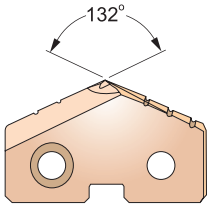
SPADE DRILLS

SERIES Y,Z,0

SM-POINT SPADE DRILL INSERTS - SUPER HSS T15
SM-POINT EINWEG BOHREINSATZ - SUPER HSS T15

- For use in high nickel alloys and materials over 280 Brinell.
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

- Zur Anwendung bei legierten Stählen mit hohem Nickelanteil und Werkstoffen über 280 Brinell
- Erhöhte Stabilität und Fluchtgenauigkeit durch neu entwickelteQuerschneidengeometrie
- Verminderte Bohrkraft und ausgezeichnete Selbstzentrierung
- Jede Abmessung außerhalb des Kataloges lieferbar



cutting conditions : P.325

Series Min. to Max. (mm/inch)	Diameter			Thick	EDP No.		
					SUPER HSS (T15)		
	Inch (inch)	Metric (mm)	Decimal (inch)	Metric (mm/inch)	TiN	TiCN	TiAIN
Y 9.50 (.374″) to 11.07 (.436″)		9.50	.3740"	2.4 (3/32″)	SM155095	SM160095	SM165095
	3/8″	9.53	.3750"		SM105024	SM110024	SM115024
		9.80	.3858"		SM155098	SM160098	SM165098
	25/64″	9.92	.3906"		SM105025	SM110025	SM115025
		10.00	.3937"		SM155100	SM160100	SM165100
		10.20	.4016"		SM155102	SM160102	SM165102
	13/32″	10.32	.4062"		SM105026	SM110026	SM115026
		10.50	.4134"		SM155105	SM160105	SM165105
	27/64″	10.72	.4219"		SM105027	SM110027	SM115027
		10.80	.4252"		SM155108	SM160108	SM165108
		11.00	.4331"		SM155110	SM160110	SM165110
Z 11.11(.437″) to 12.95(.510″)	7/16″	11.11	.4375"	2.4 (3/32″)	SM105028	SM110028	SM115028
		11.50	.4528"		SM155115	SM160115	SM165115
	29/64″	11.51	.4531"		SM105029	SM110029	SM115029
	15/32″	11.91	.4688"		SM105030	SM110030	SM115030
		12.00	.4724"		SM155120	SM160120	SM165120
	31/64″	12.30	.4844"		SM105031	SM110031	SM115031
		12.50	.4921"		SM155125	SM160125	SM165125
	1/2″	12.70	.5000"		SM105032	SM110032	SM115032
0 12.98 (.511″) to 17.65 (.695″)		13.00	.5118"	3.2 (1/8″)	SM155130	SM160130	SM165130
	33/64″	13.10	.5156"		SM105033	SM110033	SM115033
	17/32″	13.49	.5312"		SM105034	SM110034	SM115034
		13.50	.5315"		SM155135	SM160135	SM165135
	35/64″	13.89	.5469"		SM105035	SM110035	SM115035
		14.00	.5512"		SM155140	SM160140	SM165140
	9/16″	14.29	.5625"		SM105036	SM110036	SM115036
		14.50	.5709"		SM155145	SM160145	SM165145
	37/64″	14.68	.5781"		SM105037	SM110037	SM115037
		15.00	.5906"		SM155150	SM160150	SM165150
	19/32″	15.08	.5938"		SM105038	SM110038	SM115038
	39/64″	15.48	.6094"		SM105039	SM110039	SM115039
		15.50	.6102"		SM155155	SM160155	SM165155
	5/8″	15.88	.6250"		SM105040	SM110040	SM115040
		16.00	.6299"		SM155160	SM160160	SM165160

◎ : 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
◎	◎	◎	◎	○	○	○	◎	◎	○	○	○	○	◎	○	○

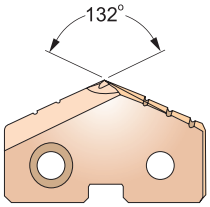
SPADE DRILLS

SERIES 0,1

SM-POINT SPADE DRILL INSERTS - SUPER HSS T15
SM-POINT EINWEG BOHREINSATZ - SUPER HSS T15

- For use in high nickel alloys and materials over 280 Brinell.
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

- Zur Anwendung bei legierten Stählen mit hohem Nickelanteil und Werkstoffen über 280 Brinell
- Erhöhte Stabilität und Fluchtgenauigkeit durch neu entwickelteQuerschneidengeometrie
- Verminderte Bohrkraft und ausgezeichnete Selbstzentrierung
- Jede Abmessung außerhalb des Kataloges lieferbar



cutting conditions : P.325

Series Min. to Max. (mm/inch)	Diameter Inch (inch)	Diameter Metric (mm)	Diameter Decimal (inch)	Thick Metric (mm/inch)	EDP No. SUPER HSS (T15) TiN	TiCN	TiAlN
0 12.98(.511″) to 17.65(.695″)	41/64″	16.27	.6406"	3.2 (1/8″)	SM105041	SM110041	SM115041
		16.50	.6496"		SM155165	SM160165	SM165165
	21/32″	16.67	.6562"		SM105042	SM110042	SM115042
		17.00	.6693"		SM155170	SM160170	SM165170
	43/64″	17.07	.6719"		SM105043	SM110043	SM115043
	11/16″	17.46	.6875"		SM105044	SM110044	SM115044
		17.50	.6890"		SM155175	SM160175	SM165175
1 17.53 (.690″) to 24.38 (.960″)	45/64″	17.86	.7031"	4.0 (5/32″)	SM105045	SM110045	SM115045
		18.00	.7087"		SM155180	SM160180	SM165180
	23/32″	18.26	.7188"		SM105046	SM110046	SM115046
		18.50	.7283"		SM155185	SM160185	SM165185
	47/64″	18.65	.7344"		SM105047	SM110047	SM115047
		19.00	.7480"		SM155190	SM160190	SM165190
	3/4″	19.05	.7500"		SM105048	SM110048	SM115048
	49/64″	19.45	.7656"		SM105049	SM110049	SM115049
		19.50	.7677"		SM155195	SM160195	SM165195
	25/32″	19.84	.7812"		SM105050	SM110050	SM115050
		20.00	.7874"		SM155200	SM160200	SM165200
	51/64″	20.24	.7969"		SM105051	SM110051	SM115051
		20.50	.8071"		SM155205	SM160205	SM165205
	13/16″	20.64	.8125"		SM105052	SM110052	SM115052
		21.00	.8268"		SM155210	SM160210	SM165210
	27/32″	21.43	.8438"		SM105054	SM110054	SM115054
	55/64″	21.83	.8594"		SM105055	SM110055	SM115055
		22.00	.8661"		SM155220	SM160220	SM165220
	7/8″	22.23	.8750"		SM105056	SM110056	SM115056
	57/64″	22.62	.8906"		SM105057	SM110057	SM115057
		23.00	.9055"		SM155230	SM160230	SM165230
	29/32″	23.02	.9062"		SM105058	SM110058	SM115058
	59/64″	23.42	.9219"		SM105059	SM110059	SM115059
	15/16″	23.81	.9375"		SM105060	SM110060	SM115060
		24.00	.9449"		SM155240	SM160240	SM165240

◎ : 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
◎	◎	◎	◎	○	○	○	◎	◎	○	○	○	○	◎	○	○

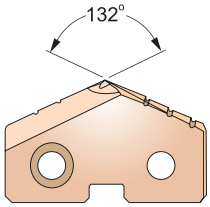
SPADE DRILLS

SERIES 2

SM-POINT SPADE DRILL INSERTS - SUPER HSS T15
SM-POINT EINWEG BOHREINSATZ - SUPER HSS T15

- For use in high nickel alloys and materials over 280 Brinell.
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

- Zur Anwendung bei legierten Stählen mit hohem Nickelanteil und Werkstoffen über 280 Brinell
- Erhöhte Stabilität und Fluchtgenauigkeit durch neu entwickelteQuerschneidengeometrie
- Verminderte Bohrkraft und ausgezeichnete Selbstzentrierung
- Jede Abmessung außerhalb des Kataloges lieferbar



cutting conditions : P.325

Series Min. to Max. (mm/inch)	Diameter			Thick	EDP No.		
					SUPER HSS (T15)		
	Inch (inch)	Metric (mm)	Decimal (inch)	Metric (mm/inch)	TiN	TiCN	TiAlN
2 24.41 (.961″) to 35.05 (1.380″)	31/32″	24.61	.9688"	4.8 (3/16″)	SM105062	SM110062	SM115062
	63/64″	25.00	.9843"		SM155250	SM160250	SM165250
	1″	25.40	1.0000"		SM105100	SM110100	SM115100
	1-1/64″	25.80	1.0156"		SM105101	SM110101	SM115101
		26.00	1.0236"		SM155260	SM160260	SM165260
	1-1/32″	26.19	1.0312"		SM105102	SM110102	SM115102
	1-3/64″	26.59	1.0469"		SM105103	SM110103	SM115103
	1-1/16″	26.99	1.0625"		SM105104	SM110104	SM115104
		27.00	1.0630"		SM155270	SM160270	SM165270
	1-3/32″	27.78	1.0938"		SM105106	SM110106	SM115106
		28.00	1.1024"		SM155280	SM160280	SM165280
	1-7/64″	28.18	1.1094"		SM105107	SM110107	SM115107
	1-1/8″	28.58	1.1250"		SM105108	SM110108	SM115108
		29.00	1.1417"		SM155290	SM160290	SM165290
	1-5/32″	29.37	1.1562"		SM105110	SM110110	SM115110
		30.00	1.1811"		SM155300	SM160300	SM165300
	1-3/16″	30.16	1.1875"		SM105112	SM110112	SM115112
	1-7/32″	30.96	1.2188"		SM105114	SM110114	SM115114
		31.00	1.2205"		SM155310	SM160310	SM165310
	1-1/4″	31.75	1.2500"		SM105116	SM110116	SM115116
		32.00	1.2598"		SM155320	SM160320	SM165320
	1-9/32″	32.54	1.2812"		SM105118	SM110118	SM115118
		33.00	1.2992"		SM155330	SM160330	SM165330
	1-5/16″	33.34	1.3125"		SM105120	SM110120	SM115120
		34.00	1.3386"		SM155340	SM160340	SM165340
	1-11/32″	34.13	1.3438"		SM105122	SM110122	SM115122
	1-3/8″	34.93	1.3750"		SM105124	SM110124	SM115124
		35.00	1.3780"		SM155350	SM160350	SM165350

◎ : 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
◎	◎	◎	◎	○	○	○	◎	◎	○	○	○	○	◎	○	○

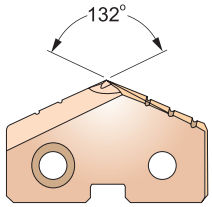
SPADE DRILLS

SERIES 3

SM-POINT SPADE DRILL INSERTS - SUPER HSS T15
SM-POINT EINWEG BOHREINSATZ - SUPER HSS T15

- For use in high nickel alloys and materials over 280 Brinell.
- Improved stability and hole straightness by newly developed thinning design.
- Less thrust force and excellent self-centering.
- Any non-standard size available.

- Zur Anwendung bei legierten Stählen mit hohem Nickelanteil und Werkstoffen über 280 Brinell
- Erhöhte Stabilität und Fluchtgenauigkeit durch neu entwickelteQuerschneidengeometrie
- Verminderte Bohrkraft und ausgezeichnete Selbstzentrierung
- Jede Abmessung außerhalb des Kataloges lieferbar



cutting conditions : P.325

Series Min. to Max. (mm/inch)	Diameter			Thick	EDP No. SUPER HSS (T15)		
	Inch (inch)	Metric (mm)	Decimal (inch)	Metric (mm/inch)	TiN	TiCN	TiAlN
3 34.37 (1.353″) to 47.80 (1.882″)	1-13/32″	35.72	1.4062"	6.4 (1/4″)	SM105126	SM110126	SM115126
		36.00	1.4173"		SM155360	SM160360	SM165360
	1-7/16″	36.51	1.4375"		SM105128	SM110128	SM115128
		37.00	1.4567"		SM155370	SM160370	SM165370
	1-15/32″	37.31	1.4688"		SM105130	SM110130	SM115130
		38.00	1.4961"		SM155380	SM160380	SM165380
	1-1/2″	38.10	1.5000"		SM105132	SM110132	SM115132
	1-17/32″	38.89	1.5312"		SM105134	SM110134	SM115134
		39.00	1.5354"		SM155390	SM160390	SM165390
	1-9/16″	39.69	1.5625"		SM105136	SM110136	SM115136
		40.00	1.5748"		SM155400	SM160400	SM165400
	1-19/32″	40.48	1.5938"		SM105138	SM110138	SM115138
		41.00	1.6142"		SM155410	SM160410	SM165410
	1-5/8″	41.28	1.6250"		SM105140	SM110140	SM115140
		42.00	1.6535"		SM155420	SM160420	SM165420
	1-21/32″	42.07	1.6562"		SM105142	SM110142	SM115142
	1-11/16″	42.86	1.6875"		SM105144	SM110144	SM115144
		43.00	1.6929"		SM155430	SM660430	SM165430
	1-23/32″	43.66	1.7188"		SM105146	SM110146	SM115146
		44.00	1.7323"		SM155440	SM160440	SM165440
	1-3/4″	44.45	1.7500"		SM105148	SM110148	SM115148
		45.00	1.7717"		SM155450	SM160450	SM165450
	1-25/32″	45.24	1.7812"		SM105150	SM110150	SM115150
		46.00	1.8110"		SM155460	SM160460	SM165460
	1-13/16″	46.04	1.8125"		SM105152	SM110152	SM115152
	1-27/32″	46.83	1.8438"		SM105154	SM110154	SM115154
		47.00	1.8504"		SM155470	SM160470	SM165470
	1-7/8″	47.63	1.8750"		SM105156	SM110156	SM115156

◎ : 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
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SPADE DRILLS

RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDKONDITIONEN

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

Material	Material Hardness (Bhn)	Material Hardness (HRc)	* HSS Grade	Speed (M/min) TiN	Speed (M/min) TiCN	Speed (M/min) TiAlN	Feed (mm/rev) 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
	225 - 275	20 - 28	HSS	45	56	66	0.13	0.19	0.24	0.34	0.43	0.50	0.57
Medium Carbon Steels C35, C40, C45 etc	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
	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
Structural Steels St33, St37-2, St44-2 St52, St60 etc	100 - 150		HSS	44	56	63	0.14	0.23	0.29	0.35	0.44	0.50	0.63
	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
Cast Iron / S,G Iron GG10, 20 ,25, 35, 40 GGG50, 70 GTW35, GTS70 etc	120 - 150		HSS	52	64	75	0.16	0.30	0.40	0.49	0.59	0.69	0.75
	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
	260 - 320	26 - 34	SH, PH	29	35	41	0.10	0.15	0.16	0.23	0.28	0.35	0.40
Alloy Steels 45CrMo4, 42CrMo4 16MnCr5, Ck75 35CrMo4, 16MnCr5 etc	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
	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
Tool Steels 102Cr6, 105WCr6, C75W 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
High Temp. Alloy Hastelloy B,Inconel 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
High Strength Alloy 36CrNiMo4, 34CrNiMo8 40NiCrMo73 etc	225 - 300	- 32	SH, PH	25	34	35	0.13	0.18	0.23	0.24	0.36	0.43	0.50
	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.