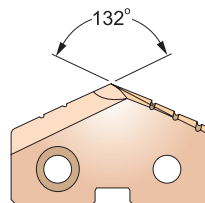


**SPADE DRILL INSERTS - HSS M4**  
**EINWEG BOHREINSATZ - HSS M4**

- ▶ For general use in steels and cast irons.
- ▶ Set up time can be reduced due to changing inserts easily on the machine.
- ▶ Any non-standard size available.
- ▶ Für allgemeine Anwendung in Stahl und Gusseisen
- ▶ Reduzierte Rüstzeiten, einfacher Einsatzwechsel auf der Maschine
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar



cutting conditions : P.325

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EDP No. HSS (M4)		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
<b>1</b>  17.53 (.690") to 24.38 (.960")	45/64"	17.86	.7031"	4.0 (5/32")	S1405045	S1410045	S1415045
		18.00	.7087"		S1455180	S1460180	S1465180
	23/32"	18.26	.7188"		S1405046	S1410046	S1415046
		18.50	.7283"		S1455185	S1460185	S1465185
	47/64"	18.65	.7344"		S1405047	S1410047	S1415047
		19.00	.7480"		S1455190	S1460190	S1465190
	3/4"	19.05	.7500"		S1405048	S1410048	S1415048
	49/64"	19.45	.7656"		S1405049	S1410049	S1415049
		19.50	.7677"		S1455195	S1460195	S1465195
	25/32"	19.84	.7813"		S1405050	S1410050	S1415050
		20.00	.7874"		S1455200	S1460200	S1465200
	51/64"	20.24	.7969"		S1405051	S1410051	S1415051
		20.50	.8071"		S1455205	S1460205	S1465205
	13/16"	20.64	.8125"		S1405052	S1410052	S1415052
		21.00	.8268"		S1455210	S1460210	S1465210
	27/32"	21.43	.8438"		S1405054	S1410054	S1415054
55/64"	21.83	.8594"	S1405055	S1410055	S1415055		
	22.00	.8661"	S1455220	S1460220	S1465220		
7/8"	22.23	.8750"	S1405056	S1410056	S1415056		
57/64"	22.62	.8906"	S1405057	S1410057	S1415057		
	23.00	.9055"	S1455230	S1460230	S1465230		
29/32"	23.02	.9063"	S1405058	S1410058	S1415058		
59/64"	23.42	.9219"	S1405059	S1410059	S1415059		
15/16"	23.81	.9375"	S1405060	S1410060	S1415060		
	24.00	.9449"	S1455240	S1460240	S1465240		
<b>2</b>  24.41 (.961") to 35.05 (1.380")	31/32"	24.61	.9688"	4.8 (3/16")	S1405062	S1410062	S1415062
	63/64"	25.00	.9843"		S1455250	S1460250	S1465250
	1"	25.40	1.0000"		S1405100	S1410100	S1415100
	1-1/64"	25.80	1.0156"		S1405101	S1410101	S1415101
		26.00	1.0236"		S1455260	S1460260	S1465260
	1-1/32"	26.19	1.0313"		S1405102	S1410102	S1415102
	1-3/64"	26.59	1.0469"		S1405103	S1410103	S1415103
	1-1/16"	26.99	1.0625"		S1405104	S1410104	S1415104
		27.00	1.0630"		S1455270	S1460270	S1465270

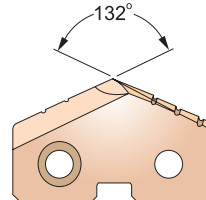
◎ : Excellent ○ : Good

Non- alloyed Steels, Free Machining Steels	Carbon Steels		Alloy Steels		High Alloyed steels		Structural Steels		Tool Steels		Stainless Steels	Cast Iron		Aluminum	Copper Alloys
	~HRc24 (~HB250)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc37 (~HB350)	HRc37~ (HB350~)	~HRc24 (~HB250)	HRc24~ (HB250~)	~HRc13 (~HB200)	HRc13~ (HB200~)	~HRc28 (~HB275)	~HRc19 (~HB220)	HRc19~ (HB220~)	~HRc8 (~HB180)
○	○	○	○	○	○	○	○	○	○	○	◎	◎	○	◎	◎

### SPADE DRILL INSERTS - HSS M4 EINWEG BOHREINSATZ - HSS M4

- ▶ For general use in steels and cast irons.
- ▶ Set up time can be reduced due to changing inserts easily on the machine.
- ▶ Any non-standard size available.

- ▶ Für allgemeine Anwendung in Stahl und Gusseisen
- ▶ Reduzierte Rüstzeiten, einfacher Einsatzwechsel auf der Maschine
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar



cutting conditions : P.325

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EDP No.		
	Inch (inch)	Metric (mm)	Decimal (inch)		HSS (M4)		
					TiN	TiCN	TiAlN
<b>2</b>  24.41 (.961") to 35.05 (1.380")	1-3/32"	27.78	1.0938"	4.8 (3/16")	S1405106	S1410106	S1415106
		28.00	1.1024"		S1455280	S1460280	S1465280
	1-7/64"	28.18	1.1094"		S1405107	S1410107	S1415107
		28.58	1.1250"		S1405108	S1410108	S1415108
	1-1/8"	29.00	1.1417"		S1455290	S1460290	S1465290
		29.37	1.1563"		S1405110	S1410110	S1415110
	1-5/32"	30.00	1.1811"		S1455300	S1460300	S1465300
		30.16	1.1875"		S1405112	S1410112	S1415112
	1-7/32"	30.96	1.2188"		S1405114	S1410114	S1415114
		31.00	1.2205"		S1455310	S1460310	S1465310
	1-1/4"	31.75	1.2500"		S1405116	S1410116	S1415116
		32.00	1.2598"		S1455320	S1460320	S1465320
	1-9/32"	32.54	1.2813"		S1405118	S1410118	S1415118
		33.00	1.2992"		S1455330	S1460330	S1465330
	1-5/16"	33.34	1.3125"		S1405120	S1410120	S1415120
34.00		1.3386"	S1455340	S1460340	S1465340		
1-11/32"	34.13	1.3438"	S1405122	S1410122	S1415122		
	34.93	1.3750"	S1405124	S1410124	S1415124		
1-3/8"	35.00	1.3780"	S1455350	S1460350	S1465350		
	1-13/32"	35.72	1.4063"	S1405126	S1410126	S1415126	
36.00		1.4173"	S1455360	S1460360	S1465360		
1-7/16"	36.51	1.4375"	S1405128	S1410128	S1415128		
	37.00	1.4567"	S1455370	S1460370	S1465370		
1-15/32"	37.31	1.4688"	S1405130	S1410130	S1415130		
	38.00	1.4961"	S1455380	S1460380	S1465380		
1-1/2"	38.10	1.5000"	S1405132	S1410132	S1415132		
	38.89	1.5313"	S1405134	S1410134	S1415134		
1-17/32"	39.00	1.5354"	S1455390	S1460390	S1465390		
	39.69	1.5625"	S1405136	S1410136	S1415136		
1-9/16"	40.00	1.5748"	S1455400	S1460400	S1465400		
	40.48	1.5938"	S1405138	S1410138	S1415138		
1-19/32"	41.00	1.6142"	S1455410	S1460410	S1465410		
	41.28	1.6250"	S1405140	S1410140	S1415140		
1-5/8"	42.00	1.6535"	S1455420	S1460420	S1465420		

◎ : Excellent ○ : Good

Non- alloyed Steels, Free Machining Steels	Carbon Steels		Alloy Steels		High Alloyed steels		Structural Steels		Tool Steels		Stainless Steels	Cast Iron		Aluminum	Copper Alloys
	~HRc24 (~HB250)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc37 (~HB350)	HRc37~ (HB350~)	~HRc24 (~HB250)	HRc24~ (HB250~)	~HRc13 (~HB200)	HRc13~ (HB200~)	~HRc28 (~HB275)	~HRc19 (~HB220)	HRc19~ (HB220~)	~HRc8 (~HB180)
○	○	○	○		○		○	○			◎	◎	○	◎	◎

**SPADE DRILL INSERTS - HSS M4**  
**EINWEG BOHREINSATZ - HSS M4**

- ▶ For general use in steels and cast irons.
- ▶ Set up time can be reduced due to changing inserts easily on the machine.
- ▶ Any non-standard size available.
- ▶ Für allgemeine Anwendung in Stahl und Gusseisen
- ▶ Reduzierte Rüstzeiten, einfacher Einsatzwechsel auf der Maschine
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar



cutting conditions : P.325

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EDP No. HSS (M4)		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
<b>3</b>  34.37 (1.353") to 47.80 (1.882")	1-21/32"	42.07	1.6563"	6.4 (1/4")	S1405142	S1410142	S1415142
	1-11/16"	42.86	1.6875"		S1405144	S1410144	S1415144
		43.00	1.6929"		S1455430	S1460430	S1465430
	1-23/32"	43.66	1.7188"		S1405146	S1410146	S1415146
		44.00	1.7323"		S1455440	S1460440	S1465440
	1-3/4"	44.45	1.7500"		S1405148	S1410148	S1415148
		45.00	1.7717"		S1455450	S1460450	S1465450
	1-25/32"	45.24	1.7813"		S1405150	S1410150	S1415150
		46.00	1.8110"		S1455460	S1460460	S1465460
	1-13/16"	46.04	1.8125"		S1405152	S1410152	S1415152
	1-27/32"	46.83	1.8438"		S1405154	S1410154	S1415154
		47.00	1.8504"		S1455470	S1460470	S1465470
<b>4</b>  46.99 (1.850") to 65.28 (2.570")	1-7/8"	47.63	1.8750"	7.9 (5/16")	S1405156	S1410156	S1415156
		48.00	1.8898"		S1455480	S1460480	S1465480
	1-29/32"	48.42	1.9063"		S1405158	S1410158	S1415158
		49.00	1.9291"		S1455490	S1460490	S1465490
	1-15/16"	49.21	1.9375"		S1405160	S1410160	S1415160
		50.00	1.9685"		S1455500	S1460500	S1465500
	1-31/32"	50.01	1.9688"		S1405162	S1410162	S1415162
	2"	50.80	2.0000"		S1405200	S1410200	S1415200
		51.00	2.0079"		S1455510	S1460510	S1465510
	2-1/32"	51.59	2.0313"		S1405202	S1410202	S1415202
	2-3/64"	52.00	2.0472"		S1455520	S1460520	S1465520
	2-1/16"	52.39	2.0625"		S1405204	S1410204	S1415204
		53.00	2.0866"		S1455530	S1460530	S1465530
	2-3/32"	53.18	2.0938"		S1405206	S1410206	S1415206
	2-1/8"	53.98	2.1250"		S1405208	S1410208	S1415208
		54.00	2.1260"		S1455540	S1460540	S1465540
	2-5/32"	54.77	2.1563"		S1405210	S1410210	S1415210
		55.00	2.1654"		S1455550	S1460550	S1465550
2-3/16"	55.56	2.1875"	S1405212	S1410212	S1415212		
	56.00	2.2047"	S1455560	S1460560	S1465560		
2-7/32"	56.36	2.2188"	S1405214	S1410214	S1415214		
	57.00	2.2441"	S1455570	S1460570	S1465570		

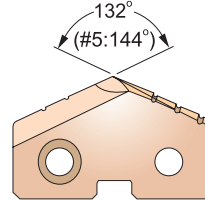
◎ : Excellent ○ : Good

Non- alloyed Steels, Free Machining Steels	Carbon Steels		Alloy Steels		High Alloyed steels		Structural Steels		Tool Steels		Stainless Steels	Cast Iron		Aluminum	Copper Alloys
	~HRc24 (~HB250)	~HRc28 (~HB275)	HRc28~ (~HB275~)	~HRc28 (~HB275)	HRc28~ (~HB275~)	~HRc37 (~HB350)	HRc37~ (~HB350~)	~HRc24 (~HB250)	HRc24~ (~HB250~)	~HRc13 (~HB200)	HRc13~ (~HB200~)	~HRc28 (~HB275)	~HRc19 (~HB220)	HRc19~ (~HB220~)	~HRc8 (~HB180)
	○	○	○	○		○		○	○		◎	◎	○	◎	◎

### SPADE DRILL INSERTS - HSS M4 EINWEG BOHREINSATZ - HSS M4

- ▶ For general use in steels and cast irons.
- ▶ Set up time can be reduced due to changing inserts easily on the machine.
- ▶ Any non-standard size available.

- ▶ Für allgemeine Anwendung in Stahl und Gusseisen
- ▶ Reduzierte Rüstzeiten, einfacher Einsatzwechsel auf der Maschine
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar



cutting conditions : P.325

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EDP No. HSS (M4)		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
<b>4</b>  46.99 (1.850") to 65.28 (2.570")	2-1/4"	57.15	2.2500"	7.9 (5/16")	S1405216	S1410216	S1415216
	2-9/32"	57.94	2.2813"		S1405218	S1410218	S1415218
		58.00	2.2835"		S1455580	S1460580	S1465580
	2-5/16"	58.74	2.3125"		S1405220	S1410220	S1415220
		59.00	2.3228"		S1455590	S1460590	S1465590
	2-11/32"	59.53	2.3438"		S1405222	S1410222	S1415222
		60.00	2.3622"		S1455600	S1460600	S1465600
	2-3/8"	60.33	2.3750"		S1405224	S1410224	S1415224
		61.00	2.4016"		S1455610	S1460610	S1465610
	2-13/32"	61.12	2.4063"		S1405226	S1410226	S1415226
	2-7/16"	61.91	2.4375"		S1405228	S1410228	S1415228
		62.00	2.4409"		S1455620	S1460620	S1465620
	2-15/32"	62.71	2.4688"		S1405230	S1410230	S1415230
		63.00	2.4803"		S1455630	S1460630	S1465630
2-1/2"	63.50	2.5000"	S1405232	S1410232	S1415232		
	64.00	2.5197"	S1455640	S1460640	S1465640		
2-17/32"	64.29	2.5313"	S1405234	S1410234	S1415234		
	65.00	2.5591"	S1455650	S1460650	S1465650		
2-9/16"	65.09	2.5625"	S1405236	S1410236	S1415236		
<b>5</b>  62.38 (2.456") to 76.20 (3.000")	2-1/2"	63.50	2.5000"	11.1 (7/16")	S14052D2	S14102D2	S14152D2
		64.00	2.5197"		S145564A	S146064A	S146564A
	2-17/32"	64.29	2.5313"		S14052D4	S14102D4	S14152D4
	2-9/16"	65.09	2.5625"		S14052D6	S14102D6	S14152D6
	2-19/32"	65.88	2.5938"		S1405238	S1410238	S1415238
		66.00	2.5984"		S1455660	S1460660	S1465660
	2-5/8"	66.68	2.6250"		S1405240	S1410240	S1415240
	2-21/32"	67.47	2.6563"		S1405242	S1410242	S1415242
		68.00	2.6772"		S1455680	S1460680	S1465680
	2-11/16"	68.26	2.6875"		S1405244	S1410244	S1415244
	2-23/32"	69.05	2.7188"		S1405246	S1410246	S1415246
	2-3/4"	69.85	2.7500"		S1405248	S1410248	S1415248
		70.00	2.7559"		S1455700	S1460700	S1465700
	2-25/32"	70.64	2.7813"		S1405250	S1410250	S1415250
2-13/16"	71.44	2.8125"	S1405252	S1410252	S1415252		

◎ : Excellent ○ : Good

Non- alloyed Steels, Free Machining Steels	Carbon Steels		Alloy Steels		High Alloyed steels		Structural Steels		Tool Steels		Stainless Steels	Cast Iron		Aluminum	Copper Alloys
	~HRc24 (~HB250)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc37 (~HB350)	HRc37~ (HB350~)	~HRc24 (~HB250)	HRc24~ (HB250~)	~HRc13 (~HB200)	HRc13~ (HB200~)	~HRc28 (~HB275)	~HRc19 (~HB220)	HRc19~ (HB220~)	~HRc8 (~HB180)
○	○	○	○		○		○	○			◎	◎	○	◎	◎

**SPADE DRILL INSERTS - HSS M4**  
**EINWEG BOHREINSATZ - HSS M4**

- ▶ For general use in steels and cast irons.
- ▶ Set up time can be reduced due to changing inserts easily on the machine.
- ▶ Any non-standard size available.
- ▶ Für allgemeine Anwendung in Stahl und Gusseisen
- ▶ Reduzierte Rüstzeiten, einfacher Einsatzwechsel auf der Maschine
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar



cutting conditions : P.325

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EDP No. HSS (M4)		
	Inch (inch)	Metric (mm)	Decimal (inch)		TiN	TiCN	TiAlN
<b>5</b>  62.38 (2.456") to 76.20 (3.000")		72.00	2.8346"	11.1 (7/16")	S1455720	S1460720	S1465720
	2-27/32"	72.23	2.8438"		S1405254	S1410254	S1415254
	2-7/8"	73.03	2.8750"		S1405256	S1410256	S1415256
	2-29/32"	73.82	2.9063"		S1405258	S1410258	S1415258
		74.00	2.9134"		S1455740	S1460740	S1465740
	2-15/16"	74.61	2.9375"		S1405260	S1410260	S1415260
	2-31/32"	75.41	2.9688"		S1405262	S1410262	S1415262
		76.00	2.9921"		S1455760	S1460760	S1465760
	3"	76.20	3.0000"		S1405300	S1410300	S1415300
	<b>6</b>  76.23 (3.001") to 89.08 (3.507")	3-1/32"	76.99		3.0313"	11.1 (7/16")	S1405302
3-1/16"		77.79	3.0625"	S1405304	S1410304		S1415304
		78.00	3.0709"	S1455780	S1460780		S1465780
3-3/32"		78.58	3.0938"	S1405306	S1410306		S1415306
3-1/8"		79.38	3.1250"	S1405308	S1410308		S1415308
		80.00	3.1496"	S1455800	S1460800		S1465800
3-5/32"		80.17	3.1563"	S1405310	S1410310		S1415310
3-3/16"		80.96	3.1875"	S1405312	S1410312		S1415312
3-7/32"		81.76	3.2188"	S1405314	S1410314		S1415314
		82.00	3.2283"	S1455820	S1460820		S1465820
3-1/4"		82.55	3.2500"	S1405316	S1410316		S1415316
3-9/32"		83.34	3.2813"	S1405318	S1410318		S1415318
		84.00	3.3071"	S1455840	S1460840		S1465840
3-5/16"		84.14	3.3125"	S1405320	S1410320		S1415320
3-11/32"		84.93	3.3438"	S1405322	S1410322		S1415322
3-3/8"		85.73	3.3750"	S1405324	S1410324		S1415324
		86.00	3.3858"	S1455860	S1460860		S1465860
3-13/32"		86.52	3.4063"	S1405326	S1410326		S1415326
3-7/16"	87.31	3.4375"	S1405328	S1410328	S1415328		
<b>7</b>		88.00	3.4646"	11.1 (7/16")	S1455880	S1460880	S1465880
	3-15/32"	88.11	3.4688"		S1405330	S1410330	S1415330
	3-1/2"	88.90	3.5000"		S1405332	S1410332	S1415332
	3-17/32"	89.69	3.5313"		S1405334	S1410334	S1415334
		90.00	3.5433"		S1455900	S1460900	S1465900
	90.49	3.5625"	S1405336	S1410336	S1415336		

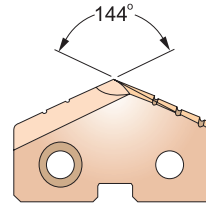
◎ : Excellent ○ : Good

Non- alloyed Steels, Free Machining Steels	Carbon Steels		Alloy Steels		High Alloyed steels		Structural Steels		Tool Steels		Stainless Steels		Cast Iron		Aluminum	Copper Alloys
	~HRc24 (~HB250)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc37 (~HB350)	HRc37~ (HB350~)	~HRc24 (~HB250)	HRc24~ (HB250~)	~HRc13 (~HB200)	HRc13~ (HB200~)	~HRc28 (~HB275)	~HRc19 (~HB220)	HRc19~ (HB220~)	~HRc8 (~HB180)	~HB110
	○	○	○	○		○	○	○			◎	◎	○	◎	◎	

### SPADE DRILL INSERTS - HSS M4 EINWEG BOHREINSATZ - HSS M4

- ▶ For general use in steels and cast irons.
- ▶ Set up time can be reduced due to changing inserts easily on the machine.
- ▶ Any non-standard size available.

- ▶ Für allgemeine Anwendung in Stahl und Gusseisen
- ▶ Reduzierte Rüstzeiten, einfacher Einsatzwechsel auf der Maschine
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar



cutting conditions : P.325

Series Min. to Max. (mm/inch)	Diameter			Thick Metric (mm/inch)	EDP No.		
	Inch (inch)	Metric (mm)	Decimal (inch)		HSS (M4)		
					TiN	TiCN	TiAlN
<b>7</b>  87.76 (3.455") to 101.60 (4.000")	3-19/32"	91.28	3.5938"	11.1 (7/16")	S1405338	S1410338	S1415338
		92.00	3.6221"		S1455920	S1460920	S1465920
	3-5/8"	92.08	3.6250"		S1405340	S1410340	S1415340
	3-21/32"	92.87	3.6563"		S1405342	S1410342	S1415342
	3-11/16"	93.66	3.6875"		S1405344	S1410344	S1415344
		94.00	3.7008"		S1455940	S1460940	S1465940
	3-23/32"	94.46	3.7188"		S1405346	S1410346	S1415346
	3-3/4"	95.25	3.7500"		S1405348	S1410348	S1415348
		96.00	3.7795"		S1455960	S1460960	S1465960
	3-25/32"	96.04	3.7813"		S1405350	S1410350	S1415350
	3-13/16"	96.84	3.8125"		S1405352	S1410352	S1415352
	3-27/32"	97.63	3.8438"		S1405354	S1410354	S1415354
		98.00	3.8583"		S1455980	S1460980	S1465980
	3-7/8"	98.43	3.8750"		S1405356	S1410356	S1415356
	3-29/32"	99.22	3.9063"		S1405358	S1410358	S1415358
	100.00	3.9370"	S1455A00	S1460A00	S1465A00		
3-15/16"	100.01	3.9375"	S1405360	S1410360	S1415360		
3-31/32"	100.81	3.9688"	S1405362	S1410362	S1415362		
4"	101.60	4.0000"	S1405400	S1410400	S1415400		
<b>8</b>  101.63 (4.001") to 114.48 (4.507")	4-1/64"	102.00	4.0157"	11.1 (7/16")	S1455A20	S1460A20	S1465A20
	4-1/16"	103.19	4.0625"		S1405404	S1410404	S1415404
	4-3/32"	104.00	4.0945"		S1455A40	S1460A40	S1465A40
	4-1/8"	104.78	4.1250"		S1405408	S1410408	S1415408
		106.00	4.1732"		S1455A60	S1460A60	S1465A60
	4-3/16"	106.36	4.1875"		S1405412	S1410412	S1415412
	4-1/4"	107.95	4.2500"		S1405416	S1410416	S1415416
		108.00	4.2520"		S1455A80	S1460A80	S1465A80
	4-5/16"	109.54	4.3125"		S1405420	S1410420	S1415420
		110.00	4.3307"		S1455B00	S1460B00	S1465B00
	4-3/8"	111.13	4.3750"		S1405424	S1410424	S1415424
		112.00	4.4094"		S1455B20	S1460B20	S1465B20
	4-7/16"	112.71	4.4375"		S1405428	S1410428	S1415428
		114.00	4.4882"		S1455B40	S1460B40	S1465B40
	4-1/2"	114.30	4.5000"		S1405432	S1410432	S1415432

◎ : Excellent ○ : Good

Non- alloyed Steels, Free Machining Steels	Carbon Steels		Alloy Steels		High Alloyed steels		Structural Steels		Tool Steels		Stainless Steels	Cast Iron		Aluminum	Copper Alloys
	~HRc24 (~HB250)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc28 (~HB275)	HRc28~ (HB275~)	~HRc37 (~HB350)	HRc37~ (HB350~)	~HRc24 (~HB250)	HRc24~ (HB250~)	~HRc13 (~HB200)	HRc13~ (HB200~)	~HRc28 (~HB275)	~HRc19 (~HB220)	HRc19~ (HB220~)	~HRc8 (~HB180)
○	○	○	○		○		○	○			◎	◎	○	◎	◎



### DRILL INSERT (METRIC) - HSS BOHREINSATZ (METRISCH) - HSS

Material	Material Hardness		* HSS Grade	Speed (M/min)			Feed (mm/rev)						
	(Bhn)	(HRc)		TiN	TiCN	TiAlN	Ø9.5 ~12.5	Ø13 ~17.5	Ø18 ~24	Ø25 ~35	Ø36 ~47	Ø48 ~65	Ø66 ~114
Free machining Steels 9SMn36, 9SMnPb28 10SPb20 etc	100 - 150		HSS	63	79	84	0.16	0.23	0.31	0.40	0.48	0.55	0.67
	150 - 200	- 13	HSS	58	70	81	0.16	0.23	0.31	0.40	0.48	0.55	0.67
	200 - 250	13 - 24	HSS	51	66	72	0.14	0.23	0.31	0.38	0.48	0.57	0.69
Low Carbon Steels C10, C15, C22, C25 etc	85 - 125		HSS	54	67	75	0.15	0.22	0.28	0.37	0.46	0.56	0.67
	125 - 175	- 7	HSS	51	63	72	0.15	0.22	0.28	0.37	0.46	0.56	0.67
	175 - 225	7 - 20	HSS	49	58	69	0.13	0.19	0.24	0.34	0.43	0.50	0.57
Medium Carbon Steels C35, C40, C45 etc	225 - 275	20 - 28	HSS	45	56	66	0.13	0.19	0.24	0.34	0.43	0.50	0.57
	125 - 175	- 7	HSS	52	63	75	0.14	0.22	0.28	0.35	0.45	0.55	0.65
	175 - 225	7 - 20	HSS	48	59	69	0.13	0.19	0.23	0.34	0.43	0.50	0.58
Structural Steels St33, St37-2, St44-2 St52, St60 etc	225 - 275	20 - 28	HSS	45	56	63	0.13	0.19	0.23	0.34	0.43	0.50	0.58
	275 - 325	28 - 34	SH, PH	42	52	58	0.10	0.17	0.21	0.28	0.38	0.45	0.55
	100 - 150		HSS	44	56	63	0.14	0.23	0.29	0.35	0.44	0.50	0.63
Cast Iron / S,G Iron GG10, 20, 25, 35, 40 GGG50, 70 GTW35, GTS70 etc	150 - 250	- 24	HSS	39	47	55	0.13	0.22	0.24	0.28	0.38	0.46	0.59
	250 - 350	24 - 37	SH, PH	32	41	45	0.10	0.20	0.22	0.24	0.34	0.40	0.48
	120 - 150		HSS	52	64	75	0.16	0.30	0.40	0.49	0.59	0.69	0.75
Alloy Steels 45CrNiMo4, 42CrMo4 16MnCr5, Ck75 35CrMo4, 16MnCr5 etc	150 - 200	- 13	HSS	48	58	70	0.14	0.26	0.35	0.45	0.56	0.64	0.68
	200 - 220	13 - 19	HSS	42	53	58	0.14	0.23	0.30	0.41	0.46	0.52	0.60
	220 - 260	19 - 26	SH, PH	35	44	52	0.13	0.17	0.23	0.30	0.35	0.43	0.50
Tool Steels 102Cr6, 105WCr6, C75W etc	260 - 320	26 - 34	SH, PH	29	35	41	0.10	0.15	0.16	0.23	0.28	0.35	0.40
	125 - 175	- 7	HSS	48	58	63	0.15	0.20	0.24	0.36	0.43	0.47	0.53
	175 - 225	7 - 20	HSS	45	56	58	0.13	0.20	0.24	0.36	0.42	0.46	0.55
High Temp. Alloy Hastelloy B, Inconel etc	225 - 275	20 - 28	HSS	41	50	56	0.13	0.16	0.23	0.35	0.41	0.44	0.55
	275 - 325	28 - 34	SH, PH	39	47	53	0.09	0.15	0.22	0.28	0.38	0.41	0.50
	325 - 375	34 - 40	SH, PH	36	43	46	0.08	0.15	0.21	0.27	0.38	0.40	0.51
High Strength Alloy 36CrNiMo4, 34CrNiMo8 40NiCrMo73 etc	150 - 200	- 13	SH	25	34	36	0.09	0.15	0.19	0.25	0.28	0.36	0.41
	200 - 250	13 - 24	SH, PH	19	27	29	0.09	0.15	0.19	0.25	0.28	0.36	0.41
Aluminum AlCuSiMn, AlMgSi0.5, AlZnMgCu1.5 etc	140 - 220	- 19	SH, PH	9	11	12	0.08	0.17	0.20	0.24	0.30	0.37	0.39
	220 - 310	19 - 33	PH	8	9	11	0.08	0.14	0.18	0.19	0.25	0.29	0.34
	225 - 300	- 32	SH, PH	25	34	35	0.13	0.18	0.23	0.24	0.36	0.43	0.50
Stainless Steels X7Cr13, X10CrA118, X5CrNi189, X5CrNiMo18 10 etc	300 - 350	32 - 37	SH, PH	19	26	27	0.10	0.18	0.23	0.24	0.36	0.43	0.50
	350 - 400	37 - 43	PH	16	21	22	0.08	0.15	0.20	0.22	0.30	0.48	0.46
Aluminum AlCuSiMn, AlMgSi0.5, AlZnMgCu1.5 etc	30		HSS	187	229	244	0.19	0.33	0.41	0.50	0.54	0.64	0.62
	180	- 8	HSS	92	137	137	0.19	0.33	0.41	0.46	0.54	0.64	0.62
Stainless Steels X7Cr13, X10CrA118, X5CrNi189, X5CrNiMo18 10 etc	135 - 185	- 9	HSS	24	29	34	0.14	0.20	0.23	0.26	0.36	0.41	0.50
	185 - 275	9 - 28	HSS	20	23	29	0.12	0.18	0.20	0.24	0.30	0.36	0.46

RPM= revolution per minute (rev/min)

M/min= surface meter per minute(M/min)

DIA= diameter of drill (mm)

mm/rev = feed rate(mm/rev)

\* Formulas :

$$M/min = \frac{(RPM) \cdot (\pi) \cdot (DIA.)}{1000}$$

$$mm/min = (RPM) \cdot (mm/rev)$$

$$RPM = \frac{(M/min) \cdot (1000)}{(\pi) \cdot (DIA.)}$$

\* HSS Grade : HSS = HSS M4, SH = Super HSS T15, PH = Premium HSS M48

The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.

I-DREAM DRILLS

DREAM DRILLS -GENERAL

DREAM DRILLS -INOX

DREAM DRILLS -ALU

DREAM DRILLS -CFRP

DREAM DRILLS -MQL TYPE

DREAM DRILLS for HARDENED STEELS

GENERAL CARBIDE DRILLS

NC-SPOTTING DRILLS

CENTER DRILLS

MULTI-1 DRILLS

HPD DRILLS

GOLD-P DRILLS

STRAIGHT SHANK DRILLS

TAPER SHANK DRILLS

NC-SPOTTING DRILLS

CENTER DRILLS

SPADE DRILLS

TECHNICAL DATA