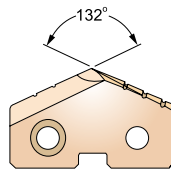


### SPADE DRILL INSERTS - PREMIUM HSS M48

- EINWEG BOHREINSATZ - PREMIUM HSS M48
- Plaquettes SPADE DRILL - HSS Premium M48
- CUSPIDI SPADE DRILL - PREMIUM HSS M48



- ▶ For use in high temperature alloys and materials with 350-500 Brinell.
- ▶ Set up time can be reduced due to changing inserts easily on the machine.
- ▶ Any non-standard size available.
- ▶ Zur Anwendung bei hitzebeständigen Legierungen und Werkstoffen mit 350-500 Brinell
- ▶ Reduzierte Rüstzeiten, einfacher Einsatzwechsel auf der Maschine
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar



Cutting conditions : p.A377

Recommended ToolHolder	Flat Shank	Page	Plain Shank	Page
	INDEXABLE DRILL HOLDER D245-246	-	-	-
	ER COLLET CHUCK		D73-115	

Series Min. to Max. mm (inch)	Diameter			Thick Metric (mm, inch)	EDP No.		
	Inch (inch)	Metric (mm)	Decimal (inch)		PREMIUM HSS M48		
					TiN	TiCN	TiAlN
<b>Y</b> Ø9.50 (.374) to Ø11.07 (.436)	3/8  25/64	9.50	.3740	2.4 (3/32)	S1555095	S1560095	S1565095
		9.53	.3750		S1505024	S1510024	S1515024
		9.80	.3860		S1555098	S1560098	S1565098
		9.92	.3906		S1505025	S1510025	S1515025
		10.00	.3937		S1555100	S1560100	S1565100
		10.20	.4016		S1555102	S1560102	S1565102
		10.32	.4063		S1505026	S1510026	S1515026
		10.50	.4134		S1555105	S1560105	S1565105
		10.72	.4219		S1505027	S1510027	S1515027
		10.80	.4252		S1555108	S1560108	S1565108
<b>Z</b> Ø11.11(.437) to Ø12.95(.510)	7/16  29/64 15/32 31/64	11.11	.4375	2.4 (3/32)	S1555110	S1560110	S1565110
		11.50	.4528		S1505028	S1510028	S1515028
		11.51	.4531		S1555115	S1560115	S1565115
		11.91	.4688		S1505029	S1510029	S1515029
		12.00	.4724		S1505030	S1510030	S1515030
		12.30	.4844		S1555120	S1560120	S1565120
		12.50	.4921		S1505031	S1510031	S1515031
		12.70	.5000		S1555125	S1560125	S1565125
		13.00	.5118		S1505032	S1510032	S1515032
		13.10	.5156		S1555130	S1560130	S1565130
<b>O</b> Ø12.98 (.511) to Ø17.65 (.695)	17/32  35/64  9/16 37/64 19/32 39/64 5/8	13.49	.5313	3.2 (1/8)	S1505033	S1510033	S1515033
		13.50	.5315		S1555135	S1560135	S1565135
		13.89	.5469		S1505034	S1510034	S1515034
		14.00	.5512		S1555135	S1560135	S1565135
		14.29	.5625		S1505035	S1510035	S1515035
		14.50	.5709		S1555140	S1560140	S1565140
		14.68	.5781		S1505036	S1510036	S1515036
		15.00	.5906		S1555145	S1560145	S1565145
		15.08	.5938		S1505037	S1510037	S1515037
		15.48	.6094		S1555150	S1560150	S1565150
	15.50  15.50  15.50	.6102		S1505038	S1510038	S1515038	
		.6250		S1555155	S1560155	S1565155	
		.6250		S1505039	S1510039	S1515039	
		.6299		S1555155	S1560155	S1565155	
				S1505040	S1510040	S1515040	
				S1555160	S1560160	S1565160	

◎ : Excellent ○ : Good

ISO	P											M				K								
Material Description	Non-alloy steel					Low alloy steel						High alloyed steel, and tool steel				Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
HRc	13	23	25	28	32	10	29	32	38	35	35	15	23	10	10	26	3	25	21	21				
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230				
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎				

ISO	N					S										H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)				Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34	55	60	55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400Rm	1050Rm	550	630	400	550
Recommended	○	○									◎	◎	◎	◎	◎			◎			



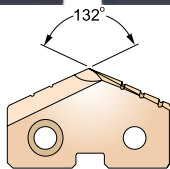
SPADE DRILL INSERTS - PREMIUM HSS M48

- EINWEG BOHREINSATZ - PREMIUM HSS M48
- Plaquettes SPADE DRILL - HSS Premium M48
- CUSPIDI SPADE DRILL - PREMIUM HSS M48



- ▶ For use in high temperature alloys and materials with 350~500 Brinell.
- ▶ Set up time can be reduced due to changing inserts easily on the machine.
- ▶ Any non-standard size available.

- ▶ Zur Anwendung bei hitzebeständigen Legierungen und Werkstoffen mit 350~500 Brinell
- ▶ Reduzierte Rüstzeiten, einfacher Einsatzwechsel auf der Maschine
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar



Cutting conditions : p.A377

Recommended ToolHolder	Flat Shank	Page	Plain Shank	Page
	INDEXABLE DRILL HOLDER	D245-246	-	-
	ER COLLET CHUCK		D73-115	

Series Min. to Max. mm (inch)	Diameter			Thick Metric (mm, inch)	EDP No.			
	Inch (inch)	Metric (mm)	Decimal (inch)		PREMIUM HSS M48			
					TiN	TiCN	TiAlN	
0 Ø12.98(.511) to Ø17.65(.695)	41/64	16.27	.6406	3.2 (1/8)	S1505041	S1510041	S1515041	
		16.50	.6496		S1555165	S1560165	S1565165	
		21/32	16.67		.6563	S1505042	S1510042	S1515042
		17.00	.6693		S1555170	S1560170	S1565170	
		43/64	17.07		.6719	S1505043	S1510043	S1515043
	11/16	17.46	.6875		S1505044	S1510044	S1515044	
		17.50	.6890		S1555175	S1560175	S1565175	
		45/64	17.86		.7031	S1505045	S1510045	S1515045
		18.00	.7087		S1555180	S1560180	S1565180	
		23/32	18.26		.7188	S1505046	S1510046	S1515046
1 Ø17.53 (.690) to Ø24.38 (.960)	47/64	18.50	.7283	4.0 (5/32)	S1555185	S1560185	S1565185	
		18.65	.7344		S1505047	S1510047	S1515047	
		19.00	.7480		S1555190	S1560190	S1565190	
	3/4	19.05	.7500		S1505048	S1510048	S1515048	
		49/64	19.45		.7656	S1505049	S1510049	S1515049
	25/32	19.50	.7677		S1555195	S1560195	S1565195	
		19.84	.7813		S1505050	S1510050	S1515050	
		20.00	.7874		S1555200	S1560200	S1565200	
		51/64	20.24		.7969	S1505051	S1510051	S1515051
		20.50	.8071		S1555205	S1560205	S1565205	
		13/16	20.64		.8125	S1505052	S1510052	S1515052
	27/32	21.00	.8268		S1555210	S1560210	S1565210	
		21.43	.8438		S1505054	S1510054	S1515054	
		55/64	21.83		.8594	S1505055	S1510055	S1515055
	7/8	22.00	.8661		S1555220	S1560220	S1565220	
		22.23	.8750		S1505056	S1510056	S1515056	
		57/64	22.62		.8906	S1505057	S1510057	S1515057
	29/32	23.00	.9055		S1555230	S1560230	S1565230	
23.02		.9063	S1505058	S1510058	S1515058			
59/64		23.42	.9219	S1505059	S1510059	S1515059		
15/16	23.81	.9375	S1505060	S1510060	S1515060			
	24.00	.9449	S1555240	S1560240	S1565240			

◎ : Excellent ○ : Good

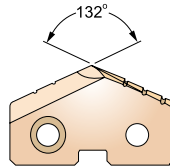
ISO Material Description	P										M			K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc	13	25	28	32	36	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	○	◎

ISO Material Description	N					S					H										
	Aluminum- wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials			Heat Resistant Super Alloys			Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron			
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400Rm	1050Rm	550	630	400	550
Recommended	○	○					○				◎	◎	◎	◎	◎			◎			

### SPADE DRILL INSERTS - PREMIUM HSS M48

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- Plaquettes SPADE DRILL - HSS Premium M48
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- ▶ Reduzierte Rüstzeiten, einfacher Einsatzwechsel auf der Maschine
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar

Cutting conditions : p.A377

Recommended ToolHolder	Flat Shank	Page	Plain Shank	Page
	INDEXABLE DRILL HOLDER D245-246	-	-	-
	ER COLLET CHUCK		D73-115	

Series Min. to Max. mm (inch)	Diameter			Thick Metric (mm, inch)	EDP No.		
	Inch (inch)	Metric (mm)	Decimal (inch)		PREMIUM HSS M48		
					TiN	TiCN	TiAlN
<p style="font-size: 2em; font-weight: bold; text-align: center;">2</p> <p>Ø24.41 (.961) to Ø35.05 (1.380)</p>	31/32	24.61	.9688	4.8 (3/16)	S1505062	S1510062	S1515062
	63/64	25.00	.9843		S1555250	S1560250	S1565250
	1	25.40	1.0000		S1505100	S1510100	S1515100
	1-1/64	25.80	1.0156		S1505101	S1510101	S1515101
					S1555260	S1560260	S1565260
	1-1/32	26.19	1.0313		S1505102	S1510102	S1515102
	1-3/64	26.59	1.0469		S1505103	S1510103	S1515103
	1-1/16	26.99	1.0625		S1505104	S1510104	S1515104
					S1555270	S1560270	S1565270
	1-3/32	27.00	1.0630		S1505106	S1510106	S1515106
					S1555280	S1560280	S1565280
	1-7/64	28.18	1.1094		S1505107	S1510107	S1515107
	1-1/8	28.58	1.1250		S1505108	S1510108	S1515108
					S1555290	S1560290	S1565290
	1-5/32	29.00	1.1417		S1505110	S1510110	S1515110
					S1555300	S1560300	S1565300
	1-3/16	29.37	1.1563		S1505112	S1510112	S1515112
					S1555310	S1560310	S1565310
	1-7/32	30.00	1.1811		S1505114	S1510114	S1515114
					S1555320	S1560320	S1565320
	1-1/4	30.16	1.1875		S1505116	S1510116	S1515116
					S1555330	S1560330	S1565330
	1-9/32	30.96	1.2188		S1505120	S1510120	S1515120
					S1555340	S1560340	S1565340
	1-5/16	31.00	1.2205		S1505122	S1510122	S1515122
					S1555350	S1560350	S1565350
	1-11/32	31.75	1.2500		S1505124	S1510124	S1515124
					S1555350	S1560350	S1565350
1-3/8	32.00	1.2598	S1505118	S1510118	S1515118		
			S1555330	S1560330	S1565330		
1-5/16	32.54	1.2813	S1505120	S1510120	S1515120		
			S1555340	S1560340	S1565340		
1-11/32	33.00	1.2992	S1505122	S1510122	S1515122		
			S1555350	S1560350	S1565350		
1-3/8	33.34	1.3125	S1505124	S1510124	S1515124		
			S1555350	S1560350	S1565350		
1-7/16	34.00	1.3386	S1505126	S1510126	S1515126		
			S1555350	S1560350	S1565350		
1-1/2	34.13	1.3438	S1505128	S1510128	S1515128		
			S1555350	S1560350	S1565350		
1-13/32	34.93	1.3750	S1505130	S1510130	S1515130		
			S1555350	S1560350	S1565350		
1-3/4	35.00	1.3780	S1505132	S1510132	S1515132		
			S1555350	S1560350	S1565350		

◎ : Excellent ○ : Good

ISO	P										M				K					
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron	
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VDI 3323	1	13	25	28	32	10	29	32	38	15	10	15	23	10	10	26	3	25		21
HRc	125	190	250	270	300	180	275	300	350	200	200	240	180		180	260	160	250	130	230
Recommended	◎	◎	◎	◎		◎	◎	◎	◎	◎					○	◎	○	◎	○	◎

ISO	N					S										H					
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	60	100	75	90	130	110	90	100			200	280	250	350	320	400Rm	1050Rm	550	630	42	55
Recommended	○	○					○				◎	◎	◎	◎	◎			◎			

SELECTION GUIDE



SERIES	1~8	Y,Z,0,1~4	Y,Z,0,1,2
TOOL MATERIAL	HSS M4	SUPER HSS T15	PREMIUM HSS M48
POINT	STANDARD	STANDARD	STANDARD
SIZE MIN	Ø17.86(#1)	Ø9.5(#Y)	Ø9.5(#Y)
SIZE MAX	Ø114.3(#8)	Ø65.09(#4)	Ø35(#2)
PAGE	A286	A292	A297



Please visit [globalyg1.com/mat](http://globalyg1.com/mat) for material search

SURFACE TREATMENT

TiN / TiCN / TiAIN

# INSERTS & HOLDERS SPADE DRILLS

For General Machines and Drilling Large Diameters  
Longer Tool Life and High Productivity

◎ : Excellent ○ : Good

Recommended cutting conditions : p.A375



ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRc			
P	1	Non-alloy steel	About 0.15% C Annealed	125		○	◎	◎
	2		About 0.45% C Annealed	190	13	○	◎	◎
	3		About 0.45% C Quenched & Tempered	250	25	○	◎	◎
	4		About 0.75% C Annealed	270	28	○	◎	◎
	5		About 0.75% C Quenched & Tempered	300	32			
	6	Low alloy steel	Annealed	180	10	○	◎	◎
	7		Quenched & Tempered	275	29	○	◎	◎
	8		Quenched & Tempered	300	32		○	◎
	9		Quenched & Tempered	350	38		○	◎
	10		High alloyed steel, and tool steel	Annealed	200	15		○
	11	Quenched & Tempered		325	35		○	◎
M	12	Stainless steel	Ferritic / Martensitic Annealed	200	15	◎	○	
	13		Martensitic Quenched & Tempered	240	23	◎	○	
	14		Austenitic	180	10	◎	○	
K	15	Grey cast iron	Pearlitic / ferritic	180	10	◎	○	○
	16		Pearlitic (Martensitic)	260	26	○	◎	◎
	17	Nodular cast iron	Ferritic	160	3	◎	○	○
	18		Pearlitic	250	25	○	◎	◎
	19		Ferritic	130		◎	○	○
20	Malleable cast iron	Pearlitic	230	21	○	◎	◎	
N	21	Aluminum-wrought alloy	Not Curable	60		◎	○	○
	22		Curable Hardened	100		◎	○	○
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable	75				
	24		≤ 12% Si, Curable Hardened	90				
	25		> 12% Si, Not Curable	130				
	26		Copper and Copper Alloys	Cutting Alloys, PB>1%	110			
	27	(Bronze / Brass)	CuZn, CuSnZn (Brass)	90		◎	○	○
	28		CuSn, lead-free copper and electrolytic copper	100				
	29		Non Metallic Materials	Duroplastic, Fiber Reinforced Plastic				
	30		Rubber, Wood, etc.					
S	31	Heat Resistant Super Alloys	Fe Based Annealed	200	15		◎	◎
	32		Cured	280	30		○	◎
	33		Annealed	250	25		○	◎
	34		Ni or Co Based Cured	350	38		○	◎
	35	Cast	320	34		○	◎	
	36	Titanium Alloys	Pure Titanium	400 Rm				
	37		Alpha + Beta Alloys Hardened	1050 Rm				
H	38	Hardened steel	Hardened	550	55		○	◎
	39		Hardened	630	60			
	40	Chilled Cast Iron	Cast	400	42			
	41	Hardened Cast Iron	Hardened	550	55			

REAMERS	<b>TAPER SHANK</b>		TAPER SHANK HOLDERS - INCH/METRIC	A364
COUNTER SINKS	<b>FLANGED SHANK</b>		FLANGED STRAIGHT SHANK HOLDERS - INCH/METRIC	A364
COUNTER BORES	<b>STRAIGHT SHANK</b>		STRAIGHT SHANK HOLDERS - INCH	A382

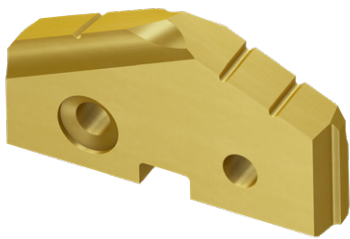




# PRODUCT FEATURES

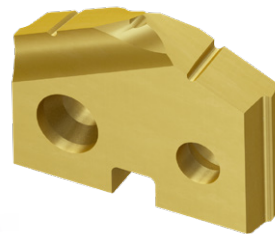
## SPADE DRILLS (Standard, SM-Point)

Reference page : p.A299 - p.A380



### Standard-Point

Standard Point  
and Neutral Rake Angle for  
**Stable Cutting**  
**Self Centering**  
**Chip Breaking**  
**Rigidity on Center**



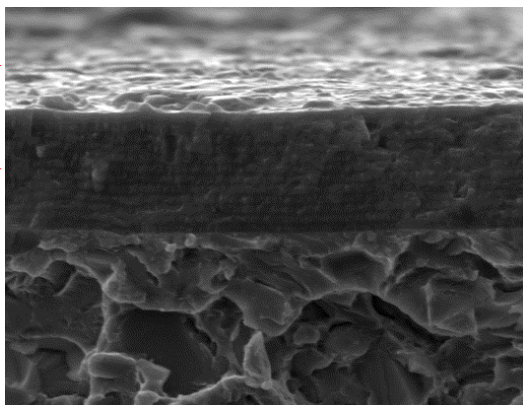
### SM-Point

Multiple Web Thinning for and Radius Back Face  
for Increased Cutting Speed and Feed  
**Wide Chip Space**  
**Good Self-Centering**  
**Less Tool Lead-off**  
**Reduction in bell mouching**



Multi Layers

Carbide



### Multi layered 'H'-coating Micro Grain Carbide Insert

Outstanding Productivity & Reliability

#### H - Coating

(Upgraded AlCrN-Based : **Multi-Layer coating**)

- Higher worn-out resistance and Lower friction
- Higher Cutting Speed and Feed
- Improved drill Hole Quality



# Special features of SM-Point Spade Drill

This new "Hybrid Point" combines the strength of the standard point with additional "Web Thinning".

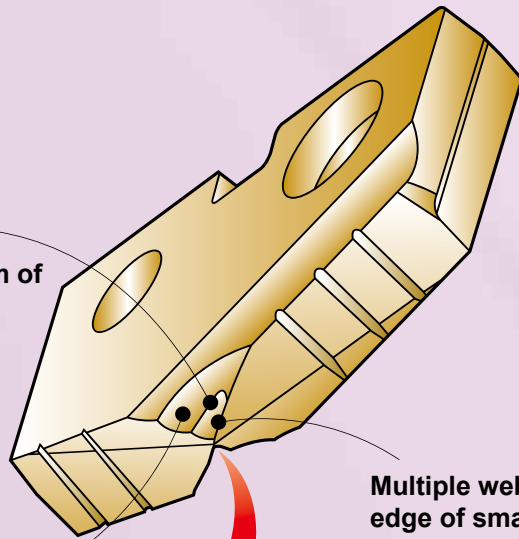
This new point increases stability, reduces thrust, improves centering and allows increased speeds and feeds.

**Multiple thinning form at the bottom of the large thinning.**

- ▶ The optimum thinning for the difference from the cutting speed, the cutting quantity and the cutting load according to the distance from the drill point to the cutting edge.

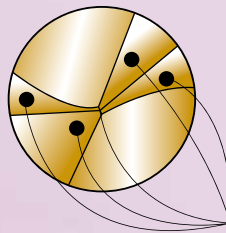
**Radius back face**

- ▶ Wide chip space



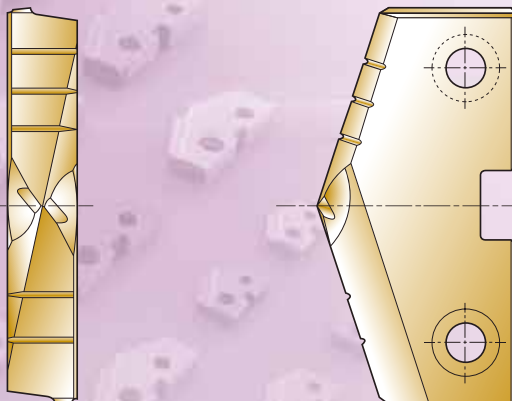
**Multiple web thinning with the cutting edge of small web thinning.**

- ▶ Good self-centering
- ▶ Less tool lead off
- ▶ Reduction in bell mouching, thrust
- ▶ Increased stability

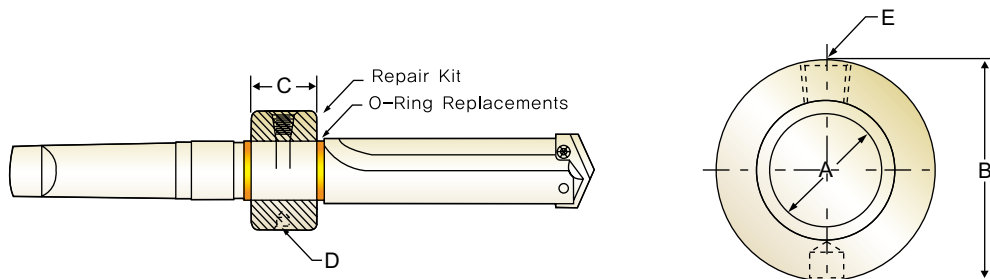


**Four-facet point**

- ▶ Self-centering
- ▶ Less thrust force



**HOLDER ACCESSORIES**  
**ROTARY COOLANT ADAPTER (RCA) AND ACCESSORIES**



**Inch**

Item No.	I.D.	O.D.	Length	Thread for Driving Rod	Pipe Tap	RCA Repair Kit Item No.	RCA O-Ring Replacements Item No.
	A	B	C	D	E		
PR110048	3/4	1-3/4	7/8	5/16-NC	◆1/8	PR210048	PR310048
PR110100	1	2-1/8	1-1/8	5/16-NC	◆1/8	PR210100	PR310100
PR110116	1-1/4	2-1/2	1-3/8	3/8-NC	◆1/4	PR210116	PR310116
PR110148	1-3/4	3	1-3/8	3/8-NC	◆1/4	PR210148	PR310148
PR110216	2-1/4	3-3/4	1-3/4	1/2-NC	◆1/2	PR210216	PR310216

**Metric**

Item No.	I.D.	O.D.	Length	Thread for Driving Rod	Pipe Tap	RCA Repair Kit Item No.	RCA O-Ring Replacements Item No.
	A	B	C	D	E		
PR120190	19.05	44.45	22.23	M8 × 1.25	◆1/8	PR220190	PR320190
PR120254	25.40	53.97	28.57	M8 × 1.25	◆1/8	PR220254	PR320254
PR120317	31.75	63.50	34.92	M10 × 1.5	◆1/4	PR220317	PR320317
PR120444	44.45	76.20	34.92	M10 × 1.5	◆1/4	PR220444	PR320444
PR120571	57.15	95.27	44.45	M12 × 1.75	◆1/2	PR220571	PR320571

◆ Thread to BSP & ISO 7-1

**TORX SCREWS**

Holder Series	Item No.	TORX Hand Driver	Drill Range Used With	
			Inch	Metric
Y	J07Y0010	J05Y0070	3/8 ~ 27/64	9.5 mm ~ 11.0 mm
Z	J07Z0110		7/16 ~ 1/2	11.5 mm ~ 12.5 mm
0	J0800210	J0500080	33/64 ~ 11/16	13.0 mm ~ 17.5 mm
0.5	J0805310		39/64 ~ 11/16	15.5 mm ~ 17.5 mm
1	J0910410	J0510090	45/64 ~ 15/16	18.0 mm ~ 24.0 mm
1.5	J0915510		55/64 ~ 15/16	22.0 mm ~ 24.0 mm
2	J1520610	J0520150	31/32 ~ 1-3/8	25.0 mm ~ 35.0 mm
2.5	J1525710		1-3/16 ~ 1-3/8	30.0 mm ~ 35.0 mm
3,4	J2030810	J0530200	1-13/32 ~ 2-9/16	36.0 mm ~ 65.0 mm
5 ~ 8	J2550910	J0550250	2-1/2 ~ 4-1/2	64.0 mm ~ 114.0 mm

\*\* Note : Replacement screws sold in packages(10 screws per package)



**SPADE DRILL HSS-M48**

ISO	VDI 3323	Material Description	Vc(m/min)			Feed(mm/rev)						
			TiN	TiCN	TiAlN	Ø9.5-12.5	Ø13-17.5	Ø18-24	Ø25-35	Ø36-47	Ø48-65	Ø66-114
<b>P</b>	1	Non-alloy steel	<b>54</b>	<b>67</b>	<b>75</b>	0.15	0.22	0.28	0.37	0.46	0.56	0.67
	2		<b>49</b>	<b>58</b>	<b>69</b>	0.13	0.19	0.24	0.34	0.43	0.50	0.57
	3		<b>45</b>	<b>56</b>	<b>63</b>	0.13	0.19	0.23	0.34	0.43	0.50	0.58
	4		<b>45</b>	<b>56</b>	<b>63</b>	0.13	0.19	0.23	0.34	0.43	0.50	0.58
	6	Low alloy steel	<b>45</b>	<b>56</b>	<b>58</b>	0.13	0.20	0.24	0.36	0.42	0.46	0.55
	7		<b>41</b>	<b>50</b>	<b>56</b>	0.13	0.16	0.23	0.35	0.41	0.44	0.55
	8		<b>39</b>	<b>47</b>	<b>53</b>	0.09	0.15	0.22	0.28	0.38	0.41	0.50
	9		<b>36</b>	<b>43</b>	<b>46</b>	0.08	0.15	0.21	0.27	0.38	0.40	0.51
	10		High alloyed steel, and tool steel	<b>25</b>	<b>34</b>	<b>36</b>	0.08	0.17	0.20	0.24	0.30	0.37
	11	<b>19</b>		<b>27</b>	<b>29</b>	0.08	0.14	0.18	0.19	0.25	0.29	0.34
	<b>K</b>	15	Grey cast iron	<b>48</b>	<b>58</b>	<b>70</b>	0.14	0.26	0.35	0.45	0.56	0.64
16		<b>29</b>		<b>35</b>	<b>41</b>	0.10	0.15	0.16	0.23	0.28	0.35	0.40
17		Nodular cast iron	<b>48</b>	<b>58</b>	<b>70</b>	0.14	0.26	0.35	0.45	0.56	0.64	0.68
18			<b>35</b>	<b>44</b>	<b>52</b>	0.13	0.17	0.23	0.30	0.35	0.43	0.50
19		Malleable cast iron	<b>52</b>	<b>64</b>	<b>75</b>	0.16	0.30	0.40	0.49	0.59	0.69	0.75
20			<b>35</b>	<b>44</b>	<b>52</b>	0.13	0.17	0.23	0.30	0.35	0.43	0.50
<b>N</b>	21	Aluminum-wrought alloy	<b>187</b>	<b>229</b>	<b>244</b>	0.19	0.33	0.41	0.50	0.54	0.64	0.70
	22		<b>92</b>	<b>137</b>	<b>137</b>	0.19	0.33	0.41	0.46	0.54	0.64	0.70
	27	Copper and Copper Alloys (Bronze / Brass)	<b>95</b>	<b>128</b>	<b>142</b>	0.19	0.31	0.43	0.53	0.64	0.74	0.79
<b>S</b>	31	Heat Resistant Super Alloys	<b>9</b>	<b>11</b>	<b>12</b>	0.08	0.17	0.20	0.24	0.30	0.37	0.39
	32		<b>8</b>	<b>9</b>	<b>11</b>	0.08	0.14	0.18	0.19	0.25	0.29	0.34
	33		<b>8</b>	<b>9</b>	<b>11</b>	0.08	0.14	0.18	0.19	0.25	0.29	0.34
	34		<b>8</b>	<b>9</b>	<b>11</b>	0.08	0.14	0.18	0.19	0.25	0.29	0.34
	35		<b>8</b>	<b>9</b>	<b>11</b>	0.08	0.14	0.18	0.19	0.25	0.29	0.34
<b>H</b>	38	Hardened steel	<b>20</b>	<b>23</b>	<b>29</b>	0.12	0.18	0.20	0.24	0.30	0.36	0.46

► 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.