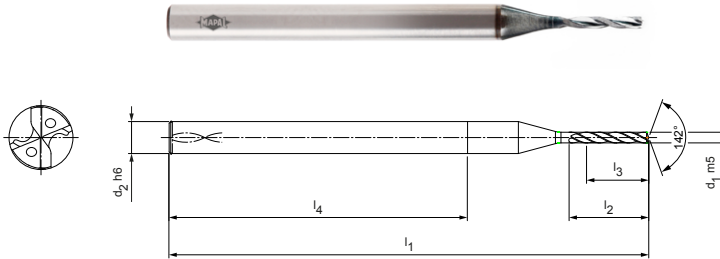
Solid carbide twist drill
SCD371 (5xD), internal coolant supply

Design:

Drill diameter: 0.80 – 2.99 mm
Bore tolerance: IT9 (achievable)
Cutting material: HP246
Number of cutting edges: 2
Number of guiding chamfers: 4
Tip angle: 142°
Helix angle: 30°

Application:

Spotting drill specifically designed for the MICRO-Deep-Drill.
Maximum use up to < diameter 3.00 mm.



Stocked preferred series in shank form HA

Dimensions						Shank form HA	
d ₁ m5	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Specification	Order no.
0,80	3	45	6	4	28	SCD371-0080-2-4-142HA05-HP246	31238823
1,00	3	45	7,5	5	28	SCD371-0100-2-4-142HA05-HP246	31238825
1,10	3	45	8,3	5	28	SCD371-0110-2-4-142HA05-HP246	31238826
1,20	3	45	9	6	28	SCD371-0120-2-4-142HA05-HP246	31238827
1,50	3	45	11,3	7,5	28	SCD371-0150-2-4-142HA05-HP246	31238890
1,60	3	50	12	8	28	SCD371-0160-2-4-142HA05-HP246	31238891
1,70	3	50	12,8	8	28	SCD371-0170-2-4-142HA05-HP246	31238892
1,80	3	50	13,5	8	28	SCD371-0180-2-4-142HA05-HP246	31238893
1,90	3	50	14,3	9,5	28	SCD371-0190-2-4-142HA05-HP246	31238894
2,00	3	50	15	10	28	SCD371-0200-2-4-142HA05-HP246	31238895
2,10	3	50	28	9,5	28	SCD371-0210-2-4-142HA05-HP246	31238896
2,20	3	52	16,5	11	28	SCD371-0220-2-4-142HA05-HP246	31238897
2,40	3	52	18	12	28	SCD371-0240-2-4-142HA05-HP246	31238899
2,50	3	52	18,8	12,5	28	SCD371-0250-2-4-142HA05-HP246	31238900
2,60	3	55	19,5	13	28	SCD371-0260-2-4-142HA05-HP246	31238901
2,70	3	55	20,3	13	28	SCD371-0270-2-4-142HA05-HP246	31238902
2,80	3	55	21	14	28	SCD371-0280-2-4-142HA05-HP246	31238903
2,90	3	55	21,8	13	28	SCD371-0290-2-4-142HA05-HP246	31238904

Configurable features



Diameter:
Diameter in increments of
0.01 mm freely selectable



Specification:

SCD371-[diameter]-2-4-142HA05-HP246

Example:

SCD371-0221-2-4-142HA05-HP246

Tool diameter d₁ = 2.21 mm

Dimensions of configurable series

d ₁ min.	d ₁ max.	d ₂ h6	l ₁	l ₂	l ₃	l ₄
0,80	0,99	3	45	l ₂ = l ₃ x 1.5	l ₃ = d ₁ x Drill depth	28
1,00	1,29	3	45			28
1,30	1,59	3	45			28
1,60	1,89	3	50			28
1,90	2,19	3	50			28
2,20	2,59	3	52			28
2,60	2,99	3	55			28

Dimensions in mm.

For recommended cutting values, see page 12/13.

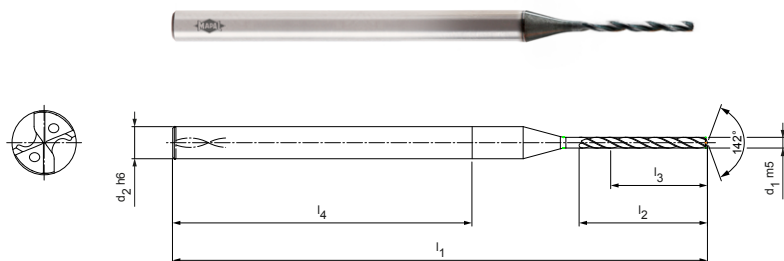
Special designs and other coatings on request.

MICRO-Drill-Steel

Solid carbide twist drill
SCD371 (8xD), internal coolant supply

Design:

Drill diameter: 1.00 – 2.99 mm
Bore tolerance: IT9 (achievable)
Cutting material: HP246
Number of cutting edges: 2
Number of guiding chamfers: 4
Tip angle: 142°
Helix angle: 30°



Stocked preferred series in shank form HA

Dimensions						Shank form HA	
d ₁ m5	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Specification	Order no.
1,00	3	50	12	8	28	SCD371-0100-2-4-142HA08-HP246	31238905
1,20	3	50	14,4	9,6	28	SCD371-0120-2-4-142HA08-HP246	31238907
1,50	3	52	18	12	28	SCD371-0150-2-4-142HA08-HP246	31238910
1,60	3	55	19,2	12,8	28	SCD371-0160-2-4-142HA08-HP246	31238911
1,80	3	55	21,6	12,8	28	SCD371-0180-2-4-142HA08-HP246	31238913
1,90	3	60	22,8	15,2	28	SCD371-0190-2-4-142HA08-HP246	31238914
2,00	3	60	24	16	28	SCD371-0200-2-4-142HA08-HP246	31238915
2,10	3	60	25,2	15,2	28	SCD371-0210-2-4-142HA08-HP246	31238916
2,20	3	62	26,4	17,6	28	SCD371-0220-2-4-142HA08-HP246	31238917
2,50	3	62	30	20	28	SCD371-0250-2-4-142HA08-HP246	31238920
2,80	3	66	33,6	20,8	28	SCD371-0280-2-4-142HA08-HP246	31238923
2,90	3	66	34,8	20,8	28,0	SCD371-0290-2-4-142HA08-HP246	31238924

Configurable features



Diameter:
Diameter in increments of
0.01 mm freely selectable



Specification:

SCD371-[diameter]-2-4-142HA08-HP246

Example:

SCD371-0221-2-4-142HA08-HP246

Tool diameter d₁ = 2.21 mm

Dimensions of configurable series

d ₁ min.	d ₁ max.	d ₂ h6	l ₁	l ₂	l ₃	l ₄
1,00	1,29	3	50	l ₂ = l ₃ x 1.5	l ₃ = d ₁ x Drill depth	28
1,30	1,59	3	52			28
1,60	1,89	3	55			28
1,90	2,19	3	60			28
2,20	2,59	3	62			28
2,60	2,99	3	66			28

Dimensions in mm.

For recommended cutting values, see page 12/13.

Special designs and other coatings on request.

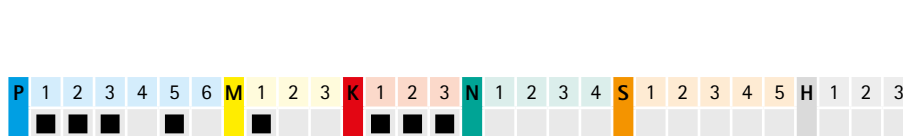
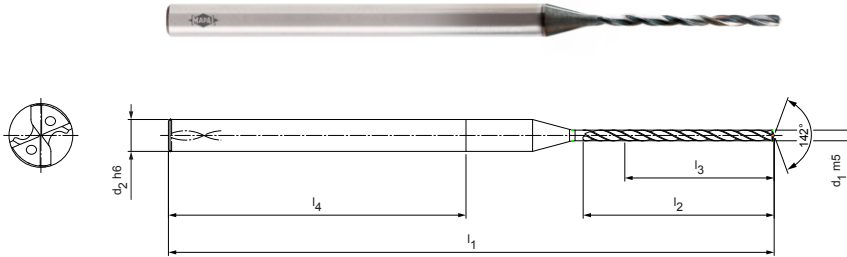
MICRO-Drill-Steel

Solid carbide twist drill

SCD371 (12xD), internal coolant supply

Design:

Drill diameter:	1.00 – 2.99 mm
Bore tolerance:	IT9 (achievable)
Cutting material:	HP246
Number of cutting edges:	2
Number of guiding chamfers:	4
Tip angle:	142°
Helix angle:	30°



Stocked preferred series in shank form HA

Dimensions						Shank form HA	
d ₁ m5	d ₂ h6	l ₁	l ₂	l ₃	l ₄	Specification	Order no.
1,00	3	57	18	12	28	SCD371-0100-2-4-142HA12-HP246	31238925
1,20	3	57	21,6	14,4	28	SCD371-0120-2-4-142HA12-HP246	31238927
1,30	3	62	23,4	15,6	28	SCD371-0130-2-4-142HA12-HP246	31238928
1,50	3	62	27	18	28	SCD371-0150-2-4-142HA12-HP246	31238930
2,00	3	72	36	24	28	SCD371-0200-2-4-142HA12-HP246	31238935
2,10	3	72	37,8	22,8	28	SCD371-0210-2-4-142HA12-HP246	31238936
2,50	3	79	45	30	28	SCD371-0250-2-4-142HA12-HP246	31238940
2,80	3	85	50,4	31,2	28	SCD371-0280-2-4-142HA12-HP246	31238943
2,90	3	85	52,2	31,2	28	SCD371-0290-2-4-142HA12-HP246	31238944

Configurable features



Diameter:

Diameter in increments of 0.01 mm freely selectable



Specification:

SCD371-[diameter]-2-4-142HA12-HP246

Example:

SCD371-0221-2-4-142HA12-HP246

Tool diameter d₁ = 2.21 mm

Dimensions of configurable series

d ₁ min.	d ₁ max.	d ₂ h6	l ₁	l ₂	l ₃	l ₄
1,00	1,29	3	57	l ₂ = l ₃ x 1.5	l ₃ = d ₁ x Drill depth	28
1,30	1,59	3	62			28
1,60	1,89	3	66			28
1,90	2,19	3	72			28
2,20	2,59	3	79			28
2,60	2,99	3	85			28

Dimensions in mm.

For recommended cutting values, see page 12/13.

Special designs and other coatings on request.

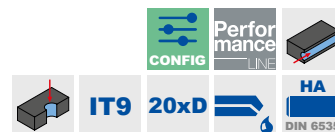
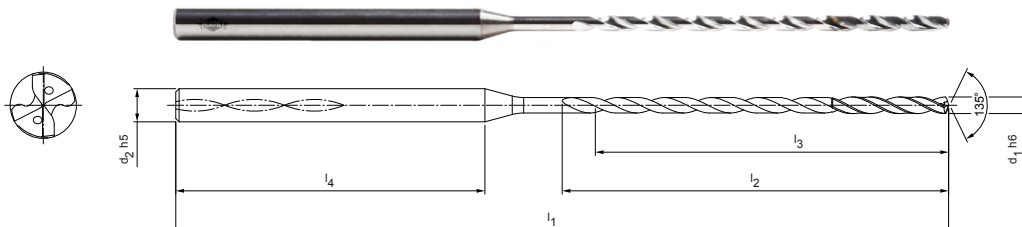
MICRO-Deep-Drill

Solid carbide twist drill

SCD171 (20xD), internal coolant supply

Design:

Drill diameter:	1.00 – 2.99 mm
Bore tolerance:	≥ IT9
Cutting material:	HP246
Number of cutting edges:	2
Number of guiding chamfers:	4
Tip angle:	135°
Helix angle:	30°



Dimensions							Shank form HA	
d ₁ h6	d ₂ h5	l ₁	l ₂	l ₃	L/d relation	l ₄	Specification	Order No.
1,00	3	62	27	25	25	28	SCD171-0100-2-4-135HA20-HP246	30998795
1,10	3	62	27	25	23	28	SCD171-0110-2-4-135HA20-HP246	30998796
1,20	3	62	27	25	21	28	SCD171-0120-2-4-135HA20-HP246	30998798
1,30	3	70	35	33	25	28	SCD171-0130-2-4-135HA20-HP246	30998799
1,40	3	70	35	32	23	28	SCD171-0140-2-4-135HA20-HP246	30998800
1,50	3	70	35	32	21	28	SCD171-0150-2-4-135HA20-HP246	30998801
1,60	3	75	41	38	24	28	SCD171-0160-2-4-135HA20-HP246	30998802
1,70	3	75	41	38	22	28	SCD171-0170-2-4-135HA20-HP246	30998803
1,80	3	75	41	38	21	28	SCD171-0180-2-4-135HA20-HP246	30998804
1,90	3	80	46	43	23	28	SCD171-0190-2-4-135HA20-HP246	30998805
2,00	3	80	46	43	22	28	SCD171-0200-2-4-135HA20-HP246	30998806
2,10	3	80	46	42	20	28	SCD171-0210-2-4-135HA20-HP246	30998807
2,20	3	90	55	51	23	28	SCD171-0220-2-4-135HA20-HP246	30998808
2,30	3	90	55	51	22	28	SCD171-0230-2-4-135HA20-HP246	30998809
2,40	3	90	55	51	21	28	SCD171-0240-2-4-135HA20-HP246	30998810
2,50	3	90	55	51	20	28	SCD171-0250-2-4-135HA20-HP246	30998811
2,60	3	100	66	62	24	28	SCD171-0260-2-4-135HA20-HP246	30998812
2,70	3	100	66	61	23	28	SCD171-0270-2-4-135HA20-HP246	30998813
2,80	3	100	66	61	22	28	SCD171-0280-2-4-135HA20-HP246	30998814
2,90	3	100	66	61	21	28	SCD171-0290-2-4-135HA20-HP246	30998815

Configurable features



Diameter:
Diameter in increments of
0.01 mm freely selectable



Specification:

SCD171-[diameter]-2-4-135HA20-HP246

Example:

SCD171-0221-2-4-135HA20-HP246

Tool diameter d₁ = 2.21 mm

Dimensions of configurable series

d ₁ h6	d ₂ h5	l ₁	l ₂	l ₃	l ₄
1,00 - 1,20	3	62	27	25	28
1,21 - 1,50	3	70	35	32	28
1,51 - 1,80	3	75	41	38	28
1,81 - 2,10	3	80	46	42	28
2,11 - 2,50	3	90	55	51	28
2,51 - 2,99	3	100	66	61	28

Dimensions in mm.

For recommended cutting values, see page 14/15.

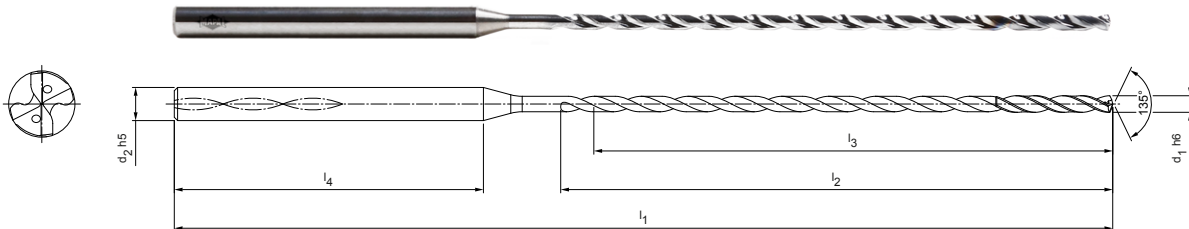
Special designs and other coatings on request.

MICRO-Deep-Drill

Solid carbide twist drill
SCD171 (30xD), internal coolant supply

Design:

Drill diameter: 1.00 – 2.99 mm
Bore tolerance: $\geq$ IT9
Cutting material: HP246
Number of cutting edges: 2
Number of guiding chamfers: 4
Tip angle: 135°
Helix angle: 30°



Dimensions							Shank form HA	
d ₁ h6	d ₂ h5	l ₁	l ₂	l ₃	L/d relation	l ₄	Specification	Order No.
1,00	3	75	38	36	36	28	SCD171-0100-2-4-135HA30-HP246	30998816
1,10	3	75	38	36	33	28	SCD171-0110-2-4-135HA30-HP246	30998817
1,20	3	75	38	36	30	28	SCD171-0120-2-4-135HA30-HP246	30998818
1,30	3	85	50	48	37	28	SCD171-0130-2-4-135HA30-HP246	30998819
1,40	3	85	50	47	34	28	SCD171-0140-2-4-135HA30-HP246	30998820
1,50	3	85	50	47	31	28	SCD171-0150-2-4-135HA30-HP246	30998821
1,60	3	95	59	56	35	28	SCD171-0160-2-4-135HA30-HP246	30998822
1,70	3	95	59	56	33	28	SCD171-0170-2-4-135HA30-HP246	30998823
1,80	3	95	59	56	31	28	SCD171-0180-2-4-135HA30-HP246	30998824
1,90	3	100	66	63	33	28	SCD171-0190-2-4-135HA30-HP246	30998825
2,00	3	100	66	63	32	28	SCD171-0200-2-4-135HA30-HP246	30998826
2,10	3	100	66	62	30	28	SCD171-0210-2-4-135HA30-HP246	30998827
2,20	3	115	80	76	35	28	SCD171-0220-2-4-135HA30-HP246	30998828
2,30	3	115	80	76	33	28	SCD171-0230-2-4-135HA30-HP246	30998829
2,40	3	115	80	76	32	28	SCD171-0240-2-4-135HA30-HP246	30998830
2,50	3	115	80	76	30	28	SCD171-0250-2-4-135HA30-HP246	30451572
2,60	3	130	96	92	35	28	SCD171-0260-2-4-135HA30-HP246	30998832
2,70	3	130	96	91	34	28	SCD171-0270-2-4-135HA30-HP246	30998833
2,80	3	130	96	91	33	28	SCD171-0280-2-4-135HA30-HP246	30998834
2,90	3	130	96	91	31	28	SCD171-0290-2-4-135HA30-HP246	30998835

Configurable features



Diameter:
Diameter in increments of
0.01 mm freely selectable



Specification:

SCD171-[diameter]-2-4-135HA30-HP246

Example:

SCD171-0221-2-4-135HA30-HP246

Tool diameter d₁ = 2.21 mm

Dimensions of configurable series

d ₁ h6	d ₂ h5	l ₁	l ₂	l ₃	l ₄
1,00 - 1,20	3	75	38	36	28
1,21 - 1,50	3	85	50	47	28
1,51 - 1,80	3	95	59	56	28
1,81 - 2,10	3	100	66	62	28
2,11 - 2,50	3	115	80	76	28
2,51 - 2,99	3	130	96	91	28

Dimensions in mm.

For recommended cutting values, see page 14/15.

Special designs and other coatings on request.

Deep drilling in two steps

1 Drilling of pilot hole

Recommendation:

Pilot drill 5xD

MICRO-Step-Drill-Steel

[SCD581]

For general drilling conditions incl. 90° countersink



Alternative:

MICRO-Drill-Steel

[SCD371]



Valid for MICRO-Deep-Drill [SCD171]

Nominal diameter: 1.00 – 2.99 mm

Info:

Pilot bore depth between 3xD – 5xD

2 Deep drilling up to 30xD

Entry into the pilot bore:

- Entering with max. 300 rpm and $v_f = 1,000 \text{ mm/min}$
- Without coolant – down to 1 mm before reaching ground of pilot bore
- Start of coolant → cooling lubricant = 10–40 bar/MQL
- Spot drilling with predefined cutting data according to table

Info:

Another option for spot drilling with the MEGA-Deep-Drill-Steel:

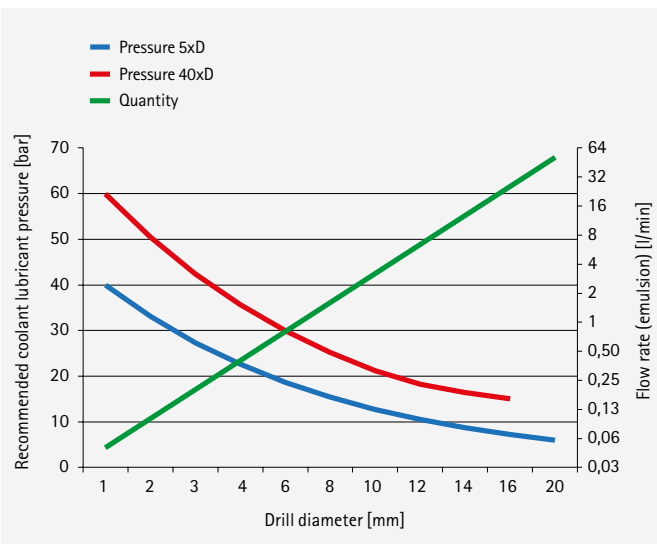
Spot drilling with feed rate 50%, linear acceleration to feed rate 100% up to drilling depth 4xD

- Deep drilling up to 30xD in one step, without chip release cycles

Pulling out:

- Pulling out with max. 300 rpm and double feed ($2 \times v_f$)
- Switch off coolant

Reference values for coolant pressure and quantity



System pressures for MQL for deep drills

MQL systems

Supply pressure

One-channel systems

up to 16 bar

Recommended supply pressure

5–6 bar

High pressure for Deep drilling < nominal Ø 12 mm

8–10 bar

High pressure for Deep drilling < nominal Ø 3 mm

14–16 bar

MICRO-Deep-Drill; SCD171 (nominal Ø range: 1.00 – 2.99 mm)

Two-channel systems

up to 10 bar

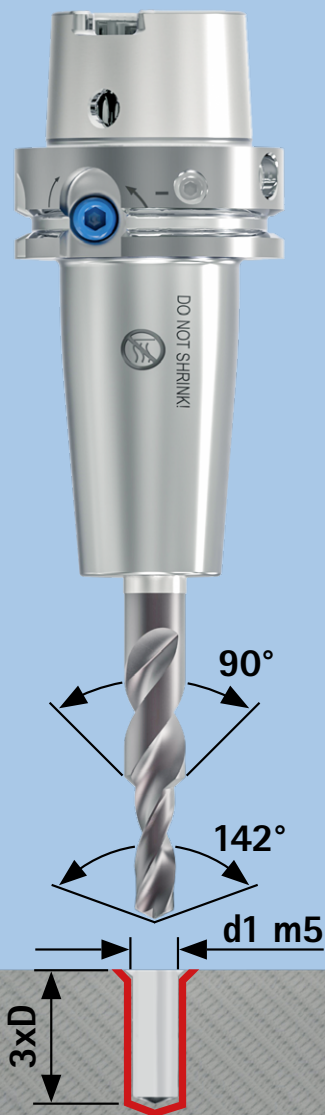
Recommended supply pressure

5–6 bar

High pressure for Deep drilling < nominal Ø 6 mm

8–10 bar

1 Drilling of pilot hole

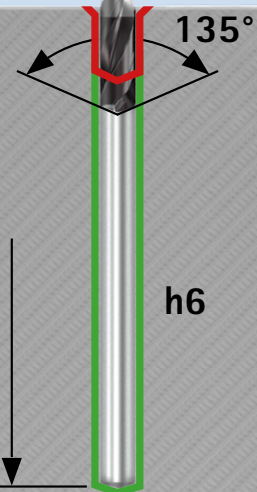


1 Piloting

2 Deep drilling up to $30 \times D$



1



2 Deep drilling up to $30 \times D$

Recommended cutting values for solid carbide drills

Feed and cutting speed

MICRO-Step-Drill-Steel | SCD581

MZG*		Material	Strength/Hardness [N/mm ²] [HRC]	
P	P1	P1.1 Structural, free-cutting, case hardened and heat-treated	< 700	
		P1.2 Structural, free-cutting, case hardened and heat-treated	< 1,200	
	P2	P2.1 Nitratated, case hardened and heat-treated steel, alloyed	< 900	
		P2.2 Nitratated, case hardened and heat-treated steel, alloyed	< 1,400	
	P3	P3.1 Tool, roller bearing, spring and high speed steel**	< 800	
		P3.2 Tool, roller bearing, spring and high speed steel**	< 1,000	
		P3.3 Tool, roller bearing, spring and high speed steel**	< 1,500	
	P5	P5.1 Cast steel		
M	M1	M1.1 Stainless steels, austenitic	< 700	
		M1.2 Stainless steels, ferritic/austenitic (duplex)	< 1,000	
K	K1	K1.1 Cast iron with lamellar graphite (grey cast iron), EN-GJL	< 300	
		K2.1 Cast iron with spheroidal graphite, EN-GJS	< 500	
	K2	K2.2 Cast iron with spheroidal graphite, EN-GJS	≤ 800	
		K2.3 Cast iron with spheroidal graphite, EN-GJS	> 800	
	K3	K3.1 Cast iron with vermicular graphite, EN-GJV; Malleable cast	< 500	
		K3.2 Cast iron with vermicular graphite, EN-GJV; Malleable cast	> 500	

MICRO-Drill-Steel | SCD371

MZG*		Material	Strength/Hardness [N/mm ²] [HRC]	
P	P1	P1.1 Structural, free-cutting, case hardened and heat-treated	< 700	
		P1.2 Structural, free-cutting, case hardened and heat-treated	< 1,200	
	P2	P2.1 Nitratated, case hardened and heat-treated steel, alloyed	< 900	
		P2.2 Nitratated, case hardened and heat-treated steel, alloyed	< 1,400	
	P3	P3.1 Tool, roller bearing, spring and high speed steel**	< 800	
		P3.2 Tool, roller bearing, spring and high speed steel**	< 1,000	
		P3.3 Tool, roller bearing, spring and high speed steel**	< 1,500	
	P5	P5.1 Cast steel		
M	M1	M1.1 Stainless steels, austenitic	< 700	
		M1.2 Stainless steels, ferritic/austenitic (duplex)	< 1,000	
K	K1	K1.1 Cast iron with lamellar graphite (grey cast iron), EN-GJL	< 300	
		K2.1 Cast iron with spheroidal graphite, EN-GJS	< 500	
	K2	K2.2 Cast iron with spheroidal graphite, EN-GJS	≤ 800	
		K2.3 Cast iron with spheroidal graphite, EN-GJS	> 800	
	K3	K3.1 Cast iron with vermicular graphite, EN-GJV; Malleable cast	< 500	
		K3.2 Cast iron with vermicular graphite, EN-GJV; Malleable cast	> 500	

** MAPAL machining groups

** If the alloy components Cr, Mo, Ni, V, W in total > 8 % then select the next higher MAPAL machining group.

The cutting values given are guide values.

The optimum data for the respective machining case should be determined in trials or during machining.

	Cutting speed v_c [m/min]				Feed f [mm] at drill diameter					
	Internal coolant	External coolant	MMS	Air	1,00	1,20	1,60	1,90	2,40	3,00
	80	70	70		0,05	0,06	0,06	0,07	0,08	0,09
	70	60	60		0,07	0,07	0,08	0,09	0,10	0,11
	80	70	70		0,06	0,07	0,08	0,08	0,10	0,11
	55	50	50		0,06	0,06	0,07	0,07	0,08	0,09
	60	50	50		0,06	0,06	0,07	0,07	0,08	0,10
	50	45	45		0,05	0,05	0,06	0,07	0,07	0,08
	50	35	40		0,05	0,05	0,05	0,06	0,06	0,07
	80	70	70		0,06	0,07	0,08	0,08	0,10	0,11
	45	30	30		0,04	0,04	0,05	0,05	0,06	0,06
	95	70	70	70	0,06	0,07	0,08	0,09	0,10	0,12
	130	80	95	95	0,07	0,07	0,08	0,09	0,11	0,13
	80	60	60		0,06	0,07	0,08	0,09	0,10	0,11
	70	65	65		0,07	0,08	0,08	0,09	0,11	0,12
	65	55	55		0,06	0,07	0,08	0,08	0,09	0,11

	Cutting speed v_c [m/min]				Feed f [mm] at drill diameter					
	Internal coolant	External coolant	MMS	Air	0,80	1,04	1,36	1,77	2,30	3,00
	80	70	70		0,04	0,04	0,05	0,06	0,07	0,08
	70	60	60		0,04	0,05	0,06	0,07	0,08	0,10
	80	70	70		0,04	0,05	0,06	0,07	0,08	0,09
	55	50	50		0,04	0,05	0,05	0,06	0,07	0,08
	60	50	50		0,04	0,04	0,05	0,06	0,07	0,08
	50	45	45		0,04	0,04	0,04	0,05	0,06	0,07
	50	35	40		0,03	0,04	0,04	0,05	0,05	0,06
	80	70	70		0,04	0,05	0,06	0,07	0,08	0,09
	40	25	25		0,03	0,03	0,03	0,04	0,05	0,06
	95	70	70		0,03	0,04	0,05	0,06	0,08	0,11
	130	80	95		0,04	0,05	0,06	0,07	0,09	0,11
	80	60	60		0,04	0,05	0,05	0,07	0,08	0,10
	70	65	65		0,04	0,05	0,06	0,07	0,09	0,11
	65	55	55		0,04	0,05	0,06	0,07	0,08	0,09

Recommended cutting values for solid carbide drills

Feed and cutting speed

MICRO-Deep-Drill | SCD171

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