TRIAG

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HARTNER

Precision Cutting Tools

INOX-BOHRER

SPEZIALISTEN ZUR BEARBEITUNG ROSTFREIER STÄHLE

NEW + Höchste Standzeiten durch neu entwickelte AlTiZrN-Beschichtung

ISO-Code

P	Stahl, hochlegierter Stahl
M	Rostfreier Stahl
K	Grauguss, Sphäroguss und Temperguss
N	Aluminium und andere Nichteisenmetalle
S	Sonder-, Super- und Titanlegierungen
H	Gehärteter Stahl und Hartguss

Piktogramme

Schneidstoff	HSS-E			VHM				
	Schnellstahl			Vollhartmetall				
Oberfläche								
	blank	AlTiN nano	AlTiZrN					
Typ	IS	S	TS 100 INOX					
Bohrtiefe	3xD	5xD	~3xD	~5xD	~10xD			
Norm	DIN 338	DIN 340	DIN 345	DIN 1897	DIN 6537 K	DIN 6537 L	WN	nach Hartner Standard
Spitzenwinkel	130°	140°						
Ø-Toleranz	h8	m7						
Schneidrichtung								
	rechts							
Schaftform	HA	HE		Cyl		MK		
	nach DIN 6535			zylindrisch		Morsekegel		
Ausspitzung								
	mit Ausspitzung							
Innenkühlung								
	mit IK		ohne IK					

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TS 100 INOX Vollhartmetall-Hochleistungsbohrer

Seite 12

M K

- Ø 3,0 – 20,0 mm
- 3xD und 5xD
- Schaft HA und HE
- AlTiNnano-Beschichtung
- mit Innenkühlung

HSCO-Spiralbohrer zylindrisch

Seite 16

P M K N

NEW
AlTiZrN-Beschichtung

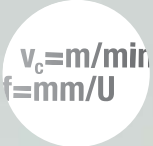
- Ø 0,2 – 17,5 mm
- DIN 1897 | DIN 338 | DIN 340
- blank und mit AlTiZrN-Beschichtung

HSCO-Spiralbohrer mit MK-Schaft

Seite 23

P M N

- Ø 10,0 – 32,0 mm
- Werksnorm kurz | DIN 345
- blank



Technischer Teil

Seite 28

- Einsatzempfehlungen

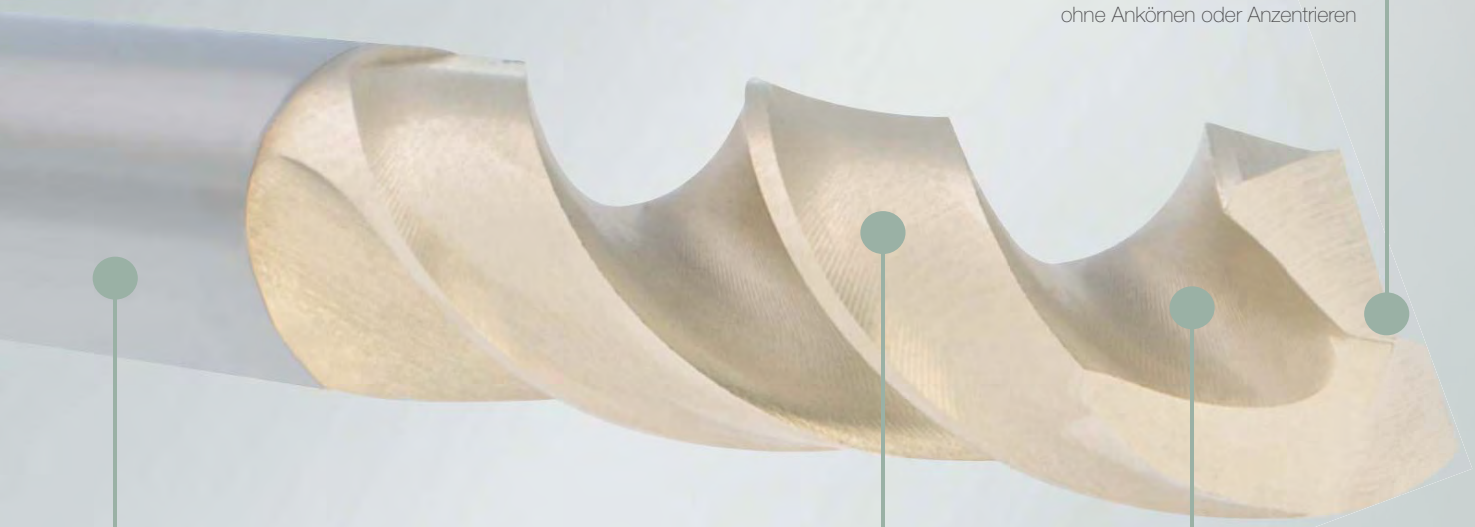
HSCO-INOX-Spiralbohrer mit AlTiZrN-Beschichtung

NEW

- wirkungsvoller Verschleißschutz und hohe Standzeit dank AlTiZrN-Beschichtung
- wirtschaftliches und prozesssicheres Bohren in VA-Materialien
- geringe Vorschubkräfte und beste Zentrierung dank Kegelmantelanschliff mit optimierter Kreuzausspitzung
- Standardprogramm Ø 1,00 – 13,00 mm
- DIN 1897 (~3xD) + DIN 338 (~5xD)

Kegelmantelanschliff mit optimierter Kreuzausspitzung

minimale Vorschubkräfte und punktgenaues Anbohren ohne Ankörnen oder Anzentrieren

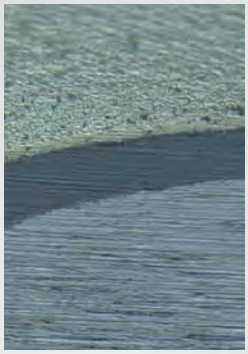


Schneidstoff

5%-kobaltlegierter Schnellarbeitsstahl für lange Werkzeuglebensdauer und hohe Warmhärte ermöglicht das Arbeiten in VA-Materialien bei hohen Temperaturen.

Spannuten

Speziell geformte Spannut für prozesssichere Spanbildung und Spanabfuhr, besonders bei der VA-Bearbeitung.



AlTiZrN S Beschichtung

Max. Anwendungstemperatur: < 900°C
Farbe: blassgold
Aufbau: mehrlagig, nanostrukturiert
Härte: 3400 HV 0,05

Die im Wesentlichen auf AlTiN basierende Sirius eignet sich insbesonders für die Bearbeitung rostfreier Stähle. Durch den nanostrukturierenden Aufbau zeigt Sie eine gute Härte und Zähigkeit. Die zirkonhaltige Deckschicht soll chemische Reaktionen mit dem Werkstoff weitgehend unterbinden und damit den Spanfluss fördern.

P	M	K	N	S	H	Norm	Typ	Schneidstoff	Oberfläche	Schneid-richtung	Schaft-form	Bohrtiefe	d1/mm	Artikel-Nr.	Progr. Seite

TS-Drills mit Innenkühlung

						DIN 6537K	TS 100 INOX	VHM	a	rechts	HA	3xD	3,000 - 20,000	89450	10

						DIN 6537K	TS 100 INOX	VHM	a	rechts	HE	3xD	3,000 - 20,000	89550	10

						DIN 6537L	TS 100 INOX	VHM	a	rechts	HA	5xD	3,000 - 20,000	89451	12

						DIN 6537L	TS 100 INOX	VHM	a	rechts	HE	5xD	3,000 - 20,000	89551	12

Spiralbohrer extra kurz

○	●		○	○		DIN 1897	IS	HSS-E	◯	rechts	zyl.	~3xD	1,000 - 12,000	81173	14

NEW

●	●	○	●	●		DIN 1897	IS	HSS-E	S	rechts	zyl.	~3xD	1,000 - 13,000	81178	15

Spiralbohrer kurz

○	●		○	○		DIN 338	IS	HSS-E	◯	rechts	zyl.	~5xD	1,000 - 13,000	81013	17

NEW

●	●	○	●	●		DIN 338	IS	HSS-E	S	rechts	zyl.	~5xD	1,000 - 13,000	81078	19

○	●			●		DIN 338	S	HSS-E	◯	rechts	zyl.	~5xD	0,200 - 17,500	81061	21

Spiralbohrer lang

○	●			●		DIN 340	S	HSS-E	◯	rechts	zyl.	~10xD	1,300 - 13,000	81361	25

Spiralbohrer mit Morsekegel

P	M	K	N	S	H	Norm	Typ	Schneidstoff	Oberfläche	Schneid-richtung	Schaft-form	Bohrtiefe	d1/mm	Artikel-Nr.	Progr. Seite
○	●		○	○		Werksnorm	IS	**HSS-E**	◯	rechts	MK	~3xD	10,000 - 29,000	**82972**	24
○	●		○	○		DIN 345	IS	**HSS-E**	◯	rechts	MK	~5xD	11,500 - 32,000	**82012**	25

MULTIPLEX HPC

Halter und INOX-Wechselplatten

Mit dem Wechselplatten-Bohrsystem Multiplex HPC bietet Hartner leistungsstarke und kostengünstige Halter und Wechselplatten für Bohrungen im Durchmesserbereich von 11,00 bis 40,00 mm an, die durch folgende Vorteile überzeugen:

- Hohe Standzeit
- Optimierter Spantransport
- Perfekte Kühlschmierung
- Hochpräziser und stabiler Plattensitz
- Stabile Halter

Folgende Platten und Halter stehen zur Wahl:

Vier Halter mit Zylinderschaft für die Bohrtiefen 1,5xD, 3xD, 5xD (Ø-Bereich 11,00 – 40,00 mm) bzw. 7xD.

(a) AlTiN nano für rostfreie Stähle — Artikel-Nr. **86725**

1,5xD — Artikel-Nr. **86682**

3xD — Artikel-Nr. **86683**

5xD — Artikel-Nr. **86684**

7xD — Artikel-Nr. **86685**

Weitere Informationen finden Sie im aktuellen Multiplex HPC-Prospekt.

Anwendungsbeispiele INOX-Bohrer mit neuer AlTiZrN-Schicht

Anwendungsbeispiel 1

Praxisfall:
Mehrspindelmaschinen - Serienfertigung
Bearbeitung von Siebblechen aus 1.4301 (V2A)
d = 2,5 mm
Bohrungstiefe 7 mm (4 Steps ohne Entspänen)
Durchgangsbohrung
Emulsion, Außenkühlung
vc = 15 m/min
f = 0,035 mm/U

Erreichter Standweg: 20,5 m

Anwendungsbeispiel 2

Laborversuch:
BAZ
Bearbeitung von 1.4571 (V4A)
d = 6,0 mm
Bohrungstiefe 18 mm
Grundlochbohrung
Emulsion, Außenkühlung
vc = 12 m/min
f = 0,080 mm/U

Erreichter Standweg: 30 m

Anwendungsbeispiel 3

Laborversuch:
BAZ
Bearbeitung von 1.4301 (V2A)
d = 6,0 mm
Bohrungstiefe 24 mm
Grundlochbohrung
Emulsion, Außenkühlung
vc = 12 m/min
f = 0,080 mm/U

Erreichter Standweg: 17 m

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VA-Materialien

Eine Werkstoffgruppe – zahllose Bezeichnungen:
Hinter dem Oberbegriff VA verbergen sich unzählige Werkstoffe mit ganz spezifischen und hochinteressanten Eigenschaften. Dadurch sind sie die ideale Lösung für anspruchsvolle Einsatzfelder wie die Lebensmittelindustrie, die Energietechnik, die chemische Industrie oder auch den Schiffsbau. Eines ist allerdings allen gemeinsam: die schwere Zerspanbarkeit.

VA-Stähle, V2A, V4A, Nirosta-Stähle, Chromstähle, Inox, Edelstähle, Chrom/Nickel-Stähle, Nickel-Basis Legierungen, rostfreie-, säure- und hitzebeständige Stähle, geschwefelt, austenitisch, martensitisch, ferritisch, ferritisch/perlitisch, ferritisch/austenitisch sind nur einige der Begriffe, die Fachleute für diese Werkstoffgruppe heute verwenden. Dahinter stehen wiederum zahlreiche spezifische Werkstoffe, die in Ihrer Vielfalt kaum zu beschreiben sind. Unterschiedliche Chrom-, Nickel-, Titan- und Molybdän-Anteile geben ihnen ihre ganz besonderen Eigenschaften, machen aber gleichzeitig auch ihre Zerspanung so komplex und schwierig.

Generell neigen VA-Werkstoffe zur Randzonenverhärtung, sind schlechte Wärmeleiter und besitzen eine hohe Zähigkeit. Außerdem ist ihre Spanbildung ungünstig, da VA-Späne häufig zum Kleben und Klemmen neigen.
Entsprechend erfordern sie speziell ausgelegte Werkzeuge und Bearbeitungsprozesse, die diesen Eigenschaften Rechnung tragen.

Bearbeitung von austenitischem Stahl

Die Legierung mit mindestens 12 % Chrom sowie Aluminium, Silizium und mindestens 9 % Nickel kennzeichnet die austenitischen Stähle, die die am weitesten verbreitete Gruppe der VA-Stähle bilden. Sie zeichnen sich durch hohe Korrosions-, Oxidations- und Hitzebeständigkeit aus.

Zerspanungseigenschaften:
schwer, hohe thermische Belastung des Werkzeugs, ausgeprägter Frei- und Spanflächenverschleiß, ungünstige Späne

Einsatzgebiete:
Energietechnik, chemische Industrie, Lebensmittelindustrie, Luftfahrt, Fassaden

Typische Werkstoffbeispiele

Stahlgruppe	Stoff Nr.	Kurzname nach DIN EN	ASTM
Stahl	1.4301	X5CrNi18-10	304
austenitisch	1.4541	X6CrNiTi18-10	321
	1.4401	X5NiMo17-12-2	316
	1.4571	XCrNiMoTi17-12-2	316Ti

Bearbeitung von martensitischem Stahl

Martensitische Stähle verfügen über einen höheren Kohlenstoffanteil bis zu 1,2 % und nur wenige weitere Legierungsbestandteile. Sie sind magnetisch, korrosionsbeständig und härtbar.

Zerspanungseigenschaften:
in weichem Zustand gut, je nach Wärmebehandlung (gehärtet / vergütet) zunehmend schwieriger.
Erhöhter Werkzeugverschleiß, hohe mechanische und thermische Belastung des Werkzeugs

Einsatzgebiete:
Energietechnik, chemische Industrie

Typische Werkstoffbeispiele

Stahlgruppe	Stoff Nr.	Kurzname nach DIN EN	ASTM
Stahl	1.4006	X12Cr13	410
martensitisch	1.4031	X39Cr13	0
	1.4021	X20Cr13	420
	1.4057	X20CrNi17-2	431

Bearbeitung von ferritischem Stahl

Ferritische Stähle verfügen über einen Cr-Gehalt von 12 – 18 % und nur wenige weitere Legierungsbestandteile. Sie sind magnetisch, hitzebeständig und gering bis durchschnittlich korrosionsbeständig, aber nicht härtbar. Durch den niedrigen Nickelanteil sind ferritische Stähle relativ kostengünstig.

Zerspanungseigenschaften:
gut, geringer Werkzeugverschleiß durch Abrasion und Adhäsion, aber ungünstige Spanbildung

Einsatzgebiete:
Energietechnik, Lebensmittelindustrie, Automobilbau

Typische Werkstoffbeispiele

Stahlgruppe	Stoff Nr.	Kurzname nach DIN EN	ASTM
Stahl	1.4724	X10CrAlSi13	403
ferritisch	1.4762	X10CrAlSi25	446
	1.4000	X6Cr13	410 S
	1.4016	X12Cr17	430

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TS-Drills mit Innenkühlung

Artikel-Nr. 89450

P	M	K	N	S	H
	•			•	

VHM | a | TS 100 INOX | 3xD | DIN 6537 K | 140° | m7 | R | HA

Ausspitzung ≥ Ø 3,000 • Flächenanschliff • Hauptschneidenform gerade • optimierte Schneidengeometrie
rost-/säure-/hitzebeständige Stähle • Titan und Titanlegierungen • Inconel, Hastelloy, Monel

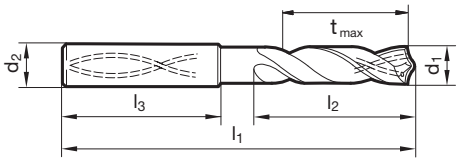
Artikel-Nr. 89550

P	M	K	N	S	H
	•			•	

VHM | a | TS 100 INOX | 3xD | DIN 6537 K | 140° | m7 | R | HE

Ausspitzung ≥ Ø 3,000 • Flächenanschliff • Hauptschneidenform gerade • optimierte Schneidengeometrie
rost-/säure-/hitzebeständige Stähle • Titan und Titanlegierungen • Inconel, Hastelloy, Monel

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
3,000	6,000	62,000	20,000	36,000	5,200	6,000	66,000	28,000	36,000
3,100	6,000	62,000	20,000	36,000	5,300	6,000	66,000	28,000	36,000
3,170	6,000	62,000	20,000	36,000	5,400	6,000	66,000	28,000	36,000
3,200	6,000	62,000	20,000	36,000	5,500	6,000	66,000	28,000	36,000
3,250	6,000	62,000	20,000	36,000	5,550	6,000	66,000	28,000	36,000
3,300	6,000	62,000	20,000	36,000	5,560	6,000	66,000	28,000	36,000
3,400	6,000	62,000	20,000	36,000	5,600	6,000	66,000	28,000	36,000
3,500	6,000	62,000	20,000	36,000	5,700	6,000	66,000	28,000	36,000
3,570	6,000	62,000	20,000	36,000	5,800	6,000	66,000	28,000	36,000
3,600	6,000	62,000	20,000	36,000	5,900	6,000	66,000	28,000	36,000
3,700	6,000	62,000	20,000	36,000	5,950	6,000	66,000	28,000	36,000
3,800	6,000	66,000	24,000	36,000	6,000	6,000	66,000	28,000	36,000
3,900	6,000	66,000	24,000	36,000	6,100	8,000	79,000	34,000	36,000
3,970	6,000	66,000	24,000	36,000	6,200	8,000	79,000	34,000	36,000
4,000	6,000	66,000	24,000	36,000	6,300	8,000	79,000	34,000	36,000
4,100	6,000	66,000	24,000	36,000	6,350	8,000	79,000	34,000	36,000
4,200	6,000	66,000	24,000	36,000	6,400	8,000	79,000	34,000	36,000
4,300	6,000	66,000	24,000	36,000	6,500	8,000	79,000	34,000	36,000
4,370	6,000	66,000	24,000	36,000	6,600	8,000	79,000	34,000	36,000
4,400	6,000	66,000	24,000	36,000	6,700	8,000	79,000	34,000	36,000
4,500	6,000	66,000	24,000	36,000	6,750	8,000	79,000	34,000	36,000
4,600	6,000	66,000	24,000	36,000	6,800	8,000	79,000	34,000	36,000
4,650	6,000	66,000	24,000	36,000	6,900	8,000	79,000	34,000	36,000
4,700	6,000	66,000	24,000	36,000	7,000	8,000	79,000	34,000	36,000
4,760	6,000	66,000	28,000	36,000	7,100	8,000	79,000	41,000	36,000
4,800	6,000	66,000	28,000	36,000	7,140	8,000	79,000	41,000	36,000
4,900	6,000	66,000	28,000	36,000	7,200	8,000	79,000	41,000	36,000
5,000	6,000	66,000	28,000	36,000	7,300	8,000	79,000	41,000	36,000
5,100	6,000	66,000	28,000	36,000	7,400	8,000	79,000	41,000	36,000
5,160	6,000	66,000	28,000	36,000	7,500	8,000	79,000	41,000	36,000

TS-Drills mit Innenkühlung

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
7,540	8,000	79,000	41,000	36,000
7,600	8,000	79,000	41,000	36,000
7,700	8,000	79,000	41,000	36,000
7,800	8,000	79,000	41,000	36,000
7,900	8,000	79,000	41,000	36,000
7,940	8,000	79,000	41,000	36,000
8,000	8,000	79,000	41,000	36,000
8,100	10,000	89,000	47,000	40,000
8,200	10,000	89,000	47,000	40,000
8,300	10,000	89,000	47,000	40,000
8,330	10,000	89,000	47,000	40,000
8,400	10,000	89,000	47,000	40,000
8,500	10,000	89,000	47,000	40,000
8,600	10,000	89,000	47,000	40,000
8,700	10,000	89,000	47,000	40,000
8,730	10,000	89,000	47,000	40,000
8,800	10,000	89,000	47,000	40,000
8,900	10,000	89,000	47,000	40,000
9,000	10,000	89,000	47,000	40,000
9,100	10,000	89,000	47,000	40,000
9,130	10,000	89,000	47,000	40,000
9,200	10,000	89,000	47,000	40,000
9,250	10,000	89,000	47,000	40,000
9,300	10,000	89,000	47,000	40,000
9,400	10,000	89,000	47,000	40,000
9,500	10,000	89,000	47,000	40,000
9,520	10,000	89,000	47,000	40,000
9,600	10,000	89,000	47,000	40,000
9,700	10,000	89,000	47,000	40,000
9,800	10,000	89,000	47,000	40,000
9,900	10,000	89,000	47,000	40,000
9,920	10,000	89,000	47,000	40,000
10,000	10,000	89,000	47,000	40,000
10,100	12,000	102,000	55,000	45,000
10,200	12,000	102,000	55,000	45,000
10,300	12,000	102,000	55,000	45,000
10,320	12,000	102,000	55,000	45,000
10,400	12,000	102,000	55,000	45,000
10,500	12,000	102,000	55,000	45,000
10,600	12,000	102,000	55,000	45,000
10,700	12,000	102,000	55,000	45,000
10,800	12,000	102,000	55,000	45,000
10,900	12,000	102,000	55,000	45,000
11,000	12,000	102,000	55,000	45,000
11,100	12,000	102,000	55,000	45,000
11,110	12,000	102,000	55,000	45,000
11,200	12,000	102,000	55,000	45,000
11,300	12,000	102,000	55,000	45,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
11,400	12,000	102,000	55,000	45,000
11,500	12,000	102,000	55,000	45,000
11,600	12,000	102,000	55,000	45,000
11,700	12,000	102,000	55,000	45,000
11,800	12,000	102,000	55,000	45,000
11,900	12,000	102,000	55,000	45,000
11,910	12,000	102,000	55,000	45,000
12,000	12,000	102,000	55,000	45,000
12,200	14,000	107,000	60,000	45,000
12,500	14,000	107,000	60,000	45,000
12,700	14,000	107,000	60,000	45,000
12,800	14,000	107,000	60,000	45,000
13,000	14,000	107,000	60,000	45,000
13,300	14,000	107,000	60,000	45,000
13,500	14,000	107,000	60,000	45,000
13,700	14,000	107,000	60,000	45,000
14,000	14,000	107,000	60,000	45,000
14,200	16,000	115,000	65,000	48,000
14,290	16,000	115,000	65,000	48,000
14,300	16,000	115,000	65,000	48,000
14,500	16,000	115,000	65,000	48,000
14,700	16,000	115,000	65,000	48,000
15,000	16,000	115,000	65,000	48,000
15,200	16,000	115,000	65,000	48,000
15,300	16,000	115,000	65,000	48,000
15,500	16,000	115,000	65,000	48,000
15,700	16,000	115,000	65,000	48,000
16,000	16,000	115,000	65,000	48,000
16,300	18,000	123,000	73,000	48,000
16,500	18,000	123,000	73,000	48,000
16,900	18,000	123,000	73,000	48,000
17,000	18,000	123,000	73,000	48,000
17,300	18,000	123,000	73,000	48,000
17,500	18,000	123,000	73,000	48,000
18,000	18,000	123,000	73,000	48,000
18,500	20,000	131,000	79,000	50,000
18,900	20,000	131,000	79,000	50,000
19,000	20,000	131,000	79,000	50,000
19,300	20,000	131,000	79,000	50,000
19,500	20,000	131,000	79,000	50,000
20,000	20,000	131,000	79,000	50,000

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TS-Drills mit Innenkühlung

Artikel-Nr. 89451

P	M	K	N	S	H
	•			•	

VHM | a | TS 100 INOX | 5xD | DIN 6537 L | 140° | m7 | R | HA

Ausspitzung ≥ Ø 3,000 • Flächenanschliff • Hauptschneidenform gerade • optimierte Schneidengeometrie
rost-/säure-/hitzebeständige Stähle • Titan und Titanlegierungen • Inconel, Hastelloy, Monel

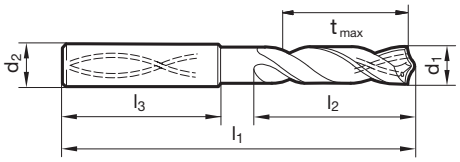
Artikel-Nr. 89551

P	M	K	N	S	H
	•			•	

VHM | a | TS 100 INOX | 5xD | DIN 6537 L | 140° | m7 | R | HE

Ausspitzung ≥ Ø 3,000 • Flächenanschliff • Hauptschneidenform gerade • optimierte Schneidengeometrie
rost-/säure-/hitzebeständige Stähle • Titan und Titanlegierungen • Inconel, Hastelloy, Monel

$t_{max} = l_2\text{-}1{,}5 \times d_1$



d1 mm	d2 mm	l1 mm	l2 mm	l3 mm	d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
3,000	6,000	66,000	28,000	36,000	5,200	6,000	82,000	44,000	36,000
3,100	6,000	66,000	28,000	36,000	5,300	6,000	82,000	44,000	36,000
3,170	6,000	66,000	28,000	36,000	5,400	6,000	82,000	44,000	36,000
3,200	6,000	66,000	28,000	36,000	5,500	6,000	82,000	44,000	36,000
3,250	6,000	66,000	28,000	36,000	5,550	6,000	82,000	44,000	36,000
3,300	6,000	66,000	28,000	36,000	5,560	6,000	82,000	44,000	36,000
3,400	6,000	66,000	28,000	36,000	5,600	6,000	82,000	44,000	36,000
3,500	6,000	66,000	28,000	36,000	5,700	6,000	82,000	44,000	36,000
3,570	6,000	66,000	28,000	36,000	5,800	6,000	82,000	44,000	36,000
3,600	6,000	66,000	28,000	36,000	5,900	6,000	82,000	44,000	36,000
3,700	6,000	66,000	28,000	36,000	5,950	6,000	82,000	44,000	36,000
3,800	6,000	74,000	36,000	36,000	6,000	6,000	82,000	44,000	36,000
3,900	6,000	74,000	36,000	36,000	6,100	8,000	91,000	53,000	36,000
3,970	6,000	74,000	36,000	36,000	6,200	8,000	91,000	53,000	36,000
4,000	6,000	74,000	36,000	36,000	6,300	8,000	91,000	53,000	36,000
4,100	6,000	74,000	36,000	36,000	6,350	8,000	91,000	53,000	36,000
4,200	6,000	74,000	36,000	36,000	6,400	8,000	91,000	53,000	36,000
4,300	6,000	74,000	36,000	36,000	6,500	8,000	91,000	53,000	36,000
4,370	6,000	74,000	36,000	36,000	6,600	8,000	91,000	53,000	36,000
4,400	6,000	74,000	36,000	36,000	6,700	8,000	91,000	53,000	36,000
4,500	6,000	74,000	36,000	36,000	6,750	8,000	91,000	53,000	36,000
4,600	6,000	74,000	36,000	36,000	6,800	8,000	91,000	53,000	36,000
4,650	6,000	74,000	36,000	36,000	6,900	8,000	91,000	53,000	36,000
4,700	6,000	74,000	36,000	36,000	7,000	8,000	91,000	53,000	36,000
4,760	6,000	82,000	44,000	36,000	7,100	8,000	91,000	53,000	36,000
4,800	6,000	82,000	44,000	36,000	7,140	8,000	91,000	53,000	36,000
4,900	6,000	82,000	44,000	36,000	7,200	8,000	91,000	53,000	36,000
5,000	6,000	82,000	44,000	36,000	7,300	8,000	91,000	53,000	36,000
5,100	6,000	82,000	44,000	36,000	7,400	8,000	91,000	53,000	36,000
5,160	6,000	82,000	44,000	36,000	7,500	8,000	91,000	53,000	36,000

TS-Drills mit Innenkühlung

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
7,540	8,000	91,000	53,000	36,000
7,600	8,000	91,000	53,000	36,000
7,700	8,000	91,000	53,000	36,000
7,800	8,000	91,000	53,000	36,000
7,900	8,000	91,000	53,000	36,000
7,940	8,000	91,000	53,000	36,000
8,000	8,000	91,000	53,000	36,000
8,100	10,000	103,000	61,000	40,000
8,200	10,000	103,000	61,000	40,000
8,300	10,000	103,000	61,000	40,000
8,330	10,000	103,000	61,000	40,000
8,400	10,000	103,000	61,000	40,000
8,500	10,000	103,000	61,000	40,000
8,600	10,000	103,000	61,000	40,000
8,700	10,000	103,000	61,000	40,000
8,730	10,000	103,000	61,000	40,000
8,800	10,000	103,000	61,000	40,000
8,900	10,000	103,000	61,000	40,000
9,000	10,000	103,000	61,000	40,000
9,100	10,000	103,000	61,000	40,000
9,130	10,000	103,000	61,000	40,000
9,200	10,000	103,000	61,000	40,000
9,250	10,000	103,000	61,000	40,000
9,300	10,000	103,000	61,000	40,000
9,400	10,000	103,000	61,000	40,000
9,500	10,000	103,000	61,000	40,000
9,520	10,000	103,000	61,000	40,000
9,600	10,000	103,000	61,000	40,000
9,700	10,000	103,000	61,000	40,000
9,800	10,000	103,000	61,000	40,000
9,900	10,000	103,000	61,000	40,000
9,920	10,000	103,000	61,000	40,000
10,000	10,000	103,000	61,000	40,000
10,100	12,000	118,000	71,000	45,000
10,200	12,000	118,000	71,000	45,000
10,300	12,000	118,000	71,000	45,000
10,320	12,000	118,000	71,000	45,000
10,400	12,000	118,000	71,000	45,000
10,500	12,000	118,000	71,000	45,000
10,600	12,000	118,000	71,000	45,000
10,700	12,000	118,000	71,000	45,000
10,800	12,000	118,000	71,000	45,000
10,900	12,000	118,000	71,000	45,000
11,000	12,000	118,000	71,000	45,000
11,100	12,000	118,000	71,000	45,000
11,110	12,000	118,000	71,000	45,000
11,200	12,000	118,000	71,000	45,000
11,300	12,000	118,000	71,000	45,000

d1 mm	d2 mm	l1 mm	l2 mm	l3 mm
11,400	12,000	118,000	71,000	45,000
11,500	12,000	118,000	71,000	45,000
11,600	12,000	118,000	71,000	45,000
11,700	12,000	118,000	71,000	45,000
11,800	12,000	118,000	71,000	45,000
11,900	12,000	118,000	71,000	45,000
11,910	12,000	118,000	71,000	45,000
12,000	12,000	118,000	71,000	45,000
12,200	14,000	124,000	77,000	45,000
12,500	14,000	124,000	77,000	45,000
12,700	14,000	124,000	77,000	45,000
12,800	14,000	124,000	77,000	45,000
13,000	14,000	124,000	77,000	45,000
13,300	14,000	124,000	77,000	45,000
13,500	14,000	124,000	77,000	45,000
13,700	14,000	124,000	77,000	45,000
14,000	14,000	124,000	77,000	45,000
14,200	16,000	133,000	83,000	48,000
14,290	16,000	133,000	83,000	48,000
14,300	16,000	133,000	83,000	48,000
14,500	16,000	133,000	83,000	48,000
14,700	16,000	133,000	83,000	48,000
15,000	16,000	133,000	83,000	48,000
15,200	16,000	133,000	83,000	48,000
15,300	16,000	133,000	83,000	48,000
15,500	16,000	133,000	83,000	48,000
15,700	16,000	133,000	83,000	48,000
16,000	16,000	133,000	83,000	48,000
16,300	18,000	143,000	93,000	48,000
16,500	18,000	143,000	93,000	48,000
16,900	18,000	143,000	93,000	48,000
17,000	18,000	143,000	93,000	48,000
17,300	18,000	143,000	93,000	48,000
17,500	18,000	143,000	93,000	48,000
18,000	18,000	143,000	93,000	48,000
18,500	20,000	153,000	101,000	50,000
18,900	20,000	153,000	101,000	50,000
19,000	20,000	153,000	101,000	50,000
19,050	20,000	153,000	101,000	50,000
19,300	20,000	153,000	101,000	50,000
19,500	20,000	153,000	101,000	50,000
20,000	20,000	153,000	101,000	50,000

HARTNER

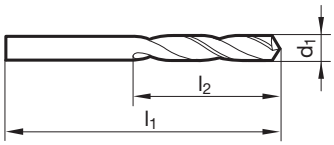
Spiralbohrer extra kurz

Artikel-Nr. 81173

P	M	K	N	S	H
○	●		○	○	

HSS-E | IS | ~3xD | DIN 1897 | 130° | h8 | R | Cyl

INOX-Drill • Kegelmantelanschliff • Co-legierter HSS-Stahl • höhere Verschleißfestigkeit
rost-/säure-/hitzebest. austenit. Stähle (V2A und V4A)



d1 mm	l1 mm	l2 mm
1,000	26,000	6,000
1,100	28,000	7,000
1,200	30,000	8,000
1,300	30,000	8,000
1,400	32,000	9,000
1,500	32,000	9,000
1,600	34,000	10,000
1,700	34,000	10,000
1,800	36,000	11,000
2,000	38,000	12,000
2,100	38,000	12,000
2,200	40,000	13,000
2,300	40,000	13,000
2,400	43,000	14,000
2,500	43,000	14,000
2,600	43,000	14,000
2,700	46,000	16,000
2,800	46,000	16,000
2,900	46,000	16,000
3,000	46,000	16,000
3,100	49,000	18,000
3,200	49,000	18,000
3,300	49,000	18,000
3,400	52,000	20,000
3,500	52,000	20,000
3,600	52,000	20,000
3,800	55,000	22,000
3,900	55,000	22,000
4,000	55,000	22,000
4,100	55,000	22,000
4,200	55,000	22,000
4,300	58,000	24,000
4,500	58,000	24,000
4,600	58,000	24,000
4,700	58,000	24,000
4,800	62,000	26,000
4,900	62,000	26,000
5,000	62,000	26,000
5,100	62,000	26,000
5,200	62,000	26,000
5,300	62,000	26,000
5,500	66,000	28,000

d1 mm	l1 mm	l2 mm
5,600	66,000	28,000
5,800	66,000	28,000
5,900	66,000	28,000
6,000	66,000	28,000
6,100	70,000	31,000
6,300	70,000	31,000
6,500	70,000	31,000
6,600	70,000	31,000
6,700	70,000	31,000
6,800	74,000	34,000
6,900	74,000	34,000
7,000	74,000	34,000
7,100	74,000	34,000
7,400	74,000	34,000
7,500	74,000	34,000
7,600	79,000	37,000
7,800	79,000	37,000
7,900	79,000	37,000
8,000	79,000	37,000
8,100	79,000	37,000
8,200	79,000	37,000
8,500	79,000	37,000
8,700	84,000	40,000
9,000	84,000	40,000
9,200	84,000	40,000
9,400	84,000	40,000
9,500	84,000	40,000
10,000	89,000	43,000
10,200	89,000	43,000
10,500	89,000	43,000
11,000	95,000	47,000
11,500	95,000	47,000
11,700	95,000	47,000
12,000	102,000	51,000

HARTNER

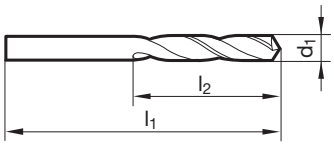
Spiralbohrer extra kurz

Artikel-Nr. 81178

P	M	K	N	S	H
●	●	○	●	●	

HSS-E | S | IS | ~3xD | DIN 1897 | 130° | h8 | R | Cyl

Kegelmantelanschliff mit optimierter Kreuzausspitzung • Co-legierter HSS-Stahl • höhere Verschleißfestigkeit rost-/säure-/hitzebest. austenit. Stähle (V2A und V4A) • Sonderlegierungen



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
1,000	26,000	6,000	5,100	62,000	26,000
1,100	28,000	7,000	5,200	62,000	26,000
1,200	30,000	8,000	5,300	62,000	26,000
1,300	30,000	8,000	5,400	66,000	28,000
1,400	32,000	9,000	5,500	66,000	28,000
1,500	32,000	9,000	5,550	66,000	28,000
1,600	34,000	10,000	5,600	66,000	28,000
1,700	34,000	10,000	5,700	66,000	28,000
1,800	36,000	11,000	5,800	66,000	28,000
1,900	36,000	11,000	5,900	66,000	28,000
2,000	38,000	12,000	6,000	66,000	28,000
2,100	38,000	12,000	6,100	70,000	31,000
2,200	40,000	13,000	6,200	70,000	31,000
2,300	40,000	13,000	6,300	70,000	31,000
2,400	43,000	14,000	6,400	70,000	31,000
2,500	43,000	14,000	6,500	70,000	31,000
2,600	43,000	14,000	6,600	70,000	31,000
2,700	46,000	16,000	6,700	70,000	31,000
2,800	46,000	16,000	6,800	74,000	34,000
2,900	46,000	16,000	6,900	74,000	34,000
3,000	46,000	16,000	7,000	74,000	34,000
3,100	49,000	18,000	7,100	74,000	34,000
3,200	49,000	18,000	7,200	74,000	34,000
3,300	49,000	18,000	7,300	74,000	34,000
3,400	52,000	20,000	7,400	74,000	34,000
3,500	52,000	20,000	7,450	74,000	34,000
3,600	52,000	20,000	7,500	74,000	34,000
3,700	52,000	20,000	7,600	79,000	37,000
3,800	55,000	22,000	7,700	79,000	37,000
3,900	55,000	22,000	7,800	79,000	37,000
4,000	55,000	22,000	7,900	79,000	37,000
4,100	55,000	22,000	8,000	79,000	37,000
4,200	55,000	22,000	8,100	79,000	37,000
4,300	58,000	24,000	8,200	79,000	37,000
4,400	58,000	24,000	8,300	79,000	37,000
4,500	58,000	24,000	8,400	79,000	37,000
4,600	58,000	24,000	8,500	79,000	37,000
4,650	58,000	24,000	8,600	84,000	40,000
4,700	58,000	24,000	8,700	84,000	40,000
4,800	62,000	26,000	8,800	84,000	40,000
4,900	62,000	26,000	8,900	84,000	40,000
5,000	62,000	26,000	9,000	84,000	40,000

Spiralbohrer extra kurz

d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
9,100	84,000	40,000	10,500	89,000	43,000
9,200	84,000	40,000	11,000	95,000	47,000
9,250	84,000	40,000	11,200	95,000	47,000
9,300	84,000	40,000	11,500	95,000	47,000
9,400	84,000	40,000	11,800	95,000	47,000
9,500	84,000	40,000	12,000	102,000	51,000
9,600	89,000	43,000	12,500	102,000	51,000
9,700	89,000	43,000	13,000	102,000	51,000
9,800	89,000	43,000			
9,900	89,000	43,000			
10,000	89,000	43,000			
10,200	89,000	43,000			

HARTNER

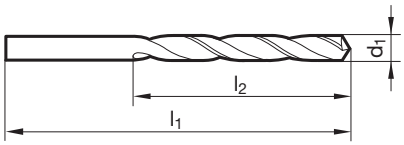
Spiralbohrer kurz

Artikel-Nr. 81013

P	M	K	N	S	H
○	●		○	○	

HSS-E | IS | ~5xD | DIN 338 | 130° | h8 | R | Cyl

INOX-Drill • Kegelmantelanschliff • Co-legierter HSS-Stahl • höhere Verschleißfestigkeit
rost-/säure-/hitzebest. austenit. Stähle (V2A und V4A)



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
1,000	34,000	12,000	5,100	86,000	52,000
1,100	36,000	14,000	5,200	86,000	52,000
1,200	38,000	16,000	5,300	86,000	52,000
1,300	38,000	16,000	5,400	93,000	57,000
1,400	40,000	18,000	5,500	93,000	57,000
1,500	40,000	18,000	5,600	93,000	57,000
1,600	43,000	20,000	5,700	93,000	57,000
1,700	43,000	20,000	5,800	93,000	57,000
1,800	46,000	22,000	5,900	93,000	57,000
1,900	46,000	22,000	6,000	93,000	57,000
2,000	49,000	24,000	6,100	101,000	63,000
2,100	49,000	24,000	6,200	101,000	63,000
2,200	53,000	27,000	6,300	101,000	63,000
2,300	53,000	27,000	6,400	101,000	63,000
2,400	57,000	30,000	6,500	101,000	63,000
2,500	57,000	30,000	6,600	101,000	63,000
2,600	57,000	30,000	6,700	101,000	63,000
2,700	61,000	33,000	6,800	109,000	69,000
2,800	61,000	33,000	6,900	109,000	69,000
2,900	61,000	33,000	7,000	109,000	69,000
3,000	61,000	33,000	7,100	109,000	69,000
3,100	65,000	36,000	7,200	109,000	69,000
3,200	65,000	36,000	7,300	109,000	69,000
3,300	65,000	36,000	7,400	109,000	69,000
3,400	70,000	39,000	7,500	109,000	69,000
3,500	70,000	39,000	7,600	117,000	75,000
3,570	70,000	39,000	7,700	117,000	75,000
3,600	70,000	39,000	7,800	117,000	75,000
3,700	70,000	39,000	7,900	117,000	75,000
3,800	75,000	43,000	8,000	117,000	75,000
3,900	75,000	43,000	8,100	117,000	75,000
4,000	75,000	43,000	8,200	117,000	75,000
4,100	75,000	43,000	8,300	117,000	75,000
4,200	75,000	43,000	8,400	117,000	75,000
4,300	80,000	47,000	8,500	117,000	75,000
4,400	80,000	47,000	8,600	125,000	81,000
4,500	80,000	47,000	8,700	125,000	81,000
4,600	80,000	47,000	8,800	125,000	81,000
4,700	80,000	47,000	8,900	125,000	81,000
4,800	86,000	52,000	9,000	125,000	81,000
4,900	86,000	52,000	9,100	125,000	81,000
5,000	86,000	52,000	9,200	125,000	81,000

Spiralbohrer kurz

d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
9,300	125,000	81,000	11,300	142,000	94,000
9,400	125,000	81,000	11,500	142,000	94,000
9,500	125,000	81,000	11,600	142,000	94,000
9,600	133,000	87,000	11,800	142,000	94,000
9,700	133,000	87,000	12,000	151,000	101,000
9,800	133,000	87,000	12,500	151,000	101,000
9,900	133,000	87,000	13,000	151,000	101,000
10,000	133,000	87,000			
10,100	133,000	87,000			
10,200	133,000	87,000			
10,300	133,000	87,000			
10,400	133,000	87,000			
10,500	133,000	87,000			
10,600	133,000	87,000			
10,900	142,000	94,000			
11,000	142,000	94,000			
11,100	142,000	94,000			
11,200	142,000	94,000			

HARTNER

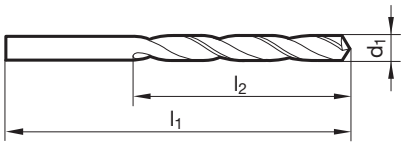
Spiralbohrer kurz

Artikel-Nr. 81078

P	M	K	N	S	H
●	●	○	●	●	

HSS-E | S | IS | ~5xD | DIN 338 | 130° | h8 | R | Cyl

Kegelmantelanschliff mit optimierter Kreuzausspitzung • Co-legierter HSS-Stahl • höhere Verschleißfestigkeit rost-/säure-/hitzebest. austenit. Stähle (V2A und V4A) • Sonderlegierungen



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
1,000	34,000	12,000	5,200	86,000	52,000
1,100	36,000	14,000	5,300	86,000	52,000
1,200	38,000	16,000	5,400	93,000	57,000
1,300	38,000	16,000	5,500	93,000	57,000
1,400	40,000	18,000	5,600	93,000	57,000
1,500	40,000	18,000	5,700	93,000	57,000
1,600	43,000	20,000	5,800	93,000	57,000
1,700	43,000	20,000	5,900	93,000	57,000
1,800	46,000	22,000	6,000	93,000	57,000
1,900	46,000	22,000	6,100	101,000	63,000
2,000	49,000	24,000	6,200	101,000	63,000
2,100	49,000	24,000	6,300	101,000	63,000
2,200	53,000	27,000	6,400	101,000	63,000
2,300	53,000	27,000	6,500	101,000	63,000
2,400	57,000	30,000	6,600	101,000	63,000
2,500	57,000	30,000	6,700	101,000	63,000
2,600	57,000	30,000	6,800	109,000	69,000
2,700	61,000	33,000	6,900	109,000	69,000
2,800	61,000	33,000	7,000	109,000	69,000
2,900	61,000	33,000	7,100	109,000	69,000
3,000	61,000	33,000	7,200	109,000	69,000
3,100	65,000	36,000	7,300	109,000	69,000
3,200	65,000	36,000	7,400	109,000	69,000
3,300	65,000	36,000	7,500	109,000	69,000
3,400	70,000	39,000	7,600	117,000	75,000
3,500	70,000	39,000	7,700	117,000	75,000
3,600	70,000	39,000	7,800	117,000	75,000
3,700	70,000	39,000	7,900	117,000	75,000
3,800	75,000	43,000	8,000	117,000	75,000
3,900	75,000	43,000	8,100	117,000	75,000
4,000	75,000	43,000	8,200	117,000	75,000
4,100	75,000	43,000	8,300	117,000	75,000
4,200	75,000	43,000	8,400	117,000	75,000
4,300	80,000	47,000	8,500	117,000	75,000
4,400	80,000	47,000	8,600	125,000	81,000
4,500	80,000	47,000	8,700	125,000	81,000
4,600	80,000	47,000	8,800	125,000	81,000
4,700	80,000	47,000	8,900	125,000	81,000
4,800	86,000	52,000	9,000	125,000	81,000
4,900	86,000	52,000	9,100	125,000	81,000
5,000	86,000	52,000	9,200	125,000	81,000
5,100	86,000	52,000	9,300	125,000	81,000

HARTNER

Spiralbohrer kurz

d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
9,400	125,000	81,000	11,800	142,000	94,000
9,500	125,000	81,000	12,000	151,000	101,000
9,600	133,000	87,000	12,500	151,000	101,000
9,700	133,000	87,000	13,000	151,000	101,000
9,800	133,000	87,000			
9,900	133,000	87,000			
10,000	133,000	87,000			
10,200	133,000	87,000			
10,500	133,000	87,000			
11,000	142,000	94,000			
11,200	142,000	94,000			
11,500	142,000	94,000			

HARTNER

Spiralbohrer kurz

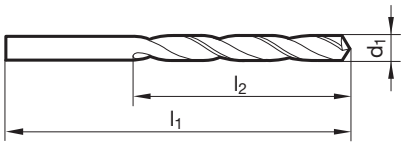
Artikel-Nr. 81061

P	M	K	N	S	H
○	●			●	

HSS-E | S | ~5xD | DIN 338 | 130° | h8 | R | Cyl

Ausspitzung ≥ Ø 1,000 • Kegelmantelanschliff • Co-legierter HSS-Stahl • höhere Verschleißfestigkeit

Titan und Titanlegierungen • rost-/säure-/hitzebest. austen. Stähle • hochfeste/kurzspan. Stähle ab 900 N/mm² • Sonderlegierungen Hastelloy, Inconel, Nimonic



d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
0,200	19,000	2,500	1,850	46,000	22,000
0,300	19,000	3,000	1,900	46,000	22,000
0,400	20,000	5,000	1,950	49,000	24,000
0,500	22,000	6,000	1,990	49,000	24,000
0,550	24,000	7,000	2,000	49,000	24,000
0,580	24,000	7,000	2,030	49,000	24,000
0,600	24,000	7,000	2,050	49,000	24,000
0,650	26,000	8,000	2,080	49,000	24,000
0,700	28,000	9,000	2,100	49,000	24,000
0,750	28,000	9,000	2,200	53,000	27,000
0,800	30,000	10,000	2,250	53,000	27,000
0,820	30,000	10,000	2,300	53,000	27,000
0,840	30,000	10,000	2,350	53,000	27,000
0,850	30,000	10,000	2,380	57,000	30,000
0,900	32,000	11,000	2,400	57,000	30,000
0,950	32,000	11,000	2,450	57,000	30,000
1,000	34,000	12,000	2,500	57,000	30,000
1,050	34,000	12,000	2,550	57,000	30,000
1,100	36,000	14,000	2,600	57,000	30,000
1,150	36,000	14,000	2,700	61,000	33,000
1,180	36,000	14,000	2,750	61,000	33,000
1,190	38,000	16,000	2,800	61,000	33,000
1,200	38,000	16,000	2,850	61,000	33,000
1,210	38,000	16,000	2,900	61,000	33,000
1,250	38,000	16,000	2,950	61,000	33,000
1,300	38,000	16,000	3,000	61,000	33,000
1,350	40,000	18,000	3,050	65,000	36,000
1,400	40,000	18,000	3,100	65,000	36,000
1,450	40,000	18,000	3,200	65,000	36,000
1,500	40,000	18,000	3,250	65,000	36,000
1,510	43,000	20,000	3,300	65,000	36,000
1,520	43,000	20,000	3,350	65,000	36,000
1,530	43,000	20,000	3,400	70,000	39,000
1,550	43,000	20,000	3,450	70,000	39,000
1,600	43,000	20,000	3,500	70,000	39,000
1,630	43,000	20,000	3,600	70,000	39,000
1,650	43,000	20,000	3,700	70,000	39,000
1,700	43,000	20,000	3,800	75,000	43,000
1,730	46,000	22,000	3,900	75,000	43,000
1,750	46,000	22,000	4,000	75,000	43,000
1,800	46,000	22,000	4,050	75,000	43,000
1,820	46,000	22,000	4,100	75,000	43,000

Spiralbohrer kurz

d1 mm	l1 mm	l2 mm	d1 mm	l1 mm	l2 mm
4,200	75,000	43,000	8,600	125,000	81,000
4,250	75,000	43,000	8,700	125,000	81,000
4,300	80,000	47,000	8,800	125,000	81,000
4,400	80,000	47,000	8,900	125,000	81,000
4,500	80,000	47,000	9,000	125,000	81,000
4,600	80,000	47,000	9,100	125,000	81,000
4,700	80,000	47,000	9,200	125,000	81,000
4,750	80,000	47,000	9,300	125,000	81,000
4,800	86,000	52,000	9,400	125,000	81,000
4,850	86,000	52,000	9,500	125,000	81,000
4,900	86,000	52,000	9,600	133,000	87,000
5,000	86,000	52,000	9,700	133,000	87,000
5,100	86,000	52,000	9,800	133,000	87,000
5,200	86,000	52,000	9,900	133,000	87,000
5,300	86,000	52,000	10,000	133,000	87,000
5,400	93,000	57,000	10,100	133,000	87,000
5,500	93,000	57,000	10,200	133,000	87,000
5,600	93,000	57,000	10,300	133,000	87,000
5,700	93,000	57,000	10,400	133,000	87,000
5,800	93,000	57,000	10,500	133,000	87,000
5,900	93,000	57,000	10,600	133,000	87,000
6,000	93,000	57,000	10,700	142,000	94,000
6,100	101,000	63,000	10,800	142,000	94,000
6,200	101,000	63,000	11,000	142,000	94,000
6,300	101,000	63,000	11,100	142,000	94,000
6,400	101,000	63,000	11,200	142,000	94,000
6,500	101,000	63,000	11,300	142,000	94,000
6,600	101,000	63,000	11,500	142,000	94,000
6,700	101,000	63,000	11,700	142,000	94,000
6,750	109,000	69,000	11,800	142,000	94,000
6,800	109,000	69,000	12,000	151,000	101,000
6,900	109,000	69,000	12,100	151,000	101,000
7,000	109,000	69,000	12,200	151,000	101,000
7,100	109,000	69,000	12,300	151,000	101,000
7,200	109,000	69,000	12,500	151,000	101,000
7,300	109,000	69,000	12,700	151,000	101,000
7,400	109,000	69,000	13,000	151,000	101,000
7,500	109,000	69,000	13,500	160,000	108,000
7,600	117,000	75,000	14,000	160,000	108,000
7,700	117,000	75,000	14,500	169,000	114,000
7,800	117,000	75,000	15,000	169,000	114,000
7,900	117,000	75,000	15,500	178,000	120,000
8,000	117,000	75,000	16,000	178,000	120,000
8,100	117,000	75,000	16,500	184,000	125,000
8,200	117,000	75,000	17,000	184,000	125,000
8,300	117,000	75,000	17,500	191,000	130,000
8,400	117,000	75,000			
8,500	117,000	75,000			

HARTNER

Spiralbohrer lang

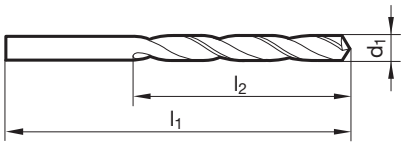
Artikel-Nr. 81361

P	M	K	N	S	H
○	●			●	

HSS-E | S | ~10xD | DIN 340 | 130° | h8 | R | Cyl

Ausspitzung ≥ Ø 1,400 • Kegelmantelanschliff • Co-legierter HSS-Stahl • höhere Verschleißfestigkeit

Titan und Titanlegierungen • rost-/säure-/hitzebest. austen. Stähle • hochfeste/kurzspan. Stähle ab 900 N/mm² • Wälzlagerstähle • Sonderlegierungen Hastelloy, Inconel, Nimonic



d1 mm	l1 mm	l2 mm
1,300	65,000	41,000
1,400	70,000	45,000
1,500	70,000	45,000
1,900	80,000	53,000
2,000	85,000	56,000
2,100	85,000	56,000
2,200	90,000	59,000
2,500	95,000	62,000
3,000	100,000	66,000
3,100	106,000	69,000
3,200	106,000	69,000
3,300	106,000	69,000
3,400	112,000	73,000
3,500	112,000	73,000
3,600	112,000	73,000
3,700	112,000	73,000
3,800	119,000	78,000
3,900	119,000	78,000
4,000	119,000	78,000
4,100	119,000	78,000
4,200	119,000	78,000
4,300	126,000	82,000
4,400	126,000	82,000
4,500	126,000	82,000
4,600	126,000	82,000
4,800	132,000	87,000
4,900	132,000	87,000
5,000	132,000	87,000
5,300	132,000	87,000
5,400	139,000	91,000
5,500	139,000	91,000
5,600	139,000	91,000
5,700	139,000	91,000
5,800	139,000	91,000
5,900	139,000	91,000
6,000	139,000	91,000

d1 mm	l1 mm	l2 mm
6,200	148,000	97,000
6,300	148,000	97,000
6,400	148,000	97,000
6,500	148,000	97,000
6,600	148,000	97,000
6,700	148,000	97,000
6,800	156,000	102,000
6,900	156,000	102,000
7,000	156,000	102,000
7,100	156,000	102,000
7,300	156,000	102,000
7,400	156,000	102,000
7,600	165,000	109,000
7,700	165,000	109,000
7,800	165,000	109,000
7,900	165,000	109,000
8,000	165,000	109,000
8,100	165,000	109,000
8,200	165,000	109,000
8,300	165,000	109,000
8,400	165,000	109,000
8,500	165,000	109,000
8,700	175,000	115,000
8,800	175,000	115,000
9,000	175,000	115,000
9,500	175,000	115,000
10,000	184,000	121,000
10,500	184,000	121,000
12,000	205,000	134,000
12,500	205,000	134,000
13,000	205,000	134,000

HARTNER

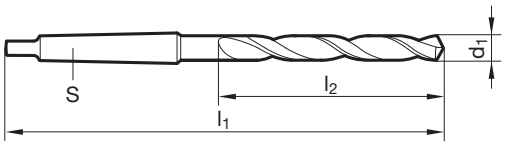
Spiralbohrer mit Morsekegel

Artikel-Nr. 82972

P	M	K	N	S	H
○	●		○	○	

HSS-E | IS | ~3xD | WN | 130° | h8 | R | MK

INOX-Drill • Kegelmantelanschliff • Co-legierter HSS-Stahl • höhere Verschleißfestigkeit
rost-/säure-/hitzebest. austenit. Stähle (V2A und V4A)



d1 mm	S	l1 mm	l2 mm
10,000	MK-1	138,000	57,000
10,500	MK-1	138,000	57,000
10,800	MK-1	142,000	61,000
11,200	MK-1	142,000	61,000
12,500	MK-1	147,000	66,000
13,200	MK-1	147,000	66,000

d1 mm	S	l1 mm	l2 mm
21,500	MK-3	219,000	98,000
29,000	MK-4	263,000	114,000

HARTNER

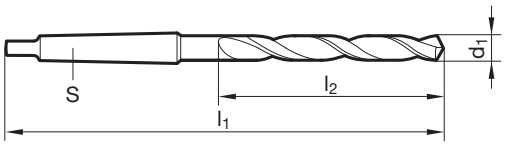
Spiralbohrer mit Morsekegel

Artikel-Nr. 82012

P	M	K	N	S	H
○	●		○	○	

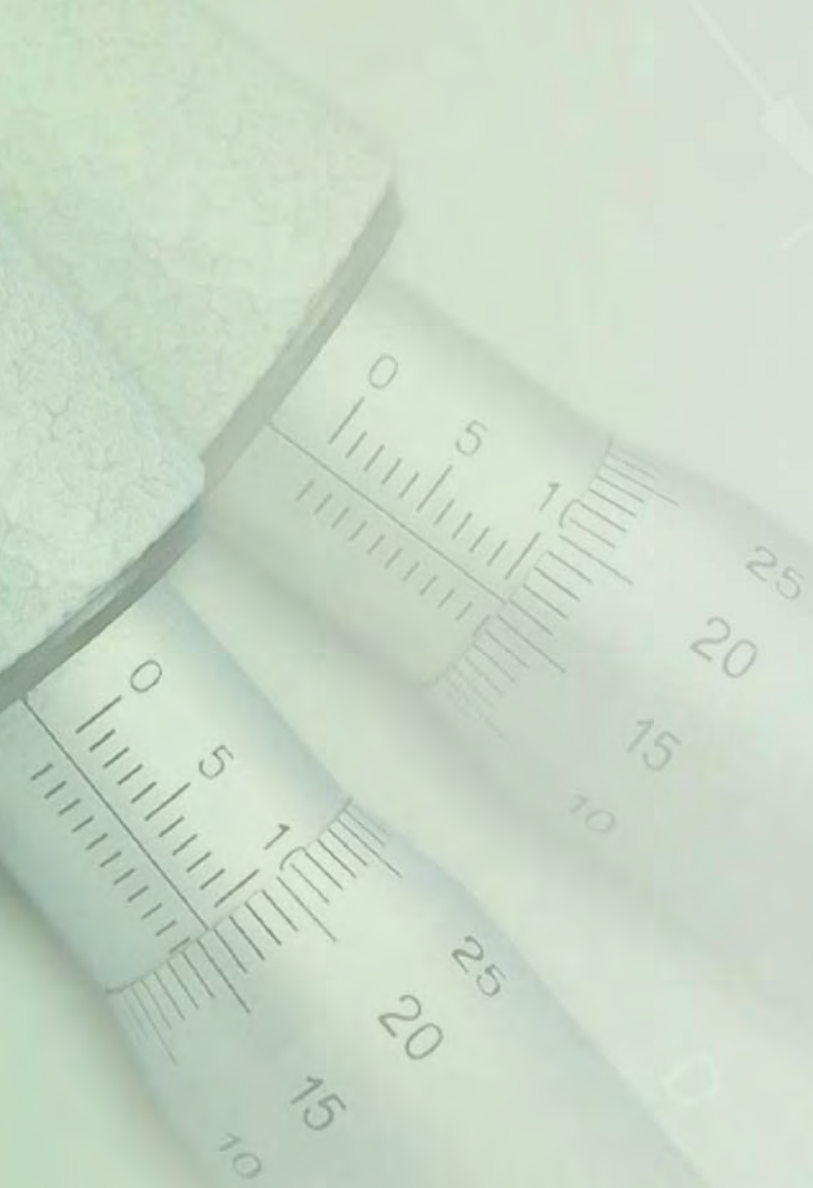
HSS-E | IS | ~5xD | DIN 345 | 130° | h8 | R | MK

INOX-Drill • Kegelmantelanschliff • Co-legierter HSS-Stahl • höhere Verschleißfestigkeit
rost-/säure-/hitzebest. austenit. Stähle (V2A und V4A)



d1 mm	S	l1 mm	l2 mm
11,500	MK-1	175,000	94,000
12,000	MK-1	182,000	101,000
14,000	MK-1	189,000	108,000
15,000	MK-2	212,000	114,000
15,500	MK-2	218,000	120,000
16,000	MK-2	218,000	120,000
16,500	MK-2	223,000	125,000
17,000	MK-2	223,000	125,000
17,250	MK-2	228,000	130,000
17,500	MK-2	228,000	130,000
18,000	MK-2	228,000	130,000
18,500	MK-2	233,000	135,000
19,500	MK-2	238,000	140,000
20,000	MK-2	238,000	140,000
20,500	MK-2	243,000	145,000
21,000	MK-2	243,000	145,000
22,000	MK-2	248,000	150,000
22,500	MK-2	253,000	155,000

d1 mm	S	l1 mm	l2 mm
23,000	MK-2	253,000	155,000
26,000	MK-3	286,000	165,000
27,500	MK-3	291,000	170,000
28,000	MK-3	291,000	170,000
29,000	MK-3	296,000	175,000
29,500	MK-3	296,000	175,000
31,500	MK-3	301,000	180,000
32,000	MK-4	334,000	185,000



EINSATZEMPFEHLUNGEN

HARTNER

Einsatzempfehlungen INOX Spiralbohrer

Bestell-Nr. ®
Norm/DIN
Schneidstoff
Oberfläche
Typ
Schaftform
Kühlung
Programm Seite

Allgemeine Hinweise für VHM-Bohrer:
Leistungsstarke Maschinen, spielarme Spindeln, fluchtungsgenaue Werkzeugaufnahmen, Rundlauffehler der Werkzeuge im eingespannten Zustand max. 0,02 mm, hohe Kühlmitteldrücke. Wir empfehlen die Anwendung von Hydraulik-Dehnspannfuttern oder Schrumpffutter.

Hinweise zur Kühlung für VHM-Bohrer:
Wir empfehlen Kühlschmierung durch Emulsion oder Öl. Alternativ kann unter bestimmten Voraussetzungen auch mit Luftkühlung gearbeitet werden. Statt Luftkühlung würden wir jedoch immer den Einsatz unter MMS-Bedingungen bevorzugen, für den die Werkzeuge besonders geeignet sind.
Bei MMS-Einsatz empfehlen wir die Verwendung des kegeligen MMS-Schaftendes sowie der Hartner MMS-Einbauteile.
Unser Außendienst berät Sie gerne.

Werkzeuge mit fett gesetzter Vorschubreihen-Nr. sind bevorzugt auszuwählen.

Bohrer-Ø mm	Vorschubreihen-Code 1	2	3	4	5	6	7	8	9
	f (mm/U)								
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800

Kühlmittel:
● Emulsion
● Öl
○ Luft

Werkstoffgruppe	Werkstoffbeispiele, neue Bezeichnung (in Klammern alte Bezeichnung) Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN	Zugfestigkeit MPa (N/mm²)	Härte	Kühlmittel
Allgemeine Baustähle	**1.0035** S185(St33), **1.0486** P275N(StE285), **1.0345** P235GH(H1), **1.0425** P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	≤1000		●
Automatenstähle	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	≤1000		●
Unlegierte Vergütungsstähle	**1.0402** C22, **1.1178** C30E (Ck30)	≤700		●
	1.0503 C45, **1.1191** C45E (Ck45)	≤850		●
	1.0601 C60, **1.1221** C60E (Ck60)	≤1000		●
Legierte Vergütungsstähle	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	≤1000		●
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	≤1400		●
Unlegierte Einsatzstähle	**1.0301** (C10), **1.1121** C10E (Ck10)	≤850		●
Legierte Einsatzstähle	**1.7276** 10CrMo11, **1.5125** 11MnSi6	≤1000		●
	1.5752 15NiCr13, **1.7131** 16MnCr5, **1.7264** 20CrMo5	≤1400		●
Nitrierstähle	**1.8504** 34CrAl6	≤1000		●
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	≤1400		●
Werkzeugstähle	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		●
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	≤1400		●
Schnellarbeitsstähle	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≤1400		●
Federstähle	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤350 HB	●
Gehärtete Stähle	–		≤48 HRC	●
			≤66 HRC	●
Rostfreie Stähle, geschwefelt	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤900		●
austenitisch	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensitisch	**1.4057** X20CrNi172 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤1500		●
Gusseisen	**0.6010** EN-GJL-100 (GG10), **0.6020** EN-GJL-200 (GG20)		≤240 HB	○ ○
	0.6025 EN-GJL-250 (GG25), **0.6035** EN-GJL-350 (GG35)		≤350 HB	○ ○
Kugelgraphit- und Temperguss	**0.7050** EN-GJS-500-7 (GGG50), **0.8035** EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), **0.8170** EN-GJMB-700-2 (GTS70)		≤350 HB	○
Hartguss	–		≤350 HB	○
Neue Gusswerkstoffe GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)		≤220 HB	○ ○
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo 6		≤300 HB	○ ○
Neue Gusswerkstoffe ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	≤1000		○ ○
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	≤1400		○ ○
Sonderlegierungen	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Titan und Titan-Legierungen	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		●
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Aluminium und Al-Legierungen	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		●
Al-Knetlegierungen	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤650		●
Al-Gusslegierungen ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		●
≤ 24 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Magnesium-Legierungen	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤400		○
Kupfer, niedriglegiert	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤500		●
Messing, kurzspanend	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		●
langspanend	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		●
Bronzen, kurzspanend	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		○ ●
	2.0790 CuNi18Zn19Pb	≤850		●
Bronzen, langspanend	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		●
	2.0980 CuAl11Ni, **2.1247** CuBe2	≤1000		●
Kunststoffe, duroplastisch	Epoxidharz, Resopal, Pertinax, Moltopren	≤150		○
thermoplastisch	Plexiglas, Hostalen, Novodur, Makralon	≤100		○ ○
aramidfaserverstärkt	Kevlar	≤1000		○
glas-/kohlefaserverstärkt	GFK/CFK	≤1000		○

≤3xD / ≤5xD

89450	89550	89451	89551
6537K	6537K	6537L	6537L
VHM	VHM	VHM	VHM
a	a	a	a
TS 100 INOX	TS 100 INOX	TS 100 INOX	TS 100 INOX
HA	HE	HA	HE
mit	mit	mit	mit
10	10	12	12

≤3xD

81173	82972
1897	WN
HSS-E	HSS-E
○	○
IS	IS
zyl.	MK
ohne	ohne
14	23

81178
1897
HSS-E
S
IS
15

≤5xD

81013	81061	82012
338	338	WN
HSS-E	HSS-E	HSS-E
○	○	○
IS	S	IS
zyl.	zyl.	zyl.
ohne	ohne	ohne
17	21	23

81078
338
HSS-E
S
IS
zyl.
ohne
19

≤10xD

81361
340
HSS-E
○
S
zyl.
ohne
25

v_c m/min	VR-Code				v_c m/min	VR-Code		v_c m/min	VR-Code	v_c m/min	VR-Code			v_c m/min	VR-Code	v_c m/min	VR-Code
					35	5	5	38	6	35	5		5	38	6	33	
					30	5	5	33	5	30	5		5	33	5	27	
					40	5	5	44	6	40	5		5	44	6	36	
					40	5	5	42	5	40	5		5	42	5	32	
					40	5	5	44	5	40	5		5	44	5	36	
								44	5	40				44	5	36	
										35						22	
										20						18	
										16		3				14	3
					36	6	6	40	6	36	6	6	6	40	6	32	
										20						18	
										15		3				13	
										16						14	
										12		3				10	
										15						13	
										12		3				10	
										15		3				12	
										8		**2**				6	
										4						4	
80	**5**	**5**	**5**	**5**	18	**4**	**4**	20	**4**	18	**4**	4	**4**	20	**4**	12	4
60	**2-3**	**2-3**	**2-3**	**2-3**	14	**3**	**3**	15	**3**	14	3	**3**	3	15	**3**	8	**3**
80	**5**	**5**	**5**	**5**	16	3	3	18	**3**	16	3	**3**	3	18	**3**	10	**3**
								30	6	35				30	6	32	
								30	6	30				30	6	27	
										30						26	
										28						24	
										10		3				6	3
30	4	4	4	4				8	1	8		1		8	1	5	1
45	**4**	**4**	**4**	**4**	10	2	2	12	**2**	10	2	**2**	2	12	**2**	8	**2**
40	**3**	**3**	**3**	**3**	6	2	2	8	**2**	6	2	**2**	2	8	**2**	5	**2**
					90	7	7	90	7	90	**7**		**7**	90	7		
					90	7	7	90	7	90	**7**		**7**	90	7		
					80	7	7	80	7	80	7		7	80	7	70	
					70	6	6	70	6	70	6		6	70	6	60	
					70	6	6	70	6	70	6		6	70	6	60	5
					40	5	5	70	5	40	5		5	70	5	36	
					60	5	5	60	5	60	5		5	60	5	54	
					40	5	5	40	5	40	5		5	40	5	36	
					35	4	4	35	4	35	4		4	35	4	30	
					30	4	4	33	4	33	4		4	33	4	24	
					20	**4**	**4**	20	**4**	20	**4**		**4**	20	**4**	18	
					15	**4**	**4**	15	**4**	15	**1**		**1**	15	**4**	13	4
										20						16	
					30	4	4									26	4

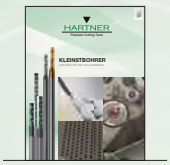
Notizen

Notizen

Unser Programm:

FU 500/FN 500

INOX-Bohrer



Kleinstbohrer

TS-Drills

Gewindewerkzeuge

TF 100 Multi-Mill

Tieflochbohrer

Multiplex

Multiplex HPC

TM-Werkzeug-Ausgabesysteme

VHM Fräswerkzeuge

M42-Spiralbohrer

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