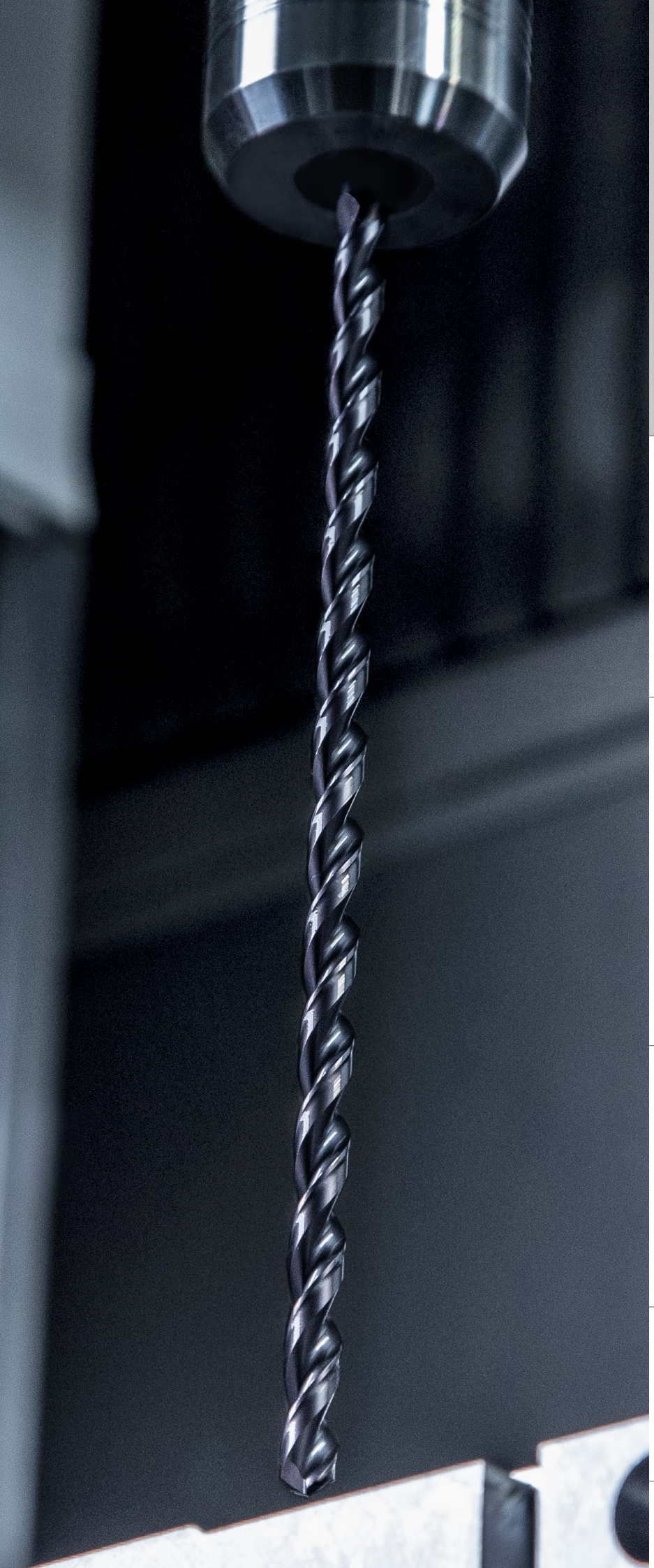


Table of contents

WNT \ Performance

Premium quality tools for high performance.

The premium quality tools from the **WNT Performance** product line have been designed for specific applications and are distinguished by their outstanding performance. If you make high demands on the performance of your production and want to achieve the very best results, we recommend the Premium tools in this product line.

Symbol explanation

Shank


Plain cylindrical shank


Cylindrical shank with lateral driving face „Weldon“


Morse taper

Version


Int. coolant supply


self-centering

● = **Main Application**

○ = Extended application

Toolfinder

	Tool type	Cutting material/ Coating	Description	DIN 1897	DIN 338	DIN 340	Series 1	series 2	series 3
				3xD	5xD	10xD	> 10xD		
Steel – Universal	VX	HSS-E TiN	▲ Universal high-performance drill ▲ Shank DIN 1835A ▲ self centering	9	15				
	UNI	HSS-E-PM TiN	▲ Wear-resistant due to HSS-E-PM and TiN coating ▲ Universal high-performance drill	10–14	16–21				
	UNI	HSS-E TiN	▲ As for Type VX ▲ Without standard shank to DIN 1835 A ▲ Available as a set	10–14	16–21	24–26			
	N	HSS vap.	▲ stable twist drill ▲ also suitable for portable drills ▲ available in set	10–14	16–21				
	WT	HSS-E vap.	▲ for high alloy steel and special alloys (Hastelloy, Inconel, Nimonic)	10–14					
	WT	HSS-E TiN	▲ as Type WT HSS-E vap. ▲ higher wear resistance due to coating	10–14					
	WTL	HSS-E F.-nit	▲ special flute profile with large chip gullet ▲ nitrided cutting edge giving increased wear protection to cutting corners and guide lands		16–21	24–26			
	WTL	HSS-E TiN	▲ as WTL HSS-E, but higher v_c and wear resistance due to coating ▲ suitable for steel and cast iron		16–21				
	WTL	HSS-E TiAlN	▲ Special flute profile with large chip spaces ▲ Higher wear resistance due to TiAlN coating				27	28	28
	WTL	HSS F.-nit	▲ special flute profile with large chip gullet ▲ nitrided cutting edge giving increased wear protection to cutting corners and guide lands				27	28	28
	WTL	HSS TiN	▲ as WTL HSS, but higher v_c and wear resistance due to coating			24–26			
	WNX	HSS-E	▲ Wide chip flutes for long-chipping materials ▲ Self-centring	10–14					
	NC	HSS TiAlN	▲ suitable for use with drill bushes ▲ very good chip evacuation with thro' coolant ▲ higher v_c and wear resistance due to coating			23			
Stainless steel	VA	HSS-E	▲ Specialist for stainless and acid-resistant materials ▲ special geometry	10–14	16–21				
Non-ferrous metals	W	HSS	▲ Specialist for non-ferrous metals		16–21				
	WTW	HSS	▲ for non-ferrous metals to 500 N/mm² ▲ for deep holes			24–26			

HSS Drills Overview

	Tool type	Cutting material | Coating	Point angle SIG	Diameter in mm DC	Steel P	Stainless steel M	Cast iron K	Non-ferrous metals N	Heat-resistant S	Tempered steel H	Non metal materials O		coated ■	uncoated □	WNT \ Performance
3xD without thro' coolant															
	VX	HSS-E TiN	118°	2–20	●	●	●	○	○		○		■		9
	UNI	HSS-E-PM TiN	130°	1–14	●		●	○	○	○	○		■		10–14
	UNI	HSS-E TiN	118°	1–14	●	●	●	○	○		○		■		10–14
	N	HSS vap.	118°	0,4–20	○		●	○			○		■		10–14
	VA	HSS-E	130°	1–12	○	●		●	○					□	10–14
	WNX	HSS-E	130°	1–20	●		●	○	○	○	○			□	10–14
	WT	HSS-E vap.	130°	0,4–25	●	●	●	○	○	○			■		10–14
	WT	HSS-E TiN	130°	1–20	●	●	●	○	●	○			■		10–14
5xD without thro' coolant															
	VX	HSS-E TiN	118°	2–20	●	●	●	○	○		○		■		15
	UNI	HSS-E-PM TiN	130°	1–14	●		●	○	○	○	○		■		16–21
	UNI	HSS-E TiN	118°	0,9–14	●	●	●	○	○		○		■		16–21
	N	HSS vap.	118°	0,2–20	○		●	○			○		■		16–21
	VA	HSS-E	130°	1–12	○	●		●	○					□	16–21
	W	HSS	130°	0,20–20				●						□	16–21
	WTL	HSS-E F-nit.	130°	1–16	●	○	●	●	○	○	○		■		16–21
	WTL	HSS-E TiN	130°	1–16	●	○	●	○	○	○	○		■		16–21
up to 10xD without thro' coolant															
	UNI	HSS-E TiN	118°	1–14	●	●	●	○	○		○		■		24–26
	WTL	HSS-E F-nit.	130°	1–12	●	○	●	●	○	○	○		■		24–26
	WTL	HSS TiN	130°	1–14	○		●	○			○		■		24–26
	WTW	HSS	130°	1–14				●						□	24–26

HSS Drills Overview

	Tool type	Cutting material | Coating	Point angle SIG	Diameter in mm DC	Steel P	Stainless steel M	Cast iron K	Non-ferrous metals N	Heat-resistant S	Tempered steel H	Non metal materials O		coated ■	uncoated □	WNT \ Performance
up to 10xD with thro' coolant															
	NC	HSS TiAlN	130°	3–13	○	○	●	○			○		■		23
over 10xD without thro' coolant															
	WTL	HSS F-nit. Series 1	130°	2–13	●		●	●			○		■		27
	WTL	HSS F-nit. series 2	130°	2–13	●		●	●			○		■		28
	WTL	HSS F-nit. series 3	130°	2,5–13	●		●	●			○		■		28
	WTL	HSS-E TiAlN Series 1	130°	3–10,2	●		●	●			○		■		27
	WTL	HSS-E TiAlN series 2	130°	3–12	●		●	●			○		■		28
	WTL	HSS-E TiAlN series 3	130°	4–10	●		●	●			○		■		28
Mini-drill															
	N	HSS-E-PM	118°	0,15–1,45	●	○	●	●	○		○			□	29
Twist Drill Sets															
	N	HSS vap.	118°	1–10	○		●	○			○		■		22
	UNI	HSS-E TiN	118°	1–10	●	●	●	○	○		○		■		22
NC Spot Drill															
	NC-A	HSS	90°	3–20	●	○	●	○	○		○			□	33–35
	NC-A	HSS TiN	90°	3–20	●	○	●	○	○		○		■		33+34
	NC-A	HSS	120°	3–20	●	○	●	○	○		○			□	33+34
	NC-A	HSS TiN	120°	3–20	●	○	●	○	○		○		■		33+34
Centre drills															
	ZB	HSS	118°	0,5–6,3	●	○	●	○	○		○	DIN 333 – Form A/B/R		□	35–37
	ZB	HSS TiN	118°	0,5–6,3	●	○	●	○	○		○	DIN 333 – Form A	■		36
	ZB	HSS-E	118°	0,5–6,3	●	○	●	○	○		○	DIN 333 – Form A		□	36

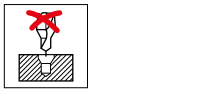
HSS Drills Overview

	Tool type	Cutting material | Coating	Point angle SIG	Diameter in mm DC	Steel P	Stainless steel M	Cast iron K	Non-ferrous metals N	Heat-resistant S	Tempered steel H	Non metal materials O		coated ■	uncoated □	WNT \ Performance
Stepped drills															
	SB	HSS vap.	118°	2,5–10,2	●	○	●	○	○		○	Countersinking angle 90°	■		39
	SB	HSS	118°	2,5–10,2	●	○	●	○	○		○	Countersinking angle 90°		□	39
	SB	HSS vap.	118°	3,2–10,5	●	○	●	○	○		○	Countersinking angle 90°	■		39
	SB	HSS	118°	3,2–10,5	●	○	●	○	○		○	Countersinking angle 90°		□	39
	SB	HSS vap.	118°	3,4–11	●	○	●	○	○		○	Countersinking angle 180°	■		40
	SB	HSS	118°	3,4–11	●	○	●	○	○		○	Countersinking angle 180°		□	40
	SB	HSS vap.	118°	3,3–17,5	●	○	●	○	○		○	Countersinking angle 60°	■		42
Drills with Morse taper															
3xD															
	WT	HSS-E vap.	130°	13–30	●	●	●	○	○	○			■		29
5xD															
	N	HSS vap.	118°	10–55	○		●	○			○		■		30
	WTL	HSS-E F.-nit/vap.	130°	10–27	●	○	●	●	○	○	○		■		30
10xD															
	N	HSS vap.	118°	10–50	○		●	○			○		■		31
	WTL	HSS-E F.-nit/vap.	130°	10–25	●	○	●	●	○	○	○		■		31
above 10xD															
	WTL	HSS F.-nit/vap. Series 1	130°	10–30	●			●	●		○		■		32
	WTL	HSS F.-nit/vap. series 2	130°	10–30	●		●	●			○		■		32
Core drills															
	N	HSS vap.	120°	12–30	●	○	●	○	○		○	3 Edges	■		38
Stepped drills															
	SB	HSS vap.	118°	6,6–17,5	●	○	●	○	○		○	Countersinking angle 180°	■		41

High-performance twist drills similar to DIN 1897, extra-short

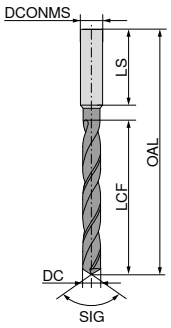
- ▲ Shank to DIN 1835 A
- ▲ Special point thinning
- ▲ Very good centering behaviour
- ▲ 4 facet
- ▲ Highest Performance

≤ 3xD



VX

TiN



SIG 118°
HSS-E

10 122 ...

DC h8 mm	OAL mm	LCF mm	DCONMS h6 mm	LS mm	
2,00	44	12	3	28	020
2,10	44	12	3	28	021
2,20	45	13	3	28	022
2,30	45	13	3	28	023
2,40	46	14	3	28	024
2,50	46	14	3	28	025
2,60	46	14	3	28	026
2,70	48	16	3	28	027
2,80	48	16	3	28	028
2,90	48	16	3	28	029
3,00	48	16	3	28	030
3,10	50	18	4	28	031
3,20	50	18	4	28	032
3,30	50	18	4	28	033
3,40	52	20	4	28	034
3,50	52	20	4	28	035
3,60	52	20	4	28	036
3,70	52	20	4	28	037
3,80	54	22	4	28	038
3,90	54	22	4	28	039
4,00	54	22	4	28	040
4,10	66	22	6	36	041
4,20	66	22	6	36	042
4,30	68	24	6	36	043
4,40	68	24	6	36	044
4,50	68	24	6	36	045
4,60	68	24	6	36	046
4,70	68	24	6	36	047
4,80	70	26	6	36	048
4,90	70	26	6	36	049
5,00	70	26	6	36	050
5,10	70	26	6	36	051
5,20	70	26	6	36	052
5,30	70	26	6	36	053
5,40	72	28	6	36	054
5,50	72	28	6	36	055
5,55	72	28	6	36	555
5,60	72	28	6	36	056
5,70	72	28	6	36	057
5,80	72	28	6	36	058
5,90	72	28	6	36	059
6,00	72	28	6	36	060
6,10	75	31	8	36	061
6,20	75	31	8	36	062
6,30	75	31	8	36	063
6,40	75	31	8	36	064
6,50	75	31	8	36	065
6,60	75	31	8	36	066
6,70	75	31	8	36	067
6,80	78	34	8	36	068
6,90	78	34	8	36	069
7,00	78	34	8	36	070
7,10	78	34	8	36	071

10 122 ...

DC h8 mm	OAL mm	LCF mm	DCONMS h6 mm	LS mm	
7,20	78	34	8	36	072
7,30	78	34	8	36	073
7,40	78	34	8	36	074
7,45	78	34	8	36	745
7,50	78	34	8	36	075
7,60	81	37	8	36	076
7,70	81	37	8	36	077
7,80	81	37	8	36	078
7,90	81	37	8	36	079
8,00	81	37	8	36	080
8,10	87	37	10	40	081
8,20	87	37	10	40	082
8,30	87	37	10	40	083
8,40	87	37	10	40	084
8,50	87	37	10	40	085
8,60	91	40	10	40	086
8,70	91	40	10	40	087
8,80	91	40	10	40	088
8,90	91	40	10	40	089
9,00	91	40	10	40	090
9,10	91	40	10	40	091
9,20	91	40	10	40	092
9,30	91	40	10	40	093
9,35	91	40	10	40	935
9,40	91	40	10	40	094
9,50	91	40	10	40	095
9,60	93	43	10	40	096
9,70	93	43	10	40	097
9,80	93	43	10	40	098
9,90	93	43	10	40	099
10,00	93	43	10	40	100
10,20	100	43	12	45	102
10,30	100	43	12	45	103
10,50	100	43	12	45	105
10,70	104	47	12	45	107
10,80	104	47	12	45	108
11,00	104	47	12	45	110
11,10	104	47	12	45	111
11,50	104	47	12	45	115
11,70	104	47	12	45	117
11,80	104	47	12	45	118
11,90	108	51	12	45	119
12,00	108	51	12	45	120
12,10	111	51	16	48	121
12,30	111	51	16	48	123
12,50	111	51	16	48	125
12,70	111	51	16	48	127
12,80	111	51	16	48	128
13,00	111	51	16	48	130
13,50	114	54	16	48	135
14,00	114	54	16	48	140
14,50	116	56	16	48	145
15,00	116	56	16	48	150
15,50	118	58	16	48	155
16,00	118	58	16	48	160
16,50	126	60	20	50	165
17,00	126	60	20	50	170
17,50	128	62	20	50	175
18,00	128	62	20	50	180
18,50	130	64	20	50	185
19,00	130	64	20	50	190
19,50	132	66	20	50	195
20,00	132	66	20	50	200

P	●
M	●
K	●
N	○
S	○
H	
O	○

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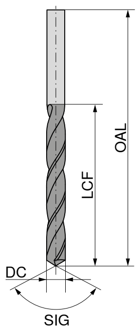
High-performance twist drills similar to DIN 1897, extra-short

≤ 3xD



	UNI	UNI	N	VA	WNX	WT	WT
	TiN	TiN	vap.			vap.	TiN
	SIG 130° HSS-E-PM	SIG 118° HSS-E	SIG 118° HSS	SIG 130° HSS-E	SIG 130° HSS-E	SIG 130° HSS-E	SIG 130° HSS-E

DC h8 mm	DC inch	OAL mm	LCF mm	10 113 ...	10 107 ...	10 105 ...	10 130 ...	10 106 ...	10 109 ...	10 110 ...
0,40		19	2,5			004 1)			00400 1)	
0,50		20	3,0			005 1)			00500 1)	
0,55		21	3,5						00550 1)	
0,60		21	3,5			006 1)			00600 1)	
0,65		22	4,0						00650 1)	
0,70		23	4,5			007 1)			00700 1)	
0,75		23	4,5						00750 1)	
0,80		24	5,0			008 1)			00800 1)	
0,85		24	5,0						00850 1)	
0,90		25	5,5			009 1)			00900 1)	
0,95		25	5,5						00950 1)	
1,00		26	6,0	010 2)	010 2)	010 1)	010	010	01000 1)	010
1,05		26	6,0						01050 1)	
1,10		28	7,0	011 2)	011 2)	011 1)	011	011	01100 1)	011
1,15		28	7,0						01150 1)	
1,20		30	8,0	012 2)	012 2)	012 1)	012	012	01200 1)	012
1,25		30	8,0						01250 1)	
1,30		30	8,0	013 2)	013 2)	013 1)	013	013	01300 1)	013
1,35		32	9,0						01350 1)	
1,40		32	9,0	014 2)	014 2)	014 1)	014	014	01400 1)	014
1,45		32	9,0						01450 1)	
1,50		32	9,0	015 2)	015 2)	015 1)	015	015	01500 1)	015
1,55		34	10,0						01550 1)	
1,60		34	10,0	016 2)	016 2)	016 1)	016	016	01600 1)	016
1,65		34	10,0						01650 1)	
1,70		34	10,0	017 2)	017 2)	017 1)	017	017	01700 1)	017
1,75		36	11,0						01750 1)	
1,80		36	11,0	018 2)	018 2)	018 1)	018	018	01800 1)	018
1,83		36	11,0						01830 1)	
1,85		36	11,0						01850 1)	
1,90		36	11,0	019 2)	019 2)	019 1)	019	019	01900 1)	019
1,95		38	12,0						01950 1)	
2,00		38	12,0	020 2)	020 2)	020 1)	020	020	02000 1)	020
2,05		38	12,0						02050 1)	
2,10		38	12,0	021 2)	021 2)	021 1)	021	021	02100 1)	021
2,15		40	13,0						02150 1)	
2,20		40	13,0	022 2)	022 2)	022 1)	022	022	02200 1)	022
2,25		40	13,0						02250 1)	
2,30		40	13,0	023 2)	023 2)	023 1)	023	023	02300 1)	023
2,35		40	13,0						02350 1)	
2,38	3/32	43	14,0	238 2)	238 2)					
2,40		43	14,0	024 2)	024 2)	024	024	024	02400	024
2,45		43	14,0						02450	
2,50		43	14,0	025 2)	025 2)	025	025	025	02500	025
2,55		43	14,0						02550	
2,60		43	14,0	026 2)	026 2)	026	026	026	02600	026
2,65		43	14,0						02650	
2,70		46	16,0	027 2)	027 2)	027	027	027	02700	027

	10 113	10 107	10 105	10 130	10 106	10 109	10 110
P	●	●	○	○	●	●	●
M		●		●		●	●
K	●	●	●		●	●	●
N	○	○	○	●	○	○	○
S	○	○		○	○	○	●
H	○				○	○	○
O	○	○	○		○		

1) uncoated
2) self-centering

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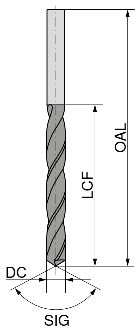
Continued on next page

High-performance twist drills similar to DIN 1897, extra-short

≤ 3xD



				UNI	UNI	N	VA	WNX	WT	WT
				TiN	TiN	vap.			vap.	TiN
				SIG 130° HSS-E-PM	SIG 118° HSS-E	SIG 118° HSS	SIG 130° HSS-E	SIG 130° HSS-E	SIG 130° HSS-E	SIG 130° HSS-E
DC h8 mm	DC inch	OAL mm	LCF mm	10 113 ...	10 107 ...	10 105 ...	10 130 ...	10 106 ...	10 109 ...	10 110 ...
2,75		46	16,0						02750	
2,78	7/64	46	16,0	278 2)	278 2)					
2,80		46	16,0	028 2)	028 2)	028	028	028	02800	028
2,85		46	16,0						02850	
2,90		46	16,0	029 2)	029 2)	029	029	029	02900	029
2,95		46	16,0						02950	
3,00		46	16,0	030 2)	030 2)	030	030	030	03000	030
3,05		49	18,0						03050	
3,10		49	18,0	031 2)	031 2)	031	031	031	03100	031
3,15		49	18,0						03150	
3,17	1/8	49	18,0	317 2)	317 2)					
3,20		49	18,0	032 2)	032 2)	032	032	032	03200	032
3,25		49	18,0						03250	
3,30		49	18,0	033 2)	033 2)	033	033	033	03300	033
3,35		49	18,0						03350	
3,40		52	20,0	034 2)	034 2)	034	034	034	03400	034
3,45		52	20,0						03450	
3,50		52	20,0	035 2)	035 2)	035	035	035	03500	035
3,55		52	20,0						03550	
3,57	9/64	52	20,0	357 2)	357 2)					
3,60		52	20,0	036 2)	036 2)	036	036	036	03600	036
3,70		52	20,0	037 2)	037 2)	037	037	037	03700	037
3,75		52	20,0						03750	
3,80		55	22,0	038 2)	038 2)	038	038	038	03800	038
3,85		55	22,0						03850	
3,90		55	22,0	039 2)	039 2)	039		039	03900	039
3,95		55	22,0						03950	
3,97	5/32	55	22,0	397 2)	397 2)					
4,00		55	22,0	040 2)	040 2)	040	040	040	04000	040
4,05		55	22,0						04050	
4,10		55	22,0	041 2)	041 2)	041	041	041	04100	041
4,15		55	22,0						04150	
4,20		55	22,0	042 2)	042 2)	042	042	042	04200	042
4,25		55	22,0						04250	
4,30		58	24,0	043 2)	043 2)	043	043	043	04300	043
4,35		58	24,0						04350	
4,37	11/64	58	24,0	437 2)	437 2)					
4,40		58	24,0	044 2)	044 2)	044		044	04400	044
4,45		58	24,0						04450	
4,50		58	24,0	045 2)	045 2)	045	045	045	04500	045
4,55		58	24,0						04550	
4,60		58	24,0	046 2)	046 2)	046	046	046	04600	046
4,65		58	24,0						04650	465
4,70		58	24,0	047 2)	047 2)	047	047	047	04700	047
4,75		58	24,0						04750	
4,76	3/16	62	26,0	476 2)	476 2)					
4,80		62	26,0	048 2)	048 2)	048	048	048	04800	048
4,85		62	26,0						04850	

	10 113	10 107	10 105	10 130	10 106	10 109	10 110
P	●	●	○	○	●	●	●
M		●		●		●	●
K	●	●	●		●	●	●
N	○	○	○	●	○	○	○
S	○	○		○	○	○	●
H	○				○	○	○
O	○	○	○		○		

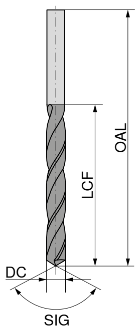
1) uncoated
2) self-centering

→ v_c Page 44+45

Continued on next page

High-performance twist drills similar to DIN 1897, extra-short

≤ 3xD



				UNI	UNI	N	VA	WNX	WT	WT
				TiN	TiN	vap.			vap.	TiN
				SIG 130°	SIG 118°	SIG 118°	SIG 130°	SIG 130°	SIG 130°	SIG 130°
				HSS-E-PM	HSS-E	HSS	HSS-E	HSS-E	HSS-E	HSS-E
				10 113 ...	10 107 ...	10 105 ...	10 130 ...	10 106 ...	10 109 ...	10 110 ...
DC h8 mm	DC inch	OAL mm	LCF mm							
4,90		62	26,0	049 2)	049 2)	049	049	049	04900	049
4,95		62	26,0						04950	
5,00		62	26,0	050 2)	050 2)	050	050	050	05000	050
5,05		62	26,0						05050	
5,10		62	26,0	051 2)	051 2)	051	051			
5,16	13/64	62	26,0	516 2)	516 2)					
5,20		62	26,0	052 2)	052 2)	052	052	052	05200	052
5,25		62	26,0						05250	
5,30		62	26,0	053 2)	053 2)	053	053	053	05300	053
5,40		66	28,0	054 2)	054 2)	054				
5,50		66	28,0	055 2)	055 2)	055	055	055	05500	055
5,55		66	28,0						05550	555
5,56	7/32	66	28,0	556 2)	556 2)					
5,60		66	28,0	056 2)	056 2)	056	056	056	05600	056
5,70		66	28,0	057 2)	057 2)	057	057	057	05700	057
5,75		66	28,0						05750	
5,80		66	28,0	058 2)	058 2)	058	058	058	05800	058
5,85		66	28,0						05850	
5,90		66	28,0	059 2)	059 2)	059	059	059	05900	059
5,95	15/64	66	28,0	595 2)	595 2)				05950	
6,00		66	28,0	060 2)	060 2)	060	060	060	06000	060
6,05		70	31,0						06050	
6,10		70	31,0	061 2)	061 2)	061				
6,20		70	31,0	062 2)	062 2)	062				
6,30		70	31,0	063 2)	063 2)	063				
6,35	1/4	70	31,0	635 2)	635 2)					
6,40		70	31,0	064 2)	064 2)	064				064
6,50		70	31,0	065 2)	065 2)	065	065	065	06500	065
6,55		70	31,0						06550	
6,60		70	31,0	066 2)	066 2)	066	066			
6,65		70	31,0						06650	
6,70		70	31,0	067 2)	067 2)	067	067			
6,75		74	34,0	675 2)	675 2)					
6,80		74	34,0	068 2)	068 2)	068	068	068	06800	068
6,90		74	34,0	069 2)	069 2)	069	069			
7,00		74	34,0	070 2)	070 2)	070	070	070	07000	070
7,10		74	34,0	071 2)	071 2)	071				
7,14	9/32	74	34,0	714 2)	714 2)					
7,20		74	34,0	072 2)	072 2)	072	072	072	07200	072
7,25		74	34,0						07250	
7,30		74	34,0	073 2)	073 2)	073				
7,40		74	34,0	074 2)	074 2)	074		074	07400	074
7,50		74	34,0	075 2)	075 2)	075	075	075	07500	075
7,60		79	37,0	076 2)	076 2)	076		076	07600	076
7,70		79	37,0	077 2)	077 2)	077	077	077	07700	077
7,75		79	37,0						07750	
7,80		79	37,0	078 2)	078 2)	078		078	07800	078
7,90		79	37,0	079 2)	079 2)	079	079	079	07900	079

	10 113	10 107	10 105	10 130	10 106	10 109	10 110
P	●	●	○	○	●	●	●
M		●		●		●	●
K	●	●	●		●	●	●
N	○	○	○	●	○	○	○
S	○	○		○	○	○	●
H	○				○	○	○
O	○	○	○		○		

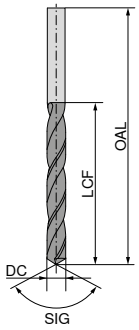
1) uncoated
2) self-centering

→ v_c Page 44+45

Continued on next page

High-performance twist drills similar to DIN 1897, extra-short

≤ 3xD



UNI	UNI	N	VA	WNX	WT	WT
TiN	TiN	vap.			vap.	TiN

SIG 130° HSS-E-PM	SIG 118° HSS-E	SIG 118° HSS	SIG 130° HSS-E	SIG 130° HSS-E	SIG 130° HSS-E	SIG 130° HSS-E
10 113 ...	**10 107 ...**	**10 105 ...**	**10 130 ...**	**10 106 ...**	**10 109 ...**	**10 110 ...**

DC $_{h8}$ mm	DC inch	OAL mm	LCF mm													
7,94	5/16	79	37,0	794 [2]		794 [2]										
8,00		79	37,0	080 [2]		080 [2]		080		080		080		08000		080
8,05		79	37,0											08050		
8,10		79	37,0	081 [2]		081 [2]		081								
8,15		79	37,0											08150		
8,20		79	37,0	082 [2]		082 [2]		082								082
8,30		79	37,0	083 [2]		083 [2]		083								
8,40		79	37,0	084 [2]		084 [2]		084		084		084		08400		084
8,50		79	37,0	085 [2]		085 [2]		085		085		085		08500		085
8,55		84	40,0											08550		
8,60		84	40,0			086 [2]		086		086						
8,70		84	40,0			087 [2]		087		087						087
8,73	11/32	84	40,0	873 [2]		873 [2]										
8,80		84	40,0	088 [2]		088 [2]		088				088		08800		088
8,90		84	40,0			089 [2]		089								
9,00		84	40,0	090 [2]		090 [2]		090		090		090		09000		090
9,10		84	40,0			091 [2]		091								
9,20		84	40,0			092 [2]		092		092		092		09200		092
9,30		84	40,0	093 [2]		093 [2]		093		093		093		09300		093
9,40		84	40,0			094 [2]		094				094		09400		094
9,50		84	40,0	095 [2]		095 [2]		095		095		095		09500		095
9,60		89	43,0			096 [2]		096				096		09600		096
9,65		89	43,0											09650		
9,70		89	43,0			097 [2]		097				097		09700		097
9,75		89	43,0											09750		
9,80		89	43,0	098 [2]		098 [2]		098		098		098		09800		098
9,90		89	43,0			099 [2]		099				099		09900		099
10,00		89	43,0	100 [2]		100 [2]		100		100		100		10000		100
10,10		89	43,0			101 [2]		101								
10,20		89	43,0	102 [2]		102 [2]		102		102		102		10200		102
10,30		89	43,0			103 [2]		103						10300		
10,40		89	43,0			104 [2]		104								
10,50		89	43,0	105 [2]		105 [2]		105		105		105		10500		105
10,60		95	47,0					106								
10,70		95	47,0					107						10700		
10,80		95	47,0					108								108
10,90		95	47,0					109								
11,00		95	47,0	110 [2]		110 [2]		110		110		110		11000		110
11,10		95	47,0					111								
11,11	7/16	95	47,0	111 [2]		111 [2]										
11,20		95	47,0					112						11200		
11,30		95	47,0					113						11300		
11,40		95	47,0					114						11400		
11,50		95	47,0	115 [2]		115 [2]		115		115		115		11500		115
11,60		95	47,0					116								
11,70		95	47,0					117		117				11700		
11,75		95	47,0											11750		
11,80		95	47,0					118				118		11800		118

P	●	●	○	○	●	●	●
M		●		●		●	●
K	●	●	●		●	●	●
N	○	○	○	●	○	○	○
S	○	○		○	○	○	●
H	○				○	○	○
O	○	○	○		○		

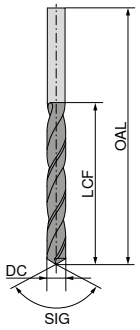
1) uncoated
2) self-centering

→ v_c Page 44+45

Continued on next page

High-performance twist drills similar to DIN 1897, extra-short

≤ 3xD



UNI	UNI	N	VA	WNX	WT	WT
TiN	TiN	vap.			vap.	TiN

SIG 130° HSS-E-PM	SIG 118° HSS-E	SIG 118° HSS	SIG 130° HSS-E	SIG 130° HSS-E	SIG 130° HSS-E	SIG 130° HSS-E
10 113 ...	**10 107 ...**	**10 105 ...**	**10 130 ...**	**10 106 ...**	**10 109 ...**	**10 110 ...**

DC $_{h8}$ mm	DC inch	OAL mm	LCF mm												
11,90		102	51,0					119							
12,00		102	51,0	120	2)	120	2)	120	120	120	12000		120		
12,10		102	51,0					121							
12,20		102	51,0					122							
12,30		102	51,0	123	2)	123	2)	123		123	12300		123		
12,40		102	51,0					124							
12,50		102	51,0	125	2)	125	2)	125		125	12500		125		
12,60		102	51,0					126							
12,70		102	51,0	127	2)	127	2)	127			12700				
12,80		102	51,0					128		128	12800		128		
12,90		102	51,0					129							
13,00		102	51,0	130	2)	130	2)	130		130	13000		130		
13,20		102	51,0					132							
13,30		107	54,0					133							
13,50		107	54,0	135	2)	135	2)	135		135	13500		135		
13,80		107	54,0					138		138					
14,00		107	54,0	140	2)	140	2)	140		140	14000		140		
14,50		111	56,0					145		145	14500		145		
14,75		111	56,0					147							
15,00		111	56,0					150		150	15000		150		
15,25		115	58,0					152							
15,50		115	58,0					155		155	15500		155		
15,75		115	58,0										157		
16,00		115	58,0					160		160	16000		160		
16,50		119	60,0					165		165	16500		165		
17,00		119	60,0					170		170	17000		170		
17,50		123	62,0					175		175	17500		175		
17,75		123	62,0										177		
18,00		123	62,0					180		180	18000		180		
18,50		127	64,0					185			18500		185		
19,00		127	64,0					190		190	19000		190		
19,50		131	66,0					195			19500		195		
20,00		131	66,0					200		200	20000		200		
20,50		136	68,0								20500				
21,00		136	68,0								21000				
21,50		141	70,0								21500				
22,00		141	70,0								22000				
23,00		146	72,0								23000				
24,00		151	75,0								24000				
25,00		151	75,0								25000				

P	●	●	○	○	●	●	●
M		●		●		●	●
K	●	●	●		●	●	●
N	○	○	○	●	○	○	○
S	○	○		○	○	○	●
H	○				○	○	○
O	○	○	○		○		

1) uncoated
2) self-centering

→ v_c Page 44+45

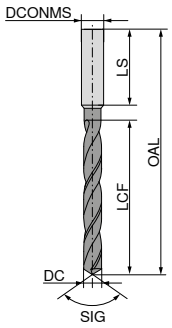
High-performance twist drill similar to DIN 338, short

- With shank to DIN 1835 A
- Special point thinning
- 4 facet
- Highest Performance
- Very good centering behaviour

≤ 5xD

VX

TiN



SIG 118°
HSS-E

10 124 ...

DC h8 mm	OAL mm	LCF mm	DCONMS h6 mm	LS mm	
2,00	56	24	3	28	020
2,10	56	24	3	28	021
2,20	59	27	3	28	022
2,30	59	27	3	28	023
2,40	62	30	3	28	024
2,50	62	30	3	28	025
2,60	62	30	3	28	026
2,70	65	33	3	28	027
2,80	65	33	3	28	028
2,90	65	33	3	28	029
3,00	65	33	3	28	030
3,10	68	36	4	28	031
3,20	68	36	4	28	032
3,30	68	36	4	28	033
3,40	71	39	4	28	034
3,50	71	39	4	28	035
3,60	71	39	4	28	036
3,70	71	39	4	28	037
3,80	75	43	4	28	038
3,90	75	43	4	28	039
4,00	75	43	4	28	040
4,10	87	43	6	36	041
4,20	87	43	6	36	042
4,30	91	47	6	36	043
4,40	91	47	6	36	044
4,50	91	47	6	36	045
4,60	91	47	6	36	046
4,65	91	47	6	36	465
4,70	91	47	6	36	047
4,80	96	52	6	36	048
4,90	96	52	6	36	049
5,00	96	52	6	36	050
5,10	96	52	6	36	051
5,20	96	52	6	36	052
5,30	96	52	6	36	053
5,40	101	57	6	36	054
5,50	101	57	6	36	055
5,55	101	57	6	36	555
5,60	101	57	6	36	056
5,70	101	57	6	36	057
5,80	101	57	6	36	058
5,90	101	57	6	36	059
6,00	101	57	6	36	060
6,10	107	63	8	36	061
6,20	107	63	8	36	062
6,30	107	63	8	36	063
6,40	107	63	8	36	064
6,50	107	63	8	36	065
6,60	107	63	8	36	066
6,70	107	63	8	36	067
6,80	113	69	8	36	068
6,90	113	69	8	36	069
7,00	113	69	8	36	070
7,10	113	69	8	36	071
7,20	113	69	8	36	072
7,30	113	69	8	36	073

10 124 ...

DC h8 mm	OAL mm	LCF mm	DCONMS h6 mm	LS mm	
7,40	113	69	8	36	074
7,50	113	69	8	36	075
7,55	119	75	8	36	755
7,60	119	75	8	36	076
7,70	119	75	8	36	077
7,80	119	75	8	36	078
7,90	119	75	8	36	079
8,00	119	75	8	36	080
8,10	125	75	10	40	081
8,20	125	75	10	40	082
8,30	125	75	10	40	083
8,40	125	75	10	40	084
8,50	125	75	10	40	085
8,60	131	81	10	40	086
8,70	131	81	10	40	087
8,80	131	81	10	40	088
8,90	131	81	10	40	089
9,00	131	81	10	40	090
9,10	131	81	10	40	091
9,20	131	81	10	40	092
9,30	131	81	10	40	093
9,40	131	81	10	40	094
9,50	131	81	10	40	095
9,55	137	87	10	40	955
9,60	137	87	10	40	096
9,70	137	87	10	40	097
9,80	137	87	10	40	098
9,90	137	87	10	40	099
10,00	137	87	10	40	100
10,10	144	87	12	45	101
10,20	144	87	12	45	102
10,30	144	87	12	45	103
10,40	144	87	12	45	104
10,50	144	87	12	45	105
10,70	151	94	12	45	107
10,80	151	94	12	45	108
11,00	151	94	12	45	110
11,20	151	94	12	45	112
11,30	151	94	12	45	113
11,40	151	94	12	45	114
11,50	151	94	12	45	115
11,60	151	94	12	45	116
11,70	151	94	12	45	117
11,80	151	94	12	45	118
11,90	158	101	12	45	119
12,00	158	101	12	45	120
12,20	161	101	16	48	122
12,30	161	101	16	48	123
12,50	161	101	16	48	125
12,70	161	101	16	48	127
12,80	161	101	16	48	128
13,00	161	101	16	48	130
13,50	166	106	16	48	135
14,00	166	106	16	48	140
14,50	169	109	16	48	145
15,00	169	109	16	48	150
15,50	172	112	16	48	155
16,00	172	112	16	48	160
16,50	181	115	20	50	165
17,00	181	115	20	50	170
17,50	184	118	20	50	175
18,00	184	118	20	50	180
18,50	188	122	20	50	185
19,00	188	122	20	50	190
19,50	191	125	20	50	195
20,00	191	125	20	50	200

P	●
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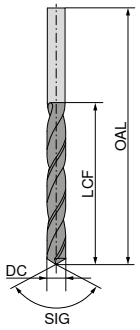
H	
O	○

→ v_c Page 46

Twist drill to DIN 338, short

≤ 5xD



	UNI	UNI	N	VA	W	WTL	WTL
	TiN	TiN	vap.			F.-nit	TiN
							
	SIG 130°	SIG 118°	SIG 118°	SIG 130°	SIG 130°	SIG 130°	SIG 130°
	HSS-E-PM	HSS-E	HSS	HSS-E	HSS	HSS-E	HSS-E
	10 173 ...	10 171 ...	10 152 ...	10 175 ...	10 161 ...	10 168 ...	10 170 ...

DC h8 mm	DC inch	OAL mm	LCF mm																
0,20		19	2,5						00200[1]			00200							
0,25		19	3,0						00250[1]			00250							
0,30		19	3,0						00300[1]			00300							
0,35		19	4,0						00350[1]			00350							
0,40		20	5,0						00400[1]			00400							
0,45		20	5,0						00450[1]			00450							
0,50		22	6,0						00500[1]			00500							
0,55		24	7,0						00550[1]			00550							
0,60		24	7,0						00600[1]			00600							
0,65		26	8,0						00650[1]			00650							
0,70		28	9,0						00700[1]			00700							
0,75		28	9,0						00750[1]			00750							
0,80		30	10,0						00800[1]			00800							
0,85		30	10,0						00850[1]			00850							
0,90		32	11,0			009[2]			00900[1]			00900							
0,95		32	11,0						00950[1]			00950							
1,00		34	12,0	010[2]		010[2]			01000[1]		010	01000			010[1]			010	
1,05		34	12,0						01050[1]			01050							
1,10		36	14,0	011[2]		011[2]			01100[1]		011	01100			011[1]			011	
1,15		36	14,0						01150[1]			01150							
1,20		38	16,0	012[2]		012[2]			01200[1]		012	01200			012[1]			012	
1,25		38	16,0			125[2]			01250[1]			01250							
1,30		38	16,0	013[2]		013[2]			01300[1]		013	01300			013[1]			013	
1,35		40	18,0						01350[1]			01350							
1,40		40	18,0	014[2]		014[2]			01400[1]		014	01400			014[1]			014	
1,45		40	18,0			145[2]			01450[1]			01450						901	
1,50		40	18,0	015[2]		015[2]			01500[1]		015	01500			015[1]			015	
1,55		43	20,0			155[2]			01550[1]			01550						902	
1,60		43	20,0	016[2]		016[2]			01600[1]		016	01600			016[1]			016	
1,65		43	20,0			165[2]			01650[1]			01650						903	
1,70		43	20,0	017[2]		017[2]			01700[1]		017	01700			017[1]			017	
1,75		46	22,0						01750[1]			01750							
1,80		46	22,0	018[2]		018[2]			01800[1]		018	01800			018[1]			018	
1,85		46	22,0						01850[1]			01850						904	
1,90		46	22,0	019[2]		019[2]			01900[1]		019	01900			019[1]			019	
1,95		49	24,0						01950[1]			01950							
2,00		49	24,0	020[2]		020[2]			02000[1]		020	02000			020[1]			020	
2,05		49	24,0						02050[1]			02050						905	
2,10		49	24,0	021[2]		021[2]			02100[1]		021	02100			021[1]			021	
2,15		53	27,0						02150[1]			02150							
2,20		53	27,0	022[2]		022[2]			02200[1]		022	02200			022[1]			022	
2,25		53	27,0						02250[1]			02250							
2,30		53	27,0	023[2]		023[2]			02300[1]		023	02300			023[1]			023	
2,35		53	27,0						02350[1]			02350							
2,38	3/32	57	30,0	238[2]		238[2]													
2,40		57	30,0	024[2]		024[2]			02400		024	02400			024			024	

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S	○	○		○		○	○
H	○					○	○
O	○	○	○			○	○

1) uncoated
2) self-centering

→ v_c Page 46+47

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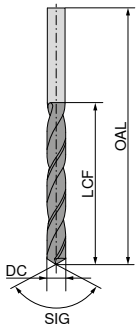
Twist drill to DIN 338, short

≤ 5xD



	UNI	UNI	N	VA	W	WTL	WTL
	TiN	TiN	vap.			F.-nit	TiN
							
	SIG 130°	SIG 118°	SIG 118°	SIG 130°	SIG 130°	SIG 130°	SIG 130°
	HSS-E-PM	HSS-E	HSS	HSS-E	HSS	HSS-E	HSS-E
	10 173 ...	10 171 ...	10 152 ...	10 175 ...	10 161 ...	10 168 ...	10 170 ...

DC h8 mm	DC inch	OAL mm	LCF mm														
2,45		57	30,0						02450			02450					
2,50		57	30,0		025 2)		025 2)		02500		025	02500		025		025	
2,55		57	30,0				255 2)		02550			02550					
2,60		57	30,0		026 2)		026 2)		02600		026	02600		026		026	
2,65		57	30,0						02650			02650					
2,70		61	33,0		027 2)		027 2)		02700		027	02700		027		027	
2,75		61	33,0						02750			02750					
2,78	7/64	61	33,0		278 2)		278 2)										
2,80		61	33,0		028 2)		028 2)		02800		028	02800		028		028	
2,85		61	33,0						02850			02850					
2,90		61	33,0		029 2)		029 2)		02900		029	02900		029		029	
2,95		61	33,0						02950			02950					
3,00		61	33,0		030 2)		030 2)		03000		030	03000		030		030	
3,05		65	36,0						03050			03050					
3,10		65	36,0		031 2)		031 2)		03100		031	03100		031		031	
3,15		65	36,0						03150			03150					
3,17	1/8	65	36,0		317 2)		317 2)										
3,20		65	36,0		032 2)		032 2)		03200		032	03200		032		032	
3,25		65	36,0				325 2)		03250			03250					
3,30		65	36,0		033 2)		033 2)		03300		033	03300		033		033	
3,35		65	36,0						03350			03350					
3,40		70	39,0		034 2)		034 2)		03400		034	03400		034		034	
3,45		70	39,0						03450			03450					
3,50		70	39,0		035 2)		035 2)		03500		035	03500		035		035	
3,55		70	39,0						03550			03550					
3,57	9/64	70	39,0		357 2)		357 2)										
3,60		70	39,0		036 2)		036 2)		03600		036	03600		036		036	
3,65		70	39,0						03650			03650					
3,70		70	39,0		037 2)		037 2)		03700		037	03700		037		037	
3,75		70	39,0						03750			03750					
3,80		75	43,0		038 2)		038 2)		03800		038	03800		038		038	
3,85		75	43,0						03850			03850					
3,90		75	43,0		039 2)		039 2)		03900		039	03900		039		039	
3,95		75	43,0						03950			03950					
3,97	5/32	75	43,0		397 2)		397 2)										
4,00		75	43,0		040 2)		040 2)		04000		040	04000		040		040	
4,05		75	43,0						04050			04050					
4,10		75	43,0		041 2)		041 2)		04100		041	04100		041		041	
4,15		75	43,0						04150			04150					
4,20		75	43,0		042 2)		042 2)		04200		042	04200		042		042	
4,25		75	43,0				425 2)		04250			04250					
4,30		80	47,0		043 2)		043 2)		04300		043	04300		043		043	
4,35		80	47,0						04350			04350					
4,37	11/64	80	47,0		437 2)		437 2)										
4,40		80	47,0		044 2)		044 2)		04400		044	04400		044		044	
4,45		80	47,0						04450								

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N	○	○	○	●	●	●	○
S	○	○		○		○	○
H	○					○	○
O	○	○	○			○	○

1) uncoated
2) self-centering

→ v_c Page 46+47

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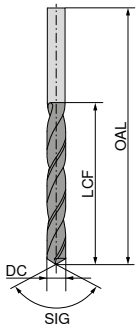
Twist drill to DIN 338, short

≤ 5xD



	UNI	UNI	N	VA	W	WTL	WTL
	TiN	TiN	vap.			F.-nit	TiN
							
	SIG 130°	SIG 118°	SIG 118°	SIG 130°	SIG 130°	SIG 130°	SIG 130°
	HSS-E-PM	HSS-E	HSS	HSS-E	HSS	HSS-E	HSS-E
	10 173 ...	10 171 ...	10 152 ...	10 175 ...	10 161 ...	10 168 ...	10 170 ...

DC h8 mm	DC inch	OAL mm	LCF mm														
4,50		80	47,0		045 2)		045 2)		04500		045		04500		045		045
4,55		80	47,0						04550				04550				
4,60		80	47,0		046 2)		046 2)		04600		046		04600		046		046
4,65		80	47,0				465 2)		04650				04650				
4,70		80	47,0		047 2)		047 2)		04700		047		04700		047		047
4,75		80	47,0						04750				04750				
4,76	3/16	86	52,0		476 2)		476 2)										
4,80		86	52,0		048 2)		048 2)		04800		048		04800		048		048
4,85		86	52,0						04850				04850				
4,90		86	52,0		049 2)		049 2)		04900		049		04900		049		049
4,95		86	52,0				495 2)		04950				04950				
5,00		86	52,0		050 2)		050 2)		05000		050		05000		050		050
5,05		86	52,0				505 2)		05050				05050				
5,10		86	52,0		051 2)		051 2)		05100		051		05100		051		
5,15		86	52,0						05150								
5,16	13/64	86	52,0		516 2)		516 2)										
5,20		86	52,0		052 2)		052 2)		05200		052		05200		052		052
5,25		86	52,0						05250				05250				
5,30		86	52,0		053 2)		053 2)		05300		053		05300				
5,35		93	57,0						05350								
5,40		93	57,0		054 2)		054 2)		05400				05400				
5,45		93	57,0						05450				05450				
5,50		93	57,0		055 2)		055 2)		05500		055		05500		055		055
5,55		93	57,0				555 2)		05550				05550				
5,56	7/32	93	57,0		556 2)		556 2)										
5,60		93	57,0		056 2)		056 2)		05600		056		05600		056		056
5,65		93	57,0						05650				05650				
5,70		93	57,0		057 2)		057 2)		05700		057		05700		057		057
5,75		93	57,0				575 2)		05750				05750				
5,80		93	57,0		058 2)		058 2)		05800		058		05800		058		058
5,85		93	57,0						05850				05850				
5,90		93	57,0		059 2)		059 2)		05900		059		05900		059		059
5,95	15/64	93	57,0		595 2)		595 2)		05950				05950				
6,00		93	57,0		060 2)		060 2)		06000		060		06000		060		060
6,05		101	63,0						06050				06050				
6,10		101	63,0		061 2)		061 2)		06100				06100				
6,15		101	63,0						06150				06150				
6,20		101	63,0		062 2)		062 2)		06200		062		06200				062
6,25		101	63,0						06250				06250				
6,30		101	63,0		063 2)		063 2)		06300				06300				
6,35	1/4	101	63,0		635 2)		635 2)		06350				06350				
6,40		101	63,0		064 2)		064 2)		06400				06400				
6,45		101	63,0						06450								
6,50		101	63,0		065 2)		065 2)		06500		065		06500		065		065
6,55		101	63,0						06550				06550				
6,60		101	63,0		066 2)		066 2)		06600				06600				

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N	○	○	○	●	●	●	○
S	○	○		○		○	○
H	○					○	○
O	○	○	○			○	○

1) uncoated
2) self-centering

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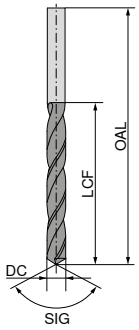
Twist drill to DIN 338, short

≤ 5xD



	UNI	UNI	N	VA	W	WTL	WTL
	TiN	TiN	vap.			F.-nit	TiN
							
	SIG 130° HSS-E-PM	SIG 118° HSS-E	SIG 118° HSS	SIG 130° HSS-E	SIG 130° HSS	SIG 130° HSS-E	SIG 130° HSS-E
	10 173 ...	10 171 ...	10 152 ...	10 175 ...	10 161 ...	10 168 ...	10 170 ...

DC $_{h8}$ mm	DC inch	OAL mm	LCF mm																
6,65		101	63,0					06650			06650								
6,70		101	63,0	067 [2]		067 [2]		06700			06700								
6,75		109	69,0	675 [2]		675 [2]		06750			06750								
6,80		109	69,0	068 [2]		068 [2]		06800		068	06800		068		068				
6,85		109	69,0					06850			06850								
6,90		109	69,0	069 [2]		069 [2]		06900		069	06900								
6,95		109	69,0					06950			06950								
7,00		109	69,0	070 [2]		070 [2]		07000		070	07000		070		070				
7,05		109	69,0					07050			07050								
7,10		109	69,0	071 [2]		071 [2]		07100			07100								
7,14	9/32	109	69,0	714 [2]		714 [2]													
7,15		109	69,0					07150											
7,20		109	69,0	072 [2]		072 [2]		07200		072	07200		072		072				
7,25		109	69,0					07250			07250								
7,30		109	69,0	073 [2]		073 [2]		07300			07300								
7,35		109	69,0					07350											
7,40		109	69,0	074 [2]		074 [2]		07400		074	07400		074		074				
7,45		109	69,0			745 [2]		07450											
7,50		109	69,0	075 [2]		075 [2]		07500		075	07500		075		075				
7,55		117	75,0					07550											
7,60		117	75,0	076 [2]		076 [2]		07600		076	07600		076		076				
7,65		117	75,0					07650											
7,70		117	75,0	077 [2]		077 [2]		07700		077	07700		077		077				
7,75		117	75,0					07750			07750								
7,80		117	75,0	078 [2]		078 [2]		07800		078	07800		078		078				
7,85		117	75,0					07850											
7,90		117	75,0	079 [2]		079 [2]		07900		079	07900		079		079				
7,94	5/16	117	75,0	794 [2]		794 [2]													
7,95		117	75,0					07950											
8,00		117	75,0	080 [2]		080 [2]		08000		080	08000		080		080				
8,05		117	75,0					08050			08050								
8,10		117	75,0	081 [2]		081 [2]		08100			08100								
8,15		117	75,0					08150			08150								
8,20		117	75,0	082 [2]		082 [2]		08200			08200								
8,25		117	75,0					08250			08250								
8,30		117	75,0	083 [2]		083 [2]		08300			08300								
8,35		117	75,0					08350											
8,40		117	75,0	084 [2]		084 [2]		08400		084	08400		084		084				
8,45		117	75,0					08450			08450								
8,50		117	75,0	085 [2]		085 [2]		08500		085	08500		085		085				
8,55		125	81,0					08550			08550								
8,60		125	81,0			086 [2]		08600		086	08600				086				
8,65		125	81,0					08650											
8,70		125	81,0			087 [2]		08700			08700								
8,73	11/32	125	81,0	873 [2]		873 [2]													
8,75		125	81,0					08750			08750								

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M						●				●					○			○	
K				●		●		●							●			●	
N				○		○		○		●		●			●			○	
S				○		○				○					○			○	
H				○											○			○	
O				○		○		○							○			○	

1) uncoated
2) self-centering

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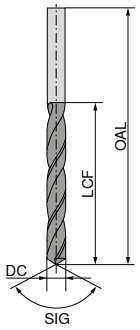
Twist drill to DIN 338, short

≤ 5xD



	UNI	UNI	N	VA	W	WTL	WTL
	TiN	TiN	vap.			F.-nit	TiN
							
	SIG 130°	SIG 118°	SIG 118°	SIG 130°	SIG 130°	SIG 130°	SIG 130°
	HSS-E-PM	HSS-E	HSS	HSS-E	HSS	HSS-E	HSS-E
	10 173 ...	10 171 ...	10 152 ...	10 175 ...	10 161 ...	10 168 ...	10 170 ...

DC h8 mm	DC inch	OAL mm	LCF mm																
8,80		125	81,0		088 2)		088 2)		08800		088		08800		088		088
8,90		125	81,0				089 2)		08900				08900				
8,95		125	81,0						08950								
9,00		125	81,0		090 2)		090 2)		09000		090		09000		090		090
9,05		125	81,0						09050								
9,10		125	81,0				091 2)		09100				09100				
9,15		125	81,0						09150								
9,20		125	81,0				092 2)		09200		092		09200		092		092
9,25		125	81,0						09250				09250				
9,30		125	81,0		093 2)		093 2)		09300		093		09300		093		093
9,35		125	81,0				935 2)		09350								
9,40		125	81,0				094 2)		09400		094		09400		094		094
9,45		125	81,0						09450								
9,50		125	81,0		095 2)		095 2)		09500		095		09500		095		095
9,55		133	87,0						09550								
9,60		133	87,0				096 2)		09600		096		09600		096		096
9,65		133	87,0						09650								
9,70		133	87,0				097 2)		09700		097		09700		097		097
9,75		133	87,0						09750								
9,80		133	87,0		098 2)		098 2)		09800		098		09800		098		098
9,85		133	87,0						09850								
9,90		133	87,0				099 2)		09900		099		09900		099		099
9,95		133	87,0						09950								
10,00		133	87,0		100 2)		100 2)		10000		100		10000		100		100
10,05		133	87,0						10050				10050				
10,10		133	87,0				101 2)		10100				10100				
10,15		133	87,0						10150								
10,20		133	87,0		102 2)		102 2)		10200		102		10200		102		102
10,25		133	87,0						10250				10250				
10,30		133	87,0				103 2)		10300		103		10300		103		103
10,35		133	87,0						10350								
10,40		133	87,0				104 2)		10400				10400				
10,45		133	87,0						10450								
10,50		133	87,0		105 2)		105 2)		10500		105		10500		105		105
10,55		133	87,0				955 2)		10550								
10,60		133	87,0						10600				10600				
10,70		142	94,0						10700		107		10700		107		
10,75		142	94,0						10750				10750				
10,80		142	94,0						10800				10800				
10,90		142	94,0						10900				10900				
11,00		142	94,0		110 2)		110 2)		11000		110		11000		110		110
11,10		142	94,0						11100				11100				
11,11	7/16	142	94,0		111 2)		111 2)										
11,20		142	94,0				112 2)		11200		112		11200		112		112
11,30		142	94,0				113 2)				113				113		
11,40		142	94,0				114 2)		11400		114		11400		114		

P	●	●	○	○			●	●
M		●		●			○	○
K	●	●	●				●	●
N	○	○	○	●	●		●	○
S	○	○		○			○	○
H	○						○	○
O	○	○	○				○	○

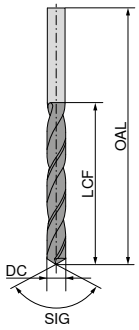
1) uncoated
2) self-centering

→ v_c Page 46+47

Continued on next page

Twist drill to DIN 338, short

≤ 5xD



	UNI	UNI	N	VA	W	WTL	WTL
	TiN	TiN	vap.			F.-nit	TiN
							
	SIG 130° HSS-E-PM	SIG 118° HSS-E	SIG 118° HSS	SIG 130° HSS-E	SIG 130° HSS	SIG 130° HSS-E	SIG 130° HSS-E
	10 173 ...	10 171 ...	10 152 ...	10 175 ...	10 161 ...	10 168 ...	10 170 ...

DC $_{h8}$ mm	DC inch	OAL mm	LCF mm																
11,50		142	94,0		115 2)		115 2)		11500		115		11500		115		115
11,60		142	94,0				116 2)		11600		116		11600		116		
11,70		142	94,0						11700		117		11700		117		117
11,80		142	94,0						11800		118		11800		118		118
11,90		151	101,0						11900		119		11900				
12,00		151	101,0		120 2)		120 2)		12000		120		12000		120		120
12,15		151	101,0				121 2)										
12,20		151	101,0						12200				12200				
12,25		151	101,0						12250								
12,30		151	101,0		123 2)		123 2)										
12,50		151	101,0		125 2)		925 2)		12500				12500		125		125
12,70		151	101,0		127 2)		127 2)		12700				12700				
12,80		151	101,0						12800				12800		128		128
13,00		151	101,0		130 2)		130 2)		13000				13000		130		130
13,10		151	101,0				131 2)										
13,20		151	101,0						13200				13200				
13,30		160	108,0				133 2)										
13,50		160	108,0		135 2)		135 2)		13500				13500		135		135
13,80		160	108,0						13800				13800		138		138
14,00		160	108,0		140 2)		140 2)		14000				14000		140		140
14,50		169	114,0						14500				14500		145		145
14,80		169	114,0												148		
15,00		169	114,0						15000				15000		150		150
15,25		178	120,0						15250								
15,50		178	120,0						15500				15500		155		155
15,80		178	120,0						15800								
16,00		178	120,0						16000				16000		160		160
16,50		184	125,0						16500				16500				
17,00		184	125,0						17000				17000				
17,50		191	130,0						17500				17500				
18,00		191	130,0						18000				18000				
18,50		198	135,0						18500								
19,00		198	135,0						19000				19000				
19,50		205	140,0						19500								
20,00		205	140,0						20000				20000				

P					●		●		○		○				●		●
M							●				●				○		○
K					●		●		●						●		●
N					○		○		○		●		●		●		○
S					○		○				○				○		○
H					○										○		○
O					○		○		○						○		○

1) uncoated
2) self-centering

→ v_c Page 46+47

Twist drill sets DIN 338, short

▲ In a box
▲ In 0.1 mm steps

≤ 5xD

	N	UNI
	vap.	TiN
		
	Drill set type N	Drill set type UNI TiN
	HSS	HSS-E
	10 158 ...	10 158 ...
DC h8 mm		
1,0 - 5,9	050	054 1)
6,0 - 10,0	100	104 1)
P	○	●
M		●
K	●	●
N	○	○
S		○
H		
O	○	○

1) self-centering

→ v_c Page 46

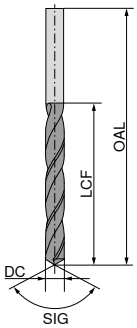
Set of type N vap. contains the drills of Art. No. 10 152 ...
Set of type UNI TiN contains the drills of Art. No. 10 171 ...

Twist drills with coolant hole, factory standard, long

≤ 10xD

NC

TiAlN



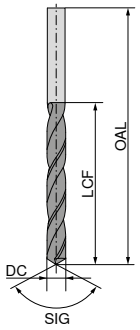
SIG 130°
HSS

DC h8 mm	OAL mm	LCF mm	10 224 ...
3,0	100	66	030
3,3	106	69	033
3,5	112	73	035
3,8	119	78	038
4,0	119	78	040
4,2	119	78	042
4,5	126	82	045
4,8	132	87	048
5,0	132	87	050
5,5	139	91	055
5,8	139	91	058
6,0	139	91	060
6,5	148	97	065
6,8	156	102	068
7,0	156	102	070
7,5	156	102	075
7,8	165	109	078
8,0	165	109	080
8,5	165	109	085
8,8	175	115	088
9,0	175	115	090
9,5	175	115	095
9,8	184	121	098
10,0	184	121	100
10,2	184	121	102
10,5	184	121	105
10,8	195	128	108
11,0	195	128	110
11,5	195	128	115
11,8	205	134	118
12,0	205	134	120
12,8	205	134	128
13,0	205	134	130
P			○
M			○
K			●
N			○
S			
H			
O			○

→ v_c Page 48

Twist drills, DIN 340, long

≤ 10xD



	UNI	WTL	WTL	WTW
	TiN	F.-nit	TiN	
				
	SIG 118° HSS-E	SIG 130° HSS-E	SIG 130° HSS	SIG 130° HSS
DC h8 mm	10 270 ...	10 225 ...	10 210 ...	10 200 ...
1,0	56	33	010	010 1)	010	010
1,1	60	37	011	011 1)	011	011
1,2	65	41	012	012 1)		012
1,3	65	41	013	013 1)		
1,4	70	45	014	014 1)		014
1,5	70	45	015	015 1)	015	015
1,6	76	50	016	016 1)	016	016
1,7	76	50	017	017 1)		
1,8	80	53	018	018 1)		018
1,9	80	53	019	019 1)	019	019
2,0	85	56	020	020 1)	020	020
2,1	85	56	021	021 1)	021	021
2,2	90	59	022	022 1)		
2,3	90	59	023	023 1)	023	023
2,4	95	62	024	024	024	024
2,5	95	62	025	025	025	025
2,6	95	62	026	026	026	026
2,7	100	66	027	027	027	027
2,8	100	66	028	028	028	028
2,9	100	66	029	029	029	029
3,0	100	66	030	030	030	030
3,1	106	69	031	031		
3,2	106	69	032	032		
3,3	106	69	033	033	033	033
3,4	112	73	034	034		
3,5	112	73	035	035	035	035
3,6	112	73	036	036	036	036
3,7	112	73	037	037	037	037
3,8	119	78	038	038	038	038
3,9	119	78	039	039	039	039
4,0	119	78	040	040	040	040
4,1	119	78	041	041		
4,2	119	78	042	042	042	042
4,3	126	82	043	043	043	043
4,4	126	82	044	044		
4,5	126	82	045	045	045	045
4,6	126	82	046	046	046	046
4,7	126	82	047	047	047	047
4,8	132	87	048	048	048	048
4,9	132	87	049	049	049	049
5,0	132	87	050	050	050	050
5,1	132	87	051	051		
P			●	●	○	
M			●	○		
K			●	●	●	
N			○	●	○	●
S			○	○		
H				○		
O			○	○	○	

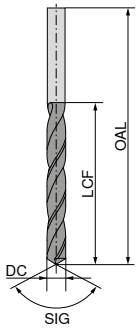
1) uncoated

→ v_c Page 48+49

Continued on next page

Twist drills, DIN 340, long

≤ 10xD



	UNI	WTL	WTL	WTW
	TiN	F.-nit	TiN	
				
	SIG 118° HSS-E	SIG 130° HSS-E	SIG 130° HSS	SIG 130° HSS
DC h8 mm	10 270 ...	10 225 ...	10 210 ...	10 200 ...
5,2	132	87	052	052	052	052
5,3	132	87	053	053	053	053
5,4	139	91	054	054		
5,5	139	91	055	055	055	055
5,6	139	91	056	056	056	056
5,7	139	91	057	057	057	057
5,8	139	91	058	058	058	058
5,9	139	91	059	059	059	059
6,0	139	91	060	060	060	060
6,1	148	97	061	061		
6,2	148	97	062	062		
6,3	148	97	063	063	063	063
6,4	148	97	064	064		
6,5	148	97	065	065	065	065
6,6	148	97	066	066		
6,7	148	97	067	067		
6,8	156	102	068	068	068	068
6,9	156	102	069	069		
7,0	156	102	070	070	070	070
7,1	156	102	071	071		
7,2	156	102	072	072	072	072
7,3	156	102	073	073		
7,4	156	102	074	074	074	074
7,5	156	102	075	075	075	075
7,6	165	109	076		076	076
7,7	165	109	077	077		077
7,8	165	109	078	078	078	078
7,9	165	109	079	079	079	079
8,0	165	109	080	080	080	080
8,1	165	109	081	081		
8,2	165	109	082	082		
8,3	165	109	083	083		
8,4	165	109	084	084	084	084
8,5	165	109	085	085	085	085
8,6	175	115	086	086		
8,7	175	115	087	087		
8,8	175	115	088	088	088	088
8,9	175	115	089	089		
9,0	175	115	090	090	090	090
9,1	175	115	091	091		
9,2	175	115	092	092		092
9,3	175	115	093	093		093
P			●	●	○	
M			●	○		
K			●	●	●	
N			○	●	○	●
S			○	○		
H				○		
O			○	○	○	

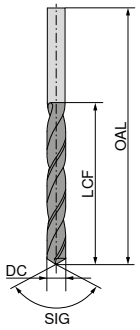
1) uncoated

→ v_c Page 48+49

Continued on next page

Twist drills, DIN 340, long

≤ 10xD



	UNI	WTL	WTL	WTW
	TiN	F.-nit	TiN	
				
	SIG 118° HSS-E	SIG 130° HSS-E	SIG 130° HSS	SIG 130° HSS
DC h8 mm / OAL mm / LCF mm	10 270 ...	10 225 ...	10 210 ...	10 200 ...
9,4 / 175 / 115	094	094		094
9,5 / 175 / 115	095	095	095	095
9,6 / 184 / 121	096			096
9,7 / 184 / 121	097	097	097	
9,8 / 184 / 121	098	098	098	098
9,9 / 184 / 121	099	099	099	
10,0 / 184 / 121	100	100	100	100
10,1 / 184 / 121	101			
10,2 / 184 / 121	102	102	102	102
10,3 / 184 / 121	103			103
10,4 / 184 / 121	104			
10,5 / 184 / 121	105	105	105	105
10,8 / 195 / 128		108		
11,0 / 195 / 128	110	110	110	110
11,5 / 195 / 128	115	115	115	115
11,6 / 195 / 128				116
11,8 / 195 / 128		118		118
12,0 / 205 / 134	120	120	120	120
12,2 / 205 / 134				122
12,3 / 205 / 134				123
12,5 / 205 / 134	125		125	125
13,0 / 205 / 134	130		130	130
13,5 / 214 / 140	135			
14,0 / 214 / 140	140		140	140
P	●	●	○	
M	●	○		
K	●	●	●	
N	○	●	○	●
S	○	○		
H		○		
O	○	○	○	

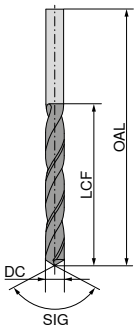
1) uncoated

→ v_c Page 48+49

Twist drills, DIN 1869, extra-long, series 1

▲ Up to diameter DC of 2.30 mm in uncoated version

> 10xD



SIG 130°
HSS-E

SIG 130°
HSS

DC h8 mm	OAL mm	LCF mm	10 236 ...	10 235 ...
2,0	125	85		020 1)
2,1	125	85		021 1)
2,2	135	90		022 1)
2,3	135	90		023 1)
2,4	140	95		024
2,5	140	95		025
2,6	140	95		026
2,7	150	100		027
2,8	150	100		028
2,9	150	100		029
3,0	150	100	03000	030
3,1	155	105		031
3,2	155	105		032
3,3	155	105	03300	033
3,4	165	115		034
3,5	165	115	03500	035
3,6	165	115		036
3,7	165	115		037
3,8	175	120		038
3,9	175	120		039
4,0	175	120	04000	040
4,1	175	120		041
4,2	175	120	04200	042
4,3	185	125		043
4,4	185	125		044
4,5	185	125	04500	045
4,6	185	125		046
4,7	185	125		047
4,8	195	135		048
4,9	195	135		049
5,0	195	135	05000	050
5,1	195	135		051
5,2	195	135		052
5,3	195	135		053
5,4	205	140		054
5,5	205	140	05500	055
5,6	205	140		056
5,7	205	140		057
5,8	205	140		058
5,9	205	140		059
6,0	205	140	06000	060
6,1	215	150		061
6,2	215	150		062
6,3	215	150		063
6,4	215	150		064
6,5	215	150	06500	065
6,6	215	150		066
6,7	215	150		067
6,8	225	155	06800	068
6,9	225	155		069
7,0	225	155	07000	070
7,1	225	155		071
7,3	225	155		073
7,4	225	155		074
7,5	225	155	07500	075
7,7	240	165		077
7,8	240	165		078
7,9	240	165		079
8,0	240	165	08000	080
8,1	240	165		081
8,2	240	165		082
8,3	240	165		083
8,4	240	165		084
8,5	240	165	08500	085
8,6	250	175		086
8,7	250	175		087
8,8	250	175		088
9,0	250	175	09000	090
9,2	250	175		092
9,4	250	175		094
9,5	250	175	09500	095
9,6	265	185		096
9,7	265	185		097
9,8	265	185		098
9,9	265	185		099
10,0	265	185	10000	100
10,2	265	185	10200	
10,5	265	185		105
11,0	280	195		110
11,5	280	195		115
12,0	295	205		120
12,5	295	205		125
13,0	295	205		130
P			●	●
M				
K			●	●
N			●	●
S				
H				
O			○	○

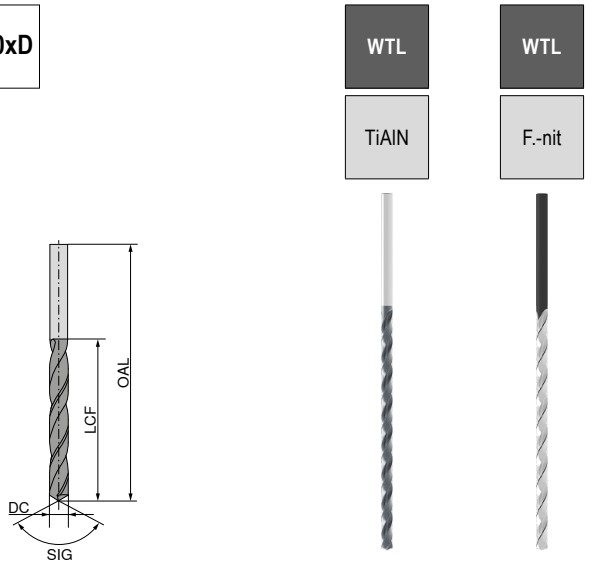
1) uncoated

→ v_c Page 50

Twist drills, DIN 1869, extra-long, series 2

▲ Up to diameter DC of 2.00 mm in uncoated version

> 10xD



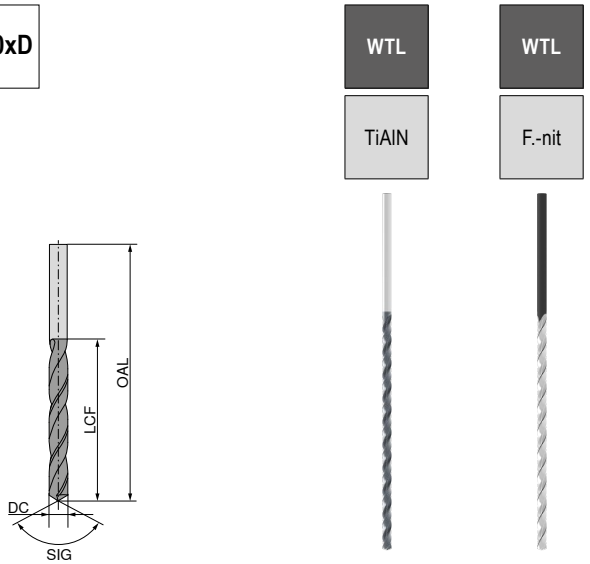
DC h8 mm	OAL mm	LCF mm	10 246 ...	10 245 ...
2,0	160	110		020 [1]
2,5	180	120		025
3,0	190	130	03000	030
3,5	210	145	03500	035
4,0	220	150	04000	040
4,5	235	160	04500	045
5,0	245	170	05000	050
5,5	260	180	05500	055
6,0	260	180	06000	060
6,5	275	190	06500	065
7,0	290	200	07000	070
7,5	290	200	07500	075
8,0	305	210	08000	080
8,5	305	210	08500	085
9,0	320	220	09000	090
9,5	320	220	09500	095
10,0	340	235	10000	100
10,2	340	235	10200	
10,5	340	235		105
11,0	365	250		110
11,5	365	250		115
12,0	375	260	12000	120
12,5	375	260		125
13,0	375	260		130
P			●	●
M				
K			●	●
N			●	●
S				
H				
O			○	○

1) uncoated

→ v_c Page 50+51

Twist drills, DIN 1869, extra-long, series 3

> 10xD



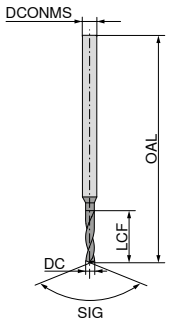
DC h8 mm	OAL mm	LCF mm	10 256 ...	10 255 ...
2,5	225	150		025
3,0	240	160		030
3,5	265	180		035
4,0	280	190	04000	040
4,5	295	200		045
5,0	315	210	05000	050
5,5	330	225		055
6,0	330	225	06000	060
6,5	350	235		065
7,0	370	250		070
7,5	370	250		075
8,0	390	265	08000	080
8,5	390	265		085
9,0	410	280		090
9,5	410	280		095
10,0	430	295	10000	100
10,5	430	295		105
11,0	455	310		110
11,5	455	310		115
12,0	480	330		120
12,5	480	330		125
13,0	480	330		130
P			●	●
M				
K			●	●
N			●	●
S				
H				
O			○	○

→ v_c Page 50+51

Twist drills, DIN 1899

▲ 4 facet
▲ with reinforced shank

Scope of supply:
Packing quantity 5 pieces (Ø 0.15 mm packing quantity 10 pieces)
price per piece



N

SIG 118°
HSS-E-PM

10 103 ...

DC -0,004 mm	OAL mm	LCF mm	DCONMS h8 mm	
0,15	25	0,8	1,0	00150
0,20	25	1,5	1,0	00200
0,25	25	1,9	1,0	00250
0,30	25	1,9	1,0	00300
0,35	25	2,4	1,0	00350
0,40	25	3,0	1,0	00400
0,45	25	3,0	1,0	00450
0,50	25	3,4	1,0	00500
0,55	25	3,9	1,0	00550
0,60	25	3,9	1,0	00600
0,65	25	4,2	1,0	00650
0,70	25	4,8	1,0	00700
0,75	25	4,8	1,0	00750
0,80	25	5,3	1,5	00800
0,85	25	5,3	1,5	00850
0,90	25	6,0	1,5	00900
0,95	25	6,0	1,5	00950
1,00	25	6,8	1,5	01000
1,05	25	6,8	1,5	01050
1,10	25	7,6	1,5	01100
1,15	25	7,6	1,5	01150
1,20	25	8,5	1,5	01200
1,25	25	8,5	1,5	01250
1,30	25	8,5	1,5	01300
1,35	25	9,5	1,5	01350
1,40	25	9,5	1,5	01400
1,45	25	9,5	1,5	01450

P	●
M	○
K	●
N	●
S	○
H	
O	○

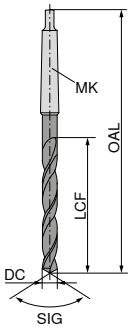
→ v_c Page 52

Twist drill, factory standard, short

≤ 3xD

WT

vap.



SIG 130°
HSS-E

10 285 ...

DC h8 mm	OAL mm	LCF mm	MK	
13,0	147	66	1	130
13,5	168	70	2	135
14,0	168	70	2	140
14,5	172	74	2	145
15,0	172	74	2	150
15,5	176	78	2	155
16,0	176	78	2	160
16,5	179	81	2	165
17,0	179	81	2	170
17,5	183	85	2	175
18,0	183	85	2	180
18,5	186	88	2	185
19,0	186	88	2	190
19,5	212	91	3	195
20,0	212	91	3	200
21,0	216	95	3	210
22,0	219	98	3	220
23,0	222	101	3	230
24,0	225	104	3	240
25,0	225	104	3	250
26,0	256	107	4	260
27,0	259	110	4	270
28,0	259	110	4	280
30,0	263	114	4	300

P	●
M	●
K	●
N	○
S	○
H	○
O	

→ v_c Page 45

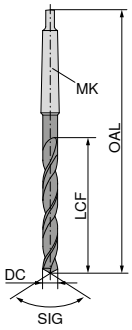
Twist drills, DIN 345

≤ 5xD

N

vap.

WTL



SIG 118°
HSS

SIG 130°
HSS-E

DC h8 mm	OAL mm	LCF mm	MK	10 265 ...	10 280 ...
10,00	168	87	1	100	100 1)
10,20	168	87	1	102	102 1)
10,50	168	87	1	105	105 1)
10,80	175	94	1	108	108 1)
11,00	175	94	1	110	110 1)
11,20	175	94	1	112	
11,50	175	94	1	115	115 1)
11,80	175	94	1	118	
12,00	182	101	1	120	120 1)
12,20	182	101	1	122	122 1)
12,50	182	101	1	125	125 1)
12,80	182	101	1	128	
13,00	182	101	1	130	130 1)
13,20	182	101	1	132	
13,50	189	108	1	135	135 1)
13,80	189	108	1	138	
14,00	189	108	1	140	140 1)
14,25	212	114	2	142	142 1)
14,50	212	114	2	145	145 1)
14,75	212	114	2	147	
15,00	212	114	2	150	150 1)
15,25	218	120	2	152	152 1)
15,50	218	120	2	155	155 1)
15,75	218	120	2	157	157 1)
16,00	218	120	2	160	160 1)
16,25	223	125	2	162	
16,50	223	125	2	165	165 2)
16,75	223	125	2	167	
17,00	223	125	2	170	170 2)
17,25	228	130	2	172	172 2)
17,50	228	130	2	175	175 2)
17,75	228	130	2	177	177 2)
18,00	228	130	2	180	180 2)
18,25	233	135	2	182	
18,50	233	135	2	185	185 2)
18,75	233	135	2	187	
19,00	233	135	2	190	190 2)
19,25	238	140	2	192	
19,50	238	140	2	195	
19,75	238	140	2	197	
20,00	238	140	2	200	200 2)
20,25	243	145	2	202	
20,50	243	145	2	205	
20,75	243	145	2	207	
21,00	243	145	2	210	210 2)
21,25	248	150	2	212	
21,50	248	150	2	215	
21,75	248	150	2	217	
22,00	248	150	2	220	220 2)
22,25	248	150	2	222	
22,50	253	155	2	225	225 2)
22,75	253	155	2	227	
23,00	253	155	2	230	230 2)
23,50	276	155	3	235	
23,75	281	160	3	237	
24,00	281	160	3	240	240 2)
24,50	281	160	3	245	
24,75	281	160	3	247	
25,00	281	160	3	250	250 2)
25,50	286	165	3	255	
25,75	286	165	3	257	
26,00	286	165	3	260	260 2)
26,50	286	165	3	265	
26,75	291	170	3	267	
27,00	291	170	3	270	270 2)
27,50	291	170	3	275	
27,75	291	170	3	277	
28,00	291	170	3	280	
28,50	296	175	3	285	
28,75	296	175	3	287	
29,00	296	175	3	290	
29,50	296	175	3	295	
29,75	296	175	3	297	
30,00	296	175	3	300	
30,50	301	180	3	305	
31,00	301	180	3	310	
31,50	301	180	3	315	
32,00	334	185	4	320	
32,50	334	185	4	325	
33,00	334	185	4	330	
33,50	334	185	4	335	
34,00	339	190	4	340	
34,50	339	190	4	345	
35,00	339	190	4	350	
35,50	339	190	4	355	
36,00	344	195	4	360	
36,50	344	195	4	365	
37,00	344	195	4	370	
37,50	344	195	4	375	
38,00	349	200	4	380	
38,50	349	200	4	385	
39,00	349	200	4	390	
39,50	349	200	4	395	
40,00	349	200	4	400	
41,00	354	205	4	410	
42,00	354	205	4	420	
43,00	359	210	4	430	
44,00	359	210	4	440	
45,00	359	210	4	450	
46,00	364	215	4	460	
47,00	364	215	4	470	
48,00	369	220	4	480	
49,00	369	220	4	490	
50,00	369	220	4	500	
51,00	412	225	5	510	
52,00	412	225	5	520	
53,00	412	225	5	530	
54,00	417	230	5	540	
55,00	417	230	5	550	

	10 265 ...	10 280 ...
P	○	●
M		○
K	●	●
N	○	●
S		○
H		○
O	○	○

1) nitrided chamfer
2) vaporised

→ v_c Page 47

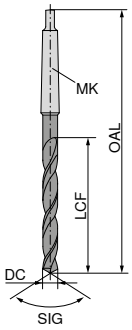
Twist drills, DIN 341, long

≤ 10xD

N

vap.

WTL



SIG 118°
HSS

SIG 130°
HSS-E

DC h8 mm	OAL mm	LCF mm	MK	10 295 ...	10 297 ...
10,00	197	116	1	100	100 1)
10,20	197	116	1	102	102 1)
10,50	197	116	1	105	105 1)
10,80	206	125	1	108	
11,00	206	125	1	110	110 1)
11,20	206	125	1	112	112 1)
11,50	206	125	1	115	115 1)
11,80	206	125	1	118	118 1)
12,00	215	134	1	120	120 1)
12,20	215	134	1	122	122 1)
12,50	215	134	1	125	125 1)
12,80	215	134	1	128	128 1)
13,00	215	134	1	130	130 1)
13,20	215	134	1	132	
13,50	223	142	1	135	135 1)
13,80	223	142	1	138	138 1)
14,00	223	142	1	140	140 1)
14,25	245	147	2	142	
14,50	245	147	2	145	145 1)
14,75	245	147	2	147	
15,00	245	147	2	150	150 1)
15,25	251	153	2	152	
15,50	251	153	2	155	155 1)
15,75	251	153	2	157	
16,00	251	153	2	160	160 1)
16,25	257	159	2	162	
16,50	257	159	2	165	165 2)
16,75	257	159	2	167	
17,00	257	159	2	170	170 2)
17,50	263	165	2	175	175 2)
17,75	263	165	2	177	
18,00	263	165	2	180	180 2)
18,50	269	171	2	185	185 2)
19,00	269	171	2	190	190 2)
19,50	275	177	2	195	195 2)
20,00	275	177	2	200	200 2)
20,50	282	184	2	205	205 2)
21,00	282	184	2	210	210 2)
21,50	289	191	2	215	
22,00	289	191	2	220	220 2)
22,50	296	198	2	225	
23,00	296	198	2	230	
23,50	319	198	3	235	
24,00	327	206	3	240	240 2)
24,50	327	206	3	245	
25,00	327	206	3	250	250 2)
25,50	335	214	3	255	
26,00	335	214	3	260	
26,50	335	214	3	265	
27,00	343	222	3	270	
27,50	343	222	3	275	
28,00	343	222	3	280	
29,00	351	230	3	290	
29,50	351	230	3	295	
30,00	351	230	3	300	
30,50	360	239	3	305	
31,00	360	239	3	310	
31,50	360	239	3	315	
32,00	397	248	4	320	
33,00	397	248	4	330	
33,50	397	248	4	335	
34,00	406	257	4	340	
35,00	406	257	4	350	
36,00	416	267	4	360	
37,00	416	267	4	370	
37,50	416	267	4	375	
38,00	426	277	4	380	
39,00	426	277	4	390	
40,00	426	277	4	400	
42,00	436	287	4	420	
43,00	447	298	4	430	
44,00	447	298	4	440	
45,00	447	298	4	450	
50,00	470	321	4	500	

	10 295 ...	10 297 ...
P	○	●
M		○
K	●	●
N	○	●
S		○
H		○
O	○	○

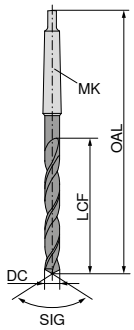
1) nitrided chamfer
2) vaporised

→ v_c Page 49

Twist drills, DIN 1870, extra-long, series 1

> 10xD

WTL



SIG 130°
HSS

10 305 ...

DC h8 mm	OAL mm	LCF mm	MK	
10,0	285	185	1	100 1)
10,5	285	185	1	105 1)
11,0	300	195	1	110 1)
11,5	300	195	1	115 1)
12,0	310	205	1	120 1)
12,5	310	205	1	125 1)
13,0	310	205	1	130 1)
13,5	325	220	1	135 1)
14,0	325	220	1	140 1)
14,5	340	220	2	145 1)
15,0	340	220	2	150 1)
15,5	355	230	2	155 1)
16,0	355	230	2	160 1)
16,5	355	230	2	165 2)
17,0	355	230	2	170 2)
17,5	370	245	2	175 2)
18,0	370	245	2	180 2)
18,5	370	245	2	185 2)
19,0	370	245	2	190 2)
19,5	385	260	2	195 2)
20,0	385	260	2	200 2)
21,0	385	260	2	210 2)
22,0	405	270	2	220 2)
23,0	405	270	2	230 2)
24,0	440	290	3	240 2)
25,0	440	290	3	250 2)
26,0	440	290	3	260 2)
28,0	460	305	3	280 2)
30,0	460	305	3	300 2)

P	●
M	
K	●
N	●
S	
H	
O	○

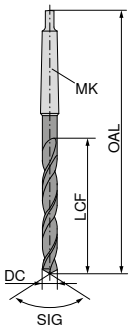
1) nitrided chamfer
2) vaporised

→ v_c Page 51

Twist drills, DIN 1870, extra-long, series 2

> 10xD

WTL



SIG 130°
HSS

10 315 ...

DC h8 mm	OAL mm	LCF mm	MK	
10,0	360	235	1	100 1)
10,5	360	235	1	105 1)
11,0	375	250	1	110 1)
11,5	375	250	1	115 1)
12,0	395	260	1	120 1)
13,0	395	260	1	130 1)
13,5	410	275	1	135 1)
14,0	410	275	1	140 1)
14,5	425	275	2	145 1)
15,0	425	275	2	150 1)
15,5	445	295	2	155 1)
16,0	445	295	2	160 1)
16,5	445	295	2	165 2)
17,0	445	295	2	170 2)
17,5	465	310	2	175 2)
18,0	465	310	2	180 2)
18,5	465	310	2	185 2)
19,0	465	310	2	190 2)
19,5	490	325	2	195 2)
20,0	490	325	2	200 2)
21,0	490	325	2	210 2)
22,0	515	345	2	220 2)
23,0	515	345	2	230 2)
24,0	555	365	3	240 2)
25,0	555	365	3	250 2)
26,0	555	365	3	260 2)
28,0	580	385	3	280 2)
30,0	580	385	3	300 2)

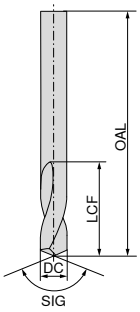
P	●
M	
K	●
N	●
S	
H	
O	○

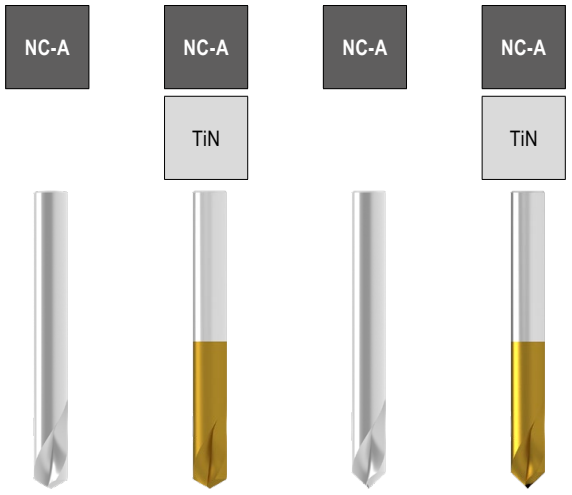
1) nitrided chamfer
2) vaporised

→ v_c Page 51

NC spot drills, factory standard

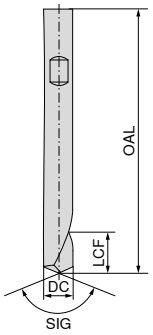
▲ helical flutes

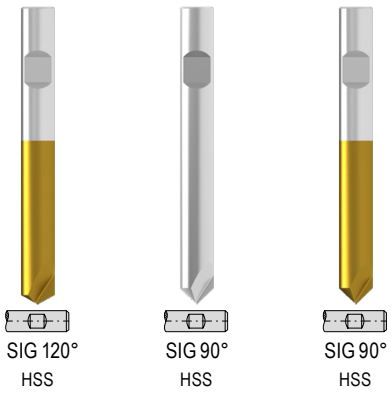




DC h6 mm	OAL mm	LCF mm	SIG 120° HSS 10 510 ...	SIG 120° HSS 10 512 ...	SIG 90° HSS 10 520 ...	SIG 90° HSS 10 522 ...
3	46	12,0	030	030	030	030
4	55	12,0	040	040	040	040
5	62	14,0	050	050	050	050
6	66	16,0	060	060	060	060
8	79	21,0	080	080	080	080
10	89	25,0	100	100	100	100
12	102	30,0	120	120	120	120
16	115	37,5	160	160	160	160
20	131	45,0	200	200	200	200

▲ with clamping flat to DIN 1835 B





DC h6 mm	OAL mm	LCF mm	SIG 120° HSS 10 513 ...	SIG 90° HSS 10 521 ...	SIG 90° HSS 10 523 ...
6	66	7,0	060	060	060
8	79	9,0	080	080	080
10	89	11,5	100	100	100
12	102	14,0	120	120	120
16	115	18,0	160	160	160
20	131	23,0	200	200	200

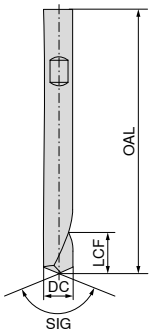
P	●	●	●	●
M	○	○	○	○
K	●	●	●	●
N	○	○	○	○
S	○	○	○	○
H				
O	○	○	○	○

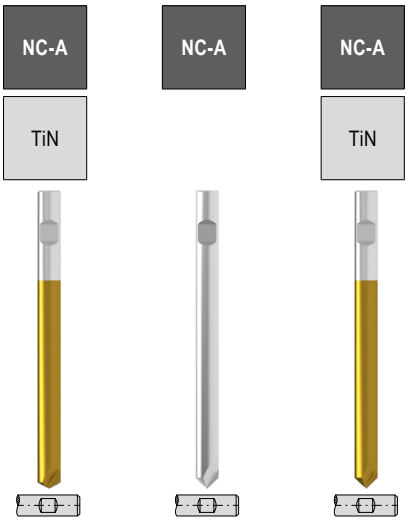
→ v_c Page 53

Suitable only for spot drilling!

NC spot drill factory standard long

▲ with clamping flat to DIN 1835 B





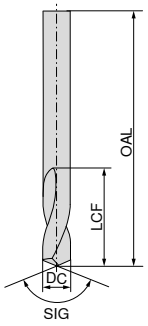
DC h6 mm	OAL mm	LCF mm	SIG 120° HSS 10 532 ...	SIG 90° HSS 10 526 ...	SIG 90° HSS 10 528 ...
6	93	7,0	060	060	060
8	117	9,0	080	080	080
10	133	11,5	100	100	100
12	151	14,0	120	120	120
16	178	18,0	160	160	160
20	205	23,0	200	200	200
P			●	●	●
M			○	○	○
K			●	●	●
N			○	○	○
S			○	○	○
H					
O			○	○	○

→ v_c Page 53

Suitable only for spot drilling!

NC spot drills, factory standard, long

▲ helical flutes



NC-A

SIG 90°
HSS

10 525 ...

DC h6 mm	OAL mm	LCF mm	
6,35	105	17	**025**
8,00	118	21	**030**
9,52	132	25	**040**
12,70	159	30	**050**
15,87	186	37	**060**

P	●
M	○
K	●
N	○
S	○
H	
O	○

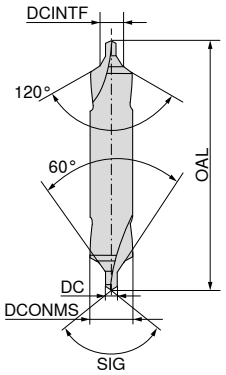
→ v_c Page 53

Suitable only for spot drilling!

Centre drills, DIN 333, form B

▲ with protective countersink 120°

ZB



Right-hand
SIG 118°
HSS

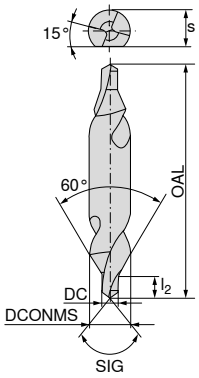
10 480 ...

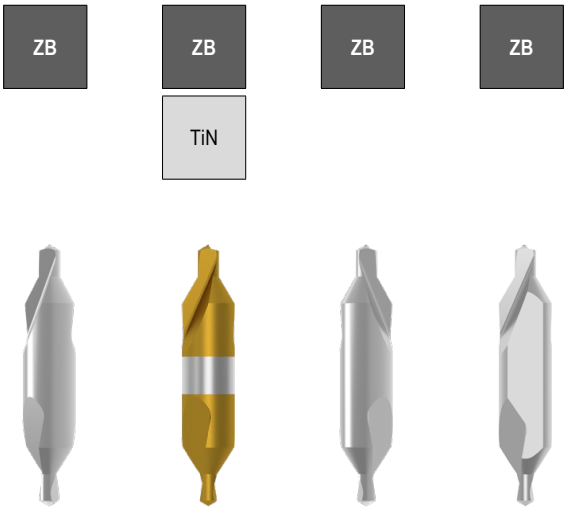
DC mm	DCONMS h8 mm	DCINTF k12 mm	OAL mm	
1,00	4,0	2,12	35,5	**100**
1,25	5,0	2,65	40,0	**125**
1,60	6,3	3,35	45,0	**160**
2,00	8,0	4,25	50,0	**200**
2,50	10,0	5,30	56,0	**250**
3,15	11,2	6,70	62,0	**315**
4,00	14,0	8,50	69,0	**400**
5,00	18,0	10,60	77,0	**500**

P	●
M	○
K	●
N	○
S	○
H	
O	○

→ v_c Page 53

Centre drills, DIN 333, form A





DC	s	DCONMS $_{h8}$	OAL	l_2	Right-hand SIG 118° HSS 10 415 ...		Right-hand SIG 118° HSS 10 425 ...		Left-hand SIG 118° HSS 10 435 ...		Right-hand SIG 118° HSS-E 10 445 ...	
mm	mm	mm	mm	mm								
0,50		3,15	25,0	0,8	**050** [2]		**050** [2]		**050** [2]			
0,80		3,15	25,0	1,1	**080** [2]		**080** [2]		**080** [2]			
1,00		3,15	31,5	1,3	**100**		**100**		**100**			
1,25		3,15	31,5	1,6	**125**		**125**		**125**			
1,60		4,00	35,5	2,0	**160**		**160**		**160**			
1,60	3,25	4,00	35,5	2,0							**160** [1]	
2,00		5,00	40,0	2,5	**200**		**200**		**200**			
2,00	4,20	5,00	40,0	2,5							**200** [1]	
2,50		6,30	45,0	3,1	**250**		**250**		**250**			
2,50	5,35	6,30	45,0	3,1							**250** [1]	
3,15		8,00	50,0	3,9	**315**		**315**		**315**			
3,15	6,95	8,00	50,0	3,9							**315** [1]	
4,00		10,00	56,0	5,0	**400**		**400**		**400**			
4,00	8,40	10,00	56,0	5,0							**400** [1]	
5,00		12,50	63,0	6,3	**500**		**500**		**500**			
5,00	10,95	12,50	63,0	6,3							**500** [1]	
6,30		16,00	71,0	8,0	**630**		**630**		**630**			
6,30	14,00	16,00	71,0	8,0							**630** [1]	
P					●		●		●		●	
M					○		○		○		○	
K					●		●		●		●	
N					○		○		○		○	
S					○		○		○		○	
H												
O					○		○		○		○	

1) with flat
2) Single ended

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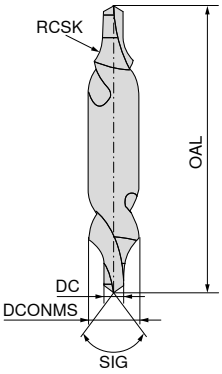
Centre drills, DIN 333, form R

ZB ZB



DC mm	DCONMS h8 mm	OAL mm	RCSK mm	Right-hand SIG 118° HSS 10 455 ...	Left-hand SIG 118° HSS 10 475 ...
0,50	3,15	25,0	2,00	**050** [1]	
0,80	3,15	25,0	2,50	**080** [1]	**080** [1]
1,00	3,15	31,5	2,90	**100**	**100**
1,25	3,15	31,5	3,15	**125**	**125**
1,60	4,00	35,5	4,00	**160**	**160**
2,00	5,00	40,0	5,00	**200**	**200**
2,50	6,30	45,0	6,30	**250**	**250**
3,15	8,00	50,0	8,00	**315**	**315**
4,00	10,00	56,0	10,00	**400**	**400**
5,00	12,50	63,0	12,50	**500**	**500**
6,30	16,00	71,0	16,00	**630**	
P				●	●
M				○	○
K				●	●
N				○	○
S				○	○
H					
O				○	○

1) Single ended

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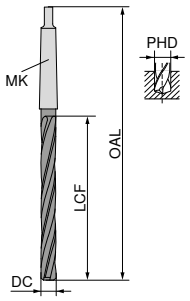
Core drills (spiral countersinks)



N

vap.

SIG 120°
HSS

DC h8 mm	OAL mm	LCF mm	PHD mm	MK	10 228 ...
12,00	182	101	8,4	1	120
12,75	182	101	9,1	1	127
13,00	182	101	9,1	1	130
13,75	189	108	9,8	1	137
14,00	189	108	9,8	1	140
14,75	212	114	10,5	2	147
15,00	212	114	10,5	2	150
15,75	218	120	11,2	2	157
16,00	218	120	11,2	2	160
16,75	223	125	11,9	2	167
17,00	223	125	11,9	2	170
17,75	228	130	12,6	2	177
18,00	228	130	12,6	2	180
18,70	233	135	13,3	2	187
19,00	233	135	13,3	2	190
19,70	238	140	14,0	2	197
20,00	238	140	14,0	2	200
20,70	243	145	14,6	2	207
21,00	243	145	14,6	2	210
21,70	248	150	15,3	2	217
22,00	248	150	15,3	2	220
22,70	253	155	16,0	2	227
23,00	253	155	16,0	2	230
23,70	281	160	16,6	3	237
24,00	281	160	16,6	3	240
24,70	281	160	17,3	3	247
25,00	281	160	17,3	3	250
25,70	286	165	18,0	3	257
26,00	286	165	18,0	3	260
26,70	291	170	18,6	3	267
27,00	291	170	18,6	3	270
27,70	291	170	19,3	3	277
28,00	291	170	19,3	3	280
28,70	296	175	20,0	3	287
29,00	296	175	20,0	3	290
29,70	296	175	20,5	3	297
30,00	296	175	20,5	3	300

P	●
M	○
K	●
N	○
S	○
H	
O	○

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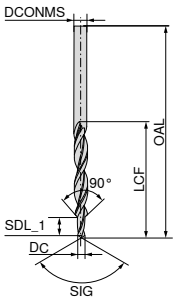
Stepped drills, DIN 8378

▲ Countersinking angle 90°
▲ for tapping drill holes according to DIN 336, Table 1 with 90 ° chamfer and for through holes according to DIN EN 20273 – medium
▲ the feed rate has to be selected based on the small Ø DC

DIN 8378

SB

vap.



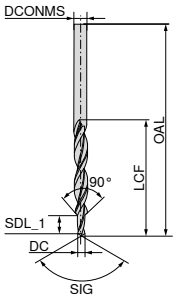
SIG 118°
HSS

10 365 ...

For threads	DC h9 mm	DCONMS h8 mm	OAL mm	SDL_1 mm	LCF mm	
M3	2,5	3,4	70	8,8	39	030
M4	3,3	4,5	80	11,4	47	040
M5	4,2	5,5	93	13,6	57	050
M6	5,0	6,6	101	16,5	63	060
M8	6,8	9,0	125	21,0	81	080
M10	8,5	11,0	142	25,5	94	100
M12	10,2	13,5	160	30,0	108	120

▲ for through holes according to DIN EN 20273 – fine
▲ with 90° screw head countersink
▲ the feed rate has to be selected based on the small Ø DC

DIN 8374



SIG 118°
HSS

10 355 ...

For threads	DC h9 mm	DCONMS h8 mm	OAL mm	SDL_1 mm	LCF mm	
M3	3,2	6,0	93	9	57	030
M4	4,3	8,0	117	11	75	040
M5	5,3	10,0	133	13	87	050
M6	6,4	11,5	142	15	94	060
M8	8,4	15,0	169	19	114	080
M10	10,5	19,0	198	23	135	100

P	●
M	○
K	●
N	○
S	○
H	
O	○

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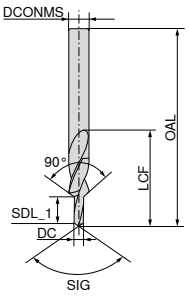
Stepped drills, overall length to DIN 1897

▲ Countersinking angle 90°
▲ for tapping drill holes according to DIN 336, Table 1 with 90 ° chamfer and for through holes according to DIN EN 20273 – medium
▲ the feed rate has to be selected based on the small Ø DC

SB



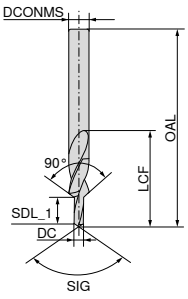
SIG 118°
HSS

10 320 ...

For threads	DC h6 mm	DCONMS h6 mm	OAL mm	SDL_1 mm	LCF mm	
M3	2,5	3,4	52	8,8	20	030
M4	3,3	4,5	58	11,4	24	040
M5	4,2	5,5	66	13,6	28	050
M6	5,0	6,6	70	16,5	31	060
M8	6,8	9,0	84	21,0	40	080
M10	8,5	11,0	95	25,5	47	100
M12	10,2	13,5	107	30,0	54	120

▲ for through holes according to DIN EN 20273 – fine
▲ with 90° screw head countersink
▲ the feed rate has to be selected based on the small Ø DC

DIN 8374



SIG 118°
HSS

10 330 ...

For threads	DC h6 mm	DCONMS h6 mm	OAL mm	SDL_1 mm	LCF mm	
M3	3,2	6,0	66	9	28	030
M4	4,3	8,0	79	11	37	040
M5	5,3	10,0	89	13	43	050
M6	6,4	11,5	95	15	47	060
M8	8,4	15,0	111	19	56	080
M10	10,5	19,0	127	23	64	100

P	●
M	○
K	●
N	○
S	○
H	
O	○

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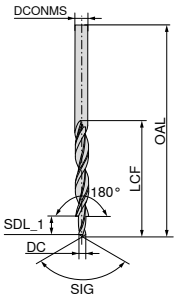
Stepped drills, DIN 8376

▲ Countersinking angle 180°
▲ for through holes according to DIN EN 20273 – Medium
▲ for screw heads to DIN 974-1 – Series 1
▲ the feed rate has to be selected based on the small Ø DC

DIN 8376

SB

vap.



SIG 118°
HSS

10 375 ...

For threads	DC h9 mm	DCONMS h8 mm	OAL mm	SDL_1 mm	LCF mm	
M3	3,4	6	93	9	57	**030** 1)
M4	4,5	8	117	11	75	**040**
M5	5,5	10	133	13	87	**050**
M6	6,6	11	142	15	94	**060**
M8	9,0	15	169	19	114	**080**
M10	11,0	18	191	23	130	**100**

P	●
M	○
K	●
N	○
S	○
H	
O	○

1) DCONMS not according to DIN 974-1

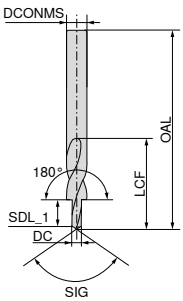
→ v_c Page 53

Stepped drills, factory standard, total length according to DIN 1897

▲ Countersinking angle 180°
▲ for through holes according to DIN EN 20273 – Medium
▲ for screw heads to DIN 974-1 – Series 1
▲ the feed rate has to be selected based on the small Ø DC

DIN 8376

SB



SIG 118°
HSS

10 340 ...

For threads	DC h6 mm	DCONMS h6 mm	OAL mm	SDL_1 mm	LCF mm	
M3	3,4	6	66	9	28	**030** 1)
M4	4,5	8	79	11	37	**040**
M5	5,5	10	89	13	43	**050**
M6	6,6	11	95	15	47	**060**
M8	9,0	15	111	19	56	**080**
M10	11,0	18	123	23	62	**100**

P	●
M	○
K	●
N	○
S	○
H	
O	○

1) DCONMS not according to DIN 974-1

→ v_c Page 53

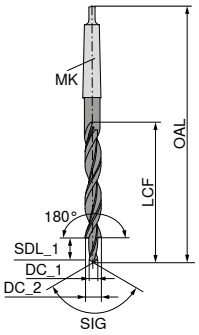
Stepped drills, DIN 8377

▲ Countersinking angle 180°
▲ for through holes according to DIN EN 20273 – Medium
▲ for screw heads to DIN 974-1 – Series 1
▲ the feed rate has to be selected based on the small Ø DC

DIN 8377

SB

vap.



SIG 118°
HSS

For threads	DC_1 h9 mm	DC_2 mm	OAL mm	SDL_1 mm	LCF mm	MK	10 405 ...
M6	6,6	11	175	15	94	1	**060**
M8	9,0	15	212	19	114	2	**080**
M10	11,0	18	228	23	130	2	**100**
M12	13,5	20	238	27	140	2	**120**
M14	15,5	24	281	31	160	3	**140**
M16	17,5	26	286	35	165	3	**160**

P	●
M	○
K	●
N	○
S	○
H	
O	○

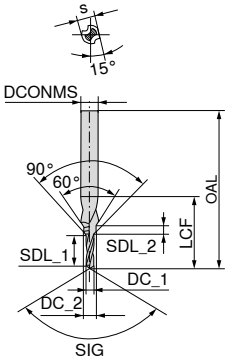
→ v_c Page 53

Stepped drills for centring, factory standard

- ▲ with flat
- ▲ Countersinking angle 60°
- ▲ Special drill for creating tapping drill holes with centring, 60° countersinking angle according to DIN 332, sheet 2, form D.
- ▲ Point thinning ≥ Ø 3,3 mm
- ▲ the feed rate has to be selected based on the small Ø DC

SB

vap.



SIG 118°
HSS

10 350 ...

For threads	DC_1 h8 mm	DCONMS h7 mm	DC_2 mm	s mm	OAL mm	SDL_1 mm	LCF mm	SDL_2 mm	
M4	3,3	8,0	4,3	6,75	63	11,0	23	1,60	**040**
M5	4,2	10,0	5,3	8,45	67	13,0	27	2,15	**050**
M6	5,0	12,5	6,4	10,45	71	16,0	33	2,90	**060**
M8	6,8	14,0	8,4	12,50	88	19,5	41	3,50	**080**
M10	8,5	16,0	10,5	14,85	94	23,0	47	4,70	**100**
M12	10,2	20,0	13,0	18,45	105	28,0	59	6,50	**120**
M16	14,0	25,0	17,0	23,40	132	33,0	67	8,30	**160**
M20	17,5	31,5	21,0	29,35	145	38,0	77	10,35	**200**

P	●
M	○
K	●
N	○
S	○
H	
O	○

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Material examples for cutting data tables

	Material sub-group	Index	Composition / Structure / Heat treatment		Tensile strength N/mm²* / HB / HRC	Material number	Material designation	Material number	Material designation
P	Unalloyed steel	P.1.1	< 0,15 % C	Annealed	420 N/mm² / 125 HB	1.0401	C15	1.1141	Ck15
		P.1.2	< 0,45 % C	Annealed	640 N/mm² / 190 HB	1.1191	C45E	1.0718	9SMnPb28
		P.1.3		Tempered	840 N/mm² / 250 HB	1.1191	C45E	1.0535	C55
		P.1.4	< 0,75 % C	Annealed	910 N/mm² / 270 HB	1.1223	C60R	1.0535	C55
		P.1.5		Tempered	1010 N/mm² / 300 HB	1.1223	C60R	1.0727	45S20
	Low-alloy steel	P.2.1		Annealed	610 N/mm² / 180 HB	1.7131	16MnCr5	1.6587	17CrNiMo6
		P.2.2		Tempered	930 N/mm² / 275 HB	1.7131	16MnCr5	1.6587	17CrNiMo6
		P.2.3		Tempered	1010 N/mm² / 300 HB	1.7225	42CrMo4	1.3505	100Cr6
		P.2.4		Tempered	1200 N/mm² / 375 HB	1.7225	42CrMo4	1.3505	100Cr6
	High-alloy steel and high-alloy tool steel	P.3.1		Annealed	680 N/mm² / 200 HB	1.4021	X20Cr13	1.4034	X46Cr13
		P.3.2		Hardened and tempered	1100 N/mm² / 300 HB	1.2343	X38CrMoV5-1	1.4034	X46Cr13
		P.3.3		Hardened and tempered	1300 N/mm² / 400 HB	1.2343	X38CrMoV5-1	1.4034	X46Cr13
	Stainless steel	P.4.1	Ferritic / martensitic	Annealed	680 N/mm² / 200 HB	1.4016	X6Cr17	1.2316	X36CrMo16
		P.4.2	Martensitic	Tempered	1010 N/mm² / 300 HB	1.4112	X90CrMoV18	1.2316	X36CrMo16
M	Stainless steel	M.1.1	Austenitic / austenitic-ferritic	Quenched	610 N/mm² / 180 HB	1.4301	X5CrNi18-10	1.4571	X6CrNiMoTi17-12-2
		M.2.1	Austenitic	Tempered	300 HB	1.4841	X15CrNiSi25-21	1.4539	X1NiCrMoCu25-20-5
		M.3.1	Austenitic / ferritic (Duplex)		780 N/mm² / 230 HB	1.4462	X2CrNiMoN22-5-3	1.4501	X2CrNiMoCuWN25-7-4
K	Grey cast iron	K.1.1	Pearlitic / ferritic		350 N/mm² / 180 HB	0.6010	GG-10	0.6025	GG-25
		K.1.2	Pearlitic (martensitic)		500 N/mm² / 260 HB	0.6030	GG-30	0.6045	GG-45
	Spherulitic graphite cast iron	K.2.1	Ferritic		540 N/mm² / 160 HB	0.7040	GGG-40	0.7060	GGG-60
		K.2.2	Pearlitic		845 N/mm² / 250 HB	0.7070	GGG-70	0.7080	GGG-80
	Malleable iron	K.3.1	Ferritic		440 N/mm² / 130 HB	0.8035	GTW-35-04	0.8045	GTW-45
		K.3.2	Pearlitic		780 N/mm² / 230 HB	0.8165	GTS-65-02	0.8170	GTS-70-02
N	Aluminium wrought alloy	N.1.1	Non-hardenable		60 HB	3.0255	Al99,5	3.3315	AlMg1
		N.1.2	Hardenable	Age-hardened	340 N/mm² / 100 HB	3.1355	AlCuMg2	3.2315	AlMgSi1
	Cast aluminium alloy	N.2.1	≤ 12 % Si, non-hardenable		250 N/mm² / 75 HB	3.2581	G-AlSi12	3.2163	G-AlSi9Cu3
		N.2.2	≤ 12 % Si, hardenable	Age-hardened	300 N/mm² / 90 HB	3.2134	G-AlSi5Cu1Mg	3.2373	G-AlSi9Mg
		N.2.3	> 12 % Si, non-hardenable		440 N/mm² / 130 HB		G-AlSi17Cu4Mg		G-AlSi18CuNiMg
	Copper and copper alloys (bronze/brass)	N.3.1	Free-machining alloys, PB > 1 %		375 N/mm² / 110 HB	2.0380	CuZn39Pb2 (Ms58)	2.0410	CuZn44Pb2
		N.3.2	CuZn, CuSnZn		300 N/mm² / 90 HB	2.0331	CuZn15	2.4070	CuZn28Sn1As
		N.3.3	CuSn, lead-free copper and electrolytic copper		340 N/mm² / 100 HB	2.0060	E-Cu57	2.0590	CuZn40Fe
	Magnesium alloys	N.4.1	Magnesium and magnesium alloys		70 HB	3.5612	MgAl6Zn	3.5312	MgAl3Zn
S	Heat-resistant alloys	S.1.1	Fe - basis	Annealed	680 N/mm² / 200 HB	1.4864	X12NiCrSi 36-16	1.4865	G-X40NiCrSi38-18
		S.1.2		Age-hardened	950 N/mm² / 280 HB	1.4980	X6NiCrTiMoVB25-15-2	1.4876	X10NiCrAlTi32-20
		S.2.1	Ni or Co basis	Annealed	840 N/mm² / 250 HB	2.4631	NiCr20TiAl (Nimonic80A)	3.4856	NiCr22Mo9Nb
		S.2.2		Age-hardened	1180 N/mm² / 350 HB	2.4668	NiCr19Nb5Mo3 (Inconel 718)	2.4955	NiFe25Cr20NbTi
		S.2.3		Cast	1080 N/mm² / 320 HB	2.4765	CoCr20W15Ni	1.3401	G-X120Mn12
	Titanium alloys	S.3.1	Pure titanium		400 N/mm²	3.7025	Ti99,8	3.7034	Ti99,7
		S.3.2	Alpha + beta alloys	Age-hardened	1050 N/mm² / 320 HB	3.7165	TiAl6V4	Ti-6246	Ti-6Al-2Sn-4Zr-6Mo
		S.3.3	Beta alloys		1400 N/mm² / 410 HB	Ti555.3	Ti-5Al-5V-5Mo-3Cr	R56410	Ti-10V-2Fe-3Al
H	Hardened steel	H.1.1		Hardened and tempered	46–55 HRC				
		H.1.2		Hardened and tempered	56–60 HRC				
		H.1.3		Hardened and tempered	61–65 HRC				
		H.1.4		Hardened and tempered	66–70 HRC				
	Chilled iron	H.2.1		Cast	400 HB				
	Hardened cast iron	H.3.1		Hardened and tempered	55 HRC				
O	Non-metal materials	O.1.1	Plastics, duroplastic		≤ 150 N/mm²				
		O.1.2	Plastics, thermoplastic		≤ 100 N/mm²				
		O.2.1	Aramid fibre-reinforced		≤ 1000 N/mm²				
		O.2.2	Glass/carbon-fibre reinforced		≤ 1000 N/mm²				
		O.3.1	Graphite						

*** Tensile strength**

Cutting data standard values – Hole depth 3xD

Index	10 122 ... Type VX-TiN		10 113 ... Type UNI-PM-TiN		10 107 ... Type UNI-TiN		10 105 ... Type N		10 130 ... Type VA	
	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F
P.1.1	46	6	44	6	46	6	28	6	38	5
P.1.2	39	5	37	5	39	5	24	5	32	4
P.1.3	35	5	33	5	35	5	21	5	29	4
P.1.4	32	5	31	5	32	5	20	5	27	4
P.1.5	28	5	26	5	28	5	17	5		
P.2.1	35	5	32	6	35	5	17	4	25	5
P.2.2	24	4	23	5	24	4	12	3	18	4
P.2.3	21	4	19	5	21	4	10	3		
P.2.4	19	3	18	4	19	3	9	2		
P.3.1	17	4	21	4	17	4	13	4		
P.3.2	13	3	16	3	13	3				
P.3.3	12	3	15	3	12	3				
P.4.1	18	4	14	3	18	4			15	3
P.4.2	17	3	14	2	17	3			14	2
M.1.1	15	4			15	4			13	3
M.2.1	12	3			12	3			11	2
M.3.1	10	3			10	3			9	2
K.1.1	41	6	46	6	41	6	30	6		
K.1.2	33	6	37	6	33	6	24	6		
K.2.1	35	6	39	6	35	6	26	6		
K.2.2	27	5	30	5	27	5	20	5		
K.3.1	35	6	39	6	35	6	26	6		
K.3.2	27	5	30	5	27	5	20	5		
N.1.1									80	7
N.1.2									80	7
N.2.1	75	6	69	6	75	6	50	6	65	6
N.2.2	60	5	55	5	60	5	40	5	52	5
N.2.3	52	5	48	5	52	5	35	5	46	5
N.3.1	69	5	64	5	69	5	60	5	60	5
N.3.2	41	4	39	4	41	4	36	4	36	4
N.3.3	55	4	52	4	55	4	48	4	48	4
N.4.1	70	5	60	5	70	5	45	5	6	5
S.1.1			7	2					8	1
S.1.2			6	1					6	1
S.2.1			6	2					7	1
S.2.2										
S.2.3										
S.3.1	9	2			9	2			10	2
S.3.2	6	1			6	1			7	1
S.3.3									6	2
H.1.1			6	1						
H.1.2										
H.1.3										
H.1.4										
H.2.1			10	3						
H.3.1										
O.1.1	29	4	23	4	29	4	20	5		
O.1.2	29	4			29	4	20	5		
O.2.1	29	4	23	4	29	4	20	5		
O.2.2	29	4	23	4	29	4	20	5		
O.3.1										

The cutting data depends extremely on the external conditions, e.g. stability of the tool and tool clamping, material and machine type.
The indicated values are possible cutting data which have to be increased or reduced according to the application conditions.

Index	10 106 ... Type WNX		10 109 ... Type WT		10 110 ... Type WT-TiN		10 285 ... Type WT-MK	
	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F
P.1.1	38	6	38	6	44	6	38	6
P.1.2	32	5	32	5	37	5	32	5
P.1.3	29	5	29	5	33	5	29	5
P.1.4	27	5	27	5	31	5	27	5
P.1.5	23	5	23	5	26	5	23	5
P.2.1	28	6	25	5	29	5	25	5
P.2.2	20	5	18	4	20	4	18	4
P.2.3	17	5	15	4	17	4	15	4
P.2.4	15	4	14	3	16	3	14	3
P.3.1	18	4	16	4	18	4	16	4
P.3.2	14	3	12	3	14	3	12	3
P.3.3	13	3	12	3	14	3	12	3
P.4.1	13	3	14	3	17	3	14	3
P.4.2	12	2	14	2	16	2	14	2
M.1.1			12	3	14	3	12	3
M.2.1			10	2	12	2	10	2
M.3.1			8	2	10	2	8	2
K.1.1	40	6	35	6	40	6	35	6
K.1.2	32	6	28	6	32	6	28	6
K.2.1	34	6	30	6	34	6	30	6
K.2.2	26	5	23	5	26	5	23	5
K.3.1	34	6	30	6	34	6	30	6
K.3.2	26	5	23	5	26	5	23	5
N.1.1								
N.1.2								
N.2.1	60	6						
N.2.2	48	5						
N.2.3	42	5						
N.3.1	56	5	62	5	71	5	62	5
N.3.2	34	4	37	4	43	4	37	4
N.3.3	45	4						
N.4.1	55	5						
S.1.1	6	2	8	1	9	1	8	1
S.1.2	5	1	6	1	7	1	6	1
S.2.1	5	2	7	1	8	1	7	1
S.2.2					5	1		
S.2.3					6	1		
S.3.1			10	2	12	2	10	2
S.3.2			7	1	7	1	7	1
S.3.3			6	2	7	2	6	2
H.1.1	5	1	4	1	5	1	4	1
H.1.2								
H.1.3								
H.1.4								
H.2.1	9	3	8	3	9	3	8	3
H.3.1								
O.1.1	20	4						
O.1.2								
O.2.1	20	4						
O.2.2	20	4						
O.3.1								

When drilling tough materials which tend to jam, chips should be removed at drilling depth ≥ 4xD and the cutting speed v_c should be reduced as follows: at drilling depths > 4xD by 10 %, at drilling depths > 6xD by 15–20 %.
It is also recommended to use an emulsion for cooling.

v_c = Cutting speed in m/min.
F = Factor for feed selection
Feed approximate values see → **Page 54**

Cutting data standard values – Hole depth 5xD

Index	10 124 ... Type VX-TiN		10 173 ... Type UNI-PM-TiN		10 171 ... Type UNI-TiN		10 152 ... Type N		10 175 ... Type VA	
	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F
P.1.1	**46**	6	**44**	6	**46**	6	28	6	38	5
P.1.2	**39**	5	**37**	5	**39**	5	24	5	32	4
P.1.3	**35**	5	**33**	5	**35**	5	21	5	29	4
P.1.4	**32**	5	**31**	5	**32**	5	20	5	27	4
P.1.5	**28**	5	**26**	5	**28**	5	17	5		
P.2.1	**35**	5	**32**	6	**35**	5	17	4	25	5
P.2.2	**24**	4	**23**	5	**24**	4	12	3	18	4
P.2.3	**21**	4	**19**	5	**21**	4	10	3		
P.2.4	**19**	3	**18**	4	**19**	3	9	2		
P.3.1	**17**	4	**21**	4	**17**	4	13	4		
P.3.2	**13**	3	**16**	3	**13**	3				
P.3.3	**12**	3	**15**	3	**12**	3				
P.4.1	**18**	4	**14**	3	**18**	4			15	3
P.4.2	**17**	3	**14**	2	**17**	3			14	2
M.1.1	**15**	4			**15**	4			**13**	3
M.2.1	**14**	4			**14**	4			**12**	3
M.3.1	**10**	3			**10**	3			**9**	2
K.1.1	**41**	6	**46**	6	**41**	6	**30**	6		
K.1.2	**33**	6	**37**	6	**33**	6	**24**	6		
K.2.1	**35**	6	**39**	6	**35**	6	**26**	6		
K.2.2	**27**	5	**30**	5	**27**	5	**20**	5		
K.3.1	**35**	6	**39**	6	**35**	6	**26**	6		
K.3.2	**27**	5	**30**	5	**27**	5	**20**	5		
N.1.1									**80**	7
N.1.2									**80**	7
N.2.1	75	6	69	6	75	6	50	6	**65**	6
N.2.2	60	5	55	5	60	5	40	5	**52**	5
N.2.3	52	5	48	5	52	5	35	5	**46**	5
N.3.1	69	5	64	5	69	5	60	5	**60**	5
N.3.2	41	4	39	4	41	4	36	4	**36**	4
N.3.3	55	4	52	4	55	4	48	4	**48**	4
N.4.1	75	6	65	6	70	6	45	6	**60**	6
S.1.1			7	2					8	1
S.1.2			6	1					6	1
S.2.1			6	2					7	1
S.2.2										
S.2.3										
S.3.1	9	2			9	2			10	2
S.3.2	6	1			6	1			7	1
S.3.3									6	1
H.1.1			6	1						
H.1.2										
H.1.3										
H.1.4										
H.2.1			10	3						
H.3.1										
O.1.1	29	4	23	4	29	4	20	5		
O.1.2	29	4			29	4	20	5		
O.2.1	29	4	23	4	29	4	20	5		
O.2.2	29	4	23	4	29	4	20	5		
O.3.1										

The cutting data depends extremely on the external conditions, e.g. stability of the tool and tool clamping, material and machine type.
The indicated values are possible cutting data which have to be increased or reduced according to the application conditions.

Index	10 161 ... Type W		10 168 ... Type WTL		10 170 ... Type WTL-TiN		10 265 ... Type N-MK		10 280 ... Type WTL-MK	
	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F
P.1.1			**32**	6	**37**	6	28	6	**32**	6
P.1.2			**27**	5	**31**	5	24	5	**27**	5
P.1.3			**24**	5	**28**	5	21	5	**24**	5
P.1.4			**23**	5	**26**	5	20	5	**23**	5
P.1.5			**19**	5	**22**	5	17	5	**19**	5
P.2.1			**20**	5	**22**	5	17	4	**20**	5
P.2.2			**14**	4	**16**	4	12	3	**14**	4
P.2.3			**12**	4	**13**	4	10	3	**12**	4
P.2.4			**11**	3	**12**	3	9	2	**11**	3
P.3.1			**15**	4	**17**	4	13	4	**15**	4
P.3.2			**11**	3	**13**	3			**11**	3
P.3.3			**10**	3	**12**	3			**10**	3
P.4.1			**10**	3	**12**	3			**10**	3
P.4.2			**10**	2	**11**	2			**10**	2
M.1.1			9	3	11	3			9	3
M.2.1			8	2					8	2
M.3.1										
K.1.1			**35**	6	**40**	6	**30**	6	**35**	6
K.1.2			**28**	6	**32**	6	**24**	6	**28**	6
K.2.1			**29**	6	**34**	6	**26**	6	**29**	6
K.2.2			**22**	5	**26**	5	**20**	5	**22**	5
K.3.1			**29**	6	**34**	6	**26**	6	**29**	6
K.3.2			**22**	5	**26**	5	**20**	5	**22**	5
N.1.1	**70**	7	**69**	7					**69**	7
N.1.2	**70**	7	**69**	7					**69**	7
N.2.1	**60**	6	**58**	6	66	6	50	6	**58**	6
N.2.2			**46**	5	53	5	40	5	**46**	5
N.2.3			**40**	5	46	5	35	5	**40**	5
N.3.1			**69**	5	79	5	60	5	**69**	5
N.3.2			**41**	4	48	4	36	4	**41**	4
N.3.3	**56**	4	**55**	4	63	4	48	4	**55**	4
N.4.1	**60**	6	**6**	6	60	6	45	6	**50**	6
S.1.1			7	2	8	2			7	2
S.1.2			6	1	6	1			6	1
S.2.1			6	2	7	2			6	2
S.2.2			3	1	4	1			3	1
S.2.3			4	1	5	1			4	1
S.3.1			6	2	7	2			6	2
S.3.2			4	1	4	1			4	1
S.3.3										
H.1.1			5	1	5	1			5	1
H.1.2										
H.1.3										
H.1.4										
H.2.1			9	3	11	3			9	3
H.3.1										
O.1.1			23	4	26	4	20	5	23	4
O.1.2			23	4	26	4	20	5	23	4
O.2.1			23	4	26	4	20	5	23	4
O.2.2			23	4	26	4	20	5	23	4
O.3.1										

When drilling tough materials which tend to jam, chips should be removed at drilling depth ≥ 4xD and the cutting speed v_c should be reduced as follows: at drilling depths > 4xD by 10 %, at drilling depths > 6xD by 15–20 %.
It is also recommended to use an emulsion for cooling.

v_c = Cutting speed in m/min.
F = Factor for feed selection
Feed approximate values see → **Page 54**

Cutting data standard values – Hole depth 10xD

Index	10 224 ... Type NC-TiALN		10 270 ... Type UNI-TiN		10 225 ... Type WTL		10 210 ... Type WTL-TiN	
	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F
P.1.1	41	7	**41**	6	**29**	6	29	6
P.1.2	34	6	**35**	5	**25**	5	25	5
P.1.3	30	6	**31**	5	**22**	5	22	5
P.1.4	28	6	**29**	5	**20**	5	20	5
P.1.5	24	6	**25**	5	**17**	5	17	5
P.2.1	25	5	**31**	5	**18**	5	18	5
P.2.2	17	4	**22**	4	**12**	4	12	4
P.2.3	15	4	**19**	4	**11**	4	11	4
P.2.4	14	3	**17**	3	**10**	3	10	3
P.3.1	19	5	**16**	4	**13**	4	13	4
P.3.2			**12**	3	**10**	3	10	3
P.3.3			**10**	2	**8**	3	8	3
P.4.1	13	4	**16**	4	**9**	3		
P.4.2	12	3	**15**	3	**9**	2		
M.1.1	12	4	**13**	4	8	3		
M.2.1	8	3	**8**	3	2	2		
M.3.1			**9**	3				
K.1.1	**43**	7	**37**	6	**31**	6	**31**	6
K.1.2	**35**	7	**30**	6	**25**	6	**25**	6
K.2.1	**37**	7	**32**	6	**26**	6	**26**	6
K.2.2	**28**	6	**24**	5	**20**	5	**20**	5
K.3.1	**37**	7	**32**	6	**26**	6	**26**	6
K.3.2	**28**	6	**24**	5	**20**	5	**20**	5
N.1.1					**62**	7		
N.1.2					**62**	7		
N.2.1	72	7	67	6	**52**	6	52	6
N.2.2	58	6	54	5	**41**	5	41	5
N.2.3	51	6	47	5	**36**	5	36	5
N.3.1	87	6	62	5	**62**	5	62	5
N.3.2	52	5	37	4	**37**	4	37	4
N.3.3	70	5	50	4	**50**	4	50	4
N.4.1	50	6	50	6	**50**	6	50	5
S.1.1					6	2		
S.1.2					5	1		
S.2.1					5	2		
S.2.2					3	1		
S.2.3					4	1		
S.3.1			8	2	5	2		
S.3.2			5	1	3	1		
S.3.3								
H.1.1					4	1		
H.1.2								
H.1.3								
H.1.4								
H.2.1					8	3		
H.3.1								
O.1.1	29	6	26	4	21	4	21	4
O.1.2	29	6	26	4	21	4	21	4
O.2.1	29	6	26	4	21	4	21	4
O.2.2	29	6	26	4	21	4	21	4
O.3.1								

The cutting data depends extremely on the external conditions, e.g. stability of the tool and tool clamping, material and machine type.
The indicated values are possible cutting data which have to be increased or reduced according to the application conditions.

Index	10 200 ... Type WTW		10 295 ... Type N-MK		10 297 ... Type WTL-MK	
	v_c m/min	F	v_c m/min	F	v_c m/min	F
P.1.1			25	6	**29**	6
P.1.2			21	5	**25**	5
P.1.3			19	5	**22**	5
P.1.4			18	5	**20**	5
P.1.5			15	5	**17**	5
P.2.1			15	4	**18**	5
P.2.2			11	3	**12**	4
P.2.3			9	3	**11**	4
P.2.4			8	2	**10**	3
P.3.1			12	4	**13**	4
P.3.2					**10**	3
P.3.3					**8**	3
P.4.1					**9**	3
P.4.2					**9**	2
M.1.1					8	3
M.2.1					2	2
M.3.1						
K.1.1			**27**	6	**31**	6
K.1.2			**22**	6	**25**	6
K.2.1			**23**	6	**26**	6
K.2.2			**18**	5	**20**	5
K.3.1			**23**	6	**26**	6
K.3.2			**18**	5	**20**	5
N.1.1	**72**	7			**62**	7
N.1.2	**72**	7			**62**	7
N.2.1			45	6	**52**	6
N.2.2			36	5	**41**	5
N.2.3			32	5	**36**	5
N.3.1			54	5	**62**	5
N.3.2			32	4	**37**	4
N.3.3			43	4	**50**	4
N.4.1			60	6	**50**	6
S.1.1					6	2
S.1.2					5	1
S.2.1					5	2
S.2.2					3	1
S.2.3					4	1
S.3.1					5	2
S.3.2					3	1
S.3.3						
H.1.1					4	1
H.1.2						
H.1.3						
H.1.4						
H.2.1					8	3
H.3.1						
O.1.1			18	5	21	4
O.1.2			18	5	21	4
O.2.1			18	5	21	4
O.2.2			18	5	21	4
O.3.1						

When drilling tough materials which tend to jam, chips should be removed at drilling depth ≥ 4xD and the cutting speed v_c should be reduced as follows: at drilling depths > 4xD by 10 %, at drilling depths > 6xD by 15–20 %.
It is also recommended to use an emulsion for cooling.

v_c = Cutting speed in m/min.
F = Factor for feed selection
Feed approximate values see → **Page 54**

Cutting data standard values – hole depth greater than 10xD

Index	10 235 ... Type WTL-R1		10 245 ... Type WTL-R2		10 255 ... Type WTL-R3		10 236 ... Type WTL-TiAlN-R1	
	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F
P.1.1	21	5	21	5	21	5	24	5
P.1.2	18	4	18	4	18	4	21	4
P.1.3	16	4	16	4	16	4	18	4
P.1.4	15	4	15	4	15	4	17	4
P.1.5	13	4	13	4	13	4	14	4
P.2.1	13	4	13	4	13	4	15	4
P.2.2	9	3	9	3	9	3	10	3
P.2.3	8	3	8	3	8	3	9	3
P.2.4	7	2	7	2	7	2	8	2
P.3.1	10	3	10	3	10	3	11	3
P.3.2	7	2	7	2	7	2	8	2
P.3.3	6	2	6	2	6	2	7	2
P.4.1								
P.4.2								
M.1.1								
M.2.1								
M.3.1								
K.1.1	23	5	23	5	23	5	26	5
K.1.2	18	5	18	5	18	5	21	5
K.2.1	19	5	19	5	19	5	22	5
K.2.2	15	4	15	4	15	4	17	4
K.3.1	19	5	19	5	19	5	22	5
K.3.2	15	4	15	4	15	4	17	4
N.1.1	45	6	45	6	45	6	52	6
N.1.2	45	6	45	6	45	6	52	6
N.2.1	38	5	38	5	38	5	43	5
N.2.2	30	4	30	4	30	4	35	4
N.2.3	26	4	26	4	26	4	30	4
N.3.1	45	4	45	4	45	4	52	4
N.3.2	27	3	27	3	27	3	31	3
N.3.3	36	3	36	3	36	3	41	3
N.4.1	55	5	55	5	55	5	60	6
S.1.1								
S.1.2								
S.2.1								
S.2.2								
S.2.3								
S.3.1								
S.3.2								
S.3.3								
H.1.1								
H.1.2								
H.1.3								
H.1.4								
H.2.1								
H.3.1								
O.1.1	15	3	15	3	15	3	17	3
O.1.2	15	3	15	3	15	3	17	3
O.2.1	15	3	15	3	15	3	17	3
O.2.2	15	3	15	3	15	3	17	3
O.3.1								

The cutting data depends extremely on the external conditions, e.g. stability of the tool and tool clamping, material and machine type.
The indicated values are possible cutting data which have to be increased or reduced according to the application conditions.

Index	10 246 ... Type WTL-TiAlN-R2		10 256 ... Type WTL-TiAlN-R3		10 305 ... Type WTL-MK-R1		10 315 ... Type WTL-MK-R2	
	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F
P.1.1	24	5	24	5	21	5	21	5
P.1.2	21	4	21	4	18	4	18	4
P.1.3	18	4	18	4	16	4	16	4
P.1.4	17	4	17	4	15	4	15	4
P.1.5	14	4	14	4	13	4	13	4
P.2.1	15	4	15	4	13	4	13	4
P.2.2	10	3	10	3	9	3	9	3
P.2.3	9	3	9	3	8	3	8	3
P.2.4	8	2	8	2	7	2	7	2
P.3.1	11	3	11	3	10	3	10	3
P.3.2	8	2	8	2	7	2	7	2
P.3.3	7	2	7	2	6	2	6	2
P.4.1								
P.4.2								
M.1.1								
M.2.1								
M.3.1								
K.1.1	26	5	26	5	23	5	23	5
K.1.2	21	5	21	5	18	5	18	5
K.2.1	22	5	22	5	19	5	19	5
K.2.2	17	4	17	4	15	4	15	4
K.3.1	22	5	22	5	19	5	19	5
K.3.2	17	4	17	4	15	4	15	4
N.1.1	52	6	52	6	45	6	45	6
N.1.2	52	6	52	6	45	6	45	6
N.2.1	43	5	43	5	38	5	38	5
N.2.2	35	4	35	4	30	4	30	4
N.2.3	30	4	30	4	26	4	26	4
N.3.1	52	4	52	4	45	4	45	4
N.3.2	31	3	31	3	27	3	27	3
N.3.3	41	3	41	3	36	3	36	3
N.4.1	60	6	60	6	55	5	55	5
S.1.1								
S.1.2								
S.2.1								
S.2.2								
S.2.3								
S.3.1								
S.3.2								
S.3.3								
H.1.1								
H.1.2								
H.1.3								
H.1.4								
H.2.1								
H.3.1								
O.1.1	17	3	17	3	15	3	15	3
O.1.2	17	3	17	3	15	3	15	3
O.2.1	17	3	17	3	15	3	15	3
O.2.2	17	3	17	3	15	3	15	3
O.3.1								

When drilling tough materials which tend to jam, chips should be removed at drilling depth ≥ 4xD and the cutting speed v_c should be reduced as follows: at drilling depths > 4xD by 10 %, at drilling depths > 6xD by 15–20 %.
It is also recommended to use an emulsion for cooling.

v_c = Cutting speed in m/min.
F = Factor for feed selection
Feed approximate values see → **Page 54**

Cutting data standard values – micro drills

Index	v_c m/min	10 103 ...						
		Ø 0,15	Ø 0,20–0,25	Ø 0,30–0,35	Ø 0,40–0,55	Ø 0,60–0,75	Ø 0,80–0,95	Ø 1,00–1,45
		f (mm/rev)						
P.1.1	33	0,009	0,011	0,015	0,019	0,026	0,031	0,050
P.1.2	28	0,007	0,009	0,011	0,014	0,020	0,024	0,041
P.1.3	25	0,007	0,009	0,011	0,014	0,020	0,024	0,041
P.1.4	23	0,007	0,009	0,011	0,014	0,020	0,024	0,041
P.1.5	20	0,007	0,009	0,011	0,014	0,020	0,024	0,041
P.2.1	20	0,005	0,007	0,009	0,011	0,015	0,020	0,035
P.2.2	14	0,004	0,005	0,007	0,008	0,012	0,016	0,029
P.2.3	12	0,004	0,005	0,007	0,008	0,012	0,016	0,029
P.2.4	11	0,003	0,004	0,005	0,007	0,009	0,013	0,024
P.3.1	15	0,005	0,007	0,009	0,011	0,015	0,020	0,035
P.3.2	11	0,004	0,005	0,007	0,008	0,012	0,016	0,029
P.3.3	10	0,004	0,005	0,007	0,008	0,012	0,016	0,029
P.4.1	11	0,004	0,005	0,007	0,008	0,012	0,016	0,029
P.4.2	10	0,003	0,004	0,005	0,007	0,009	0,013	0,024
M.1.1	9	0,004	0,005	0,007	0,008	0,012	0,016	0,029
M.2.1	8	0,004	0,005	0,007	0,008	0,012	0,016	0,029
M.3.1								
K.1.1	35	0,009	0,011	0,015	0,019	0,026	0,031	0,050
K.1.2	28	0,009	0,011	0,015	0,019	0,026	0,031	0,050
K.2.1	30	0,009	0,011	0,015	0,019	0,026	0,031	0,050
K.2.2	23	0,007	0,009	0,011	0,014	0,020	0,024	0,041
K.3.1	30	0,009	0,011	0,015	0,019	0,026	0,031	0,050
K.3.2	23	0,007	0,009	0,011	0,014	0,020	0,024	0,041
N.1.1	70	0,012	0,014	0,019	0,024	0,034	0,038	0,060
N.1.2	70	0,012	0,014	0,019	0,024	0,034	0,038	0,060
N.2.1	59	0,009	0,011	0,015	0,019	0,026	0,031	0,050
N.2.2	47	0,007	0,009	0,011	0,014	0,020	0,024	0,041
N.2.3	41	0,007	0,009	0,011	0,014	0,020	0,024	0,041
N.3.1	70	0,007	0,009	0,011	0,014	0,020	0,024	0,041
N.3.2	42	0,005	0,007	0,009	0,011	0,015	0,020	0,035
N.3.3	56	0,005	0,007	0,009	0,011	0,015	0,020	0,035
N.4.1	42	0,007	0,009	0,011	0,014	0,020	0,024	0,041
S.1.1	7	0,003	0,004	0,005	0,007	0,009	0,013	0,024
S.1.2	6	0,002	0,003	0,004	0,005	0,007	0,010	0,020
S.2.1	6	0,003	0,004	0,005	0,007	0,009	0,013	0,024
S.2.2	4	0,002	0,003	0,004	0,005	0,007	0,010	0,020
S.2.3	4	0,002	0,003	0,004	0,005	0,007	0,010	0,020
S.3.1	6	0,003	0,004	0,005	0,007	0,009	0,013	0,024
S.3.2	4	0,002	0,003	0,004	0,005	0,007	0,010	0,020
S.3.3								
H.1.1								
H.1.2								
H.1.3								
H.1.4								
H.2.1								
H.3.1								
O.1.1	23	0,007	0,009	0,011	0,014	0,020	0,024	0,041
O.1.2	23	0,007	0,009	0,011	0,014	0,020	0,024	0,041
O.2.1	23	0,007	0,009	0,011	0,014	0,020	0,024	0,041
O.2.2	23	0,007	0,009	0,011	0,014	0,020	0,024	0,041
O.3.1								

The cutting data depends extremely on the external conditions, e.g. stability of the tool and tool clamping, material and machine type.
The indicated values are possible cutting data which have to be increased or reduced according to the application conditions.

Cutting data standard values – NC spot drills, Centre drills, Core drills, Stepped drills

Index	10 510 ... / 10 520 ... / 10 521 ... / 10 526 ... / 10 525 ...		10 512 ... / 10 522 ... / 10 513 ... / 10 523 ... / 10 532 ... / 10 528 ...		10 480 ... / 10 415 ... / 10 435 ... / 10 445 ... / 10 455 ... / 10 475 ...		10 425 ...		10 228 ... / 10 365 ... / 10 355 ... / 10 320 ... / 10 330 ... / 10 375 ... / 10 340 ... / 10 405 ... / 10 350 ...	
	Type NC-A		Type NC-A TiN		Type ZB		Type ZB TiN		Type N / SB / SB vap.	
	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F	v_c m/min	F
P.1.1	28	6	32	6	28	6	32	6	28	6
P.1.2	24	5	27	5	24	5	27	5	24	5
P.1.3	24	5	27	5	24	5	27	5	24	5
P.1.4	20	5	23	5	20	5	23	5	20	5
P.1.5	17	5	19	5	17	5	19	5	17	5
P.2.1	17	4	20	4	17	4	20	4	17	4
P.2.2	12	3	14	3	12	3	14	3	12	3
P.2.3	10	3	12	3	10	3	12	3	10	3
P.2.4	9	2	11	2	9	2	11	2	9	2
P.3.1	13	4	15	4	13	4	15	4	13	4
P.3.2	13	4	15	4	13	4	15	4	13	4
P.3.3										
P.4.1	9	3	10	3	9	3	10	3	9	3
P.4.2	8	2	9	2	9	2	10	2	9	2
M.1.1	8	3	9	3	8	3	9	3	8	3
M.2.1	7	2	8	2	7	2	9	2	7	2
M.3.1	7	2	8	2	6	2	7	2	6	2
K.1.1	30	6	35	6	30	6	35	6	30	6
K.1.2	24	6	28	6	24	6	28	6	24	6
K.2.1	26	6	29	6	26	6	29	6	26	6
K.2.2	20	5	22	5	20	5	22	5	20	5
K.3.1	26	6	29	6	26	6	29	6	26	6
K.3.2	20	5	22	5	20	5	22	5	20	5
N.1.1	60	6	65	6	60	7	65	7	60	7
N.1.2	60	6	65	6	60	7	65	7	60	7
N.2.1	50	6	58	6	50	6	58	6	50	6
N.2.2	40	5	46	5	40	5	46	5	40	5
N.2.3	35	5	40	5	35	5	40	5	35	5
N.3.1	60	5	69	5	60	5	69	5	60	5
N.3.2	36	4	41	4	36	4	41	4	36	4
N.3.3	48	4	55	4	48	4	55	4	48	4
N.4.1	20	5	23	5	20	5	23	5	20	5
S.1.1	6	2	7	2	6	2	7	2	6	2
S.1.2	5	1	6	1	5	1	6	1	5	1
S.2.1	5	2	6	2	5	2	6	2	5	2
S.2.2	3	1	3	1	3	1	3	1	3	1
S.2.3	4	1	4	1	4	1	4	1	4	1
S.3.1	5	2	6	2	5	2	6	2	5	2
S.3.2	3	1	4	1	3	1	4	1	3	1
S.3.3										
H.1.1										
H.1.2										
H.1.3										
H.1.4										
H.2.1										
H.3.1										
O.1.1	20	5	23	5	20	5	23	5	20	5
O.1.2	20	5	23	5	20	5	23	5	20	5
O.2.1										
O.2.2	20	5	23	5	20	5	23	5	20	5
O.3.1										

When drilling tough materials which tend to jam, chips should be removed at drilling depth ≥ 4xD and the cutting speed v_c should be reduced as follows: at drilling depths > 4xD by 10 %, at drilling depths > 6xD by 15–20 %.
It is also recommended to use an emulsion for cooling.

v_c = Cutting speed in m/min.
F = Factor for feed selection
Feed approximate values see → **Page 54**

Feed rate guide values for HSS twist drills

Factor F	Drill diameter in mm															
	0,5	1	2	3	4	5	6	8	10	12	14	16	18	20	26	30
	Feed rate f in mm/rev.															
1	0,004	0,006	0,02	0,03	0,04	0,04	0,05	0,06	0,08	0,08	0,09	0,1	0,12	0,15	0,18	0,19
2	0,006	0,008	0,02	0,03	0,05	0,05	0,05	0,08	0,1	0,1	0,1	0,12	0,12	0,2	0,2	0,2
3	0,007	0,012	0,03	0,05	0,06	0,069	0,08	0,1	0,12	0,13	0,13	0,16	0,16	0,25	0,25	0,25
4	0,008	0,014	0,04	0,06	0,08	0,09	0,1	0,14	0,16	0,16	0,16	0,2	0,2	0,3	0,3	0,3
5	0,01	0,016	0,06	0,08	0,1	0,12	0,13	0,16	0,2	0,2	0,22	0,25	0,25	0,4	0,4	0,4
6	0,012	0,018	0,06	0,1	0,12	0,14	0,16	0,2	0,25	0,25	0,25	0,3	0,3	0,5	0,5	0,5
7	0,014	0,02	0,08	0,13	0,16	0,18	0,2	0,25	0,35	0,35	0,35	0,4	0,4	0,6	0,6	0,6
8	0,016	0,023	0,1	0,16	0,2	0,2	0,25	0,35	0,4	0,4	0,4	0,4	0,5	0,6	0,7	0,8
9	0,019	0,025	0,13	0,17	0,2	0,23	0,32	0,4	0,4	0,5	0,5	0,5	0,6	0,8	0,9	0,9

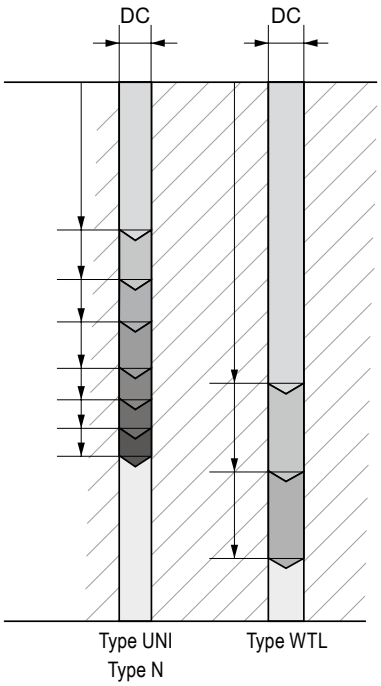
All the indicated data are guide values only and represent average values.

Speed for HSS drills

v_c m/min	Drill diameter in mm															
	2,0	2,5	3,15	4,0	5,0	6,3	8,0	10,0	12,5	16,0	20,0	25,0	31,5	40,0	50,0	63,0	80,0
	Speed in U/min																
80	12.500	10.000	8.000	6.300	5.000	4.000	3.200	2.500	2.000	1.600	1.250	1.000	800	630	500	400	320
63	10.000	8.000	6.300	5.000	4.000	3.200	2.500	2.000	1.600	1.250	1.000	800	630	500	400	320	250
50	8.000	6.300	5.000	4.000	3.200	2.500	2.000	1.600	1.250	1.000	800	630	500	400	320	250	200
40	6.300	5.000	4.000	3.200	2.500	2.000	1.600	1.250	1.000	800	630	500	400	320	250	200	160
32	5.000	4.000	3.200	2.500	2.000	1.600	1.250	1.000	800	630	500	400	320	250	200	160	125
25	4.000	3.200	2.500	2.000	1.600	1.250	1.000	800	630	500	400	320	250	200	160	125	100
20	3.200	2.500	2.000	1.600	1.250	1.000	800	630	500	400	320	250	200	160	125	100	80
16	2.500	2.000	1.600	1.250	1.000	800	630	500	400	320	250	200	160	125	100	80	63
12	2.000	1.600	1.250	1.000	800	630	500	400	320	250	200	160	125	100	80	63	50
10	1.600	1.250	1.000	800	630	500	400	320	250	200	160	125	100	80	63	50	40
8	1.250	1.000	800	630	500	400	320	250	200	160	125	100	80	63	50	40	32
6	1.000	800	630	500	400	320	250	200	160	125	100	80	63	50	40	32	25
5	800	630	500	400	320	250	200	160	125	100	80	63	50	40	32	25	20
4	630	500	400	320	250	200	160	125	100	80	63	50	40	32	25	20	16
3	500	400	320	250	200	160	125	100	80	63	50	40	32	25	20	16	12

Peck frequency for deep drilling

- Cutting edge needs to be sufficiently cooled; this is achieved by removing chips from the hole
- Chip removal frequency depends on the material to be machined, the hole depth and the drill type used
- Using a drill with a flat flute profile (WTL) significantly improves chip transport, which makes it possible to reduce the number of chip removal processes
- When drilling into tough materials and materials that tend to jam, chips should be removed for hole depths ≥ 4xD and the cutting speed v_c reduced as follows: by 10% for hole depths > 4xD, by 15-20% for hole depths > 6xD. It is also recommended to cool using emulsion.
- In the case of deep holes and to improve the positional accuracy, it is recommended to bore a pilot/centring hole.
- Drills with coolant holes and a thro' coolant supply are recommended for extremely deep holes or horizontal drilling applications



Coatings

TiN
- TiN coating
- Maximum application temperature: 450°C

TiAlN
- TiAlN multilayer coating
- Maximum application temperature: 900°C

vap.
- Vaporised
- Vaporisation (vapour-deposition) prevents cold welds from forming on the tool and increases the surface hardness and thus the wear resistance

F.-nit
- Titanium carbon nitride based PVD coating particularly suitable for steel machining
- Applicable up to approx. 450°C

Cutting materials

HSS
- Conventional high speed steel
- Universal cutting material

HSS-E
- Cobalt-alloyed high speed steel
- Cutting material with increased elevated-temperature hardness and heat resistance as well as wear resistance
- Suitable for high cutting temperatures and difficult-to-machine materials

HSS-E-PM
- Cobalt-alloyed high speed steel, produced using powder metallurgy
- Cutting material with a very tight and homogeneous structure
- High hardness, heat resistance and wear resistance