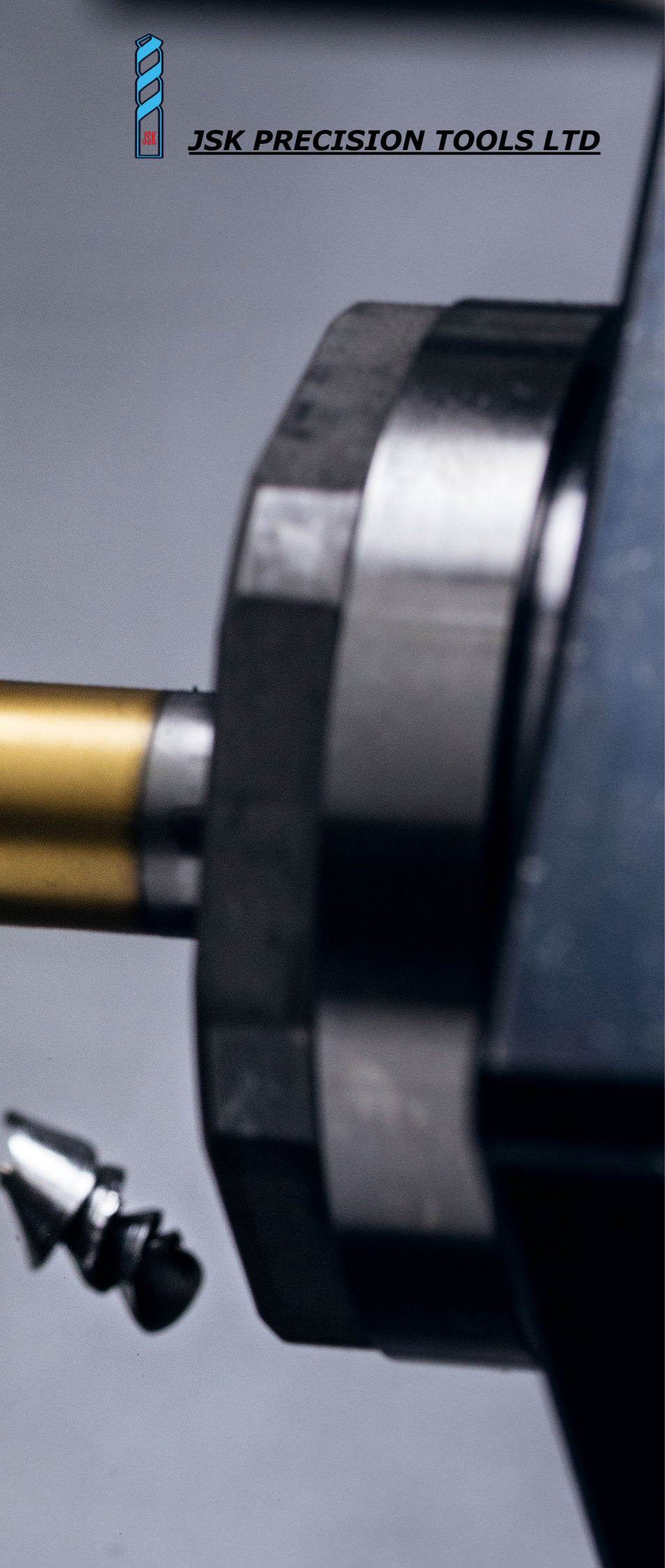




JSK PRECISION TOOLS LTD



1 HSS drilling

1

2 Solid carbide drilling

Solid drilling and bore machining

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Performance

Premium quality tools for high performance.

The premium quality tools from the **JSK PRECISION TOOLS LTD** 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



Version



Int. coolant supply



self-centering

● = Main Application

○ = Extended application



Toolfinder

	Material/ Coating	Description	DIN 1897	DIN 338	DIN 340	Series 1	Series 2	Series 3
			3xD	5xD	10xD	> 10xD		
Steel – Universal	HSS-E TiN	▲ universal high-performance drill ▲ shank DIN 1835A ▲ self centering	8	16				
	HSS-E PM TiN	▲ wear-resistant due to HSS-E-PM and TiN coating ▲ universal high-performance drill	9-14	17-22				
	HSS-E TiN	▲ as for type VX ▲ without standard shank to DIN 1835 A ▲ available as a set	9-14	17-22	26-28			
	HSS vap.	▲ stable twist drill ▲ also suitable for portable drills ▲ available in set	9-14	17-22				
	HSS-E vap.	▲ for high alloy steel and special alloys (Hastelloy, Inconel, Nimonic)	9-14					
	HSS-E TiN	▲ as type WT HSS-E vap. ▲ higher wear resistance due to coating	9-14					
	HSS F-nit	▲ left-hand cutting ▲ nitrided cutting edge giving increased wear protection to cutting corners and guide lands	15	23				
	HSS-E	▲ very good chip evacuation with thro' coolant ▲ for long chipping materials to 1000 N/mm ²		25				
	HSS-E TiN	▲ as type WNXi HSS-E ▲ higher wear resistance due to coating		25				
	HSS-E F-nit	▲ special flute profile with large chip gullet ▲ nitrided cutting edge giving increased wear protection to cutting corners and guide lands		17-22	26-28			
	HSS-E TiN	▲ as WTL HSS-E, but higher v _c and wear resistance due to coating ▲ suitable for steel and cast iron		17-22				
	HSS-E TiCN	▲ as WTL TiN, but higher v _c and wear resistance possible with high alloy steels		23				
	HSS F-nit	▲ special flute profile with large chip gullet ▲ nitrided cutting edge giving increased wear protection to cutting corners and guide lands			26-28	29	30	30
	HSS TiN	▲ as WTL HSS, but higher v _c and wear resistance due to coating			26-28			
	HSS-E	▲ wide chip flutes for long-chipping materials ▲ self-centring	9-14					
	HSS	▲ suitable for use with drill bushes ▲ very good chip evacuation with thro' coolant			25			
HSS TiAlN	▲ as NC, but higher v _c and wear resistance due to coating			25				
Stainless steel	HSS-E	▲ specialist for stainless and acid-resistant materials ▲ special geometry	9-14	17-22				
	HSS	▲ specialist for non-ferrous metals		17-22				
Non-ferrous metals	HSS	▲ for non-ferrous metals to 500 N/mm ² ▲ for deep holes			26-28			

HSS Drills Overview

	Tool type	Material Coating	Point angle	Diameter in mm DC			Performance
3xD without thro' coolant							
	VX	HSS-E TiN	118°	2-20			8
	UNI	HSS-E PM TiN	130°	1-14			9-14
	UNI	HSS-E TiN	118°	1-14			9-14
	N	HSS vap.	118°	0,4-20			9-14
	VA	HSS-E	130°	1-12			9-14
	WNX	HSS-E	130°	1-20			9-14
	WT	HSS-E vap.	130°	0,4-25			9-14
	WT	HSS-E TiN	130°	1-20			9-14
	WTL-L	HSS F-nit	130°	1-19			15 left-hand cutting
5xD without thro' coolant							
	VX	HSS-E TiN	118°	2-20			16
	UNI	HSS-E PM TiN	130°	1-14			17-22
	UNI	HSS-E TiN	118°	0,9-14			17-22
	N	HSS vap.	118°	0,2-20			17-22
	VA	HSS-E	130°	1-12			17-22
	WTL	HSS-E F-nit	130°	1-16			17-22
	WTL	HSS-E TiN	130°	1-16			17-22
	WTL	HSS-E TiCN	130°	3-12			23
	W	HSS	130°	0,20-20			17-22
	WTL-L	HSS F-nit	130°	1-16			23 left-hand cutting

HSS Drills Overview

	Tool type	Material Coating	Point angle	Diameter in mm DC			Performance
5xD with thro' coolant							
	WNXi	HSS-E	130°	5-20		<input type="checkbox"/>	25
	WNXi	HSS-E TiN	130°	5-20		<input checked="" type="checkbox"/>	25
up to 10xD without thro' coolant							
	UNI	HSS-E TiN	118°	1-14		<input checked="" type="checkbox"/>	26-28
	WTL	HSS TiN	130°	1-14		<input checked="" type="checkbox"/>	26-28
	WTL	HSS-E F-nit.	130°	1-12		<input checked="" type="checkbox"/>	26-28
	WTL	HSS F-nit.	130°	1-14		<input checked="" type="checkbox"/>	26-28
	WTW	HSS	130°	1-14		<input type="checkbox"/>	26-28
up to 10xD with thro' coolant							
	NC	HSS	130°	3-13		<input type="checkbox"/>	25
	NC	HSS TiAlN	130°	3-13		<input checked="" type="checkbox"/>	25
over 10xD without thro' coolant							
	WTL	HSS Series 1	130°	2-13		<input checked="" type="checkbox"/>	29
	WTL	HSS Series 2	130°	2-13		<input checked="" type="checkbox"/>	30
	WTL	HSS Series 3	130°	2,5-13		<input checked="" type="checkbox"/>	30
Mini-drill							
	N	HSS-E PM	118°	0,15-1,45		<input type="checkbox"/>	31
Twist Drill Sets							
	N	HSS vap.	118°	1-10		<input checked="" type="checkbox"/>	24
	UNI	HSS-E TiN	118°	1-10		<input checked="" type="checkbox"/>	24

HSS Drills Overview

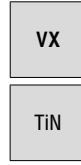
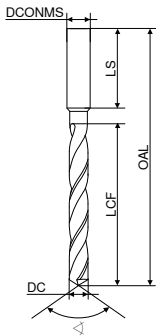
	Tool type	Material Coating	Point angle	Diameter in mm DC		<input type="checkbox"/> coated <input type="checkbox"/> uncoated	Performance
NC Spot Drill							
	NC-A	HSS	90°	3-20		<input type="checkbox"/>	35-37
	NC-A	HSS TiN	90°	3-20		<input checked="" type="checkbox"/>	35+36
	NC-A	HSS	120°	3-20		<input type="checkbox"/>	35+36
	NC-A	HSS TiN	120°	3-20		<input checked="" type="checkbox"/>	35+36
Centre drills							
	ZB	HSS	118°	0,5-6,3		<input type="checkbox"/>	DIN 333 - Form A/B/R 37-39
	ZB	HSS TiN	118°	0,5-6,3		<input checked="" type="checkbox"/>	DIN 333 - Form A 38
	ZB	HSS-E	118°	0,5-6,3		<input type="checkbox"/>	DIN 333 - Form A 38
Core drills							
	N	HSS	120°	3,8-12		<input type="checkbox"/>	3 flute 40
Stepped drills							
	SB	HSS vap.	118°	2,5-10,2		<input checked="" type="checkbox"/>	Countersinking angle 90° 41
	SB	HSS	118°	2,5-10,2		<input type="checkbox"/>	Countersinking angle 90° 41
	SB	HSS vap.	118°	3,2-10,5		<input checked="" type="checkbox"/>	Countersinking angle 90° 41
	SB	HSS	118°	3,2-10,5		<input type="checkbox"/>	Countersinking angle 90° 41
	SB	HSS vap.	118°	3,4-11		<input checked="" type="checkbox"/>	Countersinking angle 180° 42
	SB	HSS	118°	3,4-11		<input type="checkbox"/>	Countersinking angle 180° 42
	SB	HSS vap.	118°	3,3-21		<input checked="" type="checkbox"/>	Countersinking angle 60° 44

HSS Drills Overview

	Tool type	Material Coating	Point angle	Diameter in mm DC			Performance
Drills with Morse taper							
3xD		WT HSS-E vap.	130°	10-30			31
5xD		N HSS vap.	118°	10-60			32
		WTL HSS-E F-nit	130°	10-27			32
10xD		N HSS vap.	118°	10-50			33
		WTL HSS-E F-nit	130°	10-26			33
above 10xD		WTL HSS Series 1	130°	10-30			34
		WTL HSS Series 2	130°	10-30			34
Core drills		N HSS vap.	120°	10-30		3 flute	40
Stepped drills		SB HSS vap.	118°	5,5-22		Countersinking angle 180°	43

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



DC _{h8}	OAL	LCF	DCONMS _{h6}	LS
mm	mm	mm	mm	mm
2.00	44	12	3	28
2.10	44	12	3	28
2.20	45	13	3	28
2.30	45	13	3	28
2.40	46	14	3	28
2.50	46	14	3	28
2.60	46	14	3	28
2.70	48	16	3	28
2.80	48	16	3	28
2.90	48	16	3	28
3.00	48	16	3	28
3.10	50	18	4	28
3.20	50	18	4	28
3.30	50	18	4	28
3.40	52	20	4	28
3.50	52	20	4	28
3.60	52	20	4	28
3.70	52	20	4	28
3.80	54	22	4	28
3.90	54	22	4	28
4.00	54	22	4	28
4.10	66	22	6	36
4.20	66	22	6	36
4.30	68	24	6	36
4.40	68	24	6	36
4.50	68	24	6	36
4.60	68	24	6	36
4.70	68	24	6	36
4.80	70	26	6	36
4.90	70	26	6	36
5.00	70	26	6	36
5.10	70	26	6	36
5.20	70	26	6	36
5.30	70	26	6	36
5.40	72	28	6	36
5.50	72	28	6	36
5.55	72	28	6	36
5.60	72	28	6	36
5.70	72	28	6	36
5.80	72	28	6	36
5.90	72	28	6	36
6.00	72	28	6	36
6.10	75	31	8	36
6.20	75	31	8	36
6.30	75	31	8	36
6.40	75	31	8	36
6.50	75	31	8	36
6.60	75	31	8	36
6.70	75	31	8	36
6.80	78	34	8	36
6.90	78	34	8	36
7.00	78	34	8	36

DC _{h8}	OAL	LCF	DCONMS _{h6}	LS
mm	mm	mm	mm	mm
7.10	78	34	8	36
7.20	78	34	8	36
7.30	78	34	8	36
7.40	78	34	8	36
7.45	78	34	8	36
7.50	78	34	8	36
7.60	81	37	8	36
7.70	81	37	8	36
7.80	81	37	8	36
7.90	81	37	8	36
8.00	81	37	8	36
8.10	87	37	10	40
8.20	87	37	10	40
8.30	87	37	10	40
8.40	87	37	10	40
8.50	87	37	10	40
8.60	91	40	10	40
8.70	91	40	10	40
8.80	91	40	10	40
8.90	91	40	10	40
9.00	91	40	10	40
9.10	91	40	10	40
9.20	91	40	10	40
9.30	91	40	10	40
9.35	91	40	10	40
9.40	91	40	10	40
9.50	91	40	10	40
9.60	93	43	10	40
9.70	93	43	10	40
9.80	93	43	10	40
9.90	93	43	10	40
10.00	93	43	10	40
10.10	100	43	12	45
10.20	100	43	12	45
10.30	100	43	12	45
10.40	100	43	12	45
10.50	100	43	12	45
10.60	100	43	12	45
10.70	104	47	12	45
10.80	104	47	12	45
10.90	104	47	12	45
11.00	104	47	12	45
11.10	104	47	12	45
11.50	104	47	12	45
11.70	104	47	12	45
11.80	104	47	12	45
11.90	108	51	12	45
12.00	108	51	12	45
12.10	111	51	16	48
12.20	111	51	16	48
12.30	111	51	16	48
12.40	111	51	16	48
12.50	111	51	16	48
12.60	111	51	16	48
12.70	111	51	16	48
12.80	111	51	16	48
12.90	111	51	16	48
13.00	111	51	16	48
13.50	114	54	16	48
14.00	114	54	16	48
14.50	116	56	16	48
15.00	116	56	16	48
15.50	118	58	16	48
16.00	118	58	16	48
16.50	126	60	20	50
17.00	126	60	20	50
17.50	128	62	20	50
18.00	128	62	20	50
18.50	130	64	20	50
19.00	130	64	20	50
19.50	132	66	20	50
20.00	132	66	20	50


Steel	●
Stainless steel	●
Cast iron	●
Non ferrous metals	●
Heat resistant alloys	○

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

$\leq 3xD$

UNI


TiN



◊ 130°
HSS-E-PM

UNI


TiN



◊ 118°
HSS-E


N

vap.




◊ 118°
HSS

VA



◊ 130°
HSS-E


W NX



◊ 130°
HSS-E

WT


vap.



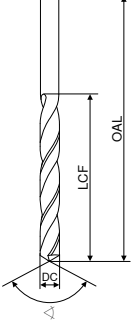
◊ 130°
HSS-E

WT

TiN



◊ 130°
HSS-E



DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
0.40		19	2.5
0.50		20	3.0
0.55		21	3.5
0.60		21	3.5
0.65		22	4.0
0.70		23	4.5
0.75		23	4.5
0.80		24	5.0
0.85		24	5.0
0.90		25	5.5
0.95		25	5.5
1.00		26	6.0
1.05		26	6.0
1.10		28	7.0
1.15		28	7.0
1.20		30	8.0
1.25		30	8.0
1.30		30	8.0
1.35		32	9.0
1.40		32	9.0
1.45		32	9.0
1.50		32	9.0
1.55		34	10.0
1.60		34	10.0
1.65		34	10.0
1.70		34	10.0
1.75		36	11.0
1.80		36	11.0
1.83		36	11.0
1.85		36	11.0
1.90		36	11.0
1.95		38	12.0
2.00		38	12.0
2.05		38	12.0
2.10		38	12.0
2.15		40	13.0
2.20		40	13.0
2.25		40	13.0
2.30		40	13.0
2.35		40	13.0
2.38	3/32	43	14.0
2.40		43	14.0
2.45		43	14.0



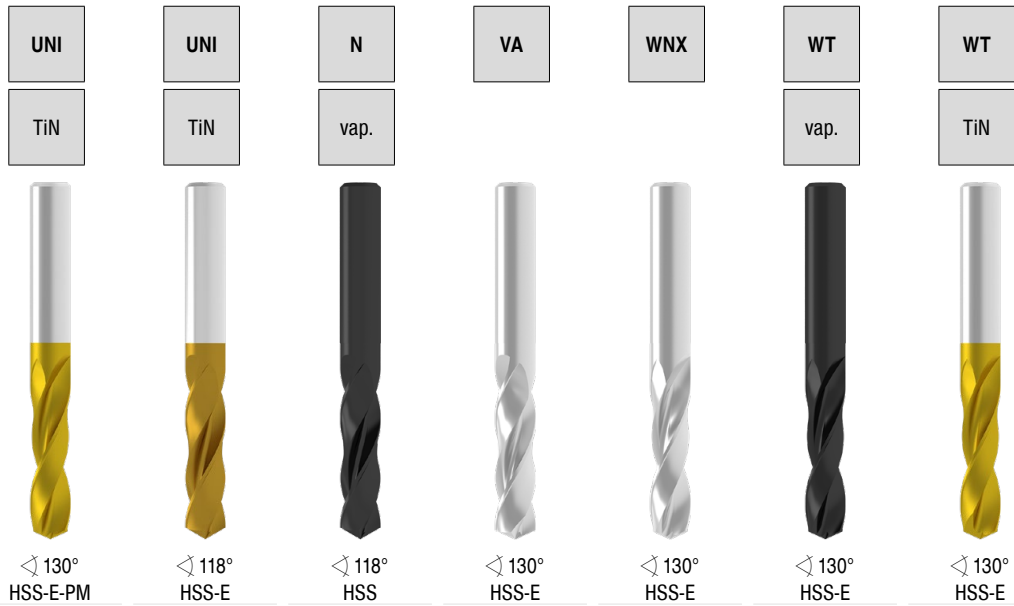
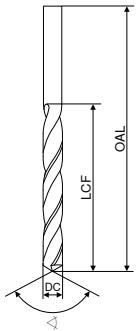
Steel	●	●	●	○	●	●	●
Stainless steel	○	●	●	●	○	○	○
Cast iron	●	●	●	○	○	○	○
Non ferrous metals	○	●	○	○	●	○	○
Heat resistant alloys	○	○	○	○	○	○	○
Hardened materials		○				○	○

- 1) uncoated
- 2) self-centering

→ v_c Page 46+47

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

≤ 3xD



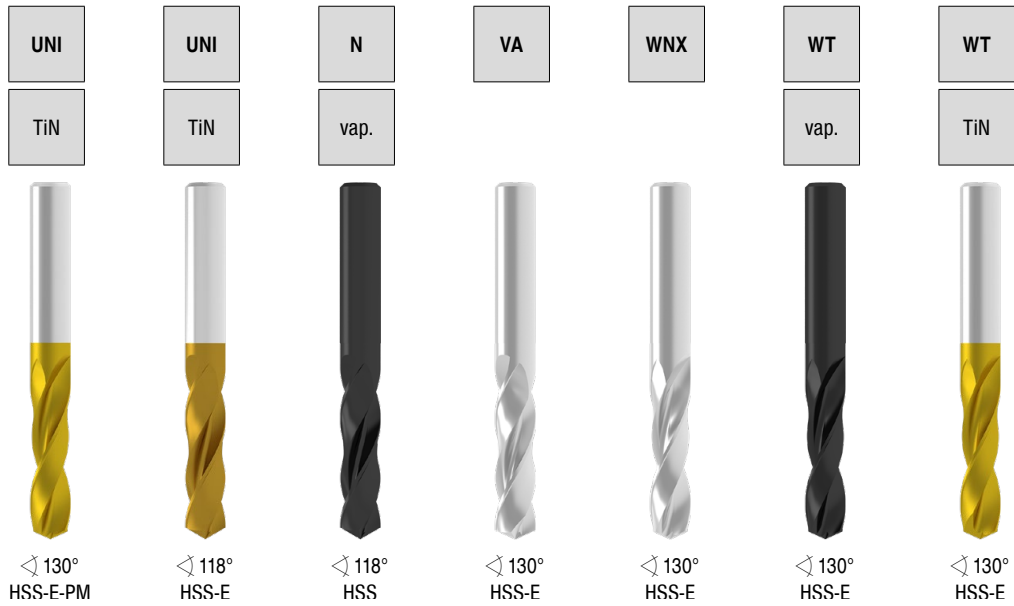
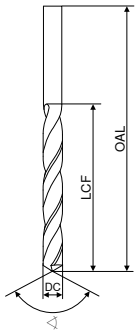
DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
2.50		43	14.0
2.55		43	14.0
2.60		43	14.0
2.65		43	14.0
2.70		46	16.0
2.75		46	16.0
2.78	7/64	46	16.0
2.80		46	16.0
2.85		46	16.0
2.90		46	16.0
2.95		46	16.0
3.00		46	16.0
3.05		49	18.0
3.10		49	18.0
3.15		49	18.0
3.17	1/8	49	18.0
3.20		49	18.0
3.25		49	18.0
3.30		49	18.0
3.35		49	18.0
3.40		52	20.0
3.45		52	20.0
3.50		52	20.0
3.55		52	20.0
3.57	9/64	52	20.0
3.60		52	20.0
3.70		52	20.0
3.75		52	20.0
3.80		55	22.0
3.85		55	22.0
3.90		55	22.0
3.95		55	22.0
3.97	5/32	55	22.0
4.00		55	22.0
4.05		55	22.0
4.10		55	22.0
4.15		55	22.0
4.20		55	22.0
4.25		55	22.0
4.30		58	24.0
4.35		58	24.0
4.37	11/64	58	24.0
4.40		58	24.0

Steel	●	●	●	○	●	●	●
Stainless steel	○	●	●	●	○	○	○
Cast iron	●	●	●	○	○	○	○
Non ferrous metals	○	●	○	○	●	○	○
Heat resistant alloys	○	○	○	○	○	○	○
Hardened materials		○				○	○

- 1) uncoated
- 2) self-centering

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

≤ 3xD



DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
4.45		58	24.0
4.50		58	24.0
4.55		58	24.0
4.60		58	24.0
4.65		58	24.0
4.70		58	24.0
4.75		58	24.0
4.76	3/16	62	26.0
4.80		62	26.0
4.85		62	26.0
4.90		62	26.0
4.95		62	26.0
5.00		62	26.0
5.05		62	26.0
5.10		62	26.0
5.15		62	26.0
5.16	13/64	62	26.0
5.20		62	26.0
5.25		62	26.0
5.30		62	26.0
5.35		66	28.0
5.40		66	28.0
5.45		66	28.0
5.50		66	28.0
5.55		66	28.0
5.56	7/32	66	28.0
5.60		66	28.0
5.70		66	28.0
5.75		66	28.0
5.80		66	28.0
5.85		66	28.0
5.90		66	28.0
5.95	15/64	66	28.0
6.00		66	28.0
6.05		70	31.0
6.10		70	31.0
6.15		70	31.0
6.20		70	31.0
6.25		70	31.0
6.30		70	31.0
6.35	1/4	70	31.0
6.40		70	31.0
6.45		70	31.0

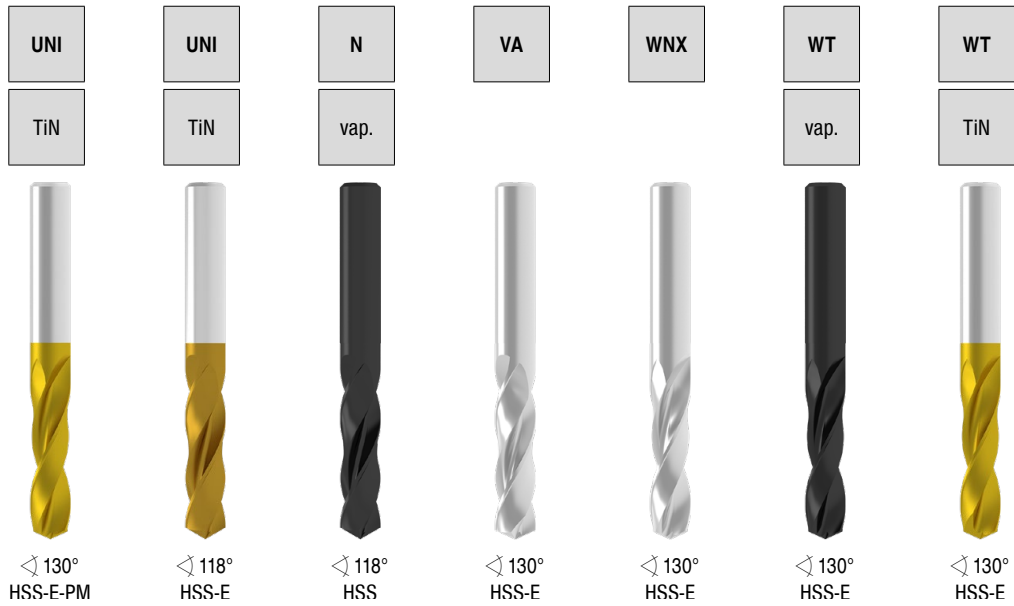
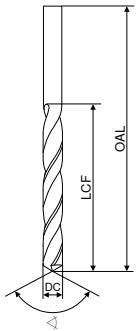
Steel	●	●	●	○	●	●	●
Stainless steel	○	●	●	●	○	○	○
Cast iron	●	●	●	○	○	○	○
Non ferrous metals	○	●	○	○	●	○	○
Heat resistant alloys	○	○	○	○	○	○	○
Hardened materials		○				○	○

- 1) uncoated
- 2) self-centering

→ v_c Page 46+47

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

≤ 3xD



DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
6.50		70	31.0
6.55		70	31.0
6.60		70	31.0
6.65		70	31.0
6.70		70	31.0
6.75		74	34.0
6.80		74	34.0
6.85		74	34.0
6.90		74	34.0
7.00		74	34.0
7.05		74	34.0
7.10		74	34.0
7.14	9/32	74	34.0
7.20		74	34.0
7.25		74	34.0
7.30		74	34.0
7.35		74	34.0
7.40		74	34.0
7.50		74	34.0
7.60		79	37.0
7.70		79	37.0
7.75		79	37.0
7.80		79	37.0
7.90		79	37.0
7.94	5/16	79	37.0
8.00		79	37.0
8.05		79	37.0
8.10		79	37.0
8.15		79	37.0
8.20		79	37.0
8.25		79	37.0
8.30		79	37.0
8.40		79	37.0
8.50		79	37.0
8.55		84	40.0
8.60		84	40.0
8.70		84	40.0
8.73	11/32	84	40.0
8.75		84	40.0
8.80		84	40.0
8.90		84	40.0
8.95		84	40.0
9.00		84	40.0

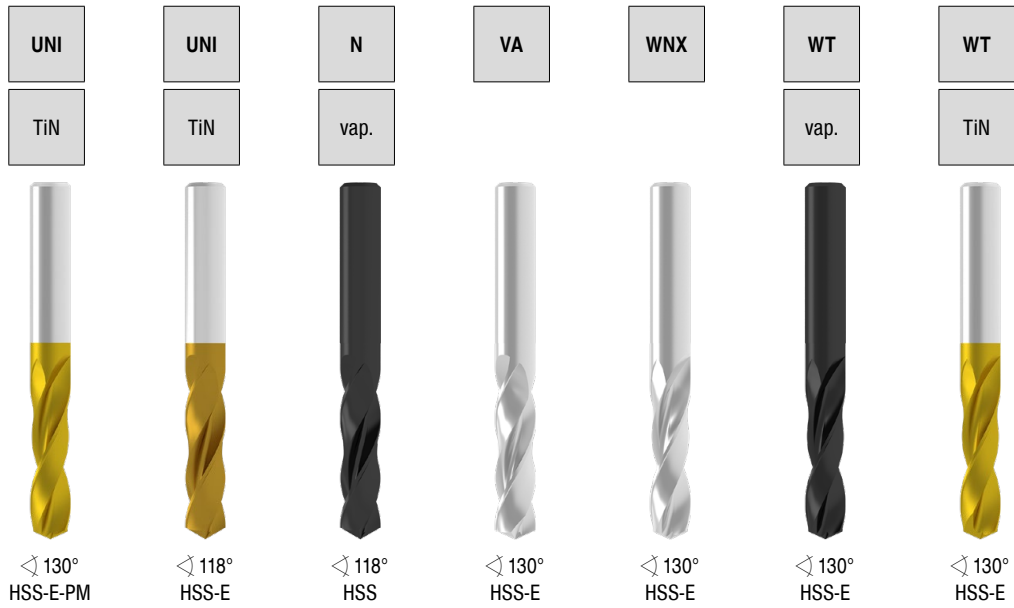
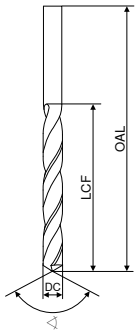
Steel	●	●	●	○	●	●	●
Stainless steel	○	●	●	●	○	○	○
Cast iron	●	●	●	○	○	○	○
Non ferrous metals	○	●	○	○	●	○	○
Heat resistant alloys	○	○	○	○	○	○	○
Hardened materials		○				○	○

- 1) uncoated
- 2) self-centering

→ v_c Page 46+47

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

≤ 3xD



130°
HSS-E-PM

118°
HSS-E

118°
HSS

130°
HSS-E

130°
HSS-E

130°
HSS-E

130°
HSS-E

DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
9.05		84	40.0
9.10		84	40.0
9.20		84	40.0
9.25		84	40.0
9.30		84	40.0
9.40		84	40.0
9.50		84	40.0
9.60		89	43.0
9.65		89	43.0
9.70		89	43.0
9.75		89	43.0
9.80		89	43.0
9.90		89	43.0
10.00		89	43.0
10.05		89	43.0
10.10		89	43.0
10.20		89	43.0
10.25		89	43.0
10.30		89	43.0
10.40		89	43.0
10.50		89	43.0
10.60		95	47.0
10.70		95	47.0
10.75		95	47.0
10.80		95	47.0
10.90		95	47.0
11.00		95	47.0
11.10		95	47.0
11.11	7/16	95	47.0
11.20		95	47.0
11.30		95	47.0
11.40		95	47.0
11.50		95	47.0
11.60		95	47.0
11.70		95	47.0
11.75		95	47.0
11.80		95	47.0
11.90		102	51.0
12.00		102	51.0
12.10		102	51.0
12.20		102	51.0
12.25		102	51.0
12.30		102	51.0

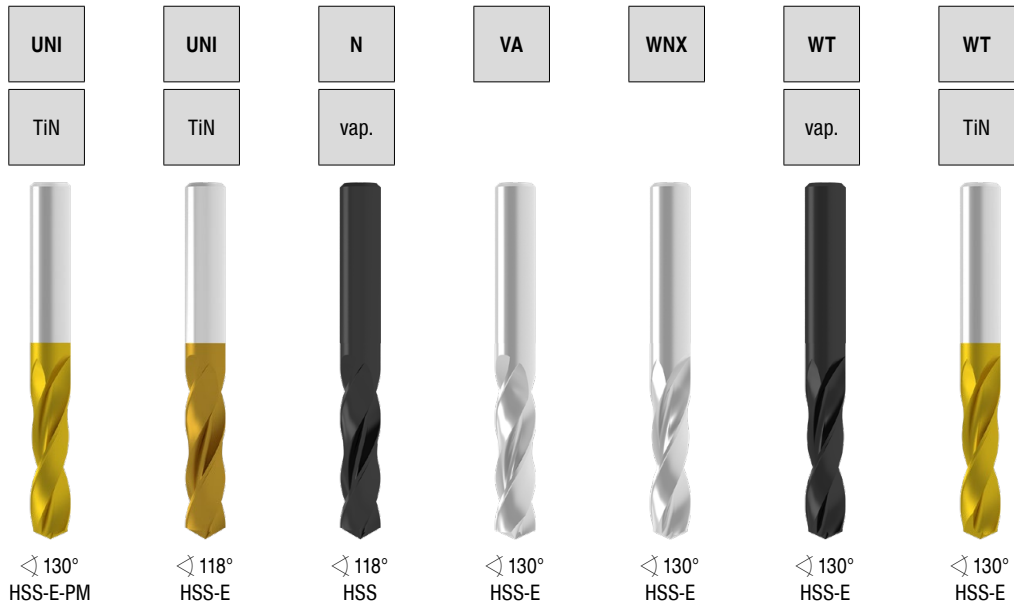
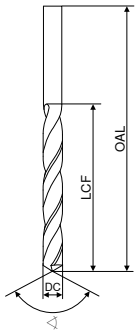
Steel	●	●	●	○	●	●	●
Stainless steel	○	●	●	●	○	○	○
Cast iron	●	●	●	○	○	○	○
Non ferrous metals	○	●	○	○	●	○	○
Heat resistant alloys	○	○	○	○	○	○	○
Hardened materials		○				○	○

- 1) uncoated
- 2) self-centering

→ v_c Page 46+47

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

≤ 3xD



130°
HSS-E-PM

118°
HSS-E

118°
HSS

130°
HSS-E

130°
HSS-E

130°
HSS-E

130°
HSS-E

DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
12.40		102	51.0
12.50		102	51.0
12.60		102	51.0
12.70		102	51.0
12.80		102	51.0
12.90		102	51.0
13.00		102	51.0
13.20		102	51.0
13.30		107	54.0
13.50		107	54.0
13.80		107	54.0
14.00		107	54.0
14.50		111	56.0
14.75		111	56.0
14.80		111	56.0
15.00		111	56.0
15.25		115	58.0
15.50		115	58.0
15.75		115	58.0
16.00		115	58.0
16.50		119	60.0
17.00		119	60.0
17.50		123	62.0
17.75		123	62.0
18.00		123	62.0
18.50		127	64.0
19.00		127	64.0
19.50		131	66.0
19.75		131	66.0
20.00		131	66.0
20.50		136	68.0
21.00		136	68.0
21.50		141	70.0
22.00		141	70.0
22.20		141	70.0
23.00		146	72.0
24.00		151	75.0
25.00		151	75.0

Steel	●	●	●	○	●	●	●
Stainless steel	○	●	●	●	○	○	○
Cast iron	●	●	●	○	○	○	○
Non ferrous metals	○	●	○	○	●	○	○
Heat resistant alloys	○	○	○	○	○	○	○
Hardened materials		○				○	○

- 1) uncoated
- 2) self-centering

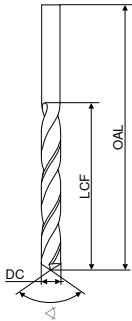
→ v_c Page 46+47

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

▲ left-hand cutting

≤ 3xD

WTL-L



130°
HSS

DC _{h8}	OAL	LCF
mm	mm	mm
1.0	26	6
1.1	28	7
1.2	30	8
1.3	30	8
1.4	32	9
1.5	32	9
1.6	34	10
1.7	34	10
1.8	36	11
1.9	36	11
2.0	38	12
2.1	38	12
2.2	40	13
2.3	40	13
2.4	43	14
2.5	43	14
2.6	43	14
2.7	46	16
2.8	46	16
2.9	46	16
3.0	46	16
3.1	49	18
3.2	49	18
3.3	49	18
3.4	52	20
3.5	52	20
3.6	52	20
3.7	52	20
3.8	55	22
3.9	55	22
4.0	55	22
4.1	55	22
4.2	55	22
4.3	58	24
4.4	58	24
4.5	58	24
4.6	58	24
4.7	58	24
4.8	62	26
4.9	62	26
5.0	62	26
5.1	62	26
5.2	62	26
5.3	62	26
5.4	66	28
5.5	66	28
5.6	66	28

DC _{h8}	OAL	LCF
mm	mm	mm
5.7	66	28
5.8	66	28
5.9	66	28
6.0	66	28
6.1	70	31
6.2	70	31
6.3	70	31
6.4	70	31
6.5	70	31
6.6	70	31
6.7	70	31
6.8	74	34
6.9	74	34
7.0	74	34
7.2	74	34
7.3	74	34
7.4	74	34
7.5	74	34
7.7	79	37
8.0	79	37
8.1	79	37
8.2	79	37
8.3	79	37
8.5	79	37
8.6	84	40
8.7	84	40
8.8	84	40
9.0	84	40
9.5	84	40
9.7	89	43
10.0	89	43
10.1	89	43
10.2	89	43
10.5	89	43
11.0	95	47
11.5	95	47
11.8	95	47
12.0	102	51
12.5	102	51
12.8	102	51
13.0	102	51
14.0	107	54
14.5	111	56
15.0	111	56
16.0	115	58
18.0	123	62
19.0	127	64

Steel	●
Stainless steel	○
Cast iron	○
Non ferrous metals	●
Heat resistant alloys	○
Hardened materials	○

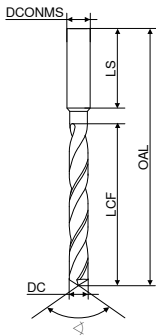
- 1) uncoated
- 2) nitrided chamfer
- 3) vaporised

→ v_c Page 47

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



A
118°
HSS-E

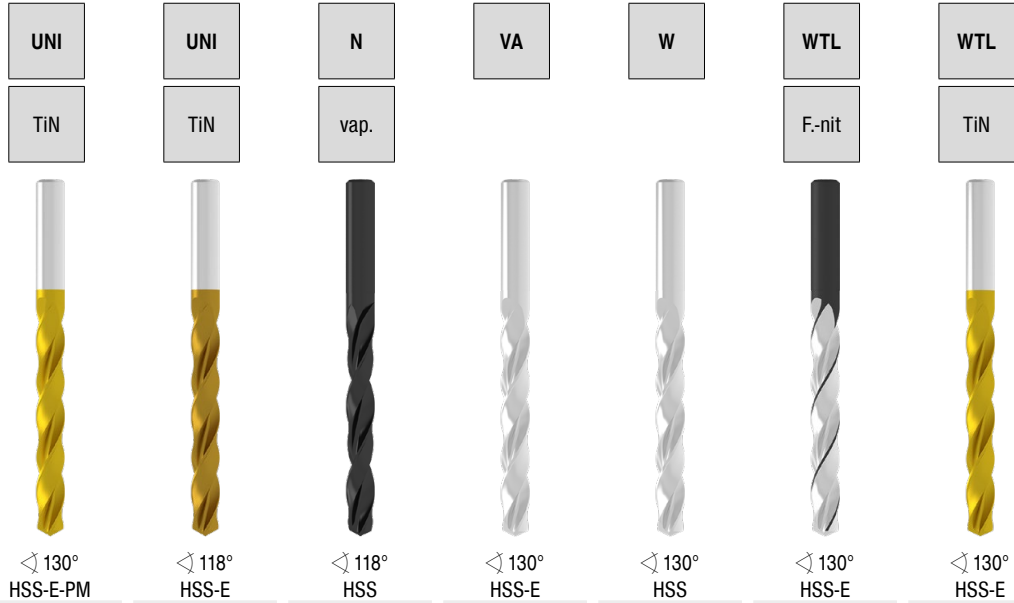
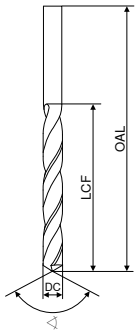
DC _{h8}	OAL	LCF	DCONMS _{h6}	LS
mm	mm	mm	mm	mm
7.40	113	69	8	36
7.50	113	69	8	36
7.55	119	75	8	36
7.60	119	75	8	36
7.70	119	75	8	36
7.80	119	75	8	36
7.90	119	75	8	36
8.00	119	75	8	36
8.10	125	75	10	40
8.20	125	75	10	40
8.30	125	75	10	40
8.40	125	75	10	40
8.50	125	75	10	40
8.60	131	81	10	40
8.70	131	81	10	40
8.80	131	81	10	40
8.90	131	81	10	40
9.00	131	81	10	40
9.10	131	81	10	40
9.20	131	81	10	40
9.30	131	81	10	40
9.40	131	81	10	40
9.50	131	81	10	40
9.55	137	87	10	40
9.60	137	87	10	40
9.70	137	87	10	40
9.80	137	87	10	40
9.90	137	87	10	40
10.00	137	87	10	40
10.10	144	87	12	45
10.20	144	87	12	45
10.30	144	87	12	45
10.40	144	87	12	45
10.50	144	87	12	45
10.60	144	87	12	45
10.70	151	94	12	45
10.80	151	94	12	45
10.90	151	94	12	45
11.00	151	94	12	45
11.10	151	94	12	45
11.20	151	94	12	45
11.30	151	94	12	45
11.40	151	94	12	45
11.50	151	94	12	45
11.60	151	94	12	45
11.70	151	94	12	45
11.80	151	94	12	45
11.90	158	101	12	45
12.00	158	101	12	45
12.10	161	101	16	48
12.20	161	101	16	48
12.30	161	101	16	48
12.40	161	101	16	48
12.50	161	101	16	48
12.60	161	101	16	48
12.70	161	101	16	48
12.80	161	101	16	48
12.90	161	101	16	48
13.00	161	101	16	48
13.50	166	106	16	48
14.00	166	106	16	48
14.50	169	109	16	48
15.00	169	109	16	48
15.50	172	112	16	48
16.00	172	112	16	48
16.50	181	115	20	50
17.00	181	115	20	50
17.50	184	118	20	50
18.00	184	118	20	50
18.50	188	122	20	50
19.00	188	122	20	50
19.50	191	125	20	50
20.00	191	125	20	50

DC _{h8}	OAL	LCF	DCONMS _{h6}	LS
mm	mm	mm	mm	mm
2.00	56	24	3	28
2.10	56	24	3	28
2.20	59	27	3	28
2.30	59	27	3	28
2.40	62	30	3	28
2.50	62	30	3	28
2.60	62	30	3	28
2.70	65	33	3	28
2.80	65	33	3	28
2.90	65	33	3	28
3.00	65	33	3	28
3.10	68	36	4	28
3.20	68	36	4	28
3.30	68	36	4	28
3.40	71	39	4	28
3.50	71	39	4	28
3.60	71	39	4	28
3.70	71	39	4	28
3.80	75	43	4	28
3.90	75	43	4	28
4.00	75	43	4	28
4.10	87	43	6	36
4.20	87	43	6	36
4.30	91	47	6	36
4.40	91	47	6	36
4.50	91	47	6	36
4.60	91	47	6	36
4.65	91	47	6	36
4.70	91	47	6	36
4.80	96	52	6	36
4.90	96	52	6	36
5.00	96	52	6	36
5.10	96	52	6	36
5.20	96	52	6	36
5.30	96	52	6	36
5.40	101	57	6	36
5.50	101	57	6	36
5.55	101	57	6	36
5.60	101	57	6	36
5.70	101	57	6	36
5.80	101	57	6	36
5.90	101	57	6	36
6.00	101	57	6	36
6.10	107	63	8	36
6.20	107	63	8	36
6.30	107	63	8	36
6.40	107	63	8	36
6.50	107	63	8	36
6.60	107	63	8	36
6.70	107	63	8	36
6.80	113	69	8	36
6.90	113	69	8	36
7.00	113	69	8	36
7.10	113	69	8	36
7.20	113	69	8	36
7.30	113	69	8	36

Steel	●
Stainless steel	●
Cast iron	●
Non ferrous metals	●
Heat resistant alloys	○

Twist drill to DIN 338, short

≤ 5xD



DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
0.20		19	2.5
0.25		19	3.0
0.30		19	3.0
0.35		19	4.0
0.40		20	5.0
0.45		20	5.0
0.50		22	6.0
0.55		24	7.0
0.60		24	7.0
0.65		26	8.0
0.70		28	9.0
0.75		28	9.0
0.80		30	10.0
0.85		30	10.0
0.90		32	11.0
0.95		32	11.0
1.00		34	12.0
1.05		34	12.0
1.10		36	14.0
1.15		36	14.0
1.20		38	16.0
1.25		38	16.0
1.30		38	16.0
1.35		40	18.0
1.40		40	18.0
1.45		40	18.0
1.50		40	18.0
1.55		43	20.0
1.60		43	20.0
1.65		43	20.0
1.70		43	20.0
1.75		46	22.0
1.80		46	22.0
1.85		46	22.0
1.90		46	22.0
1.95		49	24.0
2.00		49	24.0
2.05		49	24.0
2.10		49	24.0
2.15		53	27.0
2.20		53	27.0
2.25		53	27.0
2.30		53	27.0
2.35		53	27.0
2.38	3/32	57	30.0
2.40		57	30.0

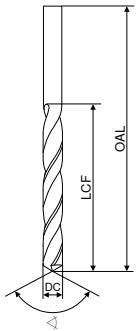
Steel	●	●	●	○	●	●
Stainless steel	○	●	●	●	○	○
Cast iron	●	●	●	○	○	○
Non ferrous metals	○	●	○	○	●	○
Heat resistant alloys	○	○	○	○	○	○
Hardened materials		○				

- 1) uncoated
- 2) self-centering

→ v_c Page 48+49

Twist drill to DIN 338, short

≤ 5xD



UNI
TiN



130°
HSS-E-PM

UNI
TiN



118°
HSS-E

N
vap.



118°
HSS

VA



130°
HSS-E

W



130°
HSS

WTL
F-nit



130°
HSS-E

WTL
TiN



130°
HSS-E

DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
2.45		57	30.0
2.50		57	30.0
2.55		57	30.0
2.60		57	30.0
2.65		57	30.0
2.70		61	33.0
2.75		61	33.0
2.78	7/64	61	33.0
2.80		61	33.0
2.85		61	33.0
2.90		61	33.0
2.95		61	33.0
3.00		61	33.0
3.05		65	36.0
3.10		65	36.0
3.15		65	36.0
3.17	1/8	65	36.0
3.20		65	36.0
3.25		65	36.0
3.30		65	36.0
3.35		65	36.0
3.40		70	39.0
3.45		70	39.0
3.50		70	39.0
3.55		70	39.0
3.57	9/64	70	39.0
3.60		70	39.0
3.65		70	39.0
3.70		70	39.0
3.75		70	39.0
3.80		75	43.0
3.85		75	43.0
3.90		75	43.0
3.95		75	43.0
3.97	5/32	75	43.0
4.00		75	43.0
4.05		75	43.0
4.10		75	43.0
4.15		75	43.0
4.20		75	43.0
4.25		75	43.0
4.30		80	47.0
4.35		80	47.0
4.37	11/64	80	47.0
4.40		80	47.0
4.45		80	47.0

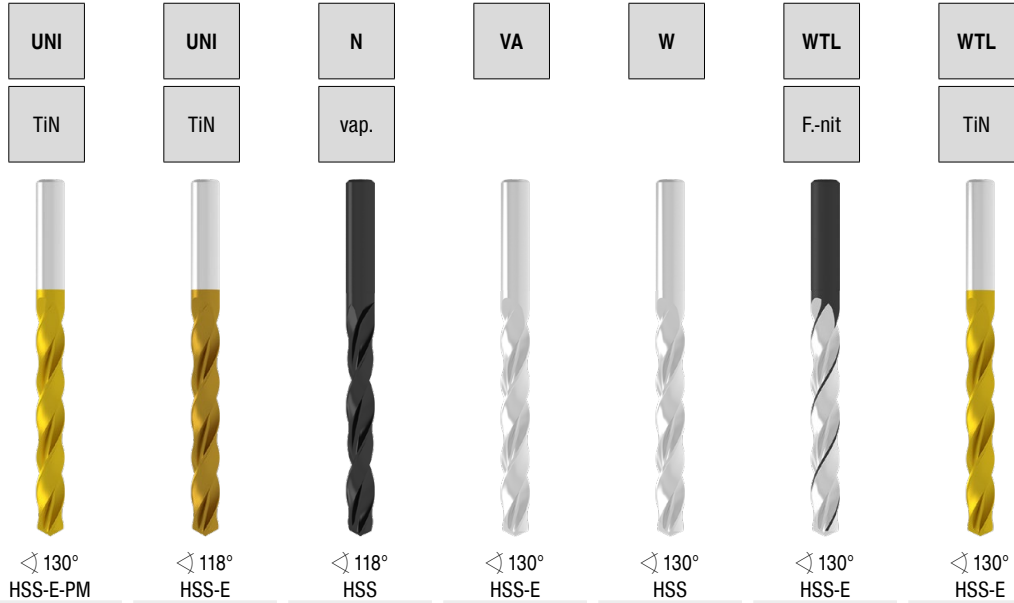
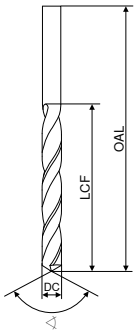
Steel	●	●	●	○	●	●
Stainless steel	○	●	●	●	○	○
Cast iron	●	●	●	○	○	○
Non ferrous metals	○	●	○	○	●	○
Heat resistant alloys	○	○	○	○	○	○
Hardened materials		○				

- 1) uncoated
- 2) self-centering

→ v_c Page 48+49

Twist drill to DIN 338, short

≤ 5xD



DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
4.50		80	47.0
4.55		80	47.0
4.60		80	47.0
4.65		80	47.0
4.70		80	47.0
4.75		80	47.0
4.76	3/16	86	52.0
4.80		86	52.0
4.85		86	52.0
4.90		86	52.0
4.95		86	52.0
5.00		86	52.0
5.05		86	52.0
5.10		86	52.0
5.15		86	52.0
5.16	13/64	86	52.0
5.20		86	52.0
5.25		86	52.0
5.30		86	52.0
5.35		93	57.0
5.40		93	57.0
5.45		93	57.0
5.50		93	57.0
5.55		93	57.0
5.56	7/32	93	57.0
5.60		93	57.0
5.65		93	57.0
5.70		93	57.0
5.75		93	57.0
5.80		93	57.0
5.85		93	57.0
5.90		93	57.0
5.95	15/64	93	57.0
6.00		93	57.0
6.05		101	63.0
6.10		101	63.0
6.15		101	63.0
6.20		101	63.0
6.25		101	63.0
6.30		101	63.0
6.35	1/4	101	63.0
6.40		101	63.0
6.45		101	63.0
6.50		101	63.0
6.55		101	63.0
6.60		101	63.0

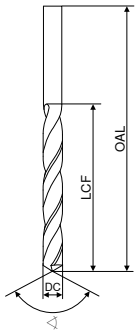
Steel	●	●	●	○	●	●
Stainless steel	○	●	●	●	○	○
Cast iron	●	●	●	○	○	○
Non ferrous metals	○	●	○	○	●	○
Heat resistant alloys	○	○	○	○	○	○
Hardened materials		○				

- 1) uncoated
- 2) self-centering

→ v_c Page 48+49

Twist drill to DIN 338, short

≤ 5xD



UNI
TiN



130°
HSS-E-PM

UNI
TiN



118°
HSS-E

N
vap.



118°
HSS

VA



130°
HSS-E

W



130°
HSS

WTL
F-nit



130°
HSS-E

WTL
TiN



130°
HSS-E

DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
6.65		101	63.0
6.70		101	63.0
6.75		109	69.0
6.80		109	69.0
6.85		109	69.0
6.90		109	69.0
6.95		109	69.0
7.00		109	69.0
7.05		109	69.0
7.10		109	69.0
7.14	9/32	109	69.0
7.15		109	69.0
7.20		109	69.0
7.25		109	69.0
7.30		109	69.0
7.35		109	69.0
7.40		109	69.0
7.45		109	69.0
7.50		109	69.0
7.55		117	75.0
7.60		117	75.0
7.65		117	75.0
7.70		117	75.0
7.75		117	75.0
7.80		117	75.0
7.85		117	75.0
7.90		117	75.0
7.94	5/16	117	75.0
7.95		117	75.0
8.00		117	75.0
8.05		117	75.0
8.10		117	75.0
8.15		117	75.0
8.20		117	75.0
8.25		117	75.0
8.30		117	75.0
8.35		117	75.0
8.40		117	75.0
8.45		117	75.0
8.50		117	75.0
8.55		125	81.0
8.60		125	81.0
8.65		125	81.0
8.70		125	81.0
8.73	11/32	125	81.0
8.75		125	81.0

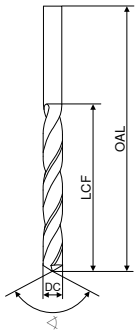
Steel	●	●	●	○	●	●
Stainless steel	○	●	●	●	○	○
Cast iron	●	●	●	○	○	○
Non ferrous metals	○	●	○	○	●	○
Heat resistant alloys	○	○	○	○	○	○
Hardened materials		○				

- 1) uncoated
- 2) self-centering

→ v_c Page 48+49

Twist drill to DIN 338, short

≤ 5xD



UNI
TiN



130°
HSS-E-PM

UNI
TiN



118°
HSS-E

N
vap.



118°
HSS

VA



130°
HSS-E

W



130°
HSS

WTL
F-nit



130°
HSS-E

WTL
TiN



130°
HSS-E

DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
8.80		125	81.0
8.90		125	81.0
8.95		125	81.0
9.00		125	81.0
9.05		125	81.0
9.10		125	81.0
9.15		125	81.0
9.20		125	81.0
9.25		125	81.0
9.30		125	81.0
9.35		125	81.0
9.40		125	81.0
9.45		125	81.0
9.50		125	81.0
9.55		133	87.0
9.60		133	87.0
9.65		133	87.0
9.70		133	87.0
9.75		133	87.0
9.80		133	87.0
9.85		133	87.0
9.90		133	87.0
9.95		133	87.0
10.00		133	87.0
10.05		133	87.0
10.10		133	87.0
10.15		133	87.0
10.20		133	87.0
10.25		133	87.0
10.30		133	87.0
10.35		133	87.0
10.40		133	87.0
10.45		133	87.0
10.50		133	87.0
10.55		133	87.0
10.60		133	87.0
10.70		142	94.0
10.75		142	94.0
10.80		142	94.0
10.90		142	94.0
11.00		142	94.0
11.10		142	94.0
11.11	7/16	142	94.0
11.20		142	94.0
11.30		142	94.0
11.40		142	94.0

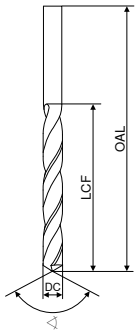
Steel	●	●	●	○	●	●
Stainless steel	○	●	●	●	○	○
Cast iron	●	●	●	○	○	○
Non ferrous metals	○	●	○	○	●	○
Heat resistant alloys	○	○	○	○	○	○
Hardened materials		○				

- 1) uncoated
- 2) self-centering

→ v_c Page 48+49

Twist drill to DIN 338, short

≤ 5xD



UNI
TiN



◊ 130°
HSS-E-PM

UNI
TiN



◊ 118°
HSS-E

N
vap.



◊ 118°
HSS

VA



◊ 130°
HSS-E

W



◊ 130°
HSS

WTL
F-nit



◊ 130°
HSS-E

WTL
TiN



◊ 130°
HSS-E

DC _{ns}	DC	OAL	LCF
mm	inch	mm	mm
11.50		142	94.0
11.60		142	94.0
11.70		142	94.0
11.80		142	94.0
11.90		151	101.0
12.00		151	101.0
12.15		151	101.0
12.20		151	101.0
12.25		151	101.0
12.30		151	101.0
12.50		151	101.0
12.70		151	101.0
12.80		151	101.0
13.00		151	101.0
13.10		151	101.0
13.20		151	101.0
13.30		160	108.0
13.50		160	108.0
13.80		160	108.0
14.00		160	108.0
14.50		169	114.0
14.80		169	114.0
15.00		169	114.0
15.25		178	120.0
15.50		178	120.0
15.80		178	120.0
16.00		178	120.0
16.50		184	125.0
17.00		184	125.0
17.50		191	130.0
18.00		191	130.0
18.50		198	135.0
19.00		198	135.0
19.50		205	140.0
20.00		205	140.0

Steel	●	●	●	○	●	●
Stainless steel	○	●	●	●	○	○
Cast iron	●	●	●	○	○	○
Non ferrous metals	○	●	○	○	●	○
Heat resistant alloys	○	○	○	○	○	○
Hardened materials		○				

- 1) uncoated
- 2) self-centering

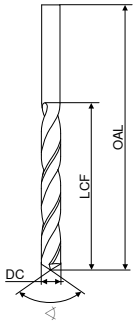
→ v_c Page 48+49

Twist drill to DIN 338, short

▲ Article no. 10 169 ... WTL-L - left-hand cutting drill

≤ 5xD

WTL	WTL-L
TiCN	F-nit



DC _{h8}	OAL	LCF
mm	mm	mm
1.0	34	12
1.3	38	16
1.4	40	18
1.5	40	18
1.6	43	20
1.7	43	20
1.8	46	22
1.9	46	22
2.0	49	24
2.1	49	24
2.2	53	27
2.3	53	27
2.4	57	30
2.5	57	30
2.6	57	30
2.7	61	33
2.8	61	33
2.9	61	33
3.0	61	33
3.1	65	36
3.2	65	36
3.3	65	36
3.4	70	39
3.5	70	39
3.6	70	39
3.7	70	39
3.8	75	43
3.9	75	43
4.0	75	43
4.1	75	43
4.2	75	43
4.3	80	47
4.4	80	47
4.5	80	47
4.6	80	47
4.7	80	47
4.8	86	52
4.9	86	52
5.0	86	52
5.1	86	52
5.2	86	52
5.3	86	52
5.4	93	57
5.5	93	57
5.6	93	57
5.7	93	57
5.8	93	57

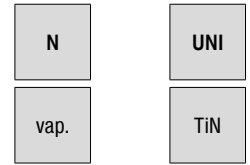
steel	●	●
stainless steel	○	
cast iron		○
non ferrous metals		○
heat resistant alloys		
uncoated		

→ v_c Page 49

Twist drill sets DIN 338, short

- ▲ in metal box
- ▲ in 0.1 mm steps

≤ 5xD



Drill set
type N
HSS



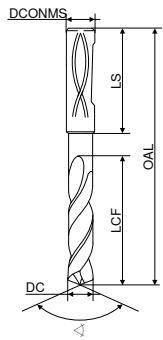
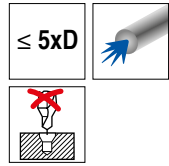
Drill set
type UNI TiN
HSS-E

Steel	●	●
Stainless steel		●
Cast iron	●	●
Non ferrous metals		●
Heat resistant alloys		○

→ v_c Page 48

Twist drill with thro' coolant ~ DIN 338, short

- ▲ relief ground
- ▲ special point thinning
- ▲ wide chip flutes
- ▲ rounded flute edges
- ▲ for long chipping materials up to 1000 N/mm²



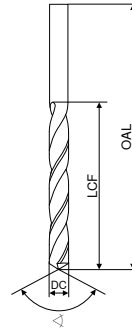
WNXi



WNXi
TiN



Twist drills with coolant hole, factory standard, long



NC



NC

TiAIN



DC _{h8}	OAL	LCF	DCONMS _{h6}	LS
mm	mm	mm	mm	mm
5.0	82	44	6	38
5.5	82	44	6	38
6.0	82	44	6	38
6.5	91	53	8	38
6.8	91	53	8	38
7.0	91	53	8	38
7.5	91	53	8	38
7.8	91	53	8	38
8.0	91	53	8	38
8.5	103	61	10	42
9.0	103	61	10	42
9.5	103	61	10	42
10.0	103	61	10	42
10.2	118	71	12	47
10.5	118	71	12	47
11.0	118	71	12	47
11.5	118	71	12	47
12.0	118	71	12	47
12.5	124	77	14	47
13.0	124	77	14	47
13.5	124	77	14	47
14.0	124	77	14	47
14.5	133	83	16	50
15.0	133	83	16	50
15.5	133	83	16	50
16.0	133	83	16	50
16.5	143	93	18	50
17.0	143	93	18	50
17.5	143	93	18	50
18.0	143	93	18	50
18.5	153	101	20	52
19.0	153	101	20	52
19.5	153	101	20	52
20.0	153	101	20	52

Steel	●	●
Stainless steel	●	●
Cast iron	●	●
Non ferrous metals	○	○
Heat resistant alloys	○	○

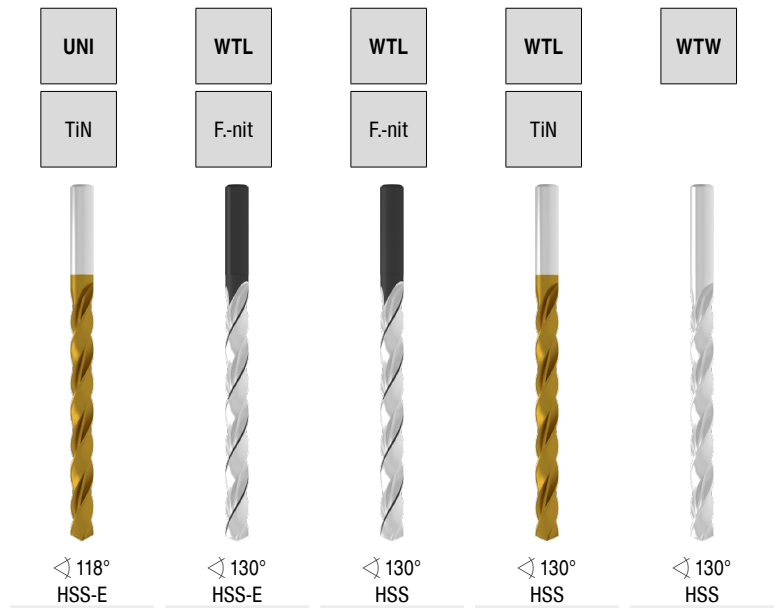
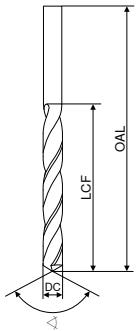
→ v_c Page 49

Steel	●	●
Stainless steel	○	○
Cast iron	●	●
Non ferrous metals	○	○
Heat resistant alloys	○	○

→ v_c Page 50

Twist drills, DIN 340, long

≤ 10xD



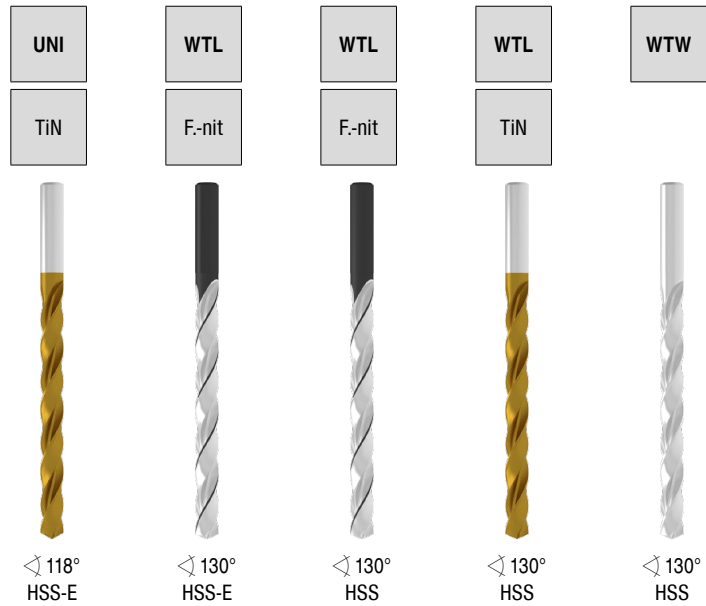
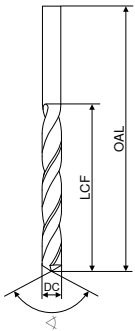
DC _{ns}	OAL	LCF
mm	mm	mm
1.0	56	33
1.1	60	37
1.2	65	41
1.3	65	41
1.4	70	45
1.5	70	45
1.6	76	50
1.7	76	50
1.8	80	53
1.9	80	53
2.0	85	56
2.1	85	56
2.2	90	59
2.3	90	59
2.4	95	62
2.5	95	62
2.6	95	62
2.7	100	66
2.8	100	66
2.9	100	66
3.0	100	66
3.1	106	69
3.2	106	69
3.3	106	69
3.4	112	73
3.5	112	73
3.6	112	73
3.7	112	73
3.8	119	78
3.9	119	78
4.0	119	78
4.1	119	78
4.2	119	78
4.3	126	82
4.4	126	82
4.5	126	82
4.6	126	82
4.7	126	82
4.8	132	87
4.9	132	87
5.0	132	87
5.1	132	87
5.2	132	87
5.3	132	87

Steel	●	●	●	●
Stainless steel	○	●	●	●
Cast iron	●	●	●	●
Non ferrous metals	○	●	●	●
Heat resistant alloys				●

1) uncoated

Twist drills, DIN 340, long

≤ 10xD



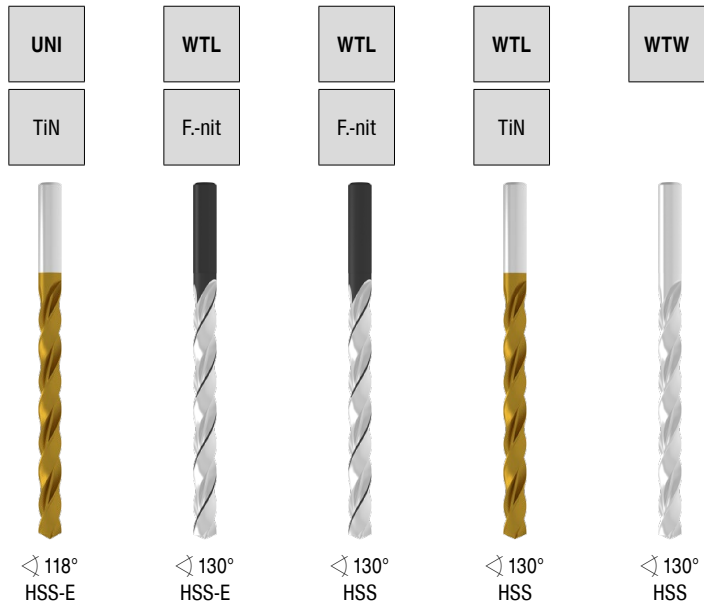
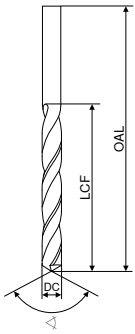
DC _{ns}	OAL	LCF
mm	mm	mm
5.4	139	91
5.5	139	91
5.6	139	91
5.7	139	91
5.8	139	91
5.9	139	91
6.0	139	91
6.1	148	97
6.2	148	97
6.3	148	97
6.4	148	97
6.5	148	97
6.6	148	97
6.7	148	97
6.8	156	102
6.9	156	102
7.0	156	102
7.1	156	102
7.2	156	102
7.3	156	102
7.4	156	102
7.5	156	102
7.6	165	109
7.7	165	109
7.8	165	109
7.9	165	109
8.0	165	109
8.1	165	109
8.2	165	109
8.3	165	109
8.4	165	109
8.5	165	109
8.6	175	115
8.7	175	115
8.8	175	115
8.9	175	115
9.0	175	115
9.1	175	115
9.2	175	115
9.3	175	115
9.4	175	115
9.5	175	115
9.6	184	121
9.7	184	121

Steel	●	●	●	●
Stainless steel	○	●	●	●
Cast iron	●	●	●	●
Non ferrous metals	○	●	●	●
Heat resistant alloys				●

1) uncoated

Twist drills, DIN 340, long

≤ 10xD



DC _{h8}	OAL	LCF
mm	mm	mm
9.8	184	121
9.9	184	121
10.0	184	121
10.1	184	121
10.2	184	121
10.3	184	121
10.4	184	121
10.5	184	121
10.6	184	121
10.8	195	128
11.0	195	128
11.5	195	128
11.6	195	128
11.8	195	128
12.0	205	134
12.2	205	134
12.3	205	134
12.5	205	134
13.0	205	134
13.5	214	140
14.0	214	140

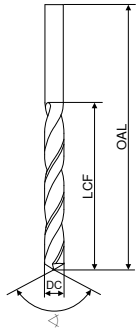
Steel	●	●	●	●
Stainless steel	○	●	●	●
Cast iron	●	●	●	●
Non ferrous metals	○	●	●	●
Heat resistant alloys				●

1) uncoated

→ v_c Page 50

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

> 10xD



WTL
F.-nit



DC _{h8}	OAL	LCF
mm	mm	mm
2.0	125	85
2.1	125	85
2.2	135	90
2.3	135	90
2.4	140	95
2.5	140	95
2.6	140	95
2.7	150	100
2.8	150	100
2.9	150	100
3.0	150	100
3.1	155	105
3.2	155	105
3.3	155	105
3.4	165	115
3.5	165	115
3.6	165	115
3.7	165	115
3.8	175	120
3.9	175	120
4.0	175	120
4.1	175	120
4.2	175	120
4.3	185	125
4.4	185	125
4.5	185	125
4.6	185	125
4.7	185	125
4.8	195	135
4.9	195	135
5.0	195	135
5.1	195	135
5.2	195	135
5.3	195	135
5.4	205	140
5.5	205	140
5.6	205	140
5.7	205	140
5.8	205	140
5.9	205	140
6.0	205	140
6.1	215	150
6.2	215	150
6.3	215	150
6.4	215	150
6.5	215	150
6.6	215	150

DC _{h8}	OAL	LCF
mm	mm	mm
6.7	215	150
6.8	225	155
6.9	225	155
7.0	225	155
7.1	225	155
7.3	225	155
7.4	225	155
7.5	225	155
7.7	240	165
7.8	240	165
7.9	240	165
8.0	240	165
8.1	240	165
8.2	240	165
8.3	240	165
8.4	240	165
8.5	240	165
8.6	250	175
8.7	250	175
8.8	250	175
9.0	250	175
9.2	250	175
9.4	250	175
9.5	250	175
9.6	265	185
9.7	265	185
9.8	265	185
9.9	265	185
10.0	265	185
10.5	265	185
11.0	280	195
11.5	280	195
12.0	295	205
12.5	295	205
13.0	295	205

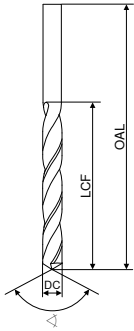
Steel	●
Stainless steel	○
Cast iron	●
Non ferrous metals	●
Heat resistant alloys	●

1) uncoated

→ v_c Page 51

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

> 10xD



DC _{h8} mm	OAL mm	LCF mm
2.0	160	110
2.5	180	120
3.0	190	130
3.5	210	145
4.0	220	150
4.5	235	160
5.0	245	170
5.5	260	180
6.0	260	180
6.5	275	190
7.0	290	200
7.5	290	200
8.0	305	210
8.5	305	210
9.0	320	220
9.5	320	220
10.0	340	235
10.5	340	235
11.0	365	250
11.5	365	250
12.0	375	260
12.5	375	260
13.0	375	260

Steel	●
Stainless steel	○
Cast iron	●
Non ferrous metals	●
Heat resistant alloys	●

1) uncoated

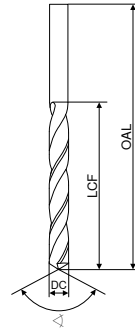
WTL
F.-nit



130°
HSS

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

> 10xD



DC _{h8} mm	OAL mm	LCF mm
2.5	225	150
3.0	240	160
3.5	265	180
4.0	280	190
4.5	295	200
5.0	315	210
5.5	330	225
6.0	330	225
6.5	350	235
7.0	370	250
7.5	370	250
8.0	390	265
8.5	390	265
9.0	410	280
9.5	410	280
10.0	430	295
10.5	430	295
11.0	455	310
11.5	455	310
12.0	480	330
12.5	480	330
13.0	480	330

Steel	●
Stainless steel	○
Cast iron	●
Non ferrous metals	●
Heat resistant alloys	●

WTL
F.-nit



130°
HSS

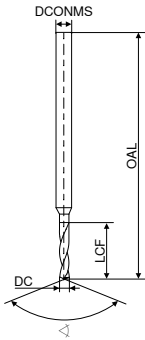
→ v_c Page 51

Micro drills, DIN 1899

- ▲ 4 facet
- ▲ with reinforced shank

Scope of supply:

- ▲ pack quantity 5 pieces
- ▲ price per piece



DC _{-0.004}	OAL	LCF	DCONMS _{h8}
mm	mm	mm	mm
0.15	25	0.8	1.0
0.20	25	1.5	1.0
0.25	25	1.9	1.0
0.30	25	1.9	1.0
0.35	25	2.4	1.0
0.40	25	3.0	1.0
0.45	25	3.0	1.0
0.50	25	3.4	1.0
0.55	25	3.9	1.0
0.60	25	3.9	1.0
0.65	25	4.2	1.0
0.70	25	4.8	1.0
0.75	25	4.8	1.0
0.80	25	5.3	1.5
0.85	25	5.3	1.5
0.90	25	6.0	1.5
0.95	25	6.0	1.5
1.00	25	6.8	1.5
1.05	25	6.8	1.5
1.10	25	7.6	1.5
1.15	25	7.6	1.5
1.20	25	8.5	1.5
1.25	25	8.5	1.5
1.30	25	8.5	1.5
1.35	25	9.5	1.5
1.40	25	9.5	1.5
1.45	25	9.5	1.5

Steel	●
Stainless steel	●
Cast iron	●
Non ferrous metals	●
Heat resistant alloys	○

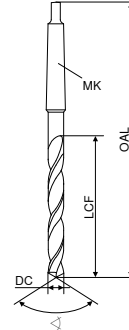
N



118°
HSS-E-PM

Twist drill, factory standard, short

≤ 3xD



WT

vap.



MK
130°
HSS-E

DC _{h8}	OAL	LCF	MK
mm	mm	mm	
10.0	138	57	1
10.5	138	57	1
11.0	142	61	1
11.5	142	61	1
12.0	147	66	1
12.5	147	66	1
13.0	147	66	1
13.5	168	70	2
14.0	168	70	2
14.5	172	74	2
15.0	172	74	2
15.5	176	78	2
16.0	176	78	2
16.5	179	81	2
17.0	179	81	2
17.5	183	85	2
18.0	183	85	2
18.5	186	88	2
19.0	186	88	2
19.5	212	91	3
20.0	212	91	3
21.0	216	95	3
22.0	219	98	3
23.0	222	101	3
24.0	225	104	3
25.0	225	104	3
26.0	256	107	4
27.0	259	110	4
28.0	259	110	4
30.0	263	114	4

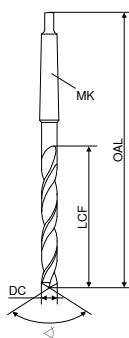
Steel	●
Stainless steel	○
Cast iron	○
Non ferrous metals	○
Heat resistant alloys	○

→ v_c Page 47

→ v_c Page 52

Twist drills, DIN 345

≤ 5xD



DC _{h8}	OAL	LCF	MK
mm	mm	mm	
23.00	253	155	2
23.50	276	155	3
23.75	281	160	3
24.00	281	160	3
24.50	281	160	3
24.75	281	160	3
25.00	281	160	3
25.50	286	165	3
25.75	286	165	3
26.00	286	165	3
26.50	286	165	3
26.75	291	170	3
27.00	291	170	3
27.50	291	170	3
27.75	291	170	3
28.00	291	170	3
28.50	296	175	3
28.75	296	175	3
29.00	296	175	3
29.50	296	175	3
29.75	296	175	3
30.00	296	175	3
30.50	301	180	3
31.00	301	180	3
31.50	301	180	3
32.00	334	185	4
32.50	334	185	4
33.00	334	185	4
33.50	334	185	4
34.00	339	190	4
34.50	339	190	4
35.00	339	190	4
35.50	339	190	4
36.00	344	195	4
36.50	344	195	4
37.00	344	195	4
37.50	344	195	4
38.00	349	200	4
38.50	349	200	4
39.00	349	200	4
39.50	349	200	4
40.00	349	200	4
41.00	354	205	4
42.00	354	205	4
43.00	359	210	4
44.00	359	210	4
45.00	359	210	4
46.00	364	215	4
47.00	364	215	4
48.00	369	220	4
49.00	369	220	4
50.00	369	220	4
51.00	412	225	5
52.00	412	225	5
53.00	412	225	5
54.00	417	230	5
55.00	417	230	5
56.00	417	230	5
57.00	422	235	5
58.00	422	235	5
59.00	422	235	5
60.00	422	235	5

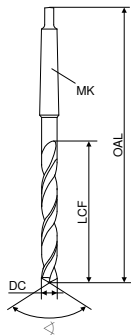
DC _{h8}	OAL	LCF	MK
mm	mm	mm	
10.00	168	87	1
10.20	168	87	1
10.50	168	87	1
10.80	175	94	1
11.00	175	94	1
11.20	175	94	1
11.50	175	94	1
11.80	175	94	1
12.00	182	101	1
12.20	182	101	1
12.50	182	101	1
12.80	182	101	1
13.00	182	101	1
13.20	182	101	1
13.50	189	108	1
13.80	189	108	1
14.00	189	108	1
14.25	212	114	2
14.50	212	114	2
14.75	212	114	2
15.00	212	114	2
15.25	218	120	2
15.50	218	120	2
15.75	218	120	2
16.00	218	120	2
16.25	223	125	2
16.50	223	125	2
16.75	223	125	2
17.00	223	125	2
17.25	228	130	2
17.50	228	130	2
17.75	228	130	2
18.00	228	130	2
18.25	233	135	2
18.50	233	135	2
18.75	233	135	2
19.00	233	135	2
19.25	238	140	2
19.50	238	140	2
19.75	238	140	2
20.00	238	140	2
20.25	243	145	2
20.50	243	145	2
20.75	243	145	2
21.00	243	145	2
21.25	248	150	2
21.50	248	150	2
21.75	248	150	2
22.00	248	150	2
22.25	248	150	2
22.50	253	155	2
22.75	253	155	2

Steel	●	●
Stainless steel		○
Cast iron	●	○
Non ferrous metals	○	○
Heat resistant alloys		

1) vaporised

Twist drills, DIN 341, long

≤ 10xD



DC _{h8}	OAL	LCF	MK
mm	mm	mm	
24.00	327	206	3
24.50	327	206	3
25.00	327	206	3
25.50	335	214	3
26.00	335	214	3
26.50	335	214	3
27.00	343	222	3
27.50	343	222	3
28.00	343	222	3
29.00	351	230	3
29.50	351	230	3
30.00	351	230	3
30.50	360	239	3
31.00	360	239	3
31.50	360	239	3
32.00	397	248	4
33.00	397	248	4
33.50	397	248	4
34.00	406	257	4
35.00	406	257	4
36.00	416	267	4
37.00	416	267	4
37.50	416	267	4
38.00	426	277	4
39.00	426	277	4
40.00	426	277	4
42.00	436	287	4
43.00	447	298	4
44.00	447	298	4
45.00	447	298	4
50.00	470	321	4

DC _{h8}	OAL	LCF	MK
mm	mm	mm	
10.00	197	116	1
10.20	197	116	1
10.50	197	116	1
10.80	206	125	1
11.00	206	125	1
11.20	206	125	1
11.50	206	125	1
11.80	206	125	1
12.00	215	134	1
12.20	215	134	1
12.50	215	134	1
12.80	215	134	1
13.00	215	134	1
13.20	215	134	1
13.50	223	142	1
13.80	223	142	1
14.00	223	142	1
14.25	245	147	2
14.50	245	147	2
14.75	245	147	2
15.00	245	147	2
15.25	251	153	2
15.50	251	153	2
15.75	251	153	2
16.00	251	153	2
16.25	257	159	2
16.50	257	159	2
16.75	257	159	2
17.00	257	159	2
17.25	263	165	2
17.50	263	165	2
17.75	263	165	2
18.00	263	165	2
18.25	269	171	2
18.50	269	171	2
18.75	269	171	2
19.00	269	171	2
19.25	275	177	2
19.50	275	177	2
19.75	275	177	2
20.00	275	177	2
20.50	282	184	2
21.00	282	184	2
21.50	289	191	2
21.75	289	191	2
22.00	289	191	2
22.50	296	198	2
23.00	296	198	2
23.50	319	198	3

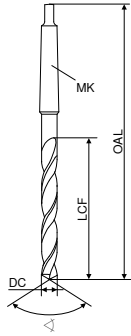
Steel	●	●
Stainless steel		●
Cast iron	●	●
Non ferrous metals	○	●
Heat resistant alloys		

1) vaporised

→ v_c Page 50

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

> 10xD

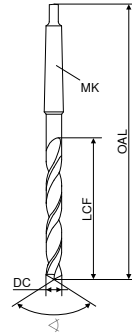


WTL



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

> 10xD



WTL



DC _{h8}	OAL	LCF	MK
mm	mm	mm	
10.0	285	185	1
10.5	285	185	1
11.0	300	195	1
11.5	300	195	1
12.0	310	205	1
12.5	310	205	1
13.0	310	205	1
13.5	325	220	1
14.0	325	220	1
14.5	340	220	2
15.0	340	220	2
15.5	355	230	2
16.0	355	230	2
16.5	355	230	2
17.0	355	230	2
17.5	370	245	2
18.0	370	245	2
18.5	370	245	2
19.0	370	245	2
19.5	385	260	2
20.0	385	260	2
21.0	385	260	2
22.0	405	270	2
23.0	405	270	2
24.0	440	290	3
25.0	440	290	3
26.0	440	290	3
28.0	460	305	3
30.0	460	305	3

DC _{h8}	OAL	LCF	MK
mm	mm	mm	
10.0	360	235	1
10.5	360	235	1
11.0	375	250	1
11.5	375	250	1
12.0	395	260	1
13.0	395	260	1
13.5	410	275	1
14.0	410	275	1
14.5	425	275	2
15.0	425	275	2
15.5	445	295	2
16.0	445	295	2
16.5	445	295	2
17.0	445	295	2
17.5	465	310	2
18.0	465	310	2
18.5	465	310	2
19.0	465	310	2
19.5	490	325	2
20.0	490	325	2
21.0	490	325	2
22.0	515	345	2
23.0	515	345	2
24.0	555	365	3
25.0	555	365	3
26.0	555	365	3
28.0	580	385	3
30.0	580	385	3

Steel	●
Stainless steel	○
Cast iron	●
Non ferrous metals	●
Heat resistant alloys	●

Steel	●
Stainless steel	○
Cast iron	●
Non ferrous metals	●
Heat resistant alloys	●

- 1) nitrided chamfer
- 2) vaporised

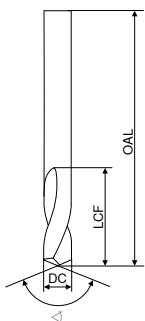
→ v_c Page 51

- 1) nitrided chamfer
- 2) vaporised

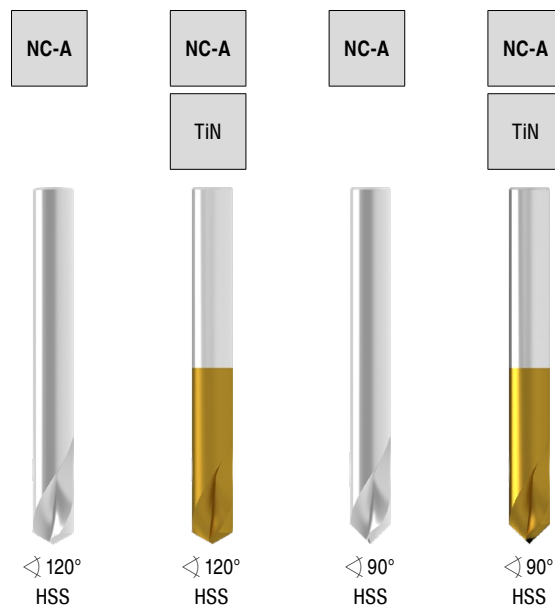
→ v_c Page 51

NC spot drills, factory standard

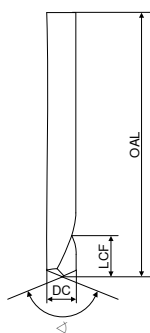
▲ helical flutes



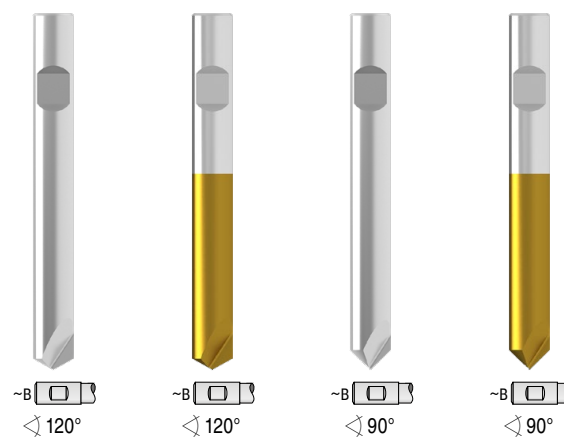
DC _{h6}	OAL	LCF
mm	mm	mm
3	46	12.0
4	55	12.0
5	62	14.0
6	66	16.0
8	79	21.0
10	89	25.0
12	102	30.0
16	115	37.5
20	131	45.0



▲ with clamping flat to DIN 1835 B



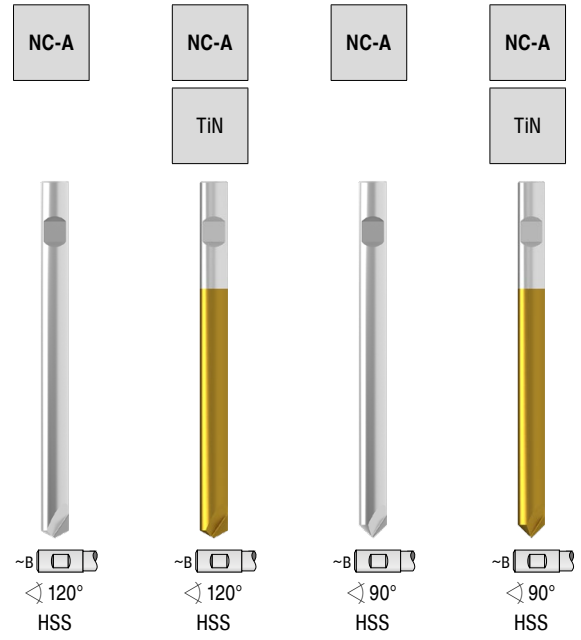
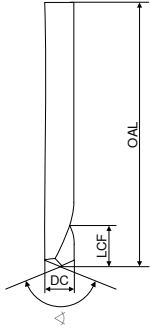
DC _{h6}	OAL	LCF
mm	mm	mm
6	66	7.0
8	79	9.0
10	89	11.5
12	102	14.0
16	115	18.0
20	131	23.0



Steel	15-35	25-55	15-35	25-55
Stainless steel	10-15	20-25	10-15	20-25
Cast iron	20-35	30-55	20-35	30-55
Non ferrous metals	50-70	65-85	50-70	65-85
Heat resistant alloys				

NC spot Drill Factory Standard Long

▲ with clamping flat to DIN 1835 B



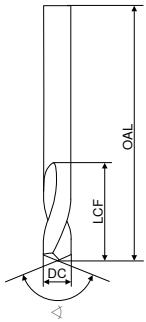
DC _{h6}	OAL	LCF
mm	mm	mm
6	93	7.0
8	117	9.0
10	133	11.5
12	151	14.0
16	178	18.0
20	205	23.0

Steel	15-35	25-55	15-35	25-55
Stainless steel	10-15	20-25	10-15	20-25
Cast iron	20-35	30-55	20-35	30-55
Non ferrous metals	50-70	65-85	50-70	65-85
Heat resistant alloys				

NC spot drills, factory standard, long

▲ helical flutes

NC-A



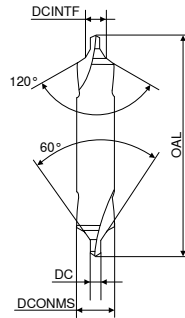
90°
HSS

Centre drills, DIN 333, form B

▲ with protective countersink 120°

ZB

ZB



Right-hand
118°
HSS



Left-hand
118°
HSS

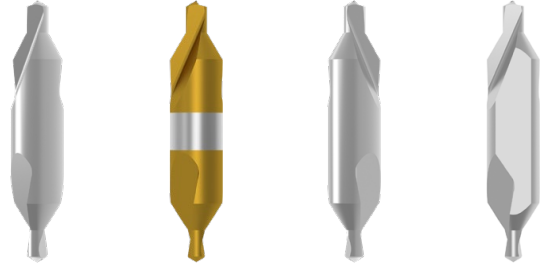
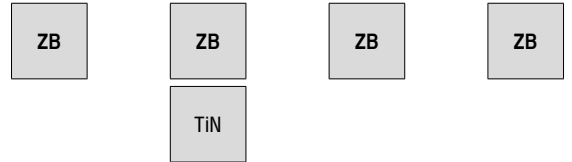
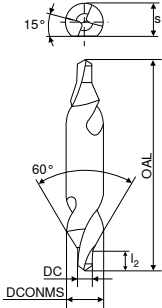
DC _{h6}	OAL	LCF
mm	mm	mm
6.35	105	17
8.00	118	21
9.52	132	25
12.70	159	30
15.87	186	37
19.05	213	45

Steel	15-35
Stainless steel	10-15
Cast iron	20-35
Non ferrous metals	50-70
Heat resistant alloys	

DC	DCONMS _{h8}	DCINTF _{k12}	OAL
mm	mm	mm	mm
1.00	4.0	2.12	35.5
1.25	5.0	2.65	40.0
1.60	6.3	3.35	45.0
2.00	8.0	4.25	50.0
2.50	10.0	5.30	56.0
3.15	11.2	6.70	62.0
4.00	14.0	8.50	69.0
5.00	18.0	10.60	77.0

Steel	15-35	15-35
Stainless steel	10-15	10-15
Cast iron	20-35	20-35
Non ferrous metals	50-70	50-70
Heat resistant alloys		

Centre drills, DIN 333, form A



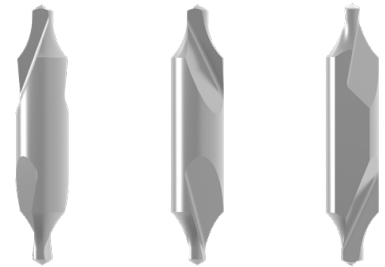
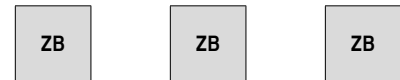
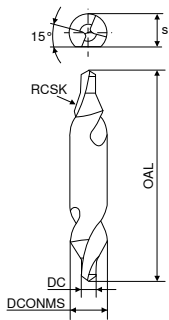
Right-hand $\sphericalangle 118^\circ$ HSS Right-hand $\sphericalangle 118^\circ$ HSS Left-hand $\sphericalangle 118^\circ$ HSS Right-hand $\sphericalangle 118^\circ$ HSS-E

DC	s	DCONMS _{h8}	OAL	l ₂
mm	mm	mm	mm	mm
0.50		3.15	25.0	0.8
0.80		3.15	25.0	1.1
1.00		3.15	31.5	1.3
1.25		3.15	31.5	1.6
1.60	3.25	4.00	35.5	2.0
1.60		4.00	35.5	2.0
2.00	4.20	5.00	40.0	2.5
2.00		5.00	40.0	2.5
2.50	5.35	6.30	45.0	3.1
2.50		6.30	45.0	3.1
3.15	6.95	8.00	50.0	3.9
3.15		8.00	50.0	3.9
4.00	8.40	10.00	56.0	5.0
4.00		10.00	56.0	5.0
5.00	10.95	12.50	63.0	6.3
5.00		12.50	63.0	6.3
6.30	14.00	16.00	71.0	8.0
6.30		16.00	71.0	8.0

Material	Right-hand $\sphericalangle 118^\circ$ HSS	Right-hand $\sphericalangle 118^\circ$ HSS	Left-hand $\sphericalangle 118^\circ$ HSS	Right-hand $\sphericalangle 118^\circ$ HSS-E
Steel	15-35	25-55	15-35	15-35
Stainless steel	10-15	20-25	10-15	10-15
Cast iron	20-35	30-55	20-35	20-35
Non ferrous metals	50-70	65-85	50-70	50-70
Heat resistant alloys				

- 1) with flat
- 2) Single ended

Centre drills, DIN 333, form R



Right-hand
118°
HSS

Left-hand
118°
HSS

Right-hand
118°
HSS

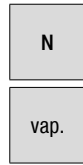
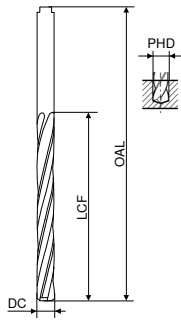
DC	s	DCONMS _{nb}	OAL	RCSK
mm	mm	mm	mm	mm
0.50		3.15	25.0	2.00
0.80		3.15	25.0	2.50
1.00		3.15	31.5	2.90
1.25		3.15	31.5	3.15
1.60	3.25	4.00	35.5	4.00
1.60		4.00	35.5	4.00
2.00	4.20	5.00	40.0	5.00
2.00		5.00	40.0	5.00
2.50	5.35	6.30	45.0	6.30
2.50		6.30	45.0	6.30
3.15	6.95	8.00	50.0	8.00
3.15		8.00	50.0	8.00
4.00	8.40	10.00	56.0	10.00
4.00		10.00	56.0	10.00
5.00	10.95	12.50	63.0	12.50
5.00		12.50	63.0	12.50
6.30	14.00	16.00	71.0	16.00
6.30		16.00	71.0	16.00

Steel	15-35	15-35	15-35
Stainless steel	10-15	10-15	10-15
Cast iron	20-35	20-35	20-35
Non ferrous metals	50-70	50-70	50-70
Heat resistant alloys			

- 1) with flat
- 2) Single ended

Core drills (spiral countersinks)

▲ with cylindrical shank, DIN 344

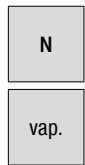
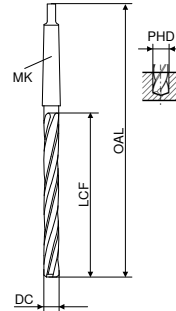


120°
HSS

DC _{h8}	OAL	LCF	PHD
mm	mm	mm	mm
3.80	96	64	2.8
4.00	96	64	2.8
4.80	108	74	3.5
5.00	108	74	3.5
5.80	116	80	4.2
6.00	116	80	4.2
6.80	133	93	4.9
7.00	133	93	4.9
7.80	142	100	5.6
8.00	142	100	5.6
8.80	151	107	6.3
9.00	151	107	6.3
9.80	162	116	7.0
10.00	162	116	7.0
10.75	173	125	7.7
11.00	173	125	7.7
11.75	184	134	8.4
12.00	184	134	8.4

Steel	15-35
Stainless steel	10-15
Cast iron	20-35
Non ferrous metals	50-80
Heat resistant alloys	14-28

Core drills (spiral countersinks)



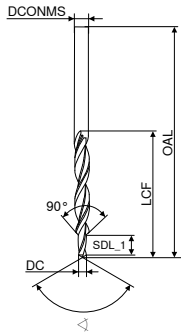
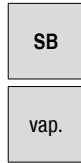
MK
120°
HSS

DC _{h8}	OAL	LCF	PHD	MK
mm	mm	mm	mm	
10.00	168	87	7.0	1
10.75	175	94	7.7	1
11.00	175	94	7.7	1
11.75	182	101	8.4	1
12.00	182	101	8.4	1
12.75	182	101	9.1	1
13.00	182	101	9.1	1
13.75	189	108	9.8	1
14.00	189	108	9.8	1
14.75	212	114	10.5	2
15.00	212	114	10.5	2
15.75	218	120	11.2	2
16.00	218	120	11.2	2
16.75	223	125	11.9	2
17.00	223	125	11.9	2
17.75	228	130	12.6	2
18.00	228	130	12.6	2
18.70	233	135	13.3	2
19.00	233	135	13.3	2
19.70	238	140	14.0	2
20.00	238	140	14.0	2
20.70	243	145	14.6	2
21.00	243	145	14.6	2
21.70	248	150	15.3	2
22.00	248	150	15.3	2
22.70	253	155	16.0	2
23.00	253	155	16.0	2
23.70	281	160	16.6	3
24.00	281	160	16.6	3
24.70	281	160	17.3	3
25.00	281	160	17.3	3
25.70	286	165	18.0	3
26.00	286	165	18.0	3
26.70	291	170	18.6	3
27.00	291	170	18.6	3
27.70	291	170	19.3	3
28.00	291	170	19.3	3
28.70	296	175	20.0	3
29.00	296	175	20.0	3
29.70	296	175	20.5	3
30.00	296	175	20.5	3

Steel	15-35
Stainless steel	10-15
Cast iron	20-35
Non ferrous metals	50-80
Heat resistant alloys	14-28

Stepped drills, DIN 8378

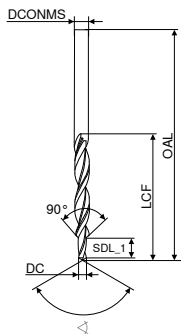
- ▲ countersinking angle 90°
- ▲ for tapping drill holes according to DIN 336, Table 1 with 90° chamfer and for through holes according to DIN EN 20273 – medium



◊ 118°
HSS

For threads	DC _{h9}	DCONMS _{h8}	OAL	SDL_1	LCF
	mm	mm	mm	mm	mm
M3	2.5	3.4	70	8.8	39
M4	3.3	4.5	80	11.4	47
M5	4.2	5.5	93	13.6	57
M6	5.0	6.6	101	16.5	63
M8	6.8	9.0	125	21.0	81
M10	8.5	11.0	142	25.5	94
M12	10.2	13.5	160	30.0	108

- ▲ for through holes according to DIN EN 20273 – fine
- ▲ with 90° screw head countersink



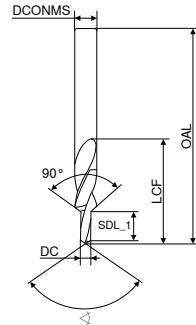
◊ 118°
HSS

For threads	DC _{h9}	DCONMS _{h8}	OAL	SDL_1	LCF
	mm	mm	mm	mm	mm
M3	3.2	6.0	93	9	57
M4	4.3	8.0	117	11	75
M5	5.3	10.0	133	13	87
M6	6.4	11.5	142	15	94
M8	8.4	15.0	169	19	114
M10	10.5	19.0	198	23	135

Steel	10-30
Stainless steel	10-15
Cast iron	20-35
Non ferrous metals	50-70
Heat resistant alloys	

Stepped drills, overall length to DIN 1897

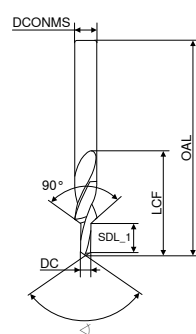
- ▲ countersinking angle 90°
- ▲ for tapping drill holes according to DIN 336, Table 1 with 90° chamfer and for through holes according to DIN EN 20273 – medium



◊ 118°
HSS

For threads	DC _{h6}	DCONMS _{h6}	OAL	SDL_1	LCF
	mm	mm	mm	mm	mm
M3	2.5	3.4	52	8.8	20
M4	3.3	4.5	58	11.4	24
M5	4.2	5.5	66	13.6	28
M6	5.0	6.6	70	16.5	31
M8	6.8	9.0	84	21.0	40
M10	8.5	11.0	95	25.5	47
M12	10.2	13.5	107	30.0	54

- ▲ for through holes according to DIN EN 20273 – fine
- ▲ with 90° screw head countersink



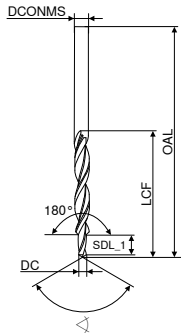
◊ 118°
HSS

For threads	DC _{h6}	DCONMS _{h6}	OAL	SDL_1	LCF
	mm	mm	mm	mm	mm
M3	3.2	6.0	66	9	28
M4	4.3	8.0	79	11	37
M5	5.3	10.0	89	13	43
M6	6.4	11.5	95	15	47
M8	8.4	15.0	111	19	56
M10	10.5	19.0	127	23	64

Steel	10-30
Stainless steel	10-15
Cast iron	20-35
Non ferrous metals	50-70
Heat resistant alloys	

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



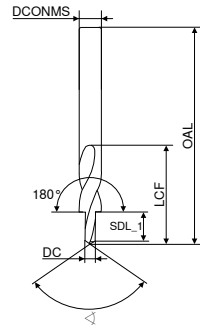
For threads	DC _{h9}	DCONMS _{h8}	OAL	SDL_1	LCF
	mm	mm	mm	mm	mm
M3	3.4	6	93	9	57
M4	4.5	8	117	11	75
M5	5.5	10	133	13	87
M6	6.6	11	142	15	94
M8	9.0	15	169	19	114
M10	11.0	18	191	23	130

Steel	10-30
Stainless steel	10-15
Cast iron	20-35
Non ferrous metals	50-70
Heat resistant alloys	

1) DCONMS not according to DIN 974-1

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



118°
HSS

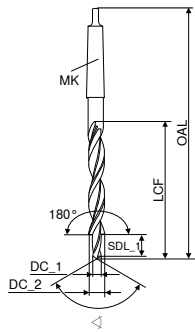
For threads	DC _{h6}	DCONMS _{h6}	OAL	SDL_1	LCF
	mm	mm	mm	mm	mm
M3	3.4	6	66	9	28
M4	4.5	8	79	11	37
M5	5.5	10	89	13	43
M6	6.6	11	95	15	47
M8	9.0	15	111	19	56
M10	11.0	18	123	23	62

Steel	10-30
Stainless steel	10-15
Cast iron	20-35
Non ferrous metals	50-70
Heat resistant alloys	

1) DCONMS not according to DIN 974-1

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



HSS

For threads	DC_1	DC_2	OAL	SDL_1	LCF	MK
	mm	mm				
M5	5.5	10	168	13	87	1
M6	6.6	11	175	15	94	1
M8	9.0	15	212	19	114	2
M10	11.0	18	228	23	130	2
M12	13.5	20	238	27	140	2
M14	15.5	24	281	31	160	3
M16	17.5	26	286	35	165	3
M18	20.0	30	296	39	175	3
M20	22.0	33	334	43	185	4

Steel	10-30
Stainless steel	10-15
Cast iron	20-35
Non ferrous metals	50-70
Heat resistant alloys	

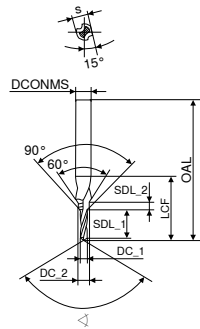
Stepped drills for centring, factory standard

- ▲ 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 $\geq \varnothing 3,3$ mm



SB

vap.



118°
HSS

For threads	DC_1 _{h8}	DCONMS _{h7}	DC_2	s	OAL	SDL_1	LCF	SDL_2
	mm	mm	mm	mm	mm	mm	mm	mm
M4	3.3	8.0	4.3	6.75	63	11.0	23	1.60
M5	4.2	10.0	5.3	8.45	67	13.0	27	2.15
M6	5.0	12.5	6.4	10.45	71	16.0	33	2.90
M8	6.8	14.0	8.4	12.50	88	19.5	41	3.50
M10	8.5	16.0	10.5	14.85	94	23.0	47	4.70
M12	10.2	20.0	13.0	18.45	105	28.0	59	6.50
M16	14.0	25.0	17.0	23.40	132	33.0	67	8.30
M20	17.5	31.5	21.0	29.35	145	38.0	77	10.35
M24	21.0	40.0	25.0	36.50	160	45.0	90	12.00

Steel	10-30
Stainless steel	10-15
Cast iron	20-35
Non ferrous metals	50-70
Heat resistant alloys	

Material examples referring to the cutting data tables

	Index	Material	Strength N/mm ² / HB / HRC	Material number	Material designation	Material number	Material designation	Material number	Material designation
P	1.1	General construction steel	< 800 N/mm ²	1.0402	EN3B				
	1.2	Free cutting steel	< 800 N/mm ²	1.0711	EN1A				
	1.3	Hardened steel, non alloyed	< 800 N/mm ²	1.0401	EN32C				
	1.4	Alloyed hardened steel	< 1000 N/mm ²	1.7325	25 CD4				
	1.5	Tempering steel, unalloyed	< 850 N/mm ²	1.5752	EN36	1.0535	EN9		
	1.6	Tempering steel, unalloyed	< 1000 N/mm ²	1.6582	EN24				
	1.7	Tempering steel, alloyed	< 800 N/mm ²	1.7225	EN19				
	1.8	Tempering steel, alloyed	< 1300 N/mm ²	1.8515	EN40B				
	1.9	Steel castings	< 850 N/mm ²	0.9650	G-X 260 Cr 27	1.6750	GS-20 NiCrMo 3.7	1.6582	GS-34 CrNiMo 6
	1.10	Nitriding steel	< 1000 N/mm ²	1.8509	EN41B				
	1.11	Nitriding steel	< 1200 N/mm ²	1.1186	EN8	1.1160	EN14A		
	1.12	Roller bearing steel	< 1200 N/mm ²	1.3505	534A99				
	1.13	Spring steel	< 1200 N/mm ²		EN45		EN47		EN43
	1.14	High-speed steel	< 1300 N/mm ²	1.3343	M2	1.3249	M34		
	1.15	Cold working tool steel	< 1300 N/mm ²	1.2379	D2	1.2311	P20		
	1.16	Hot working tool steel	< 1300 N/mm ²	1.2344	H13				
M	2.1	Cast steel and sulphured stainless steel	< 850 N/mm ²	1.4581	318				
	2.2	Stainless steel, ferritic	< 750 N/mm ²	1.4000	403				
	2.3	Stainless steel, martensitic	< 900 N/mm ²	1.4057	EN57				
	2.4	Stainless steel, ferritic / martensitic	< 1100 N/mm ²	1.4028	EN56B				
	2.5	Stainless steel, austenitic / ferritic	< 850 N/mm ²	1.4542	17-4PH				
	2.6	Stainless steel, austenitic	< 750 N/mm ²	1.4305	303	1.4401	316	1.4301	304
	2.7	Heat resistant steel	< 1100 N/mm ²	1.4876	Incoloy 800				
K	3.1	Grey cast iron with lamellar graphite	100-350 N/mm ²	0.6015	Grade 150	0.6020	Grade 220	0.6025	Grade 260
	3.2	Grey cast iron with lamellar graphite	300-500 N/mm ²	0.6030	Grade 300	0.6035	Grade 350	0.6040	Grade 400
	3.3	Gray cast iron with spheroidal graphite	300-500 N/mm ²	0.7040	SG 400-12	0.7043	SG 370-17	0.7050	SG 500-7
	3.4	Gray cast iron with spheroidal graphite	500-900 N/mm ²	0.7060	SG 600-3	0.7070	SG 700-2	0.7080	SG 800-2
	3.5	White malleable cast iron	270-450 N/mm ²	0.8035	GTW-35	0.8045	GTW-45		
	3.6	White malleable cast iron	500-650 N/mm ²	0.8055	GTW-55	0.8065	GTW-65		
	3.7	Black malleable cast iron	300-450 N/mm ²	0.8135	GTS-35	0.8145	GTS-45		
	3.8	Black malleable cast iron	500-800 N/mm ²	0.8155	GTS-55	0.8170	GTS-70		
N	4.1	Aluminium (non alloyed, low alloyed)	< 350 N/mm ²	3.0255	1050 A	3.0275	1070 A	3.0285	1080 A (A8)
	4.2	Aluminium alloys < 0.5 % Si	< 500 N/mm ²	3.1325	2017 A (AU4G)	3.4335	7005 (AZ5G)	3.4365	7075 (AZ5GU)
	4.3	Aluminium alloy 0.5-10 % Si	< 400 N/mm ²	3.2315	A-G S1	3.2373	A-S9 G	3.2151	A-S6 U4
	4.4	Aluminium alloys 10-15 % Si	< 400 N/mm ²	3.2581	A-S12	3.2583	A-S12 U		
	4.5	Aluminum alloys > 15 % Si	< 400 N/mm ²		A-S18		A-S17 U4		
	4.6	Copper (non alloyed, low alloyed)	< 350 N/mm ²	2.0040	Cu-c1	2.0060	Cu-a1	2.0090	Cu-b1
	4.7	Copper wrought alloys	< 700 N/mm ²	2.1247	Cub2 (Beryllium Copper)	2.0855	CuN2S (Nickel Copper)	2.1310	CU-Fe2P
	4.8	Special copper alloys	< 200 HB	2.0916	Cu-A5	2.1525	Cu-S3 M		Ampco 8 (Cu-A6Fe2)
	4.9	Special copper alloys	< 300 HB	2.0978	Cu-Ai11 Fe5 Ni5		Ampco 18 (Cu-A10 Fe3)		
	4.10	Special copper alloys	> 300 HB	2.1247	Cu Be2		Ampco M4		
	4.11	Short-chipping brass, bronze, red bronze	< 600 N/mm ²	2.0331	Cu Zn36 Pb1,5	2.0380	Cu Zn39 Pb2 (Ms 56)	2.0410	Cu Zn44 Pb2
	4.12	Long-chipping brass	< 600 N/mm ²	2.0335	Cu Zn 36 (Ms63)	2.1293	Cu Cr1 Zr		
	4.13	Thermoplastics			PE		PS		Plexiglas
	4.14	Duroplastics			PF		Bakelite		Pertinax
	4.15	Fibre-reinforced plastics			Carbon Fibre		Fibreglass		Aramid Fibre (Kevlar)
	4.16	Magnesium and magnesium alloys	< 850 N/mm ²	3.5812	Mg A7 Z1	3.5662	Mg A9	3.5105	Mg Tr3 Z2 Zn 1
	4.17	Graphite			R8500X		R8650		Technograph 15
	4.18	Tungsten and tungsten alloys			W-Ni Fe (Densimet)		W- Ni Cu (Inermet)		Denal
	4.19	Molybdenum and molybdenum alloys			TZM		MHO		Mo W
S	5.1	Pure nickel		2.4066	Ni99 (Nickel 200)	2.4068	Lc Ni99 (Nickel 201)		
	5.2	Nickel alloys		1.3912	Fe-Ni36 (Invar)	1.3917	Fe-Ni42 (N42)	1.3922	Fe-Ni48 (N48)
	5.3	Nickel alloys	< 850 N/mm ²	2.4375	Ni Cu30 Al (Monel K500)	2.4360	Ni Cu30Fe (Monel 400)	2.4668	
	5.4	Nickel molybdenum alloys		2.4600	Ni Mo30Cr2 (Hastelloy B4)	2.4617	Ni Mo28 (Hastelloy B2)	2.4819	Ni Mo16Cr16 Hastell. C276
	5.5	Nickel-chromium alloys	< 1300 N/mm ²	2.4951	Ni Cr20TiAl (Nimonic 80A)	2.4858	Ni Cr21Mo (Inconel 825)	2.4856	Ni Cr22Mo9Nb Inconel 625
	5.6	Cobalt Chrome Alloys	< 1300 N/mm ²	2.4964	Co Cr20 W15 Ni10		Co Cr20 Ni16 Mo7		Co Cr28 Mo 6
	5.7	Heat resistant alloys	< 1300 N/mm ²	1.4718	Z45 C S 9-3	1.4747	Z80 CSN 20-02	1.4845	Z12 CN 25-20
	5.8	Nickel-cobalt-chromium alloys	< 1400 N/mm ²	2.4851	Ni Cr23Fe (Inconel 601)	2.4668	Ni Cr19NbMo (Inconel 718)	2.4602	Ni Cr21Mo14 Hastelloy C22
	5.9	Pure titanium	< 900 N/mm ²	3.7025	T35 (Titanium Grade 1)	3.7034	T40 (Titanium Grade 2)	3.7064	T60 (Titanium Grade 4)
	5.10	Titanium alloys	< 700 N/mm ²		T-A6-Nb7 (367)		T-A5-Sn2-Mo4-Cr4 (Ti17)		T-A3-V2,5 (Gr18)
	5.11	Titanium alloys	< 1200 N/mm ²	3.7165	T-A6-V4 (Ta6V)		T-A4-3V-Mo2-Fe2 (SP700)		T-A5-Sn1-Zr1-V1-Mo (Gr32)
H	6.1		< 45 HRC						
	6.2		46-55 HRC						
	6.3	Tempered steel	56-60 HRC						
	6.4		61-65 HRC						
	6.5		65-70 HRC						

Cutting data standard values – Hole depth 3xD

Index	Type VX-TiN 10 122 ...		Type UNI-PM-TiN 10 113 ...		Type UNI-TiN 10 107 ...		Type N 10 105 ...		Type VA 10 130 ...		Type WNX 10 106 ...	
	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F
1.1	33-38	5-6	37-42	5-6	33-38	5-6	22-27	5-6			22-27	5-6
1.2	40-44	6	44-47	6-7	40-44	6	26-34	5-6			22-30	5-6
1.3	44	6	47	4	44	6	30	6	36	6	30	6
1.4	18-22	3-4	20-25	4-5	18-22	3-4			18-32	3-4	15-18	3-4
1.5	40-44	6	47	6	40-44	6	25	5			25	5
1.6	26	5	44	5	26	5	16	5			20	5
1.7	27	4	30	4	27	4					18	4
1.8	22	3	25	3	22	3					15	3
1.9	20	4	22	4	20	4					18	4
1.10	22	4	25	4	22	4			20	4	18	4
1.11	16	3	20	4	16	3			15	3	13	4
1.12	20	4	25	4	20	4	16	4			18	4
1.13	9	2	10	2	9	2			12	2	6	2
1.14	13	3	16	3	13	3					12	3
1.15	15-20	3-4	17-22	4-5	15-20	3-4	12-16	3-4			13-18	3-4
1.16	15-20	3-4	17-22	4-5	15-20	3-4	12-16	3-4			13-18	3-4
2.1	20	4	19	4	20	4			18	4	13	4
2.2	18	4	17	4	18	4			15	4	11	4
2.3	18	4	16	4	18	4			14	3	12	4
2.4	18	4	15	4	18	4					11	4
2.5	15	3	14	3	15	3			13	3	10	3
2.6	16	3	15	3	16	3			12	3	9	3
2.7	12	3	13	3	12	3					8	3
3.1	45	6	50	6	45	6	34	6			31	6
3.2	40	6	44	6	40	6	26	6			28	6
3.3	40	6	44	6	40	6	25	6			21	6
3.4	30	6	33	6	30	6	20	6			17	6
3.5	42	6	44	6	42	6	26	6	45	6	21	6
3.6	35	6	33	6	35	6	23	6	32	6	18	6
3.7	32	6	44	6	32	6	22	6			24	6
3.8	30	6	33	6	30	6	21	6			23	6
4.1	70	7			70	7			90	7	70	7
4.2	70	7			70	7			90	7	70	7
4.3	85	7			85	7			80	7	50	7
4.4	70	7			70	7			70	6	50	6
4.5	70	6			70	6			70	6	50	6
4.6	88	5	88	5	88	5			40	5	60	5
4.7	44	5	50	5	44	5			38	4	40	4
4.8	50	4	33	5	50	4			48	4	36	4
4.9	45	4	29	5	45	4			43	4	35	4
4.10	40	4	28	5	40	4			37	4	32	4
4.11	77	5	84	5	77	5	36-40	4				
4.12	44	5	46	5	44	5			40	5	40	5
4.13	15	4	27	5	15	4					28	4
4.14	25	4	22	4	25	4	18	4	20	4	18	4
4.15												
4.16	70	6			70	6					70	6
4.17												
4.18	14	3			14	3						
4.19	18	4			18	4						
5.1	8	2			8	2						
5.2	10	2			10	2						
5.3	8	1			8	1						
5.4	8	1	5	2	8	1						
5.5	8	2			8	2						
5.6	8	2			8	2						
5.7	10	2	10	2	10	2			7	2	6	2
5.8	8	1			8	1						
5.9	8	1			8	1						
5.10	12	2			12	2			10	2		
5.11	8	2			8	2			6	2		
6.1	8	1			8	1						
6.2												
6.3												
6.4												
6.5												

Index	Type WT 10 109 ...		Type WT-TiN 10 110 ...		Type WTL-L 10 112 ...		Type WT-MK 10 285 ...	
	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F
1.1	30-35	5	35-45	5	22-27	5-6	30-35	5
1.2	30-35	5	35-45	5	26-34	5-6	30-40	5
1.3	36	4	44	4	30	6	36	6
1.4	15-20	3-4	18-22	3-4	13-16	3-4	15-20	3-4
1.5	40	5	44	5	25-34	5	35-40	5
1.6	35	4	38	4	16	5	35	4
1.7	20	4	27	4	16	4	20	4
1.8	16	3	22	3	13	3	16	3
1.9	16	3	18	3	16	4	16	3
1.10	16	4	22	4	16	4	16	4
1.11	12	3	18	3	11	4	12	3
1.12	15	4	17	4	16	4	20	4
1.13	8	2	9	2	12	2	8	2
1.14	12	3	15	3	12	3	15	3
1.15	12-15	3-4	14-19	3-4	12-16	3-4	12-20	3-4
1.16	12-15	3-4	14-19	3-4	12-16	3-4	12-20	3-4
2.1	16	4	18	4	12	4	16	4
2.2	14	4	15	4	10	3	14	4
2.3	15	3	17	3	11	3	15	3
2.4	14	3	15	3	10	3	14	3
2.5	13	3	15	3	9	3	13	3
2.6	12	3	14	3	8	3	12	3
2.7	11	3	13	3	7	3	11	3
3.1	35	6	40	6	30	6	35	6
3.2	30	6	35	6	25	6	30	6
3.3	30	6	33	6	25	6	30	6
3.4	25	6	27	6	20	6	25	6
3.5	30	6	36	6	26	6	30	6
3.6	28	6	34	6	23	6	28	6
3.7	26	6	30	6	22	6	26	6
3.8	24	6	28	6	21	6	24	6
4.1					70	7		
4.2					70	7		
4.3					50	7		
4.4					50	6		
4.5					45	6		
4.6					60	5		
4.7	38	5	40	5	40	4	38	5
4.8	38	4	40	4	32	4	38	4
4.9	25	4	32	4	30	4	25	4
4.10					28	4		
4.11								
4.12					40	5		
4.13					28	5		
4.14	20	4	25	4	18	4	20	4
4.15								
4.16					70	6		
4.17								
4.18								
4.19								
5.1								
5.2								
5.3	7	1	8	1			7	1
5.4	7	1	8	1			7	1
5.5	7	1	8	1			7	1
5.6	8	2	10	2			8	2
5.7								
5.8								
5.9	12	2	15	2			10	2
5.10	12	2	15	2			10	2
5.11	8	2	10	2			6	2
6.1	4	1	8	1	6	1-2	4	1
6.2			4	1				
6.3								
6.4								
6.5								

i When drilling tough materials which tend to jam, chips should be removed at drilling depth $\geq 4xD$ 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.

i v_c = Cutting speed in m/min.
F = Factor for feed selection
Feed approximate values see → **Page 53**

Cutting data standard values – Hole depth 5xD

Index	Type VX-TiN 10 124 ...		Type UNI-PM-TiN 10 173 ...		Type UNI-TiN 10 171 ...		Type N 10 152 ...		Type VA 10 175 ...		Type W 10 161 ...		Type WTL 10 168 ...	
	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F
1.1	33-38	5-6	37-42	5-6	33-38	5-6	22-27	5-6					30-35	5
1.2	40-44	5-6	44-47	6-7	40-44	5-6	26-34	5-6					40	5
1.3	44	6	47	4	44	6	30	6					36	5
1.4	18-22	3-4	20-25	4-5	18-22	3-4			16-28	3-4			15-20	3-4
1.5	40-44	6	47	6	40-44	6	25	5					40	5
1.6	26	5	44	5	26	5							35	4
1.7	27	4	30	4	27	4							20	4
1.8	22	3	25	3	22	3							16	3
1.9	20	4	22	4	20	4							14	3
1.10	22	4	25	4	22	4			18	4			16	4
1.11	16	3	20	4	16	3			15	3			12	3
1.12	20	4	25	4	20	4	16	4					10	3
1.13	9	2	10	2	9	2								
1.14	13	3	16	3	13	3							15	3
1.15	15-20	3-4	17-22	4-5	15-20	3-4	12-16	3-4					15	4
1.16	15-20	3-4	17-22	4-5	15-20	3-4	12-16	3-4					12	3
2.1	20	4	19	4	20	4			16	4			15	4
2.2	18	4	17	4	18	4			14	4			14	4
2.3	18	4	16	4	18	4			13	4			12	3
2.4	18	4	15	4	18	4			14	3			13	3
2.5	15	3	14	3	15	3			12	3				
2.6	16	3	15	3	16	3			11	3				
2.7	12	3	13	3	12	3			10	3				
3.1	45	6	50	6	45	6	34	6					36	6
3.2	40	6	44	6	40	6	26	6					28	6
3.3	40	6	44	6	40	6	25	6					30	6
3.4	30	6	33	6	30	6	20	6					22	6
3.5	42	6	44	6	42	6	26	6	42	6			28	6
3.6	35	6	33	6	35	6	23	6	30	6			23	6
3.7	32	6	44	6	32	6	22	6					20	6
3.8	30	6	33	6	30	6	21	6					18	6
4.1	70	7			70	7					80	7		
4.2	70	7			70	7			90	7	80	7		
4.3	85	7			85	7			90	7	63	7		
4.4	70	7			70	7			70	6			55	6
4.5	70	6			70	6			70	6			55	6
4.6	88	5	88	5	88	5			55	5	50	5	40	5
4.7	44	5	50	5	44	5			44	4			36	5
4.8	47	4	33	5	47	4			36	4			28	4
4.9	43	4	29	5	43	4			30	4			22	4
4.10	38	4	28	5	38	4			30	3			20	4
4.11	77	5	84	5	77	5								
4.12	44	5	46	5	44	5			45	5			45	4
4.13	15	4	27	5	15	4					28	5		
4.14	25	4	22	4	25	4	18	4					20	4
4.15														
4.16	70	6			70	6								
4.17														
4.18	14	3			14	3			11	3				
4.19	18	4			18	4			13	4				
5.1	8	2			8	2								
5.2	10	2			10	2								
5.3	8	1			8	1								
5.4	8	1	5	2	8	1								
5.5	8	2			8	2								
5.6	8	2			8	2								
5.7	10	1	10	2	10	1			9	2				
5.8	8	1			8	1								
5.9	8	1			8	1								
5.10	12	2			12	2			10	2				
5.11	8	2			8	2								
6.1	8	1			8	1								
6.2														
6.3														
6.4														
6.5														

i 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	Type WTL-TiN 10 170 ...		Type WTL-TiCN 10 172 ...		Type WTL-L 10 169 ...		Type WNXi 10 180 ...		Type WNXi-TiN 10 181 ...		Type N-MK 10 265 ...		Type WTL-MK 10 280 ...	
	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F
1.1	36-42	5	36-42	6	22-27	5-6	42-50	6-7	42-60	6-7	22-27	5-6	30-35	5
1.2	42-48	5	42-48	6	25-32	5-6	42-50	6-7	42-60	6-7	25-32	5-6	40	5
1.3	48	4	48	7	32	6	50	7	62	7	30	6	36	6
1.4	20-24	3-4	20-24	4-5			16-22	4-5	20-31	4-5			15-20	3-4
1.5	48	5	48	6	25	5	38-48	6	48-60	6	25	5	28-40	5
1.6	42	4	42	5			28	5	30	5			28	4
1.7	34	4	34	5			25	5	30	5			18-20	4
1.8	30	3	30	4			20	4	25	4			16	3
1.9	18	3	20	4			22	5	25	5			14	3
1.10	24	4	20	5			22	5	28	5			14-16	4
1.11	20	3	15	4			14	4	20	4			12	3
1.12	13	3	15	4			24	5	26	5	16	4	10	3
1.13			11	3			15	3	18	3				
1.14	17	3	17	4			18	4	20	4			10-15	3
1.15	18	4	21	5	16	4	16-24	4-5	18-30	4-5	12-16	3-4	15	4
1.16	14	3	15	4			16-24	4-5	18-30	4-5	12-16	3-4	12	3
2.1	18	4	20	5			20	5	25	5			15	4
2.2	16	4	18	4			18	5	22	5			14	4
2.3	14	3	16	4			16	5	20	5			12	3
2.4	15	3	17	4			18	5	22	5			13	3
2.5							15	4	19	4				
2.6							14	4	18	4				
2.7							12	4	17	4				
3.1	45	6			32	6	48	7	60	7	32	6	36	6
3.2	36	6			25	6	42	7	52	7	25	6	28	6
3.3	40	6			28	6	42	7	52	7	28	6	30	6
3.4	28	6			20	6	40	7	50	7	20	6	22	6
3.5	36	6			25	6	42	7	52	7	25	6	28	6
3.6	30	6			22	6	35	7	45	7	22	6	23	6
3.7	25	6			18	6	32	7	42	7	21	6	20	6
3.8	22	6			16	6	30	7	40	7	20	6	18	6
4.1					80	7								
4.2					80	7								
4.3	85	7			63	7	95	7	120	7			70-80	7
4.4	70	6			50	6	75	8	95	8			60-70	6
4.5	70	6			50	6	75	8	95	8			60-70	6
4.6	88	5			32	5	78	6	98	6			40	5
4.7	45	5			50	5	55	6	62	6			36	5
4.8	32	4			15	4							28	4
4.9	25	4					42	5	48	5			22	4
4.10	22	4					38	5	44	5			20	4
4.11														
4.12					40	5	55	6	55	6			45	4
4.13							38	6	44	6	28	5		
4.14	24	4			16	4					18	4	18	4
4.15														
4.16														
4.17														
4.18							15	4	20	4				
4.19							18	4	22	5				
5.1							9	3	11	3				
5.2							11	3	13	3				
5.3							9	2	11	2				
5.4							9	2	11	2				
5.5							9	2	11	2				
5.6							11	3	13	3				
5.7							9	2	11	2				
5.8							9	3	11	3				
5.9							9	2	11	2				
5.10							14	3	17	3				
5.11							10	3	12	3				
6.1							8	3	10	3				
6.2							4	3	5	3				
6.3														
6.4														
6.5														

i When drilling tough materials which tend to jam, chips should be removed at drilling depth $\geq 4xD$ 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.

i v_c = Cutting speed in m/min.
F = Factor for feed selection
Feed approximate values see → **Page 53**

Cutting data standard values – Hole depth 10xD and over 10xD

Index	Hole depth 10xD													
	Type NC 10 223 ...		Type NC-TiALN 10 224 ...		Type UNI-TiN 10 270 ...		Type WTL 10 225 ...		Type WTL 10 215 ...		Type WTL-TiN 10 210 ...		Type WTW 10 200 ...	
	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F
1.1	30-40	5-6	50-65	6-7	25-32	5-6	28-32	5-6	22-28	5-6	24-30	5-6		
1.2	30-40	5-6	50-65	6-7	28-35	6	28-32	5-6	22-28	5-6	28-32	5-6		
1.3	40	6	65	7	28	6	32	6	28	6	32	6		
1.4	12-17	3-4	18-25	4-5	12-14	3-4	13-18	3-4			10-14	4		
1.5	30-40	5	45-55	6	25-28	6	26-36	5	22	5	26-36	5		
1.6	22	4	35	5	15	5	24	4-5			24	4		
1.7	20	3	30	4	13	4	16	4			18	4		
1.8	14	3	20	4	12	3	12	3						
1.9	14	3	20	4	13	4	12	3						
1.10	14	4	20	5	13	4	14	4			12	4		
1.11	10	3	15	4	8	3	10	3						
1.12	10	3	15	4			8	3			8	3		
1.13	7	2	12	3			6	2						
1.14	10	3	15	4	10	3	12	3						
1.15	20	4	30	4	10-13	3-4	16	8	14	4	15	4		
1.16	10	3	15	4	10-13	3-4	8	3			8	3		
2.1	14	4	20	4	13	4	12	4						
2.2	14	4	20	4			13	4						
2.3	12	3	18	3	12	4	10	3						
2.4	13	3	20	3			11	3						
2.5	11	3	16	3			9	3						
2.6	10	3	15	3	8-13	3-4	8	3						
2.7							7	2-3						
3.1	40	6	65	7	32	6	28	6	28	6	36	6-7		
3.2	30	6	50	7	26	6	22	6	22	6	28	6-7		
3.3	35	6	60	7	28	6	30	6	22	6	28	6-7		
3.4	25	6	40	7	20	6	24	6	18	6	22	6-7		
3.5	30	6	50	7	28	6	24	6	22	6	28	6-7		
3.6	32	6	55	7	20	6	20	6	16	6	30	6-7		
3.7	24	6	36	7	28	6	16	6	14	6	20	6-7		
3.8	22	6	32	7	20	6	15	6	13	6	18	6-7		
4.1					50	7							65	7
4.2	80	6	110	7	60	7							65	7
4.3	80	6	110	7	60	7	70	7	55	7	70	7		
4.4	75	7	95	8	50	6	60	6	45	6	55	6		
4.5	60	6	80	7	50	6	60	6	45	6	55	6		
4.6	60	5	60	6	24	5	54	5	54	5	65	5		
4.7	40	5	60	6			30	5	28	5	36	5		
4.8	36	4	55	5			26	4	24	4	28	4		
4.9	25	4	35	5			22	4	20	4	22	4		
4.10	23	4	30	5			20	4	18	4	20	4		
4.11					35-50	4-5								
4.12	50	5	65	5	28	5	38	5	34	5	44	5		
4.13	30	5	40	5	12	4							22	5
4.14					18	4	16	4	14	4	18	4		
4.15														
4.16					50	6							63	6
4.17														
4.18	8	2	10	3										
4.19	7	2	9	3										
5.1	8	2	11	2-3										
5.2	6	2	7	2-3										
5.3	6	1	7	2										
5.4	6	2	7	2										
5.5	6	1	7	2										
5.6	5	1	6	2										
5.7	5	1	6	2										
5.8	5	1	6	1										
5.9	5	1	6	1										
5.10	6	2	7	2-3										
5.11	6	1	7	2-3										
6.1	6	3	7	3										
6.2	4	2	5	2										
6.3														
6.4														
6.5														

i 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	Hole depth 10xD								Hole depth above 10xD							
	Type N-MK 10 295 ...		Type WTL-MK 10 297 ...		Type WTL-R1 10 235 ...		Type WTL-R2 10 245 ...		Type WTL-R3 10 255 ...		Type WTL-MK-R1 10 305 ...		Type WTL-MK-R2 10 315 ...			
	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F	v _c in m/min	F		
1.1	28-36	5-6	28-32	5-6	18-22	4-5	18-22	4-5	18-22	4-5	18-22	4-5	18-22	4-5		
1.2	28-36	5-6	28-32	5-6	18-22	4-5	18-22	4-5	18-22	4-5	18-22	4-5	18-22	4-5		
1.3	27	6	32	6	22	4	22	4	22	4	22	4	22	4		
1.4	14	4	10-14	3-4	10	3	10	3	10	3	10	3	10	3		
1.5	28-36	5	36	5	18-22	4	18-22	4	18-22	4	18-22	4	18-22	4		
1.6	22	4	24	4												
1.7	18	4	16	4	12	3	12	3	12	3	12	3	12	3		
1.8			12	3												
1.9			12	3												
1.10	12	4	12	4	8	3	8	3	8	3	8	3	8	3		
1.11			8	3												
1.12	8	3	8	3												
1.13			6	2												
1.14			8	3	6	2	6	2	6	2	6	2	6	2		
1.15	18	4	16	4												
1.16	8	3	8	3												
2.1			12	4	8	3	8	3	8	3	8	3	8	3		
2.2			13	4	8	3	8	3	8	3	8	3	8	3		
2.3			10	3												
2.4			11	3												
2.5			9	3												
2.6			8	3												
2.7			7	2-3												
3.1	36	6-7	28	6	22	5	22	5	22	5	22	5	22	5		
3.2	28	6-7	22	6	18	5	18	5	18	5	18	5	18	5		
3.3	28	6-7	30	6	20	5	20	5	20	5	20	5	20	5		
3.4	22	6-7	24	6	14	5	14	5	14	5	14	5	14	5		
3.5	28	6-7	22	6	18	5	18	5	18	5	18	5	18	5		
3.6	30	6-7	20	6	16	5	16	5	16	5	16	5	16	5		
3.7	20	6-7	16	6	14	5	14	5	14	5	14	5	14	5		
3.8	18	6-7	15	6	12	5	12	5	12	5	12	5	12	5		
4.1																
4.2																
4.3	70	7	70	7	45	6	45	6	45	6	45	6	45	6		
4.4	55	6	60	6	36	5	36	5	36	5	36	5	36	5		
4.5	55	6	50	6	36	5	36	5	36	5	36	5	36	5		
4.6	54	5	54	5	22	4	22	4	22	4	22	4	22	4		
4.7	36	5	30	5	20	3	20	3	20	3	20	3	20	3		
4.8	28	4	26	4	22	3	22	3	22	3	22	3	22	3		
4.9	22	4	22	4	22	3	22	3	22	3	22	3	22	3		
4.10	20	4	20	4	20	3	20	3	20	3	20	3	20	3		
4.11																
4.12	36	4	38	5	28	4	28	4	28	4	28	4	28	4		
4.13	22	5			20	3	20	3	20	3	20	3	20	3		
4.14	14	4	16	4	14	4	14	4	14	4	14	4	14	4		
4.15																
4.16					55	5	55	5	55	5	55	5	55	5		
4.17																
4.18																
4.19																
5.1																
5.2																
5.3																
5.4																
5.5																
5.6																
5.7																
5.8																
5.9																
5.10																
5.11																
6.1																
6.2																
6.3																
6.4																
6.5																

i When drilling tough materials which tend to jam, chips should be removed at drilling depth $\geq 4xD$ 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.

i v_c = Cutting speed in m/min.
F = Factor for feed selection
Feed approximate values see → **Page 53**

Cutting data standard values – micro drills 10 103 ...

Index	v _c in m/min	Nominal Ø in mm						
		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.	f mm/rev.	f mm/rev.	f mm/rev.	f mm/rev.	f mm/rev.	f mm/rev.
1.1	18	0,009	0,011	0,015	0,019	0,026	0,031	0,050
1.2	18	0,007	0,009	0,011	0,014	0,020	0,024	0,041
1.3	18	0,009	0,011	0,015	0,019	0,026	0,031	0,050
1.4	14	0,005	0,007	0,009	0,011	0,015	0,020	0,035
1.5	18	0,007	0,009	0,011	0,014	0,020	0,024	0,041
1.6	14	0,005	0,007	0,009	0,011	0,015	0,020	0,035
1.7	14	0,005	0,007	0,009	0,011	0,015	0,020	0,035
1.8	12	0,004	0,005	0,007	0,009	0,012	0,016	0,029
1.9	12	0,004	0,005	0,007	0,008	0,012	0,016	0,029
1.10	14	0,005	0,007	0,009	0,011	0,015	0,020	0,035
1.11	12	0,004	0,005	0,007	0,008	0,012	0,016	0,029
1.12	14	0,005	0,007	0,009	0,011	0,015	0,020	0,035
1.13	8	0,003	0,004	0,005	0,007	0,009	0,013	0,024
1.14	14	0,004	0,005	0,007	0,008	0,012	0,016	0,029
1.15	12–14	0,004	0,006	0,008	0,007	0,010	0,014	0,026
1.16	12–14	0,004	0,006	0,008	0,007	0,010	0,014	0,026
2.1	12	0,005	0,007	0,009	0,011	0,015	0,020	0,035
2.2	10	0,005	0,007	0,009	0,011	0,015	0,020	0,035
2.3	6	0,004	0,005	0,007	0,008	0,012	0,016	0,029
2.4	6	0,004	0,005	0,007	0,008	0,012	0,016	0,029
2.5	6	0,004	0,006	0,008	0,007	0,010	0,014	0,026
2.6	6	0,004	0,005	0,007	0,008	0,012	0,016	0,029
2.7	6	0,004	0,005	0,007	0,008	0,012	0,016	0,029
3.1	25	0,009	0,011	0,015	0,019	0,026	0,031	0,050
3.2	22	0,009	0,011	0,015	0,019	0,026	0,031	0,050
3.3	18	0,009	0,011	0,015	0,019	0,026	0,031	0,050
3.4	22	0,009	0,011	0,015	0,019	0,026	0,031	0,050
3.5	22	0,009	0,011	0,015	0,019	0,026	0,031	0,050
3.6	20	0,009	0,011	0,015	0,019	0,026	0,031	0,050
3.7	22	0,004	0,005	0,007	0,008	0,012	0,016	0,029
3.8	20	0,009	0,011	0,015	0,019	0,026	0,031	0,050
4.1								
4.2								
4.3	26	0,012	0,014	0,019	0,024	0,034	0,038	0,060
4.4	24	0,012	0,014	0,019	0,024	0,034	0,038	0,060
4.5	18	0,009	0,011	0,015	0,019	0,026	0,031	0,050
4.6	42	0,007	0,009	0,011	0,014	0,020	0,024	0,041
4.7	38	0,007	0,009	0,011	0,014	0,020	0,024	0,041
4.8	45	0,009	0,011	0,015	0,019	0,026	0,031	0,050
4.9	35	0,007	0,009	0,011	0,014	0,020	0,024	0,041
4.10	30	0,007	0,009	0,011	0,014	0,020	0,024	0,041
4.11								
4.12	22	0,007	0,009	0,011	0,014	0,020	0,024	0,041
4.13	18	0,005	0,007	0,009	0,011	0,015	0,020	0,035
4.14	16	0,005	0,007	0,009	0,011	0,015	0,020	0,035
4.15								
4.16	75	0,009	0,011	0,015	0,019	0,026	0,031	0,050
4.17								
4.18	6	0,004	0,005	0,007	0,008	0,012	0,016	0,029
4.19	6	0,004	0,005	0,007	0,008	0,012	0,016	0,029
5.1	5	0,004	0,005	0,007	0,008	0,012	0,016	0,029
5.2	5	0,004	0,005	0,007	0,008	0,012	0,016	0,029
5.3	5	0,004	0,005	0,007	0,008	0,012	0,016	0,029
5.4	5	0,004	0,005	0,007	0,008	0,012	0,016	0,029
5.5	5	0,004	0,005	0,007	0,008	0,012	0,016	0,029
5.6	5	0,004	0,005	0,007	0,008	0,012	0,016	0,029
5.7	6	0,005	0,007	0,009	0,011	0,015	0,020	0,035
5.8	5	0,004	0,005	0,007	0,008	0,012	0,016	0,029
5.9	5	0,004	0,005	0,007	0,008	0,012	0,016	0,029
5.10	4	0,003	0,004	0,005	0,007	0,009	0,013	0,024
5.11	4	0,003	0,004	0,005	0,007	0,009	0,013	0,024
6.1	3	0,002	0,003	0,004	0,005	0,007	0,010	0,020
6.2								
6.3								
6.4								
6.5								

i 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.

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

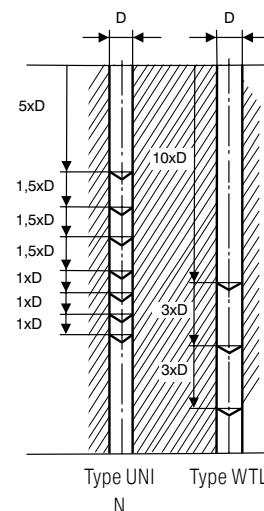
i All the indicated data are guide values only and represent average values.

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	12500	10000	8000	6300	5000	4000	3200	2500	2000	1600	1250	1000	800	630	500	400	320
63	10000	8000	6300	5000	4000	3200	2500	2000	1600	1250	1000	800	630	500	400	320	250
50	8000	6300	5000	4000	3200	2500	2000	1600	1250	1000	800	630	500	400	320	250	200
40	6300	5000	4000	3200	2500	2000	1600	1250	1000	800	630	500	400	320	250	200	160
32	5000	4000	3200	2500	2000	1600	1250	1000	800	630	500	400	320	250	200	160	125
25	4000	3200	2500	2000	1600	1250	1000	800	630	500	400	320	250	200	160	125	100
20	3200	2500	2000	1600	1250	1000	800	630	500	400	320	250	200	160	125	100	80
16	2500	2000	1600	1250	1000	800	630	500	400	320	250	200	160	125	100	80	63
12	2000	1600	1250	1000	800	630	500	400	320	250	200	160	125	100	80	63	50
10	1600	1250	1000	800	630	500	400	320	250	200	160	125	100	80	63	50	40
8	1250	1000	800	630	500	400	320	250	200	160	125	100	80	63	50	40	32
6	1000	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

- ▲ drill must be sufficiently cooled
- ▲ by use of a drill with flat chip gullet profile (type WTL) chip transport is substantially improved
- ▲ for extremely deep drilling or when machining horizontally through coolant drills with internal coolant supply are recommended



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

TiCN

- ▲ TiCN multilayer coating
- ▲ maximum application temperature: 450 °C

F-nit

- ▲ titanium carbon nitride based PVD coating particularly suitable for steel machining
- ▲ applicable up to approx. 450 °C