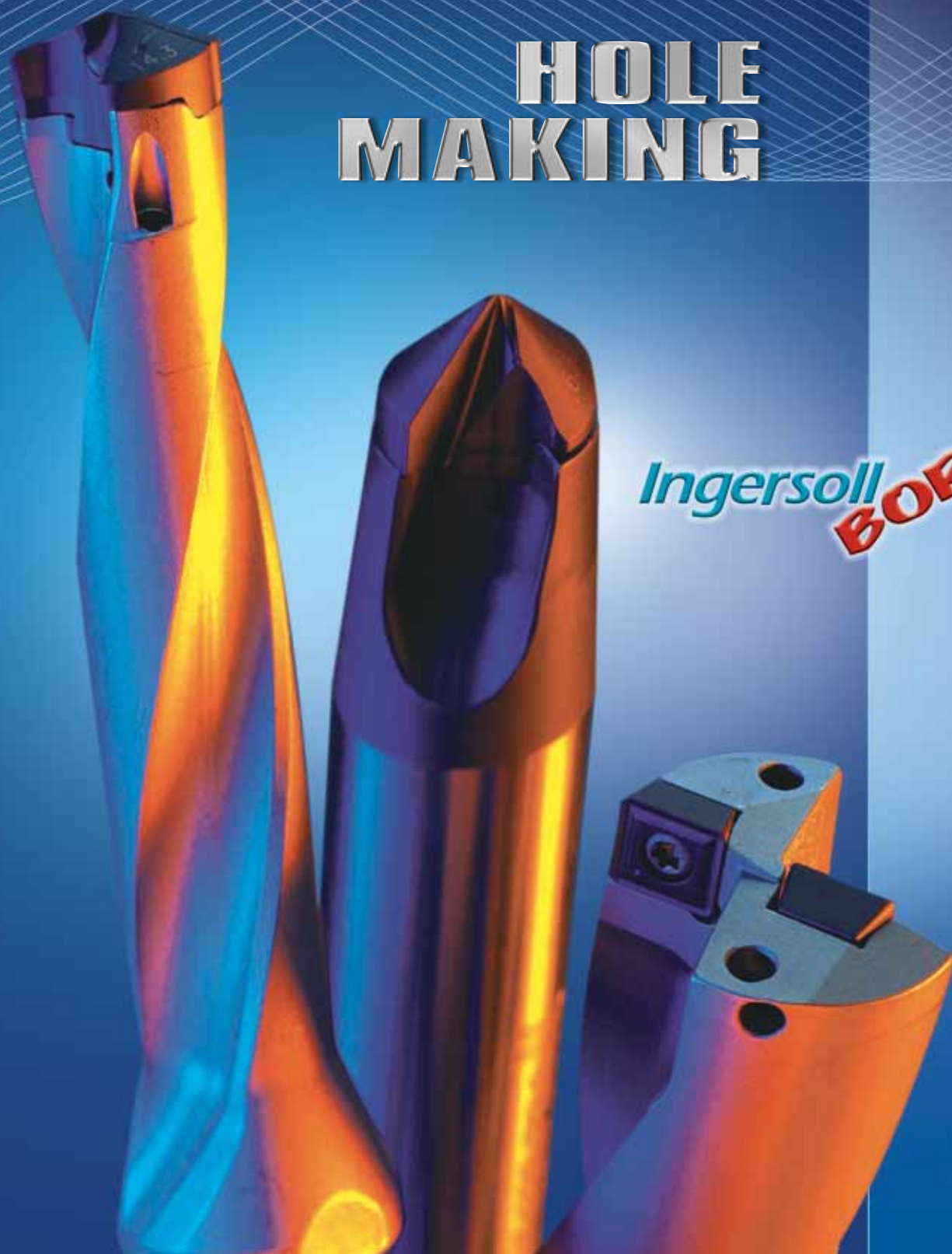


Member IMC Group
Ingersoll
Cutting Tools

HOLE MAKING

Ingersoll **BORE** line



Member IMC Group

Ingersoll

Cutting Tools



Ingersoll **BORE**line

In the year 2000, Ingersoll Cutting Tool Company came to realize that in order to better serve our customers in the demanding world of metal removal, it was time to expand our horizons and become a full line supplier to the metal working industry. To that end Ingersoll introduced a line of innovative, technologically superior drills and rolled out its first ever comprehensive "Hole Making" catalog.

Now five years later, due in a large part to the popularity of both the Qwik-Twist and Quad-Drill+ lines of drilling products, the "BOREline" is the fastest growing division at Ingersoll Cutting Tools.

In this new "BOREline" catalog we've expanded both the Qwik-Twist and Quad-Drill+ lines and added exciting new products such as Ingersoll Gun Drills and a complete line of Rotary Tool Holders.

Our network of distribution partners supported by our sales engineering staff is an invaluable resource of technical tooling application expertise and customer support. These highly trained, skilled individuals are available to you on-site in your facility until our products are performing the way you expect.

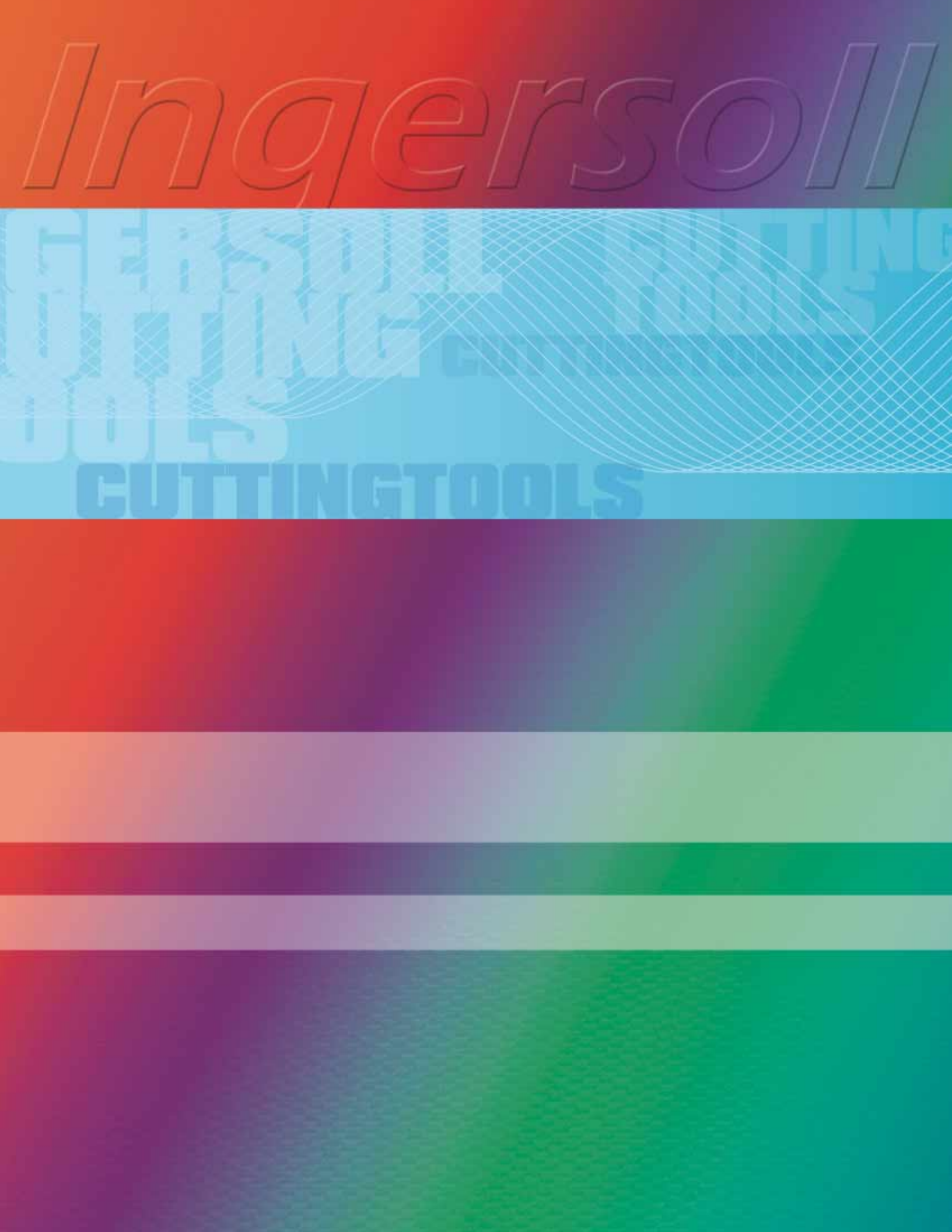
We are more than just a tooling supplier. We want you to view us as partners . . . as a specialized extension of your own process engineering capabilities. We have the resources and experience you need to make informed and effective tooling decisions.

Our goal is to help you remain competitive in a rapidly changing manufacturing environment, with the latest and most productive hole making tools in the industry.

Sincerely,
The Ingersoll "BOREline" Team

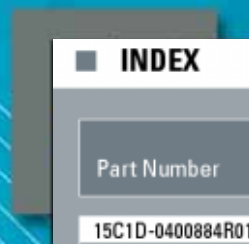
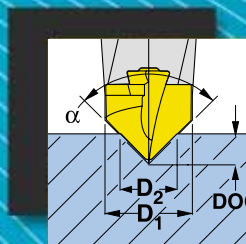
P.S. For all of your finish precision boring needs, please refer to Ingersoll's "D'Andrea" Modular Boring catalog.





Ingersoll

CUTTING
TOOLS



■ HOLE MAKING

PAGE 6

■ TOOL HOLDERS

PAGE 52

■ TECHNICAL INFORMATION

PAGE 84

PAGE 114

■ INDEX



Ingersoll



CUTTING TOOLS
CUTTING TOOLS

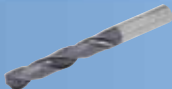
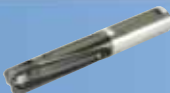
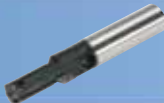
HOLE MAKING

Cutting Tools



Mettler MC Group
Ingersoll
Cutting Tools

HOLE MAKING

	Diameter Range	Cutting Depth	Description	Series	Page
	.685-.842	.12-.42	SPOT-IN™ Indexable Spotting Drill	FAK	10
	.685-.842	.12-.42	DRILL-PAK™ Indexable Spotting Drill Pak	FAK	10
	.472 and .630	.08-.31	SPOT-IN™ Replaceable Point Drills	Y	12
	.1181-.4724	.87-2.08	DRILL-IN™ Solid Carbide Drills	DR	14
	.2953-1.0197	.87-2.95	QWIK-TWIST™ Replaceable Point Drills 3:1	Y	16
	.2953-1.0197	1.46-4.92	QWIK-TWIST™ Replaceable Point Drills 5:1	Y	17
	.3937-1.0197	3.15-7.87	QWIK-TWIST™ Replaceable Point Drills 8:1	Y	18
	.2953-.8228	1.02-2.60	QWIK-TWIST™ Slip Fit Drills	Y	19
	.2953-.8228	.43-2.50	QWIK-TWIST™ Chamfer Shanks	MHK	21
	.2677-.8622	.97-1.98	QWIK-TWIST™ Tap Drill/Chamfer Combo	Y	22

	Diameter Range	Cutting Depth	Description	Series	Page
	.394-.787	.06-.08	QWIK TWIST Chamfer Rings	CB	24
	.500-2.000	.100-.400	QUAD DRILL⁺ Square Insert Indexable Drills 2:1	Q	30
	.500-2.000	1.50-6.00	QUAD DRILL⁺ Square Insert Indexable Drills 3:1	Q	31
	.500-2.000	2.00-8.00	QUAD DRILL⁺ Square Insert Indexable Drills 4:1	Q	32
	2.125-3.250	.87-.295 4.25-9.75	QUAD DRILL Square Insert Solid Carbide Drills 2:1, 3:1	Q	33
	—	—	QUAD DRILL⁺ Eccentric Adjustment Bushing	BU	35
	.500-2.000	.50-2.00	QUAD BORE Center Cut Counter Bore Tools	15S	36
	.438-2.000	.44-2.00	QUAD BORE Indexable Counter Bore Tools	15C	37
	—	—	QWIK GUN Gun Drills	—	40

SPOT^oIN™ INDEXABLE SPOTTING DRILL - SERIES "FAK"

Diameters	Nominal Included Angles	Insert Corner
.685" to .842"	82°, 90°, 118°, 135°, 144°	118°, 135°, 144° : .010" R 82°, 90° : .031", .010" R



Spot Drilling



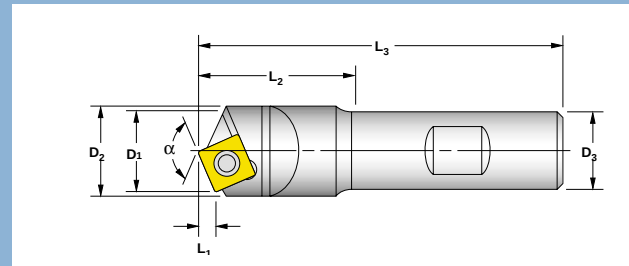
Counter Sinking



Engraving



Chamfering



α Included Angle	D ₁ Max Dia. of Spot inch	D ₁ Max Dia. of Spot mm	Drill Number	L ₁ Maximum Depth of Cut	D ₂ Overall Diameter	L ₂ Extension from Holder	L ₃ Overall Length	D ₃ Shank Size/Style	Number of Inserts
82°	.782	19,86	FAK-0708284R01	.42	.810	1.50	3.50	.750 Weldon	1
90°	.842	21,39	FAK-0809084R01	.39	.810	1.50	3.50	.750 Weldon	1
118°	.685	17,40	FAK-0611884R01	.20	.875	1.50	3.50	.750 Weldon	1
135°	.738	18,75	FAK-0713584R01	.15	.875	1.50	3.50	.750 Weldon	1
144°	.737	18,72	FAK-0714484R01	.12	.875	1.50	3.50	.750 Weldon	1

DRILL^oPAK™ INDEXABLE SPOTTING DRILL PACKAGES- SERIES "FAK"



Spot Drilling



Counter Sinking



Engraving



Chamfering

Included Angle	Package Number
82°	FAK-0708284K01
90°	FAK-0809084K01
118°	FAK-0611884K01
135°	FAK-0713584K01
144°	FAK-0714484K01

**Save
up to 15%**
when purchasing
tooling packages

Spotting drills with indexable strength and convenience

Tooling Package Includes:

- One indexable spotting drill
- Ten inserts
- One Torx® screw driver
- Three additional insert screws
- Durable polypropylene case



SPOT-IN™ FAK ENGRAVING CAPABILITY

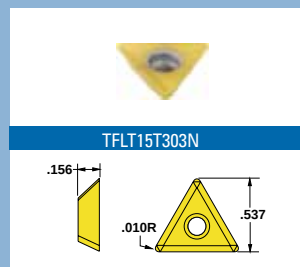
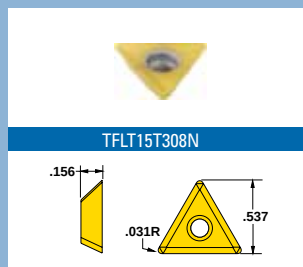
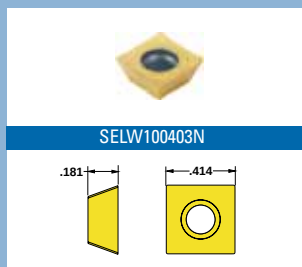
- Engrave part numbers, serial numbers, lot numbers, company logos, etc. all in the same machine set-up.
- Utilize the CNC control capability to program the engraving.
- High speed engraving capability up to 100 inches/minute.

Item No.- 5110040
Insert Part No.- TFLT15T303N
Grade- IN1530 (Tough wear resistant grade, well suited for engraving)



.010 R for fine engraving
line width

INSERTS



α Included Angle	Insert Number	Application	Corner	Grade*	
				IN	1530
82°**	TFLT15T303N	Multi-Purpose	.010R	■	
82°	TFLT15T308N	Multi-Purpose	.031R	■	
90°**	TFLT15T303N	Multi-Purpose	.010R	■	
90°	TFLT15T308N	Multi-Purpose	.031R	■	
118°	SELW100403N	Multi-Purpose	.010R	■	
135°	SELW100403N	Multi-Purpose	.010R	■	
144°	SELW100403N	Multi-Purpose	.010R	■	

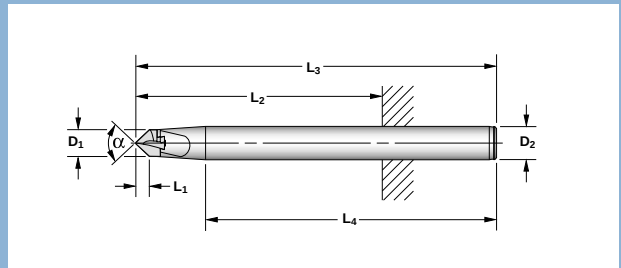
*For insert grade descriptions, see page 86. ** .010 insert radii for engraving

HARDWARE

Insert Series	Insert Screw		Driver	
	Part No.	Torque	Part No.	
TFLT15	SM30-065-00	13-18 in. lbs.	DS-T09W (Tx-09)	
SELW10	SM40-093-20	30-35 in. lbs.	DS-T15T (Tx-15)	

For technical information, see pages 91 and 92.

RIES "Y"

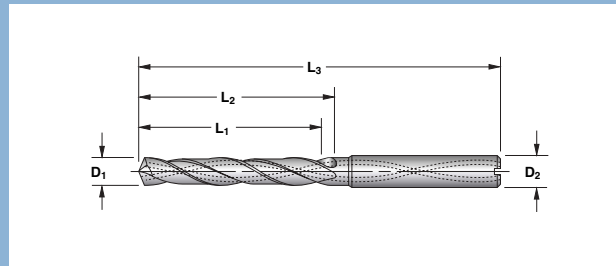
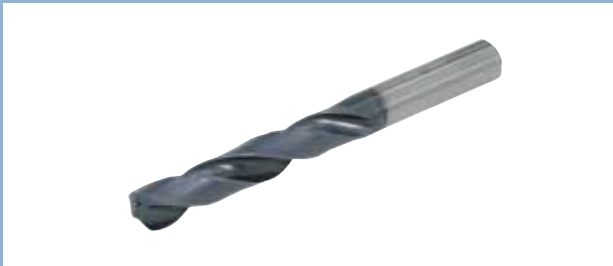
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SOLID CARBIDE DRILLS - SERIES "DR"

Diameters
3,00mm to 12,00mm

L:D Ratio
5:1

Geometry
140° included point angle
30° axial rake angle



Metric Standard-(dimensions in mm unless noted)

D ₁ Diameter		Drill Number	D ₂ Shank Diameter	L ₁ Maximum Depth of Cut	L ₂ Flute Length	L ₃ Overall Length
mm	inches					
3,00	.1181	DR0300024T7R01	6,00	24	28	66
3,10	.1220	DR0310023T7R01	6,00	23	28	66
3,20	.1260	DR0320023T7R01	6,00	23	28	66
3,30	.1299	DR0330023T7R01	6,00	23	28	66
3,40	.1339	DR0340023T7R01	6,00	23	28	66
3,50	.1378	DR0350023T7R01	6,00	23	28	66
3,60	.1417	DR0360023T7R01	6,00	23	28	66
3,70	.1457	DR0370022T7R01	6,00	22	28	66
3,80	.1496	DR0380030T7R01	6,00	30	36	74
3,90	.1535	DR0390030T7R01	6,00	30	36	74
4,00	.1575	DR0400030T7R01	6,00	30	36	74
4,10	.1614	DR0410030T7R01	6,00	30	36	74
4,20	.1654	DR0420030T7R01	6,00	30	36	74
4,30	.1693	DR0430030T7R01	6,00	30	36	74
4,40	.1732	DR0440029T7R01	6,00	29	36	74
4,50	.1772	DR0450029T7R01	6,00	29	36	74
4,60	.1811	DR0460029T7R01	6,00	29	36	74
4,70	.1850	DR0470029T7R01	6,00	29	36	74
4,80	.1890	DR0480037T7R01	6,00	37	44	82
4,90	.1929	DR0490037T7R01	6,00	37	44	82
5,00	.1969	DR0500037T7R01	6,00	39	46	84
5,10	.2008	DR0510036T7R01	6,00	38	46	84
5,20	.2047	DR0520036T7R01	6,00	38	46	84
5,30	.2087	DR0530036T7R01	6,00	38	46	84
5,40	.2126	DR0540036T7R01	6,00	38	46	84
5,50	.2165	DR0550036T7R01	6,00	38	46	84
5,60	.2205	DR0560036T7R01	6,00	38	46	84
5,70	.2244	DR0570035T7R01	6,00	37	46	84
5,80	.2283	DR0580035T7R01	6,00	37	46	84
5,90	.2323	DR0590035T7R01	6,00	37	46	84
6,00	.2362	DR0600035T7R01	6,00	37	46	84
6,10	.2402	DR0610044T0R01	8,00	47	56	94
6,20	.2441	DR0620044T0R01	8,00	47	56	94
6,30	.2480	DR0630044T0R01	8,00	47	56	94
6,40	.2520	DR0640043T0R01	8,00	46	56	94

(CONTINUED)

Metric Standard-(dimensions in mm unless noted)					
D ₁ Diameter		Drill Number	D ₂ Shank Diameter	L ₁ Maximum Depth of Cut	L ₂ Flute Length
mm	inches				
6,50	.2559	DR0650043TOR01	8,00	46	56
6,60	.2598	DR0660043TOR01	8,00	46	56
6,70	.2638	DR0670043TOR01	8,00	46	56
6,80	.2677	DR0680043TOR01	8,00	46	56
6,90	.2717	DR0690043TOR01	8,00	46	56
7,00	.2756	DR0700043TOR01	8,00	46	56
7,10	.2795	DR0710042TOR01	8,00	45	56
7,20	.2835	DR0720042TOR01	8,00	45	56
7,30	.2874	DR0730042TOR01	8,00	45	56
7,40	.2913	DR0740042TOR01	8,00	45	56
7,50	.2953	DR0750042TOR01	8,00	45	56
7,60	.2992	DR0760042TOR01	8,00	45	56
7,70	.3031	DR0770041TOR01	8,00	44	56
7,80	.3071	DR0780041TOR01	8,00	44	56
7,90	.3110	DR0790041TOR01	8,00	44	56
8,00	.3150	DR0800041TOR01	8,00	44	56
8,10	.3189	DR0810049T1R01	10,00	53	65
8,20	.3228	DR0820049T1R01	10,00	53	65
8,30	.3268	DR0830049T1R01	10,00	53	65
8,40	.3307	DR0840048T1R01	10,00	52	65
8,50	.3346	DR0850048T1R01	10,00	52	65
8,60	.3386	DR0860048T1R01	10,00	52	65
8,70	.3425	DR0870048T1R01	10,00	52	65
8,80	.3465	DR0880048T1R01	10,00	52	65
8,90	.3504	DR0890048T1R01	10,00	52	65
9,00	.3543	DR0900048T1R01	10,00	52	65
9,10	.3583	DR0910047T1R01	10,00	51	65
9,20	.3622	DR0920047T1R01	10,00	51	65
9,30	.3661	DR0930047T1R01	10,00	51	65
9,40	.3701	DR0940047T1R01	10,00	51	65
9,50	.3740	DR0950047T1R01	10,00	51	65
9,60	.3780	DR0960047T1R01	10,00	51	65
9,70	.3819	DR0970046T1R01	10,00	50	65
9,80	.3858	DR0980046T1R01	10,00	50	65
9,90	.3898	DR0990046T1R01	10,00	50	65
10,00	.3937	DR1000046T1R01	10,00	50	65
10,10	.3976	DR1010056T2R01	12,00	63	78
10,20	.4016	DR1020056T2R01	12,00	63	78
10,30	.4055	DR1030056T2R01	12,00	63	78
10,40	.4094	DR1040055T2R01	12,00	62	78
10,50	.4134	DR1050055T2R01	12,00	62	78
10,60	.4173	DR1060055T2R01	12,00	62	78
10,70	.4213	DR1070055T2R01	12,00	62	78
10,80	.4252	DR1080055T2R01	12,00	62	78
10,90	.4291	DR1090055T2R01	12,00	62	78
11,00	.4331	DR1100055T2R01	12,00	62	78
11,10	.4370	DR1110054T2R01	12,00	61	78
11,20	.4409	DR1120054T2R01	12,00	61	78
11,30	.4449	DR1130054T2R01	12,00	61	78
11,40	.4488	DR1140054T3R01	12,00	61	78
11,50	.4528	DR1150054T2R01	12,00	61	78
11,60	.4567	DR1160054T2R01	12,00	61	78
11,70	.4606	DR1170053T2R01	12,00	60	78
11,80	.4646	DR1180053T2R01	12,00	60	78
11,90	.4685	DR1190053T2R01	12,00	60	78
12,00	.4724	DR1200053T2R01	12,00	60	78

For technical information, see page 93.

QWIKOTWIST™ REPLACEABLE POINT DRILLS - SERIES "Y"

Diameters
.2953" to 1.0197"

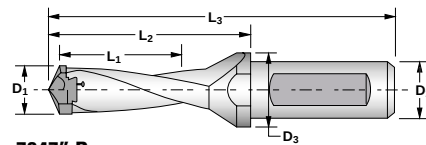
Length to Diameter Ratio
3:1



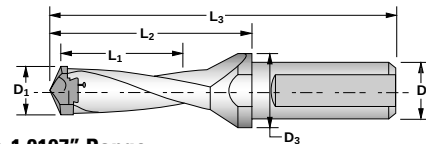
Drilling



Coolant



.2953" to .7047" Range



.7087" to 1.0197" Range

D ₁ Nom. Dia. inch mm		Body Number 3:1	L ₁ DOC	L ₂ Ext.	L ₃ Overall	D ₂ Shank Dia.	D ₃ Flange Dia.	Pocket Size	Clamping Key	Optional Torque Clamping Key	Chamfer Ring
.2953-.3110	7,5-7,9	YD0750022B9R01	.87	1.30	3.07	.500	.63	8	KDCM-8	TKDCM-8	-
.3150-.3307	8,0-8,4	YD0800024B9R01	.94	1.38	3.15	.500	.63	8	KDCM-8	TKDCM-8	-
.3346-.3504	8,5-8,9	YD0850025B9R01	.98	1.46	3.23	.500	.63	8	KDCM-8	TKDCM-8	-
.3543-.3701	9,0-9,4	YD0900027B9R01	1.06	1.54	3.31	.500	.63	9	KDCM-9	TKDCM-9	-
.3740-.3898	9,5-9,9	YD0950028B9R01	1.10	1.68	3.45	.500	.63	9	KDCM-9	TKDCM-9	-
.3937-.4094	10,0-10,4	YD1000030C0R01	1.18	1.73	3.62	.625	.79	10	KDCM-10	TKDCM-10	CB100-01
.4134-.4291	10,5-10,9	YD1050031C0R01	1.24	1.81	3.70	.625	.79	10	KDCM-10	TKDCM-10	CB105-01
.4331-.4488	11,0-11,4	YD1100033C0R01	1.30	1.89	3.78	.625	.79	11	KDCM-11	TKDCM-11	CB110-01
.4528-.4685	11,5-11,9	YD1150034C0R01	1.35	1.97	3.86	.625	.79	11	KDCM-11	TKDCM-11	CB115-01
.4724-.4882	12,0-12,4	YD1200036C0R01	1.41	2.06	3.95	.625	.79	12	KDCM-12	TKDCM-12	CB120-01
.4912-.5079	12,5-12,9	YD1250037C0R01	1.47	2.12	4.01	.625	.79	12	KDCM-12	TKDCM-12	CB125-01
.5118-.5276	13,0-13,4	YD1300039C0R01	1.53	2.22	4.11	.625	.79	13	KDCM-13	TKDCM-13	CB130-01
.5315-.5472	13,5-13,9	YD1350040C0R01	1.59	2.30	4.19	.625	.79	13	KDCM-13	TKDCM-13	CB135-01
.5512-.5669	14,0-14,4	YD1400042C0R01	1.65	2.41	4.30	.625	.79	14	KDCM-14	TKDCM-14	CB140-01
.5709-.5866	14,5-14,9	YD1450043C0R01	1.71	2.49	4.38	.625	.79	14	KDCM-14	TKDCM-14	CB145-01
.5906-.6260	15,0-15,9	YD150004518R01	1.77	2.58	4.55	.750	.98	15	KDCM-15	TKDCM-15	CB150-01
.6299-.6654	16,0-16,9	YD160004818R01	1.89	2.75	4.72	.750	.98	16	KDCM-16	TKDCM-16	CB160-01
.6693-.7047	17,0-17,9	YD170005118R01	2.01	2.89	4.86	.750	.98	17	KDCM-17	TKDCM-17	CB170-01
.7087-.7441	18,0-18,9	YD1800054C8R01	2.13	3.08	5.28	1.000	1.26	18	KDCM-18	TKDCM-18	CB180-01
.7480-.7835	19,0-19,9	YD1900057C8R01	2.24	3.24	5.44	1.000	1.26	19	KDCM-19	TKDCM-19	CB190-01
.7874-.8228	20,0-20,9	YD2000060C8R01	2.36	3.42	5.62	1.000	1.26	20	KDCM-20	TKDCM-20	CB200-01
.8268-.8622	21,0-21,9	YD2100063C8R01	2.48	3.57	5.77	1.000	1.26	21	KDCM-21	TKDCM-21	-
.8661-.9016	22,0-22,9	YD2200066C8R01*	2.60	3.74	5.94	1.000	1.26	22	KDCM-22	TKDCM-22	-
.9055-.9409	23,0-23,9	YD2300069C8R01*	2.71	3.92	6.12	1.000	1.26	23	KDCM-23	TKDCM-23	-
.9449-.9803	24,0-24,9	YD2400072C8R01*	2.83	4.08	6.28	1.000	1.26	24	KDCM-24	TKDCM-24	-
.9843-1.0197	25,0-25,9	YD2500075C8R01*	2.95	4.29	6.49	1.000	1.26	25	KDCM-25	TKDCM-25	-

Do not mount a smaller drill point than the D1 range listed for each drill body.

* Drill bodies for coolant through the point.

Metric shanks available as non-stock standards.

See pages 25-29 for replaceable drill points.

For technical information, see pages 95-99.

BOREline

Diameters
.2953" to 1.0197"

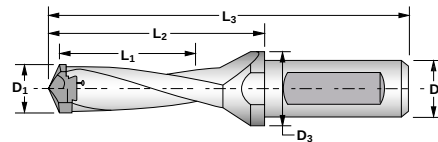
Length to Diameter Ratio
5:1



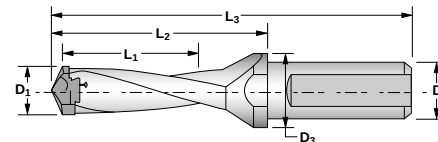
Drilling



Coolant



.2953" to .7047" Range



.7087" to 1.0197" Range

D ₁ Nom. Dia.		Body Number 5:1	L ₁	L ₂	L ₃	D ₂ Shank Dia.	D ₃ Flange Dia.	Pocket Size	Clamping Key	Optional Torque Clamping Key	Chamfer Ring
inch	mm		DOC	Ext.	Overall						
.2953-.3110	7,5-7,9	YD0750037B9R01	1.46	2.01	3.78	.500	.63	8	KDCM-8	TKDCM-8	-
.3150-.3307	8,0-8,4	YD0800040B9R01	1.57	2.01	3.78	.500	.63	8	KDCM-8	TKDCM-8	-
.3346-.3504	8,5-8,9	YD0850042B9R01	1.65	2.13	3.90	.500	.63	8	KDCM-8	TKDCM-8	-
.3543-.3701	9,0-9,4	YD0900045B9R01	1.77	2.25	4.02	.500	.63	9	KDCM-9	TKDCM-9	-
.3740-.3898	9,5-9,9	YD0950047B9R01	1.85	2.37	4.14	.500	.63	9	KDCM-9	TKDCM-9	-
.3937-.4094	10,0-10,4	YD1000050C0R01	1.96	2.52	4.41	.625	.79	10	KDCM-10	TKDCM-10	CB100-01
.4134-.4291	10,5-10,9	YD1050052C0R01	2.06	2.64	4.53	.625	.79	10	KDCM-10	TKDCM-10	CB105-01
.4331-.4488	11,0-11,4	YD1100055C0R01	2.16	2.76	4.65	.625	.79	11	KDCM-11	TKDCM-11	CB110-01
.4528-.4685	11,5-11,9	YD1150057C0R01	2.26	2.87	4.76	.625	.79	11	KDCM-11	TKDCM-11	CB115-01
.4724-.4882	12,0-12,4	YD1200060C0R01	2.36	3.00	4.89	.625	.79	12	KDCM-12	TKDCM-12	CB120-01
.4912-.5079	12,5-12,9	YD1250062C0R01	2.46	3.12	5.01	.625	.79	12	KDCM-12	TKDCM-12	CB125-01
.5118-.5276	13,0-13,4	YD1300065C0R01	2.56	3.24	5.13	.625	.79	13	KDCM-13	TKDCM-13	CB130-01
.5315-.5472	13,5-13,9	YD1350067C0R01	2.65	3.36	5.25	.625	.79	13	KDCM-13	TKDCM-13	CB135-01
.5512-.5669	14,0-14,4	YD1400070C0R01	2.75	3.51	5.40	.625	.79	14	KDCM-14	TKDCM-14	CB140-01
.5709-.5866	14,5-14,9	YD1450072C0R01	2.85	3.63	5.52	.625	.79	14	KDCM-14	TKDCM-14	CB145-01
.5906-.6260	15,0-15,9	YD150007518R01	2.95	3.76	5.73	.750	.98	15	KDCM-15	TKDCM-15	CB150-01
.6299-.6654	16,0-16,9	YD160008018R01	3.15	4.01	5.98	.750	.98	16	KDCM-16	TKDCM-16	CB160-01
.6693-.7047	17,0-17,9	YD170008518R01	3.35	4.23	6.20	.750	.98	17	KDCM-17	TKDCM-17	CB170-01
.7087-.7441	18,0-18,9	YD1800090C8R01	3.54	4.50	6.70	1.000	1.26	18	KDCM-18	TKDCM-18	CB180-01
.7480-.7835	19,0-19,9	YD1900095C8R01	3.74	4.73	6.93	1.000	1.26	19	KDCM-19	TKDCM-19	CB190-01
.7874-.8228	20,0-20,9	YD2000100C8R01	3.94	5.00	7.20	1.000	1.26	20	KDCM-20	TKDCM-20	CB200-01
.8268-.8622	21,0-21,9	YD2100105C8R01	4.13	5.23	7.43	1.000	1.26	21	KDCM-21	TKDCM-21	-
.8661-.9016	22,0-22,9	YD2200110C8R01*	4.33	5.47	7.67	1.000	1.26	22	KDCM-22	TKDCM-22	-
.9055-.9409	23,0-23,9	YD2300115C8R01*	4.53	5.72	7.92	1.000	1.26	23	KDCM-23	TKDCM-23	-
.9449-.9803	24,0-24,9	YD2400120C8R01*	4.72	5.97	8.17	1.000	1.26	24	KDCM-24	TKDCM-24	-
.9843-1.0197	25,0-25,9	YD2500125C8R01*	4.92	6.26	8.46	1.000	1.26	25	KDCM-25	TKDCM-25	-

Do not mount a smaller drill point than the D1 range listed for each drill body.

* Drill bodies for coolant through the point.

Metric shanks available as non-stock standards.

See pages 25-29 for replaceable drill points.

For technical information, see pages 95-99.

QWIKOTWIST™ REPLACEABLE POINT DRILLS - SERIES "Y"

Diameters
.3937" to 1.0197"

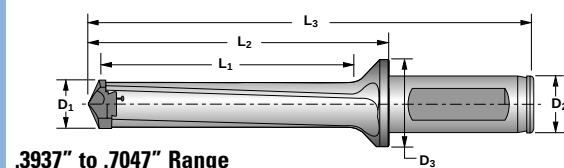
Length to Diameter Ratio
8:1



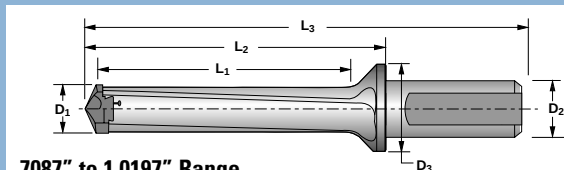
Drilling



Coolant



.3937" to .7047" Range



.7087" to 1.0197" Range

D ₁ Nom. Dia.		Body Number 8:1	L ₁	L ₂	L ₃	D ₂	D ₃	Pocket Size	Clamping Key	Optional Torque Clamping Key
	inch	mm	DOC	Ext.	Overall	Shank Dia.	Flange Dia.			
.3937-.4291	10,0-10,9	YD1000080C0R01	3.15	3.70	5.59	.625	.79	10	KDCM-10	TKDCM-10
.4331-.4685	11,0-11,9	YD1100088C0R01	3.46	4.06	5.95	.625	.79	11	KDCM-11	TKDCM-11
.4724-.5079	12,0-12,9	YD1200096C0R01	3.78	4.42	6.31	.625	.79	12	KDCM-12	TKDCM-12
.5118-.5472	13,0-13,9	YD1300104C0R01	4.09	4.78	6.67	.625	.79	13	KDCM-13	TKDCM-13
.5512-.5866	14,0-14,9	YD1400112C0R01	4.41	5.17	7.06	.625	.79	14	KDCM-14	TKDCM-14
.5906-.6260	15,0-15,9	YD150012018R01	4.72	5.54	7.51	.750	.98	15	KDCM-15	TKDCM-15
.6299-.6654	16,0-16,9	YD160012818R01	5.04	5.90	7.87	.750	.98	16	KDCM-16	TKDCM-16
.6693-.7047	17,0-17,9	YD170013618R01	5.35	6.24	8.21	.750	.98	17	KDCM-17	TKDCM-17
.7087-.7441	18,0-18,9	YD1800144C8R01	5.67	6.62	8.82	1.000	1.26	18	KDCM-18	TKDCM-18
.7480-.7835	19,0-19,9	YD1900152C8R01	5.98	6.98	9.18	1.000	1.26	19	KDCM-19	TKDCM-19
.7874-.8228	20,0-20,9	YD2000160C8R01	6.30	7.37	9.57	1.000	1.26	20	KDCM-20	TKDCM-20
.8268-.8622	21,0-21,9	YD2100168C8R01	6.61	7.72	9.93	1.000	1.26	21	KDCM-21	TKDCM-21
.8661-.9016	22,0-22,9	YD2200176C8R01*	6.93	8.07	10.28	1.000	1.26	22	KDCM-22	TKDCM-22
.9055-.9409	23,0-23,9	YD2300184C8R01*	7.24	8.46	10.67	1.000	1.26	23	KDCM-23	TKDCM-23
.9449-.9803	24,0-24,9	YD2400192C8R01*	7.56	8.83	11.04	1.000	1.26	24	KDCM-24	TKDCM-24
.9843-1.0197	25,0-25,9	YD2500200C8R01*	7.87	9.20	11.41	1.000	1.26	25	KDCM-25	TKDCM-25

Do not mount a smaller drill point than the D1 range listed for each drill body.

* Drill bodies for coolant through the point.

Metric shanks available as non-stock standards.

See pages 25-29 for replaceable drill points.

For technical information, see pages 95-99.

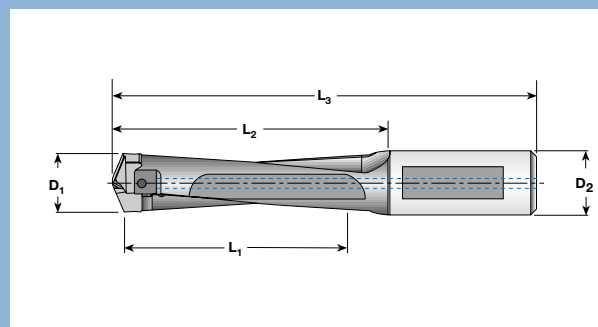
QWIK TWIST™ SLIP FIT DRILLS - SERIES "Y"

Diameters
.2953-.8228"

Length to Diameter Ratio
3.5:1



Coolant



D1 Nom. Dia		Part Number	L ₁ DOC	L ₂ Ext	L ₃ Overall	D ₂ Shank Dia		Pocket Size	Clamping Key
inch	mm					inch	mm		
.2953-.3110	7,5-7,9	YD0750026SDR00	1.02	1.33	3.02	.315	8	8	KDCM-8
.3150-.3307	8,0-8,4	YD0800028SDR00	1.10	1.41	3.11	.315	8	8	KDCM-8
.3346-.3504	8,5-8,9	YD0850029SER00	1.14	1.45	3.15	.354	9	8	KDCM-8
.3543-.3701	9,0-9,4	YD0900031SER00	1.22	1.54	3.23	.354	9	9	KDCM-9
.3740-.3898	9,5-9,9	YD0950033SFR00	1.30	1.59	3.28	.394	10	9	KDCM-9
.3937-.4094	10,0-10,4	YD1000033SFR00	1.30	1.69	3.39	.394	10	10	KDCM-10
.4134-.4291	10,5-10,9	YD1050034SGR00	1.34	1.76	3.46	.433	11	10	KDCM-10
.4331-.4488	11,0-11,4	YD1100036SGR00	1.42	1.85	3.54	.433	11	11	KDCM-11
.4528-.4685	11,5-11,9	YD1150038SHR00	1.50	1.91	3.61	.472	12	11	KDCM-11
.4724-.4882	12,0-12,4	YD1200042SHR00	1.65	2.00	3.69	.472	12	12	KDCM-12
.4921-.5079	12,5-12,9	YD1250042SJR00	1.65	2.07	3.76	.512	13	12	KDCM-12
.5118-.5276	13,0-13,4	YD1300042SJR00	1.65	2.15	3.92	.512	13	13	KDCM-13
.5315-.5472	13,5-13,9	YD1350044SKR00	1.73	2.21	3.98	.551	14	13	KDCM-14
.5512-.5669	14,0-14,4	YD1400048SKR00	1.89	2.33	4.10	.551	14	14	KDCM-14
.5709-.5866	14,5-14,9	YD1450050SLR00	1.97	2.40	4.17	.591	15	14	KDCM-15
.5906-.6260	15,0-15,9	YD1500052SLR00	2.05	2.49	4.26	.591	15	15	KDCM-15
.6299-.6654	16,0-16,9	YD1600052SMR00	2.05	2.64	4.53	.630	16	16	KCDM-16
.6693-.7047	17,0-17,9	YD1700055SNR00	2.17	2.90	4.79	.669	17	17	KDCM-17
.7087-.7441	18,0-18,9	YD1800060SPR00	2.36	3.08	4.97	.709	18	18	KDCM-18
.7480-.7835	19,0-19,9	YD1900062SQR00	2.44	3.22	5.35	.748	19	19	KDCM-19
.7874-.8228	20,0-20,9	YD2000066SRR00	2.60	3.33	5.46	.787	20	20	KDCM-20

Do not mount a smaller drill point than the D1 range listed for each drill body.

See pages 25-29 for replaceable drill points.

For technical information, see page 102.

QWIKTWIST™ TORQUE KEY



Key Part Number	Drill Pocket Size	Minimal Clamping Torque (in-lb)
TKDCM-8	8	1.3 - 1.8
TKDCM-9	9	1.3 - 1.8
TKDCM-10	10	1.9 - 2.1
TKDCM-11	11	1.9 - 2.1
TKDCM-12	12	1.9 - 2.1
TKDCM-13	13	1.9 - 2.1
TKDCM-14	14	1.9 - 2.1
TKDCM-15	15	1.9 - 2.1
TKDCM-16	16	1.9 - 2.1
TKDCM-17	17	2.3 - 2.6
TKDCM-18	18	2.3 - 2.6
TKDCM-19	19	2.3 - 2.6
TKDCM-20	20	2.3 - 2.6
TKDCM-21	21	2.7 - 3.1
TKDCM-22	22	2.7 - 3.1
TKDCM-23	23	2.7 - 3.1
TKDCM-24	24	2.7 - 3.1
TKDCM-25	25	2.7 - 3.1

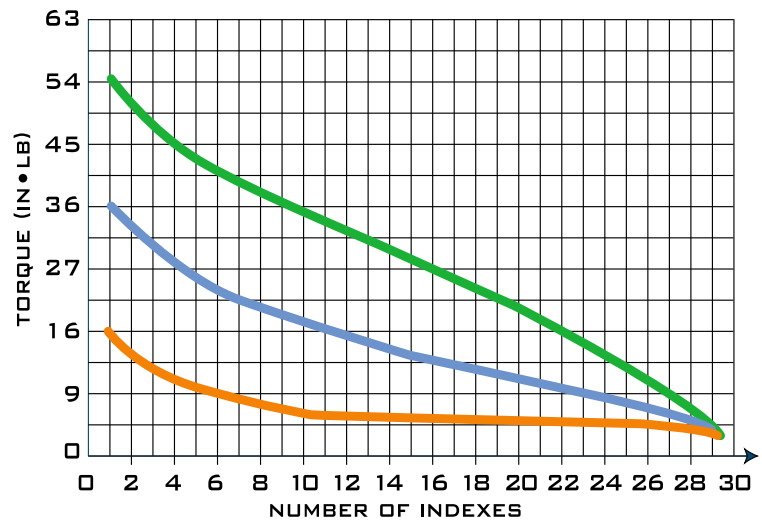
The number of drill point indexes is dependent on machine rigidity, workpiece stability and clamping, machining parameters, workpiece configuration, material coolant, coolant pressure and proper drill application.

It is recommended to use the torque key for inspection purposes only, not as a substitute for the standard key provided with each drill body.

Torque keys are available for checking minimal clamping torque. If a "click" is not heard or felt while slowly unclamping with the torque key, the drill must be replaced



TYPICAL UNLOCKING TORQUE RANGE



DIA=.669 - 1.020

DIA=.433 - .665

DIA=.295 - .429

QWIK-TWIST™ SLIP FIT CHAMFER SHANKS - SERIES "MHK"

Hole Diameters
.2953" - .8228"

Shanks
Adjustable depth drilling and
chamfering combination tools



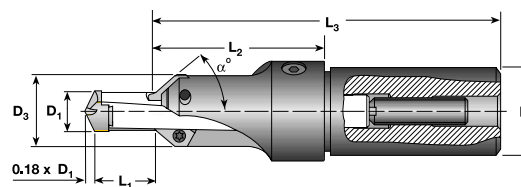
Chamfering



Drilling



Coolant



D1		Slip Fit Drills Part No.	L1		Chamfer Part Number	*D2	D3	L2	L3	Chamfer
Nom. Dia.	Adjustment Min ¹ Max ²		Shank	Insert		Ext.	OAL	Inse		
Inch mm			Dia	Dia				Series		
.2953-.3110	7,5-7,9	YD0750026SDR00	.43 .81	MHK018047DBR01	1.000	.74	1.87	4.07	GOMT06...	
.3150-.3307	8,0-8,4	YD0800028SDR00	.49 .85							
.3346-.3504	8,5-8,9	YD0850029SER00	.53 .98		MHK019047DBR01	1.000	.78	1.87	4.07	GOMT06...
.3543-.3701	9,0-9,4	YD0900031SER00	.55 1.00							
.3740-3898	9,5-9,9	YD0950033SFR00	.61 1.08	MHK024067DBR01		1.000	.98	2.65	4.85	GOMT08...
.3937-.4094	10,0-10,4	YD1000033SFR00	.49 1.04							
.4134-.4291	10,5-10,9	YD1050034SGR00	.49 1.08		MHK025067DBR01	1.000	1.02	2.65	4.85	GOMT08...
.4331-.4488	11,0-11,4	YD1100036SGR00	.63 1.14							
.4528-.4685	11,5-11,9	YD1150038SHR00	.53 1.22	MHK026067DBR01		1.000	1.06	2.65	4.85	GOMT08...
.4724-.4882	12,0-12,4	YD1200042SHR00	.67 1.30							
.4921-.5079	12,5-12,9	YD1250042SJR00	.67 1.38		MHK027067DBR01	1.000	1.10	2.65	4.85	GOMT08...
.5118-.5276	13,0-13,4	YD1300042SJR00	.75 1.42							
.5315-.5472	13,5-13,9	YD1350044SKR00	.67 1.46	MHK028067DCR01		1.250	1.12	2.65	5.01	GOMT08...
.5512-.5669	14,0-14,4	YD1400048SKR00	.75 1.54							
.5709-.5866	14,5-14,9	YD1450050SLR00	.69 1.56		MHK029067DCR01	1.250	1.16	2.65	5.01	GOMT08...
.5906-.6260	15,0-15,9	YD1500052SLR00	.89 1.61							
.6299-.6654	16,0-16,9	YD1600052SMR00	.93 1.83	MHK030067DCR01		1.250	1.20	2.65	5.01	GOMT08...
.6693-.7047	17,0-17,9	YD1700055SNR00	1.00 1.95		MHK031067DCR01	1.250	1.24	2.65	5.01	GOMT08...
.7087-.7441	18,0-18,9	YD1800060SPR00	1.10 2.13			MHK032067DCR01	1.250	1.28	2.65	5.01
.7480-.7835	19,0-19,9	YD1900062SQR00	1.30 2.36	MHK033075DCR01			1.250	1.31	2.95	5.31
.7874-.8228	20,0-20,9	YD2000066SRR00	1.42 2.50		MHK034075DCR01		1.250	1.35	2.95	5.31

1- Minimum adjustment is with the smallest drill point diameter in the range

2- Minimum adjustment is with the largest drill point diameter in the range

*Straight shank with whistle notch flat

For chamfer inserts see page 23.

For replaceable points see page 25-29.

For technical information, see page 102.

HARDWARE

Drill Range	Side Lock Screw	Rear Adjusting Screw	Lock Screw Key	Insert Screw	Torque (in-lbs)	Insert Screw Torx Blade	Insert Screw T-Handle
Chamfer Shank .2953"-.3701"	SA060-02	SC060-02	WS-0060	SM25-064-00	9-13	DS-T08W	—
Chamfer Shank .3740"-.8228"	SA100-02	SC100-02	DS-H05HB	SM40-093-20	30-35	DS-T15HB	DSHH06T

QWIK-TWIST™ TAP DRILL/CHAMFER COMBO - SERIES "Y"

Tap Drills

M8-M24
UNC/UNF 3/8" - 7/8"

Combine tap drilling and chamfering
in one operation.



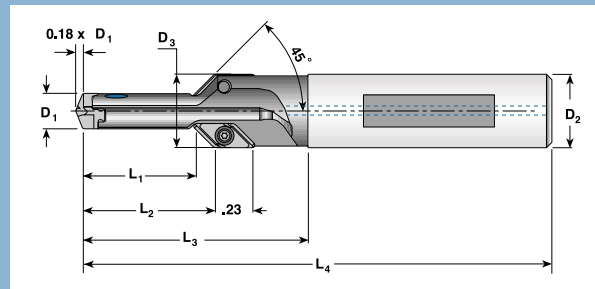
Chamfering



Drilling



Coolant



Metric

Thread Size	D1		Body Number	General Purpose Drill Point	D1 Point Range	L1 Full Dia to Chamfer	L2 Full Dia to Top of Chamfer	L3 Ext	L4 OAL	D2		D3 Chamfer Dia	Pocket Size	Clamping Key
	Nom Point Size Inch	Nom Point Size mm								Shank Dia mm	Shank Dia			
M8	.2677	6,8	YC0680021SKR00	YAB0680R01	.2677 .2913	.827	.972	1.650	3.42	14	.551	.547	6,8	KDCM-8
M10	.3346	8,5	YC0830026SKR00	YAB0850R01	.3268 .3504	1.024	1.138	1.831	3.60	14	.551	.551	8	KDCM-8
M12	.4016	10,2	YC1000030SKR00	YAB1020R01	.3937 .4291	1.181	1.264	2.047	3.82	14	.551	.551	10	KDCM-10
M14	.4724	12,0	YC1200035SMR00	YAB1200R01	.4724 .5079	1.378	1.465	2.283	4.17	16	.630	.630	12	KDCM-12
M16	.5512	14,0	YC1400039SPR00	YAB1400R01	.5512 .5866	1.535	1.622	2.362	4.25	18	.709	.709	14	KDCM-14
M20	.6890	17,5	YC1730042SRR00	YAB1750R01	.6811 .7047	1.654	1.728	2.480	4.45	20	.787	.827	17	KDCM-17
M24	.8268	21,0	YC2100048SSR00	YAB2100R01	.8268 .8622	1.890	1.984	2.677	4.88	25	.984	1.004	21	KDCM-21

Reduce recommended feed for M8 drill by 10%.

Inch

Thread Size	D1		Body Number	General Purpose Drill Point	D1 Point Range	L1 Full Dia to Chamfer	L2 Full Dia to Top of Chamfer	L3 Ext	L4 OAL	D2		D3 Chamfer Dia	Pocket Size	Clamping Key
	Nom Point Size Inch	Nom Point Size mm								Shank Dia mm	Shank Dia Inch			
3/8 UNC	.3110	7,9	YC0770025RHR01	YAB0790R01	.3031 .3110	1.00	1.15	1.80	3.69	.625	15.88	.59	8	KDCM-8
3/8 UNF	.3346	8,5	YC0820025RHR01	YAB0850R01	.3228 .3504	1.00	1.15	1.80	3.69	.625	15.88	.61	8	KDCM-8
7/16 UNC	.3701	9,4	YC0910026RHR01	YAB0940R01	.3583 .3898	1.06	1.20	1.83	3.72	.625	15.88	.63	9	KDCM-9
7/16 UNF	.3898	9,9	YC0910026RHR01	YAB0990R01	.3819 .3898	1.06	1.18	1.82	3.71	.625	15.88	.63	9	KDCM-9
1/2 UNC	.4252	10,8	YC1050026RHR01	YAB1080R01	.4134 .4291	1.06	1.17	1.89	3.78	.625	15.88	.63	10	KDCM-10
1/2 UNF	.4528	11,5	YC1130026RHR01	YAB1150R01	.4449 .4685	1.06	1.15	1.89	3.78	.625	15.88	.63	11	KDCM-11
9/16 UNC	.4843	12,3	YC1210026RHR01	YAB1230R01	.4764 .5079	1.06	1.14	1.89	3.78	.625	15.88	.63	12	KDCM-12
9/16 UNF	.5118	13,0	YC1300026RHR01	YAB1300R01	.5118 .5472	1.06	1.12	1.89	3.78	.625	15.88	.63	13	KDCM-13
5/8 UNC	.5394	13,7	YC1330030RJR01	YAB1370R01	.5236 .5472	1.20	1.32	2.01	3.98	.750	19.05	.75	13	KDCM-13
5/8 UNF	.5748	14,6	YC1450030RJR01	YAB1460R01	.5709 .5866	1.20	1.29	2.03	4.00	.750	19.05	.75	14	KDCM-14
3/4 UNC	.6575	16,7	YC1650035RJR01	YAB1670R01	.6496 .6654	1.40	1.47	2.20	4.17	.750	19.05	.78	16	KDCM-16
3/4 UNF	.6890	17,5	YC1730035RLR01	YAB1750R01	.6811 .7047	1.40	1.50	2.20	4.40	1.000	25.40	.88	17	KDCM-17
7/8 UNC	.7677	19,5	YC1920041RLR01	YAB1950R01	.7559 .7835	1.65	1.78	2.48	4.68	1.000	25.40	1.00	19	KDCM-19
7/8 UNF	.8071	20,5	YC2040041RLR01	YAB2050R01	.8031 .8228	1.65	1.75	2.48	4.68	1.000	25.40	1.00	20	KDCM-20

For chamfer inserts see page 23. For replaceable points see page 25-29. For technical information, see page 102.

HARDWARE

Chamfering Insert Screw

Chamfering Insert Screw Key

Torque (in-lbs)

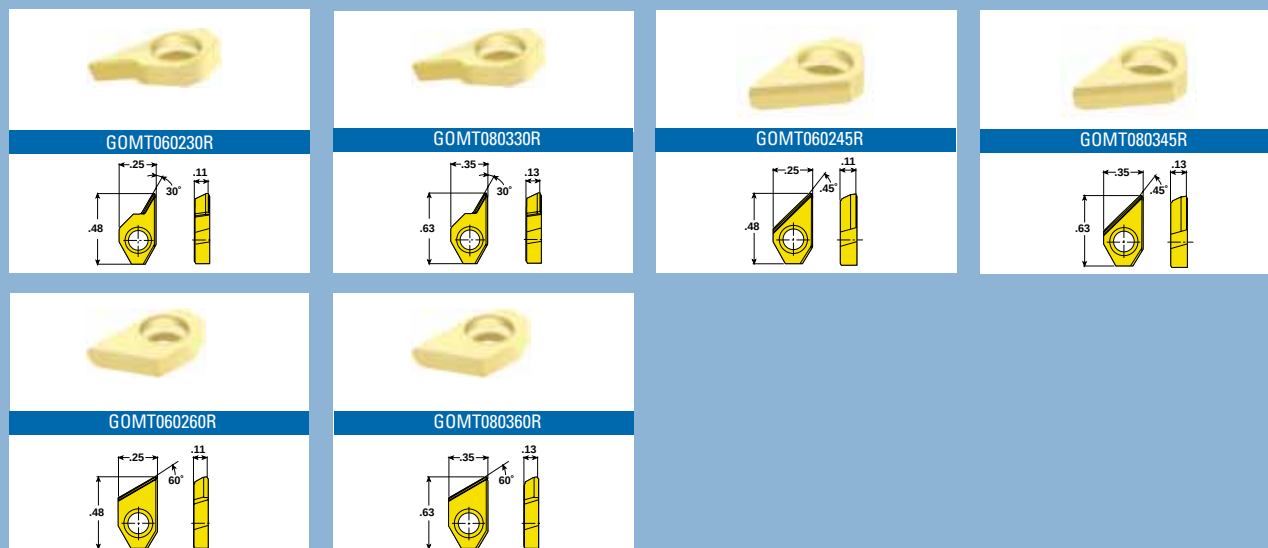
SM22-046-00

DS-T07F

7-11

BOREline

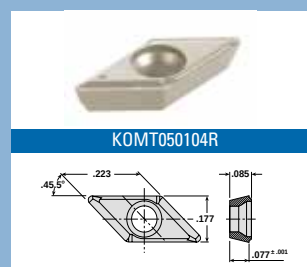
CHAMFER SHANK INSERTS



Insert Number	Application	Grade*	
		IN	2005
GOMT060230R	Multi-Purpose		■
GOMT080330R	Multi-Purpose		■
GOMT060245R	Multi-Purpose		■
GOMT080345R	Multi-Purpose		■
GOMT060260R	Multi-Purpose		■
GOMT080360R	Multi-Purpose		■

* For insert grade descriptions, see page 86.

TAP DRILL/CHAMFER COMBO DRILL INSERTS



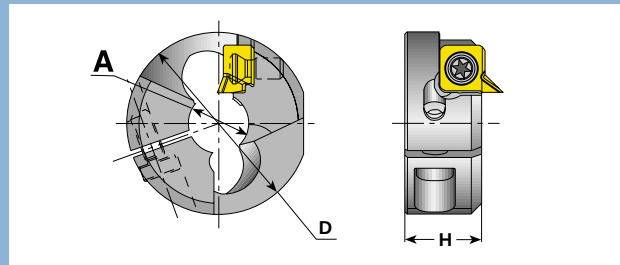
Insert Number	Application	Grade*	
		IN	1505
KOMT050104R	Multi-Purpose		■

* For insert grade descriptions, see page 86.

QWIK•TWIST™ CHAMFER RINGS - SERIES "CB"

Chamfer Hole Diameters
.394" to .787"

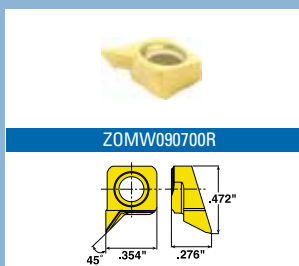
Chamfer Rings
Combine drilling and chamfering in one operation.



Ring Number	A Fits Quik•Twist Drill Series	Maximum Chamfer Size	D	H
CB100-01	YD1000	.06" X 45°	1.26	.56
CB105-01	YD1050	.06" X 45°	1.26	.56
CB110-01	YD1100	.06" X 45°	1.38	.57
CB115-01	YD1150	.06" X 45°	1.38	.57
CB120-01	YD1200	.06" X 45°	1.48	.57
CB125-01	YD1250	.06" X 45°	1.48	.57
CB130-01	YD1300	.06" X 45°	1.54	.57
CB135-01	YD1350	.06" X 45°	1.54	.57
CB140-01	YD1400	.06" X 45°	1.61	.60
CB145-01	YD1450	.06" X 45°	1.61	.60
CB150-01	YD1500	.06" X 45°	1.69	.65
CB160-01	YD1600	.08" X 45°	1.77	.67
CB170-01	YD1700	.08" X 45°	1.85	.69
CB180-01	YD1800	.08" X 45°	1.89	.71
CB190-01	YD1900	.08" X 45°	1.97	.71
CB200-01	YD2000	.08" X 45°	2.05	.71

Chamfer rings for use only with 3:1 and 5:1 Quik Twist drills.

INSERTS & HARDWARE



Insert Number	Application	Grade*	
		IN	1530
ZOMW090700R	Multi-Purpose		■

* For insert grade descriptions, see page 86.

Ring Number	Insert Screw		Ring Clamp Screw	Driver		
	Part No.	Torque	Part No.	Insert Driver Blade	Clamp Screw Driver Blade	Driver Blade Handle
CB 100 to CB150	SM40-093-20	30-35 in. lbs.	SD050-A5	DS-T15HB	DS-T25HB	DSHH06T
CB 160 to CB200	SM40-093-20	30-35 in. lbs.	SD060-20	DS-T15HB	DS-H05HB	DSHH06T

For technical information, see pages 100-101.

DRILL POINTS- .2677" TO .4291"

General Purpose

Cast Iron


D ₁ Drill Diameter inch mm		General Purpose Part Number	Cast Iron** Part Number	Pocket Size	Grade*	
					IN	2005
.2677	6,8	YAB0680R01	YBB0680R01	6, 8	■	
.2953	7,5	YAB0750R01	YBB0750R01	8	■	
.2992	7,6	YAB0760R01	YBB0760R01	8	■	
.3031	7,7	YAB0770R01	YBB0770R01	8	■	
.3071	7,8	YAB0780R01	YBB0780R01	8	■	
.3110	7,9	YAB0790R01	YBB0790R01	8	■	
.3150	8,0	YAB0800R01	YBB0800R01	8	■	
.3189	8,1	YAB0810R01	YBB0810R01	8	■	
.3228	8,2	YAB0820R01	YBB0820R01	8	■	
.3268	8,3	YAB0830R01	YBB0830R01	8	■	
.3307	8,4	YAB0840R01	YBB0840R01	8	■	
.3346	8,5	YAB0850R01	YBB0850R01	8	■	
.3386	8,6	YAB0860R01	YBB0860R01	8	■	
.3425	8,7	YAB0870R01	YBB0870R01	8	■	
.3465	8,8	YAB0880R01	YBB0880R01	8	■	
.3504	8,9	YAB0890R01	YBB0890R01	8	■	
.3543	9,0	YAB0900R01	YBB0900R01	9	■	
.3583	9,1	YAB0910R01	YBB0910R01	9	■	
.3622	9,2	YAB0920R01	YBB0920R01	9	■	
.3661	9,3	YAB0930R01	YBB0930R01	9	■	
.3701	9,4	YAB0940R01	YBB0940R01	9	■	
.3740	9,5	YAB0950R01	YBB0950R01	9	■	
.3780	9,6	YAB0960R01	YBB0960R01	9	■	
.3819	9,7	YAB0970R01	YBB0970R01	9	■	
.3858	9,8	YAB0980R01	YBB0980R01	9	■	
.3898	9,9	YAB0990R01	YBB0990R01	9	■	
.3937	10,0	YAB1000R01	YBB1000R01	10	■	
.3976	10,1	YAB1010R01	YBB1010R01	10	■	
.4016	10,2	YAB1020R01	YBB1020R01	10	■	
.4055	10,3	YAB1030R01	YBB1030R01	10	■	
.4094	10,4	YAB1040R01	YBB1040R01	10	■	
.4134	10,5	YAB1050R01	YBB1050R01	10	■	
.4173	10,6	YAB1060R01	YBB1060R01	10	■	
.4213	10,7	YAB1070R01	YBB1070R01	10	■	
.4252	10,8	YAB1080R01	YBB1080R01	10	■	
.4291	10,9	YAB1090R01	YBB1090R01	10	■	

* For insert grade descriptions, see page 86.

** Cast iron point also effective in reducing burrs and breakout in steel applications.

QWIK-TWIST™ REPLACEABLE DRILL POINTS - SERIES "Y"

DRILL POINTS- .4331" TO .5866"

D ₁ Drill Diameter inch mm	General Purpose Part Number	Cast Iron** Part Number	Pocket Size	Grade*	
				IN	2005
.4331	11,0	YAB1100R01	YBB1100R01	11	■
.4370	11,1	YAB1110R01	YBB1110R01	11	■
.4409	11,2	YAB1120R01	YBB1120R01	11	■
.4449	11,3	YAB1130R01	YBB1130R01	11	■
.4488	11,4	YAB1140R01	YBB1140R01	11	■
.4528	11,5	YAB1150R01	YBB1150R01	11	■
.4567	11,6	YAB1160R01	YBB1160R01	11	■
.4606	11,7	YAB1170R01	YBB1170R01	11	■
.4646	11,8	YAB1180R01	YBB1180R01	11	■
.4685	11,9	YAB1190R01	YBB1190R01	11	■
.4724	12,0	YAB1200R01	YBB1200R01	12	■
.4764	12,1	YAB1210R01	YBB1210R01	12	■
.4803	12,2	YAB1220R01	YBB1220R01	12	■
.4843	12,3	YAB1230R01	YBB1230R01	12	■
.4882	12,4	YAB1240R01	YBB1240R01	12	■
.4921	12,5	YAB1250R01	YBB1250R01	12	■
.4961	12,6	YAB1260R01	YBB1260R01	12	■
.5000	12,7	YAB1270R01	YBB1270R01	12	■
.5039	12,8	YAB1280R01	YBB1280R01	12	■
.5079	12,9	YAB1290R01	YBB1290R01	12	■
.5118	13,0	YAB1300R01	YBB1300R01	13	■
.5157	13,1	YAB1310R01	YBB1310R01	13	■
.5197	13,2	YAB1320R01	YBB1320R01	13	■
.5236	13,3	YAB1330R01	YBB1330R01	13	■
.5276	13,4	YAB1340R01	YBB1340R01	13	■
.5315	13,5	YAB1350R01	YBB1350R01	13	■
.5354	13,6	YAB1360R01	YBB1360R01	13	■
.5394	13,7	YAB1370R01	YBB1370R01	13	■
.5433	13,8	YAB1380R01	YBB1380R01	13	■
.5472	13,9	YAB1390R01	YBB1390R01	13	■
.5512	14,0	YAB1400R01	YBB1400R01	14	■
.5551	14,1	YAB1410R01	YBB1410R01	14	■
.5591	14,2	YAB1420R01	YBB1420R01	14	■
.5630	14,3	YAB1430R01	YBB1430R01	14	■
.5669	14,4	YAB1440R01	YBB1440R01	14	■
.5709	14,5	YAB1450R01	YBB1450R01	14	■
.5748	14,6	YAB1460R01	YBB1460R01	14	■
.5787	14,7	YAB1470R01	YBB1470R01	14	■
.5827	14,8	YAB1480R01	YBB1480R01	14	■
.5866	14,9	YAB1490R01	YBB1490R01	14	■

* For insert grade descriptions, see page 86.

** Cast iron point also effective in reducing burrs and breakout in steel applications.

Ingersoll

DRILL POINTS- .5906" TO .7441"

D ₁ Drill Diameter inch mm	General Purpose Part Number	Cast Iron** Part Number	Pocket Size	Grade*	
				IN	2005
.5906	15,0	YAB1500R01	YBB1500R01	15	■
.5945	15,1	YAB1510R01	YBB1510R01	15	■
.5984	15,2	YAB1520R01	YBB1520R01	15	■
.6024	15,3	YAB1530R01	YBB1530R01	15	■
.6063	15,4	YAB1540R01	YBB1540R01	15	■
.6102	15,5	YAB1550R01	YBB1550R01	15	■
.6142	15,6	YAB1560R01	YBB1560R01	15	■
.6181	15,7	YAB1570R01	YBB1570R01	15	■
.6220	15,8	YAB1580R01	YBB1580R01	15	■
.6260	15,9	YAB1590R01	YBB1590R01	15	■
.6299	16,0	YAB1600R01	YBB1600R01	16	■
.6339	16,1	YAB1610R01	YBB1610R01	16	■
.6378	16,2	YAB1620R01	YBB1620R01	16	■
.6417	16,3	YAB1630R01	YBB1630R01	16	■
.6457	16,4	YAB1640R01	YBB1640R01	16	■
.6496	16,5	YAB1650R01	YBB1650R01	16	■
.6535	16,6	YAB1660R01	YBB1660R01	16	■
.6575	16,7	YAB1670R01	YBB1670R01	16	■
.6614	16,8	YAB1680R01	YBB1680R01	16	■
.6654	16,9	YAB1690R01	YBB1690R01	16	■
.6693	17,0	YAB1700R01	YBB1700R01	17	■
.6732	17,1	YAB1710R01	YBB1710R01	17	■
.6772	17,2	YAB1720R01	YBB1720R01	17	■
.6811	17,3	YAB1730R01	YBB1730R01	17	■
.6850	17,4	YAB1740R01	YBB1740R01	17	■
.6890	17,5	YAB1750R01	YBB1750R01	17	■
.6929	17,6	YAB1760R01	YBB1760R01	17	■
.6968	17,7	YAB1770R01	YBB1770R01	17	■
.7008	17,8	YAB1780R01	YBB1780R01	17	■
.7047	17,9	YAB1790R01	YBB1790R01	17	■
.7087	18,0	YAB1800R01	YBB1800R01	18	■
.7126	18,1	YAB1810R01	YBB1810R01	18	■
.7165	18,2	YAB1820R01	YBB1820R01	18	■
.7205	18,3	YAB1830R01	YBB1830R01	18	■
.7244	18,4	YAB1840R01	YBB1840R01	18	■
.7283	18,5	YAB1850R01	YBB1850R01	18	■
.7323	18,6	YAB1860R01	YBB1860R01	18	■
.7362	18,7	YAB1870R01	YBB1870R01	18	■
.7402	18,8	YAB1880R01	YBB1880R01	18	■
.7441	18,9	YAB1890R01	YBB1890R01	18	■

* For insert grade descriptions, see page 86.

** Cast iron point also effective in reducing burrs and breakout in steel applications.

QWIKO TWIST™ REPLACEABLE DRILL POINTS - SERIES "Y"

DRILL POINTS- .7480" TO .9016"

D ₁ Drill Diameter inch mm	General Purpose Part Number	Cast Iron** Part Number	Pocket Size	Grade*	
				IN	2005
.7480	19,0	YAB1900R01	YBB1900R01	19	■
.7500	19,05	YAB1905R01	YBB1905R01	19	■
.7520	19,1	YAB1910R01	YBB1910R01	19	■
.7559	19,2	YAB1920R01	YBB1920R01	19	■
.7598	19,3	YAB1930R01	YBB1930R01	19	■
.7638	19,4	YAB1940R01	YBB1940R01	19	■
.7677	19,5	YAB1950R01	YBB1950R01	19	■
.7717	19,6	YAB1960R01	YBB1960R01	19	■
.7756	19,7	YAB1970R01	YBB1970R01	19	■
.7795	19,8	YAB1980R01	YBB1980R01	19	■
.7835	19,9	YAB1990R01	YBB1990R01	19	■
.7874	20,0	YAB2000R01	YBB2000R01	20	■
.7913	20,1	YAB2010R01	YBB2010R01	20	■
.7953	20,2	YAB2020R01	YBB2020R01	20	■
.7992	20,3	YAB2030R01	YBB2030R01	20	■
.8031	20,4	YAB2040R01	YBB2040R01	20	■
.8071	20,5	YAB2050R01	YBB2050R01	20	■
.8110	20,6	YAB2060R01	YBB2060R01	20	■
.8150	20,7	YAB2070R01	YBB2070R01	20	■
.8189	20,8	YAB2080R01	YBB2080R01	20	■
.8228	20,9	YAB2090R01	YBB2090R01	20	■
.8268	21,0	YAB2100R01	YBB2100R01	21	■
.8307	21,1	YAB2110R01	YBB2110R01	21	■
.8346	21,2	YAB2120R01	YBB2120R01	21	■
.8386	21,3	YAB2130R01	YBB2130R01	21	■
.8425	21,4	YAB2140R01	YBB2140R01	21	■
.8465	21,5	YAB2150R01	YBB2150R01	21	■
.8504	21,6	YAB2160R01	YBB2160R01	21	■
.8543	21,7	YAB2170R01	YBB2170R01	21	■
.8583	21,8	YAB2180R01	YBB2180R01	21	■
.8622	21,9	YAB2190R01	YBB2190R01	21	■
.8661	22,0	YAB2200R01	YBB2200R01	22	■
.8701	22,1	YAB2210R01	YBB2210R01	22	■
.8740	22,2	YAB2220R01	YBB2220R01	22	■
.8750	22,22	YAB2222R01	YBB2222R01	22	■
.8780	22,3	YAB2230R01	YBB2230R01	22	■
.8819	22,4	YAB2240R01	YBB2240R01	22	■
.8858	22,5	YAB2250R01	YBB2250R01	22	■
.8898	22,6	YAB2260R01	YBB2260R01	22	■
.8937	22,7	YAB2270R01	YBB2270R01	22	■
.8976	22,8	YAB2280R01	YBB2280R01	22	■
.9016	22,9	YAB2290R01	YBB2290R01	22	■

** Cast iron point also effective in reducing burrs and breakout in steel applications.

DRILL POINTS- .9055" TO 1.0197"

D ₁ Drill Diameter inch mm		General Purpose Part Number	Cast Iron** Part Number	Pocket Size	Grade*	
					IN	2005
.9055	23,0	YAB2300R01	YBB2300R01	23	■	
.9094	23,1	YAB2310R01	YBB2310R01	23	■	
.9134	23,2	YAB2320R01	YBB2320R01	23	■	
.9173	23,3	YAB2330R01	YBB2330R01	23	■	
.9213	23,4	YAB2340R01	YBB2340R01	23	■	
.9252	23,5	YAB2350R01	YBB2350R01	23	■	
.9291	23,6	YAB2360R01	YBB2360R01	23	■	
.9331	23,7	YAB2370R01	YBB2370R01	23	■	
.9370	23,8	YAB2380R01	YBB2380R01	23	■	
.9409	23,9	YAB2390R01	YBB2390R01	23	■	
.9449	24,0	YAB2400R01	YBB2400R01	24	■	
.9488	24,1	YAB2410R01	YBB2410R01	24	■	
.9528	24,2	YAB2420R01	YBB2420R01	24	■	
.9567	24,3	YAB2430R01	YBB2430R01	24	■	
.9606	24,4	YAB2440R01	YBB2440R01	24	■	
.9646	24,5	YAB2450R01	YBB2450R01	24	■	
.9685	24,6	YAB2460R01	YBB2460R01	24	■	
.9724	24,7	YAB2470R01	YBB2470R01	24	■	
.9764	24,8	YAB2480R01	YBB2480R01	24	■	
.9803	24,9	YAB2490R01	YBB2490R01	24	■	
.9843	25,0	YAB2500R01	YBB2500R01	25	■	
.9882	25,1	YAB2510R01	YBB2510R01	25	■	
.9921	25,2	YAB2520R01	YBB2520R01	25	■	
.9961	25,3	YAB2530R01	YBB2530R01	25	■	
1.0000	25,4	YAB2540R01	YBB2540R01	25	■	
1.0039	25,5	YAB2550R01	YBB2550R01	25	■	
1.0079	25,6	YAB2560R01	YBB2560R01	25	■	
1.0118	25,7	YAB2570R01	YBB2570R01	25	■	
1.0157	25,8	YAB2580R01	YBB2580R01	25	■	
1.0197	25,9	YAB2590R01	YBB2590R01	25	■	

* For insert grade descriptions, see page 86.

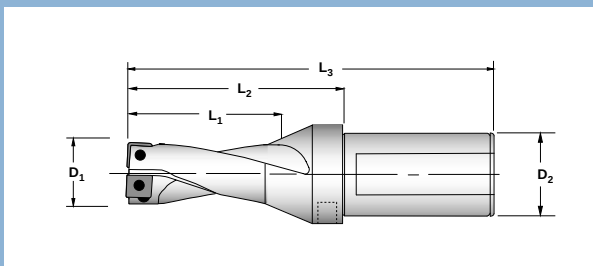
** Cast iron point also effective in reducing burrs and breakout in steel applications.

QUADODRILL⁺ SQUARE INSERT INDEXABLE DRILLS-2:1

Diameters
.500" to 2.000"

L:D Ratio
2:1

Geometry
Positive



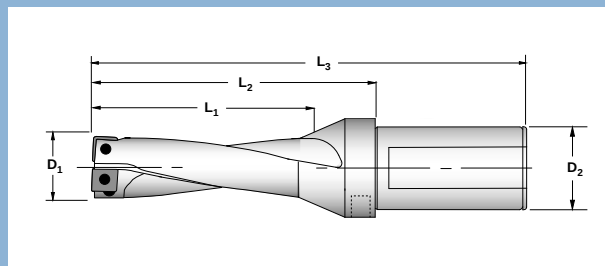
D ₁ Nom. Dia.		New Drill Number	L ₁ Drilling Length	L ₂ Ext. frm Holder	L ₃ Overall Length	D ₂ Shank Style/Size	Num. of Inserts
inch	mm						
.500	12,7	Q0127025N5R01	1.00	2.05	4.25	1.000 Universal	2
.531	13,5	Q0135027N5R01	1.06	2.13	4.33	1.000 Universal	2
.563	14,3	Q0143029N5R01	1.13	2.13	4.33	1.000 Universal	2
.594	15,0	Q0150030N5R01	1.19	2.24	4.44	1.000 Universal	2
.625	15,9	Q0159032N5R01	1.25	2.36	4.57	1.000 Universal	2
.657	16,7	Q0167033N5R01	1.31	2.44	4.65	1.000 Universal	2
.688	17,5	Q0175035N5R01	1.38	2.56	4.76	1.000 Universal	2
.719	18,3	Q0183037N5R01	1.44	2.56	4.76	1.000 Universal	2
.750	19,0	Q0191038N5R01	1.50	2.64	4.84	1.000 Universal	2
.781	19,8	Q0198040N5R01	1.56	2.80	5.00	1.000 Universal	2
.813	20,6	Q0206041N5R01	1.63	2.87	5.08	1.000 Universal	2
.843	21,4	Q0214042N5R02	1.69	2.95	5.16	1.000 Universal	2
.875	22,2	Q0222044N5R02	1.75	2.95	5.16	1.000 Universal	2
.906	23,0	Q0230046N6R01	1.81	3.19	5.55	1.250 Universal	2
.938	23,8	Q0238048N6R01	1.88	3.31	5.67	1.250 Universal	2
.969	24,6	Q0246049N6R01	1.94	3.43	5.79	1.250 Universal	2
1.000	25,4	Q0254051N6R01	2.00	3.50	5.87	1.250 Universal	2
1.031	26,2	Q0262052N6R01	2.06	3.50	5.87	1.250 Universal	2
1.063	27,0	Q0270054N6R01	2.13	3.58	5.94	1.250 Universal	2
1.094	27,8	Q0278056N6R02	2.19	3.70	6.06	1.250 Universal	2
1.125	28,6	Q0286057N6R02	2.25	3.78	6.14	1.250 Universal	2
1.156	29,4	Q0294059N6R01	2.31	3.98	6.34	1.250 Universal	2
1.187	30,2	Q0302060N6R01	2.37	3.98	6.34	1.250 Universal	2
1.219	31,0	Q0310062N6R01	2.44	4.09	6.45	1.250 Universal	2
1.250	31,7	Q0318063N6R01	2.50	4.17	6.53	1.250 Universal	2
1.281	32,5	Q0325065N6R01	2.56	4.29	6.65	1.250 Universal	2
1.312	33,3	Q0333067N6R01	2.62	4.29	6.65	1.250 Universal	2
1.343	34,1	Q0341068N6R02	2.69	4.37	6.73	1.250 Universal	2
1.375	34,9	Q0349070N6R02	2.75	4.49	6.85	1.250 Universal	2
1.406	35,7	Q0357071N6R02	2.81	4.61	6.97	1.250 Universal	2
1.437	36,5	Q0365073N6R01	2.87	4.72	7.08	1.250 Universal	2
1.468	37,3	Q0373075N6R01	2.94	4.72	7.08	1.250 Universal	2
1.500	38,1	Q0381076N6R01	3.00	4.84	7.20	1.250 Universal	2
1.531	38,9	Q0389078N6R01	3.06	4.92	7.28	1.250 Universal	2
1.562	39,7	Q0397079N6R01	3.12	5.04	7.40	1.250 Universal	2
1.594	40,5	Q0405081N6R01	3.19	5.16	7.52	1.250 Universal	2
1.625	41,3	Q0413083N6R01	3.25	5.16	7.52	1.250 Universal	2
1.687	42,8	Q0428086N6R02	3.37	5.35	7.71	1.250 Universal	2
1.719	43,7	Q0437087N6R01	3.44	5.43	7.79	1.250 Universal	2
1.750	44,5	Q0445089N6R01	3.50	5.59	7.95	1.250 Universal	2
1.781	45,2	Q0452090N7R01	3.56	5.59	8.35	1.500 Universal	2
1.813	46,0	Q0460092N7R01	3.63	5.71	8.46	1.500 Universal	2
1.875	47,6	Q0476095N7R01	3.75	5.91	8.66	1.500 Universal	2
1.937	49,2	Q0492098N7R01	3.87	5.98	8.74	1.500 Universal	2
1.969	50,0	Q0500100N7R01	3.94	6.10	8.86	1.500 Universal	2
2.000	50,8	Q0508102N7R01	4.00	6.22	8.98	1.500 Universal	2

For insert information, see page 34.

Diameters
.500" to 2.000"

L:D Ratio
3:1

Geometry
Positive



D ₁ Nom. Dia. inch mm		New Drill Number	L ₁ Drilling Length	L ₂ Ext. frm Holder	L ₃ Overall Length	D ₂ Shank Style/Size	Num. of Inserts
.500	12,7	Q0127038N5R01	1.50	2.56	4.76	1.000 Universal	2
.531	13,5	Q0135041N5R01	1.59	2.68	4.88	1.000 Universal	2
.563	14,3	Q0143043N5R01	1.69	2.68	4.88	1.000 Universal	2
.594	15,0	Q0150045N5R01	1.78	2.83	5.03	1.000 Universal	2
.626	15,9	Q0159048N5R01	1.88	2.99	5.20	1.000 Universal	2
.657	16,7	Q0167050N5R01	1.97	3.11	5.31	1.000 Universal	2
.688	17,5	Q0175053N5R01	2.06	3.27	5.47	1.000 Universal	2
.719	18,3	Q0183055N5R01	2.16	3.27	5.47	1.000 Universal	2
.750	19,0	Q0191057N5R01	2.25	3.39	5.59	1.000 Universal	2
.781	19,8	Q0198059N5R01	2.34	3.58	5.79	1.000 Universal	2
.813	20,6	Q0206062N5R01	2.44	3.70	5.91	1.000 Universal	2
.843	21,4	Q0214064N5R02	2.53	3.82	6.02	1.000 Universal	2
.875	22,2	Q0222067N5R02	2.63	3.82	6.02	1.000 Universal	2
.906	23,0	Q0230069N6R01	2.72	4.09	6.46	1.250 Universal	2
.938	23,8	Q0238071N6R01	2.81	4.25	6.61	1.250 Universal	2
.969	24,6	Q0246074N6R01	2.91	4.41	6.77	1.250 Universal	2
1.000	25,4	Q0254076N6R01	3.00	4.53	6.89	1.250 Universal	2
1.031	26,2	Q0262079N6R01	3.09	4.53	6.89	1.250 Universal	2
1.063	27,0	Q0270081N6R01	3.19	4.65	7.01	1.250 Universal	2
1.094	27,8	Q0278083N6R02	3.28	4.80	7.17	1.250 Universal	2
1.125	28,6	Q0286086N6R02	3.38	4.92	7.28	1.250 Universal	2
1.156	29,4	Q0294088N6R01	3.47	5.16	7.52	1.250 Universal	2
1.187	30,2	Q0302090N6R01	3.56	5.16	7.52	1.250 Universal	2
1.219	31,0	Q0310093N6R01	3.66	5.31	7.67	1.250 Universal	2
1.250	31,7	Q0318095N6R01	3.75	5.43	7.79	1.250 Universal	2
1.281	32,5	Q0325098N6R01	3.84	5.59	7.95	1.250 Universal	2
1.312	33,3	Q0333100N6R01	3.94	5.59	7.95	1.250 Universal	2
1.343	34,1	Q0341102N6R02	4.03	5.71	8.07	1.250 Universal	2
1.375	34,9	Q0349105N6R02	4.13	5.87	8.23	1.250 Universal	2
1.406	35,7	Q0357107N6R02	4.22	6.02	8.38	1.250 Universal	2
1.437	36,5	Q0365110N6R01	4.31	6.18	8.54	1.250 Universal	2
1.468	37,3	Q0373112N6R01	4.40	6.18	8.54	1.250 Universal	2
1.500	38,1	Q0381114N6R01	4.50	6.34	8.70	1.250 Universal	2
1.531	38,9	Q0389117N6R01	4.59	6.46	8.82	1.250 Universal	2
1.562	39,7	Q0397119N6R01	4.69	6.61	8.97	1.250 Universal	2
1.594	40,5	Q0405122N6R01	4.78	6.77	9.13	1.250 Universal	2
1.625	41,3	Q0413124N6R01	4.88	6.77	9.13	1.250 Universal	2
1.687	42,8	Q0428128N6R02	5.06	7.05	9.41	1.250 Universal	2
1.719	43,7	Q0437131N6R01	5.16	7.17	9.53	1.250 Universal	2
1.750	44,5	Q0445134N6R01	5.25	7.36	9.72	1.250 Universal	2
1.781	45,2	Q0452136N7R01	5.34	7.36	10.12	1.500 Universal	2
1.813	46,0	Q0460138N7R01	5.44	7.52	10.28	1.500 Universal	2
1.875	47,6	Q0476143N7R01	5.63	7.80	10.55	1.500 Universal	2
1.937	49,2	Q0492148N7R01	5.81	7.91	10.67	1.500 Universal	2
1.969	50,0	Q0500150N7R01	5.91	8.07	10.83	1.500 Universal	2
2.000	50,8	Q0508152N7R01	6.00	8.23	10.98	1.500 Universal	2

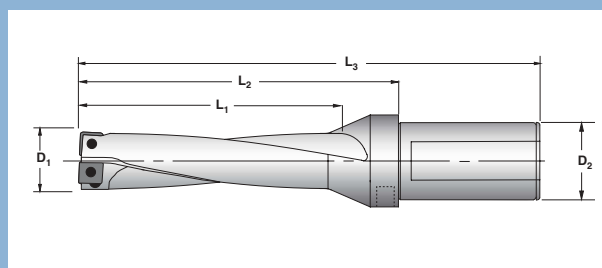
For insert information, see page 34.

QUADODRILL⁺ SQUARE INSERT INDEXABLE DRILLS-4:1

Diameters
.500" to 2.000"

L:D Ratio
4:1

Geometry
Positive



D ₁ Nom. Dia. inch	mm	Drill Number	L ₁ Drilling Length	L ₂ Ext. frm Holder	L ₃ Overall Length	D ₂ Shank Style/Size	Num. of Inserts
.500	12,7	Q0127051N5R01	2.00	3.07	5.27	1.000 Universal	2
.531	13,5	Q0135054N5R01	2.12	3.23	5.43	1.000 Universal	2
.563	14,3	Q0143057N5R01	2.25	3.23	5.43	1.000 Universal	2
.594	15,0	Q0150060N5R01	2.38	3.43	5.63	1.000 Universal	2
.626	15,9	Q0159064N5R01	2.50	3.62	5.83	1.000 Universal	2
.657	16,7	Q0167067N5R01	2.63	3.78	5.98	1.000 Universal	2
.688	17,5	Q0175070N5R01	2.75	3.98	6.18	1.000 Universal	2
.719	18,3	Q0183073N5R01	2.88	3.98	6.18	1.000 Universal	2
.750	19,0	Q0191076N5R01	3.00	4.13	6.34	1.000 Universal	2
.781	19,8	Q0198079N5R01	3.12	4.37	6.57	1.000 Universal	2
.813	20,6	Q0206082N5R01	3.25	4.53	6.73	1.000 Universal	2
.843	21,4	Q0214086N5R02	3.37	4.69	6.89	1.000 Universal	2
.875	22,2	Q0222089N5R02	3.50	4.69	6.89	1.000 Universal	2
.906	23,0	Q0230092N6R01	3.62	5.00	7.36	1.250 Universal	2
.938	23,8	Q0238095N6R01	3.75	5.20	7.56	1.250 Universal	2
.969	24,6	Q0246098N6R01	3.88	5.39	7.76	1.250 Universal	2
1.000	25,4	Q0254102N6R01	4.00	5.55	7.91	1.250 Universal	2
1.031	26,2	Q0262105N6R01	4.12	5.55	7.91	1.250 Universal	2
1.063	27,0	Q0270108N6R01	4.25	5.71	8.27	1.250 Universal	2
1.094	27,8	Q0278111N6R02	4.38	5.91	7.79	1.250 Universal	2
1.125	28,6	Q0286114N6R02	4.50	6.06	8.43	1.250 Universal	2
1.156	29,4	Q0294118N6R01	4.62	6.34	8.70	1.250 Universal	2
1.187	30,2	Q0302120N6R01	4.75	6.34	8.90	1.250 Universal	2
1.219	31,0	Q0310124N6R01	4.88	6.54	8.82	1.250 Universal	2
1.250	31,8	Q0318127N6R01	5.00	6.69	9.05	1.250 Universal	2
1.281	32,5	Q0325130N6R01	5.12	6.89	9.25	1.250 Universal	2
1.312	33,3	Q0333133N6R01	5.25	6.89	9.25	1.250 Universal	2
1.343	34,1	Q0341136N6R02	5.37	6.65	9.33	1.250 Universal	2
1.375	34,9	Q0349140N6R02	5.50	7.24	9.60	1.250 Universal	2
1.406	35,7	Q0357143N6R02	5.62	7.44	9.80	1.250 Universal	2
1.437	36,5	Q0365146N6R01	5.75	7.64	10.00	1.250 Universal	2
1.468	37,3	Q0373149N6R01	5.87	7.64	10.00	1.250 Universal	2
1.500	38,1	Q0381152N6R01	6.00	7.83	10.19	1.250 Universal	2
1.531	38,9	Q0389156N6R01	6.12	7.99	10.35	1.250 Universal	2
1.562	39,7	Q0397159N6R01	6.25	8.19	10.55	1.250 Universal	2
1.594	40,5	Q0405162N6R01	6.38	8.39	10.75	1.250 Universal	2
1.625	41,3	Q0413165N6R01	6.50	8.39	10.75	1.250 Universal	2
1.687	42,8	Q0428171N6R02	6.75	8.74	11.26	1.250 Universal	2
1.719	43,7	Q0437175N6R01	6.88	8.90	11.18	1.250 Universal	2
1.750	44,5	Q0445178N6R01	7.00	9.13	11.89	1.250 Universal	2
1.781	45,2	Q0452181N7R01	7.12	9.13	11.89	1.500 Universal	2
1.813	46,0	Q0460184N7R01	7.25	9.33	12.09	1.500 Universal	2
1.875	47,6	Q0476190N7R01	7.50	9.69	12.44	1.500 Universal	2
1.937	49,2	Q0492197N7R01	7.75	9.84	12.60	1.500 Universal	2
1.969	50,0	Q0500200N7R01	7.88	10.04	12.80	1.500 Universal	2
2.000	50,8	Q0508203N7R01	8.00	10.24	12.99	1.500 Universal	2

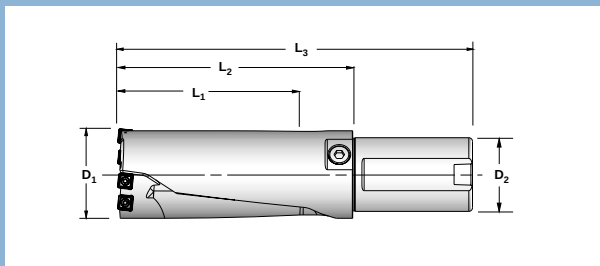
For insert information, see page 34.

BOREline

Diameters
2.125" to 3.250"

L:D Ratio
2:1, 3:1

Geometry
Neutral



2:1

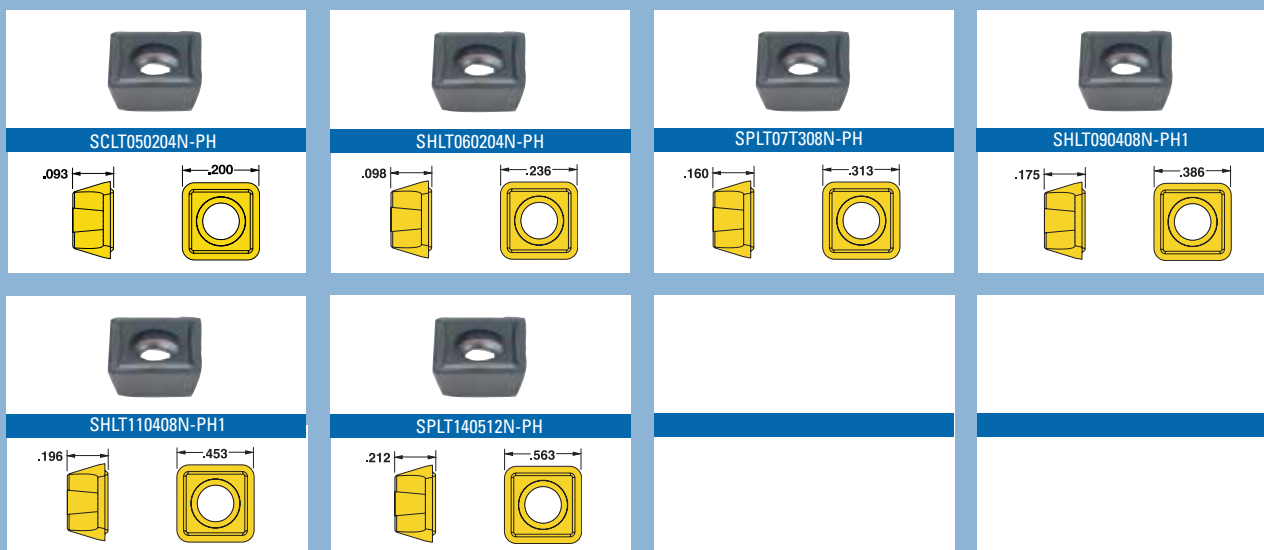
D ₁ Nom. Dia.		Drill Number	L ₁ Drilling Length	L ₂ Ext. frm Holder	L ₃ Overall Length	D ₂ Shank Style/Size	Num. of Inserts
inch	mm						
2.125	53,9	Q0539108N8R01	4.25	6.00	9.25	2.000 Universal	4
2.250	57,1	Q0571114N8R01	4.50	6.00	9.25	2.000 Universal	4
2.375	60,3	Q0603121N8R01	4.75	6.50	9.75	2.000 Universal	4
2.500	63,5	Q0635127N8R01	5.00	6.38	9.63	2.000 Universal	4
2.625	66,6	Q0666133N8R01	5.25	6.75	10.00	2.000 Universal	4
2.750	69,8	Q0698140N8R01	5.50	7.00	10.25	2.000 Universal	4
2.875	73,0	Q0730146N8R01	5.75	7.25	10.50	2.000 Universal	4
3.000	76,2	Q0762152N8R01	6.00	7.50	10.75	2.000 Universal	4
3.250	82,5	Q0825165N8R01	6.50	8.00	11.25	2.000 Universal	4

3:1

D Nom. Dia.		Drill Number	L ₁ Drilling Length	L ₂ Ext. frm Holder	L ₃ Overall Length	D ₂ Shank Style/Size	Num. of Inserts
inch	mm						
2.125	53,9	Q0539162N8R01	6.38	7.88	11.13	2.000 Universal	4
2.250	57,1	Q0571172N8R01	6.75	8.25	11.50	2.000 Universal	4
2.375	60,3	Q0603181N8R01	7.13	8.88	12.13	2.000 Universal	4
2.500	63,5	Q0635191N8R01	7.50	8.88	12.13	2.000 Universal	4
2.625	66,6	Q0666200N8R01	7.88	8.38	12.63	2.000 Universal	4
2.750	69,8	Q0698210N8R01	8.25	9.75	13.00	2.000 Universal	4
2.875	73,0	Q0730219N8R01	8.63	10.13	13.38	2.000 Universal	4
3.000	76,2	Q0762229N8R01	9.00	10.50	13.75	2.000 Universal	4
3.250	82,5	Q0825248N8R01	9.75	11.25	14.50	2.000 Universal	4

For insert information, see page 34.

INSERTS

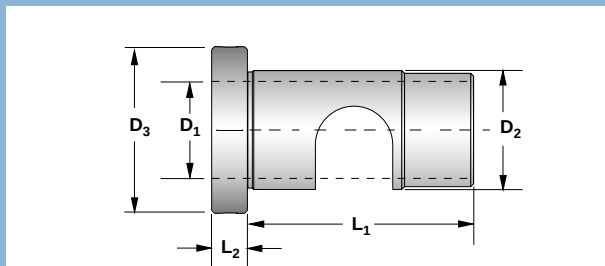


Drill Diameter	Insert Number	Corner	Grades*		
			IN	1030	2005
.500-.594	SCLT050204N-PH	.015R	■	■	
.625-.813	SHLT060204N-PH	.016R	■	■	
.843-1.063 + 2.125	SPLT07T308N-PH	.030R	■	■	
1.094-1.312, 2.250-2.750	SHLT090408N-PH1	.030R	■	■	
1.343-1.625, 2.875-3.000	SHLT110408N-PH1	.030R	■	■	
1.687 - 2.000 + 3.250	SPLT140512N-PH	.047R	■	■	

* For insert grade descriptions, see page 86.

HARDWARE

Insert Screw			Driver	
Drill Diameter	Part No.	Torque	Part No.	Coolant Fitting
.500-.594	SM20-043-00	5-9 in. lbs.	DS-TP06S	PF-0012
.625-.813	SM22-052-00	7-11 in. lbs.	DS-T07F (Tx-07)	PF-0012
.843-1.063 + 2.125	SM25-064-00	10-15 in. lbs.	DS-T08W (Tx-08)	PF-0013
1.094-1.312, 2.250-2.750	SM35-088-60	25-30 in. lbs.	DS-T10T (Tx-10)	—
1.343-1.625, 2.875-3.000	SM40-093-20	30-35 in. lbs.	DS-T15T (Tx-15)	—
1.687 - 2.000 + 3.250	SM50-122-50	40-45 in. lbs.	DS-T20T (Tx-20)	—



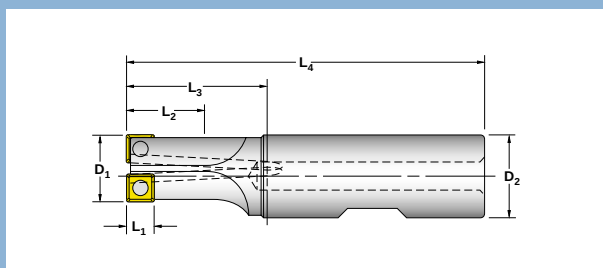
Bushing Number	D ₁	D ₂	D ₃	L ₁	L ₂
BU16-16	1.00	1.25	1.75	2.00	0.38
BU24-44	1.25	1.50	2.00	2.10	0.38
BU32-02	1.50	2.00	2.50	2.44	0.38

For technical information, see page 108.



CENTER-CUTTING COUNTER BORE TOOLS- SERIES "15S"

Diameters
 .500" to 2.000"
L:D Ratio
 1:1
Geometry
 Positive



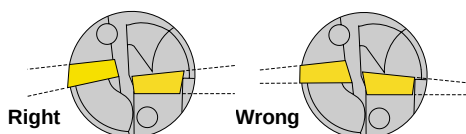
D ₁ Nom. Dia. inch mm	Drill Number	L ₁ Cutting Edge	L ₂ Max C-bore Depth	L ₃ Ext. from Holder	L ₄ Overall Length	D ₂ Shank Size/Style	Num. of Inserts
.500	12,7	15S1D-0500884R01	.22	.50	.88	2.85	.750 Weldon 1
.625	15,8	15S1D-0601084R01	.22	.62	1.00	2.97	.750 Weldon 2
.719	18,2	15S1D-0701084R01	.22	.72	1.00	2.97	.750 Weldon 2
.750	19,0	15S1D-0701284R01	.22	.75	1.25	3.22	.750 Weldon 2
.813	20,6	15S1G-0801284R01	.40	.75	1.25	3.25	.750 Weldon 1
.844	21,4	15S1G-0801284R02	.40	.75	1.25	3.25	.750 Weldon 1
1.000	25,4	15S1F-1001580R01	.33	1.00	1.50	3.69	1.000 Weldon 2
1.187	30,1	15S1G-1102080R01	.40	1.18	2.00	4.25	1.000 Weldon 2
1.250	31,7	15S1G-1202080R01	.40	1.25	2.00	4.25	1.000 Weldon 2
1.375	34,9	15S1G-1302281R01	.40	1.38	2.25	4.50	1.250 Weldon 2
1.500	38,1	15S1G-1502281R01	.40	1.50	2.25	4.50	1.250 Weldon 2
1.625	41,2	15S1J-1602381R01	.53	1.63	2.38	4.63	1.250 Weldon 2
1.750	44,4	15S1J-1702681R01	.53	1.75	2.62	4.82	1.250 Weldon 2
2.000	50,8	15S1J-2003081R01	.53	2.00	3.00	5.61	1.250 Weldon 2

HARDWARE

Insert Screw			Driver
Drill Diameter	Part No.	Torque	New Part No.
.500-.750	SM22-052-00	7-11 in. lbs.	DS-T07F (Tx-07)
.813-1.000	SM40-080-30	30-35 in. lbs.	DS-T15T (Tx-15)
1.187-1.500	SM40-093-20	30-35 in. lbs.	DS-T15T (Tx-15)
1.625	SM50-096-20	40-45 in. lbs.	DS-T20T (Tx-20)
1.750-2.000	SM50-127-10	40-45 in. lbs.	DS-T20T (Tx-20)

For technical information, see pages 109 and 110.

Insert Loading-15S: Insert Series R.



Series R inserts have only two cutting edges and must be loaded into the pockets properly or damage to the tool may result.

For insert informaton see page 38.

For technical information, see pages 109 and 110.

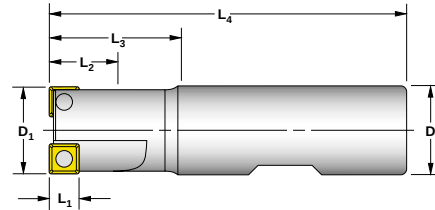
BOREline

INDEXABLE COUNTER BORING TOOLS- SERIES "15C"

Diameters
.438" to 2.000"

L:D Ratio
1:1

Geometry
Positive



D ₁ Nom. Dia. inch mm	Drill Number	L ₁ Cutting Edge	L ₂ Max C'bore Depth	L ₃ Ext. from Holder	L ₄ Overall Length	D ₂ Shank Size/Style	Number of Inserts	Min. Cored Hole Dia.	
								Socket Head Cap Screw	Min. Cored Hole Dia.
.438 11,1	15C1D-0400884R01	.22	.44	.88	2.85	.750 Weldon	1	1/4	.150
.531 13,4	15C1D-0500884R01	.22	.53	.88	2.85	.750 Weldon	1	5/16	.230
.625 15,8	15C1D-0601084R01	.22	.62	1.00	2.97	.750 Weldon	2	3/8	.320
.719 18,2	15C1D-0701084R01	.22	.72	1.00	2.97	.750 Weldon	2	7/16	.420
.812 20,6	15C1E-0801284R01	.28	.81	1.25	3.25	.750 Weldon	2	1/2	.250
1.000 25,4	15C1G-1001580R01	.40	1.00	1.50	3.75	1.000 Weldon	2	5/8	.250
1.187 30,1	15C1G-1102080R01	.40	1.18	2.00	4.25	1.000 Weldon	2	3/4	.437
1.250 31,7	15C1G-1202080R01	.40	1.25	2.00	4.25	1.000 Weldon	2	-	.500
1.375 34,9	15C1G-1302281R01	.40	1.38	2.25	4.50	1.250 Weldon	3	-	.625
1.500 38,1	15C1G-1502281R01	.40	1.50	2.25	4.50	1.250 Weldon	3	-	.750
1.500 38,1	15C1G-1503781R01	.40	1.00	3.75	6.00	1.250 Weldon*	3	-	.750
1.750 44,4	15C1J-1702681R01	.53	1.75	2.62	4.82	1.250 Weldon	2	-	.880
2.000 50,8	15C1J-2003081R01	.53	2.00	3.00	5.25	1.250 Weldon	4	-	1.120

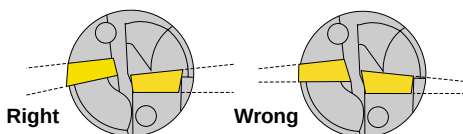
*Modified Weldon shank for more extension.

HARDWARE

Insert Screw			Driver
Drill Diameter	Part No.	Torque	New Part No.
0.438	SM22-037-00	7-11 in. lbs.	DS-T07F (Tx-07)
.531-.719	SM22-052-30	7-11 in. lbs.	DS-T07F (Tx-07)
.812	SM30-065-20	13-18 in. lbs.	DS-T09W (Tx-09)
1.000-1.500	SM40-093-20	30-35 in. lbs.	DS-T15T (Tx-15)
1.750	SM50-127-10	40-45 in. lbs.	DS-T20T (Tx-20)
2.000	SM50-096-20	40-45 in. lbs.	DS-T20T (Tx-20)

For technical information, see pages 109 and 110.

Insert Loading-15C: Insert Series R.



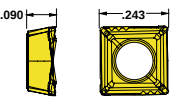
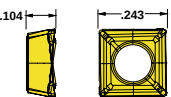
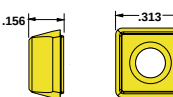
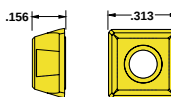
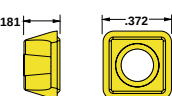
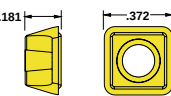
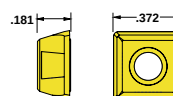
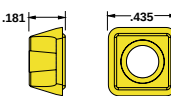
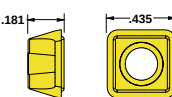
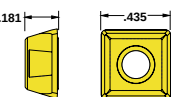
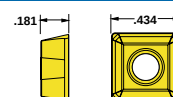
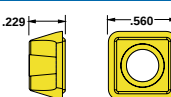
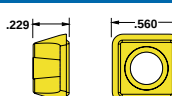
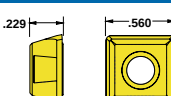
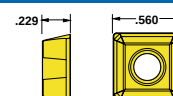
Series R inserts have only two cutting edges and must be loaded into the pockets properly or damage to the tool may result.

For insert informaton see page 38.

For technical information, see pages 109 and 110.

QUAD[®]BORE™ INDEXABLE COUNTER BORING INSERTS

INSERTS

 SPLT060204R-DM04 	 SPLT060204R 	 SDLT07T308N-PS 	 SDLT07T308N-PH 
 SHLT090408N-FS 	 SHLT090416N-FS 	 SHLT090408N-PH 	 SHLT110408N-FS 
 SHLT110416N-FS 	 SHLT110408N-PH 	 SHLT110408TN-HR 	 SHLT140508N-FS 
 SHLT140516N-FS 	 SHLT140508N-PH 	 SHLT140508TN-HR 	

*For Insert Descriptions, see page 86.

***DM04 Series:** Designed with 4 cutting edges and is suitable for use in all materials.

***R Series:** Designed with 2 cutting edges for use in materials such as steels, cast irons, stainless, carbon and alloyed steels.

***PS Series:** Designed with 4 cutting edges for use in materials that tend to drill easily but are too malleable to break.

***FS Series:** Designed with 4 cutting edges for use in materials such as steels, cast irons, stainless, carbon and alloyed steels.

***PH Series:** Designed with 4 cutting edges for use in materials such as steels, cast irons, stainless, carbon, alloyed steels, aluminum and high temp alloys.

***HR Series:** Designed with 4 cutting edges for use in materials such as steels, cast irons, stainless, carbon, alloyed steels, aluminum and high temp alloys.

15C Counterbore Diameter inchmm				Insert Number	Corner	Grade*							
						IN	30M	40P	1030	1040	2005	6515	6530
.438 to .719	11,1 to 18,2	SPLT060204R-DM04	.016R					■					
.438 to .719	11,1 to 18,2	SPLT060204R	.016R			■		■	■				
.812	20,6	SDLT07T308N-PS	.030R					■					
.812	20,6	SDLT07T308N-PH	.030R								■		
1.000 to 1.500	25,4 to 38,1	SHLT110408N-FS	.030R					■			■	■	
1.000 to 1.500	25,4 to 38,1	SHLT110416N-FS	.060R					■					
1.000 to 1.500	25,4 to 38,1	SHLT110408TN-PH	.030R								■		
1.000 to 1.500	25,4 to 38,1	SHLT110408N-HR	.030R			■	■	■			■		■
1.750 to 2.000	44,4 to 50,8	SHLT140508N-FS	.030R					■			■	■	
1.750 to 2.000	44,4 to 50,8	SHLT140516N-FS	.060R					■				■	
1.750 to 2.000	44,4 to 50,8	SHLT140508N-PH	.030R								■		
1.750 to 2.000	44,4 to 50,8	SHLT140508TN-HR	.030R			■	■	■			■		■

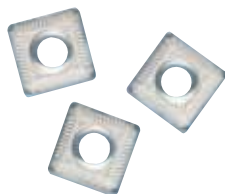
* For insert grade descriptions, see page 86.

15S Center Cutting Counterbore Diameter inch mm				Insert Number	Corner	Grade*							
						IN	30M	40P	1030	1040	2005	6515	6530
.500 to .750	11,1 to 19,0	SPLT060204R-DM04	.016R					■					
.500 to .750	11,1 to 19,0	SPLT060204R	.016R			■			■	■			
.500 to .750	11,1 to 19,0	SPLT060204-DM	.016R										
.813 to 1.500	20,7 to 38,1	SHLT110408N-FS	.030R					■			■		■
.813 to 1.500	20,7 to 38,1	SHLT110416N-FS	.060R					■					■
.813 to 1.500	20,7 to 38,1	SHLT110408N-PH	.030R					■					
.813 to 1.500	20,7 to 38,1	SHLT110408N-HR	.030R			■			■				
1.000	25,4	SHLT090408N-FS	.030R					■		■			■
1.000	25,4	SHLT090416N-FS	.060R					■				■	
1.000	25,4	SHLT090408N-PH	.030R							■			
1.625 to 2.000	41,2 to 50,8	SHLT140508N-FS	.030R					■			■		■
1.625 to 2.000	41,2 to 50,8	SHLT140516N-FS	.060R					■					■
1.625 to 2.000	41,2 to 50,8	SHLT140508N-PH	.030R					■					
1.625 to 2.000	41,2 to 50,8	SHLT140508N-HR	.030R			■	■	■		■			■

* For insert grade descriptions, see page 86.

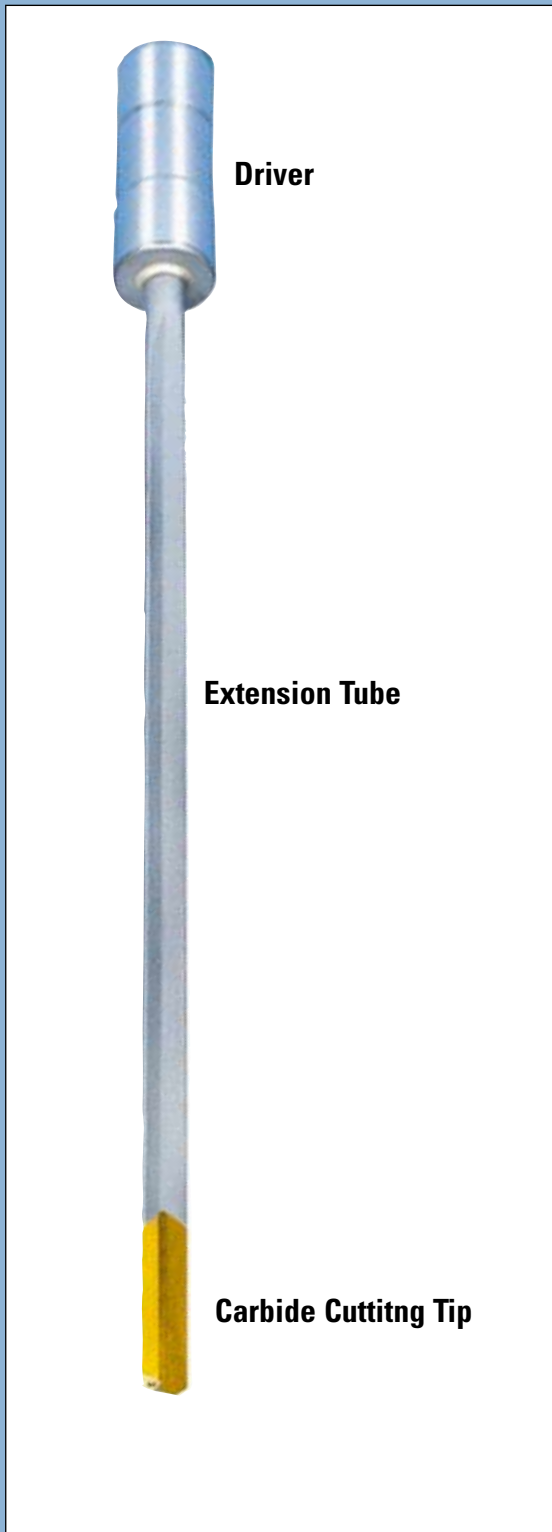
Optional Inserts

Insert Series SHLT110408TN-HR & SHLT140508TN-HR for End Milling.



Series 15C1G, 15C1J, 15S1G and 15S1TJ can use optional insert Series SHLT110408TN-HR & SHLT140508TN-HR. These inserts include a chipbreaker designed to enhance chip formation when end milling. Do not use Series SHLT110408TN-HR or SHLT140508TN-HR inserts for counterboring applications.

■ QWIKOGUN™ SINGLE FLUTE BRAZED GUN DRILLS



Diameter Range (inch): Ø0.100" to Ø1.575"

Length Range (inch): 5.9" to 118.0"

Advantages:

- Hole tolerance of IT7 to IT9 attainable
- Excellent straightness and concentricity
- Reduced true position deviation
- Surface finish Ra 0.4 to 1.6 easily achieved
- Often eliminates secondary reaming operation

The Carbide Cutting Tip

Available with 4 different standard cutting geometries, 8 different standard pad forms and 4 coating options for a multitude of possibilities.

The Extension Tube

Designed with a crimped "V" flute and large coolant ports. The hardened steel extension tube provides the optimal conditions for twist resistance, coolant flow and chip evacuation.

The Driver

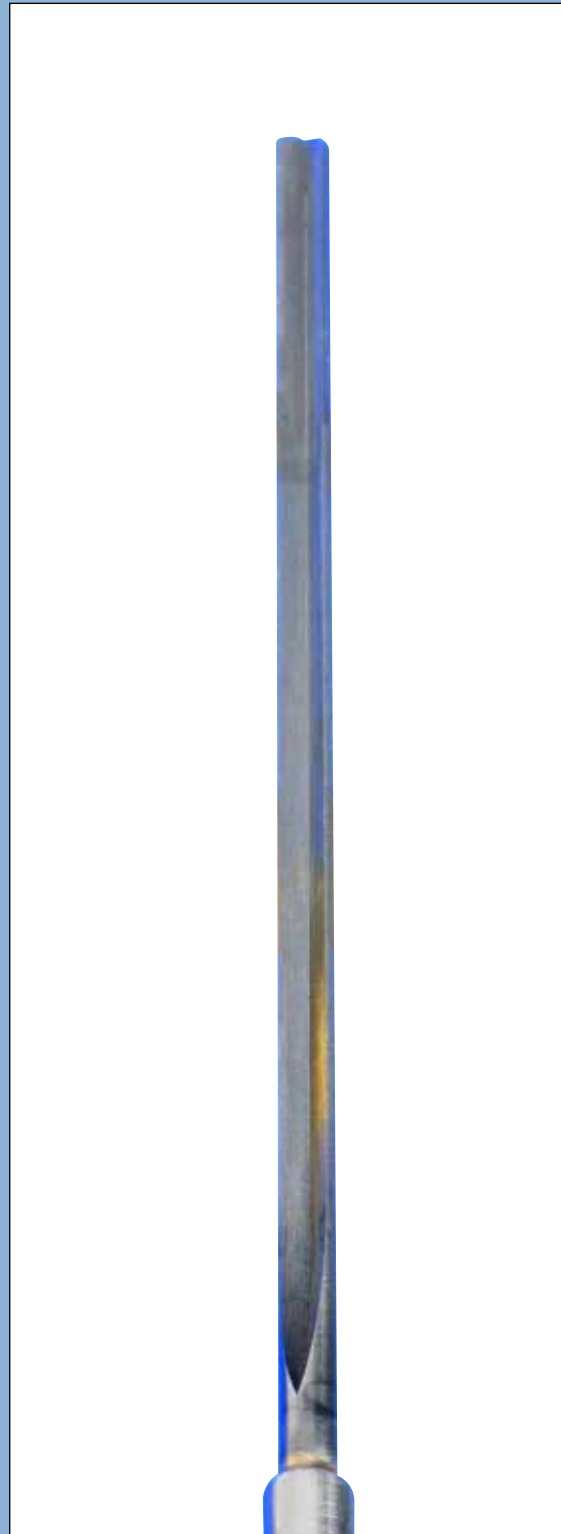
The steel driver provides the means to clamp the gundrill into the machine tool.

SOLID CARBIDE GUNDRILLS

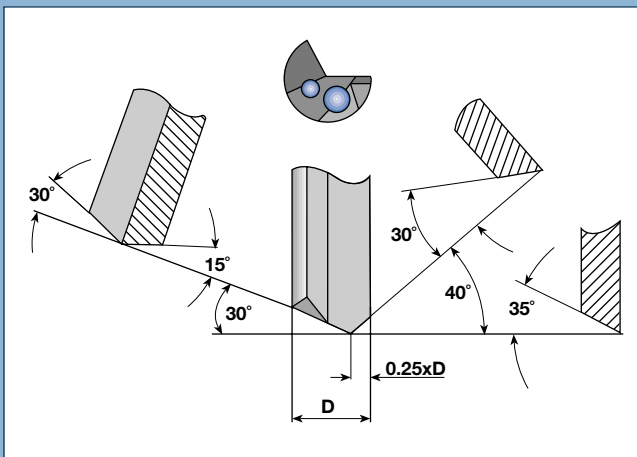
Diameter Range (inch): Ø.055" to Ø.630"

Length Range (inch): 40 x Drill Diameter up to 7.874" flute length

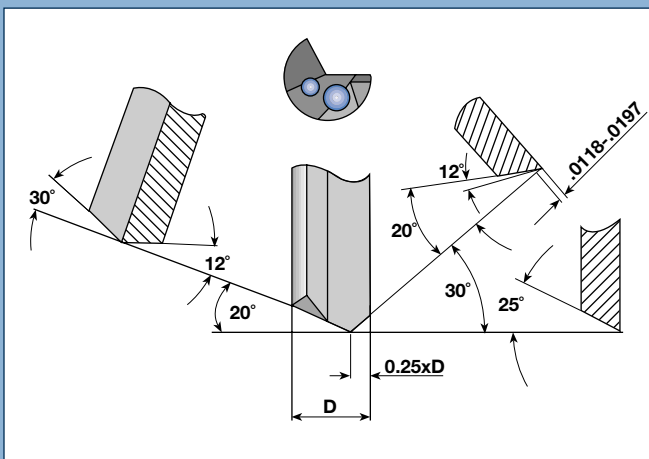
Made with an integral cutting tip and extension tube with either a steel or carbide driver. The solid carbide gun drill is designed for use in conventional machining centers and lathes. These drills provide superior rigidity with optimum coolant flow. As a result, speeds and feeds up to 100% faster may be obtained.



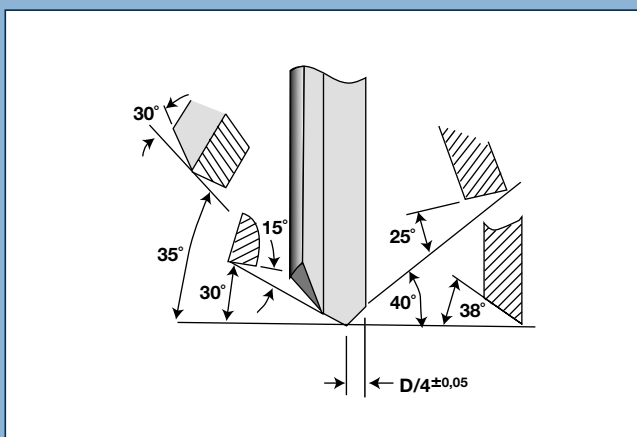
STANDARD GUN DRILL SHARPENING ANGLES



Standard sharpening for diameters less than .157"



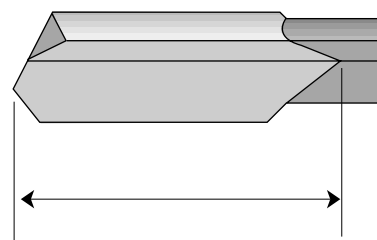
Standard sharpening for diameters greater than .157"



Optional sharpening for materials where it is difficult to break a chip.

Depending on the required tolerance, cutting performance and desired chip shape, the following standard sharpening angles are recommended

Standard Gundrill Carbide Length



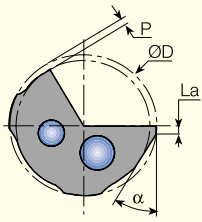
Diameter Range	Head Length
.098" - .149"	.787"
.150" - .159"	.906"
.160" - .199"	.994"
.200" - .258"	1.181"
.259" - .435"	1.378"
.436" - .722"	1.575"
.723" - .841"	1.772"
.842" - .919"	1.970"
.920" - 1.037"	2.165"
1.038" - 1.260"	2.560"

Regrindable Length = Length-Dia.

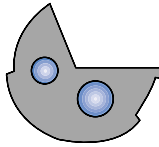
STANDARD GUN DRILL PAD FORMS

Drilling capacity and hole finish are dependent on the geometrical shape of the drill head. Both the pad form and the sharpening must be matched to the workpiece material. The pad form is determined when the tool is manufactured. Regrinding may change the cutting geometry, but the pad form will remain the same.

All cross section profile parameters such as: P, La and α must be precisely matched to the workpiece material properties.



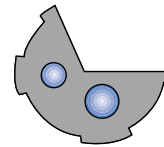
Universal G Form



Applications:

For all material groups
Works well in materials that tend to shrink
Maintains precision bore tolerance and straightness

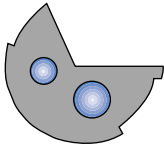
Standard A Form



Applications:

For cast iron & aluminum alloys (coated)
Drilling through cross holes and angled entry and exits
Large gap between pads ensures good lubrication

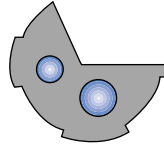
Standard B Form



Applications:

For cast iron & aluminum alloys
Maintains high precision hole tolerances
Excellent surface finish

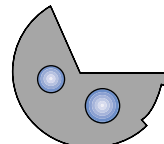
Standard C Form



Applications:

With larger back taper for use in materials that tend to shrink. (Some alloys and stainless)
Drilling through cross holes and angled entry and exit
Not recommended for precise straightness control

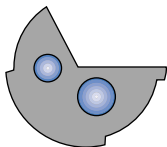
Standard D Form



Applications:

For cast iron only (with coating)
Works very well in grey cast iron

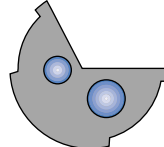
Standard E Form



Applications:

General purpose for all materials
Commonly used in crankshaft and other forged materials
Precise straightness control

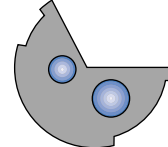
Standard H Form



Applications:

For all non-ferrous materials
For cast iron greater than .200" hole diameter
Can be used in wood & plastic with a larger back taper

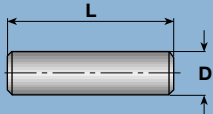
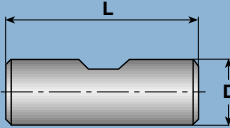
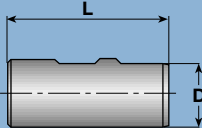
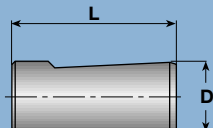
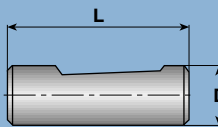
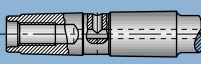
Standard I Form



Applications:

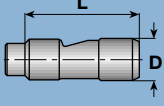
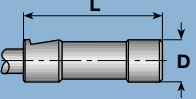
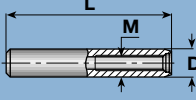
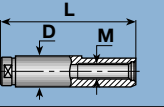
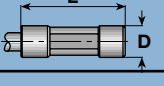
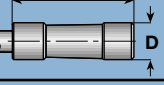
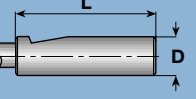
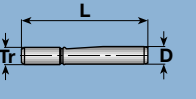
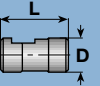
For aluminum and brass when best surface finish is required
Can be used in cross hole and interrupted cut applications

STANDARD GUN DRILL DRIVERS FOR MACHINING CENTERS, LATHES, ETC.

Driver Type	Drawing	ØD x L	Driver Code	Carbide Tipped Gun Drills	Solid Carbide Gun Drills
Cylindrical DIN1835A DIN6535HA		.157x1.102	01	•	•
		.197x1.102	02		•
		.236x1.417	03	•	•
		.315x1.417	04	•	•
		.394x1.575	05	•	•
		.472x1.772	06	•	•
		.551x1.772	07		•
		.630x1.890	08	•	•
		.709x1.890	09		
		.787x1.968	10	•	
		.984x2.205	11	•	
		1.260x2.362	12	•	
		1.575x2.756	13		
		1.969x3.150	14		
		2.480x3.543	15		
Weldon DIN1835B DIN6535HB		.236x1.417	16	•	
		.315x1.417	17	•	
		.394x1.575	18	•	•
		.472x1.772	19	•	•
		.630x1.890	20	•	•
		.709x1.890	21		
		.787x1.968	22	•	•
		.984x2.205	23	•	
		1.260x2.362	24	•	
		1.575x2.756	25		
		1.968x3.150	26		
		2.48x3.543	27		
Whistle Notch DIN1835E		.236x1.417	28	•	
		.315x1.417	29	•	
		.394x1.575	30	•	•
		.472x1.772	31	•	•
		.630x1.890	32	•	•
		.709x1.890	33		
		.787x1.968	34	•	•
		.984x2.205	35	•	
		1.26x2.362	36	•	
		1.575x2.756	37		
Whistle Notch DIN6535HE		.236x1.417	38	•	
		.315x1.417	39	•	
		.394x1.575	40	•	•
		.472x1.772	41	•	•
		.630x1.890	42	•	•
		.709x1.890	43		
		.787x1.968	44	•	•
DIN228AK		CM1	45		
		CM2	46	•	
		CM3	47		
		CM4	48		
DIN228BK		CM1	49		
		CM2	50	•	
		CM3	51		
		CM4	52		

• Recommended style

STANDARD GUN DRILL DRIVERS FOR GUN DRILL MACHINES

Driver Type	Drawing	D x L	Driver Code	Carbide Tipped Gun Drills	Solid Carbide Gun Drills
Central Clamping Surface 15°		.236x1.181	53		•
		.394x1.575	54	•	•
		.630x1.772	55	•	
		.750x2.748	56	•	
		.984x2.756	57	•	
		1.00x2.748	58	•	
		1.25x2.748	59	•	
		1.50x2.748	60		
Frontal Clamping Surface 15°		.630x1.968	61	•	
Cylindrical with Thread		.394x1.968 M6X0.5	62		•
		.394x2.362 M6X0.5	63	•	
		.500x1.968 M6x0.5	64		•
		.630x3.150 M10X1	65	•	•
		.984x3.937 M16x1.5	66	•	
		1.417x4.724 M24x1.5	67		
VDI Design		.394x2.677 M6x0.5	68	•	
		.630x3.543 M10x1	69	•	•
		.984x4.409 M16x1.5	70	•	
		1.417x5.315 M24x1.5	71		
Central Clamping Hexagonal		.984x2.756	72	•	
		1.26x2.756	73	•	
Central Clamping Tapered		.500x1.500	74	•	•
		.630x2.756	75		
		.750x2.748	76	•	
		.787x2.756	77		
Frontal Clamping Surface 2°		.500x1.500	78	•	
		.750x2.748	79	•	
		1.00x2.748	80	•	
		1.00x3.937	81	•	
		1.25x2.748	82	•	
		1.25x3.937	83	•	
		1.50x2.748	84		
		1.50x3.937	85		
Trapezoidal Thread		.630x4.409 Tr 16x1.5	86	•	
		.787x4.960 Tr 20x2	87	•	
		1.102x4.960 Tr 28x2	88	•	
		1.417x6.378 Tr 36x2	89		
Spraymist Driver		.630x1.575	90	•	
		.984x1.968	91	•	
		1.378x2.362	92	•	

• Recommended style



■ BRAZED GUN DRILLS

All Ingersoll brazed gun drills are made to order. Standard gun drill components, carbide tips, extension tubes and drivers are kept in stock.

STANDARD DESIGN

- Standard diameters:
 - Ø.098" to .787" available in .004" increments
 - Ø.788" to 1.260" available in .039" (1mm) increments
- Standard sub-micron carbide Grade (K15)
- Standard inch sizes in stock:
1/4, 7/16, 3/8, 1/2, 9/16, 5/8, 3/4
- Standard pad form = G form
(Standard inch sizes = E form)
- Standard back taper (0.07%)
- Standard sharpening
- Uncoated
- Standard driver

SEMI-STANDARD DESIGN

- Out of standard diameter range
- Any other pad form from the catalog other than G or E
- Special surface finish
- Any coating

SPECIAL DESIGN

- Any non-catalog specification

■ SOLID CARBIDE GUN DRILLS

All Ingersoll solid carbide gun drills are made to order. Standard solid carbide gun drills and drivers are kept in stock.

STANDARD DESIGN

- Standard sub-micron carbide Grade (K15)
- Standard pad form (G)
- Standard back taper (0.07%)
- Standard sharpening
- Uncoated
- Standard driver

SEMI-STANDARD DESIGN

- Any other pad form from the catalog
- Special surface finish
- Coating

SPECIAL DESIGN

- Any non-catalog specification

GUN DRILL REQUEST FOR QUOTATION FORM

CUSTOMER

Customer Number
Company Name
Address
Contact Person

THE PIECE PART

Name
Part Number

Hole Diameter
Tolerance
Surface Finish (Ra, Rz,...)
Concentricity (.001"/1.0")
Straightness (.001"/1.0')

Hole Depth

Hole Type (Check all that apply)			
Blind Hole ☐	Through Hole ☐		
Angled entry ☐	Angled exit ☐		
Drilling from solid ☐	Core drill ☐		
Cross holes ☐	Other (text)		

Material (Din material, spec etc.)			
Steel ☐	Iron ☐	Aluminum ☐	
Stainless steel ☐	Nickel ☐	Other ☐	
Hardness			
Long chips ☐	Short chips ☐		

Application			
Workpiece	Stationary ☐	Rotating ☐	
Tool	Stationary ☐	Rotating ☐	

THE MACHINE

Machine Type/Model
Power [hp/Kw]
Rigidity: Good ☐ Average ☐ Poor ☐

Cutting Data	Max Possible	Current
Cutting speed "Vc" (SFM)		
Revolutions per minute		
Feed "f" (in/rev)		
Feed "F" (in/min)		

Drill Guide Method	Internal Dia.	Tolerance
Pre-Drilled pilot hole		
Bushing		

Coolant
Pressure "P" (psi)
Flow Rate (gal/min)
Neat Oil ☐ Soluable ☐ %

Additional Information

Inquiry Number	
Inquiry Date	
Quantities Requested	

THE TOOL

Tool Type	Carbide Tipped ☐
Unknown ☐	Solid Carbide ☐
Single Lipped ☐	Double Lipped ☐
Customer Drawing No.	

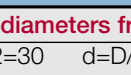
Tool Diameter		[in/mm]
Tolerance h5 ☐	Other ☐	

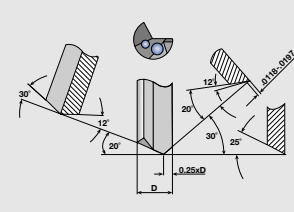
Coating of the Carbide Tip	
Uncoated ☐	TiAlN ☐
TiN ☐	AlTiN ☐
TiCN ☐	Unknown ☐
TiN + TiCN ☐	Other

Carbide Tip Length	Other
Standard ☐	

Overall Length		[in/mm]
Flute Length		[in/mm]

Driver
List Std catalog number
Other Length x Diameter
Driver Extension L x Dia

Pad Forms	
	G ☐
	E ☐
	A ☐
	C ☐
	B ☐
	D ☐
	H ☐
	I ☐

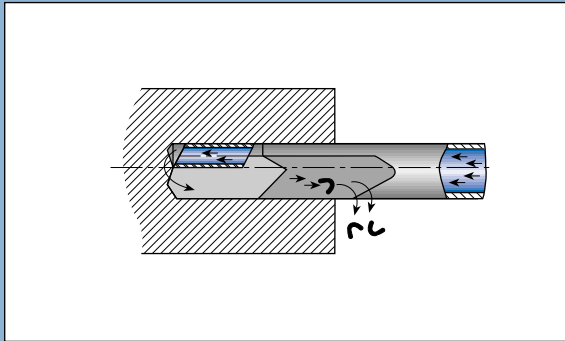
Grind Geometry


Std grind for diameters from .055" thru .157"					
—1=40	—2=30	d=D/4	—1=0	—2=30	b=0
—1=30	—2=15	—3=35	—1=0	—2=30	b=0

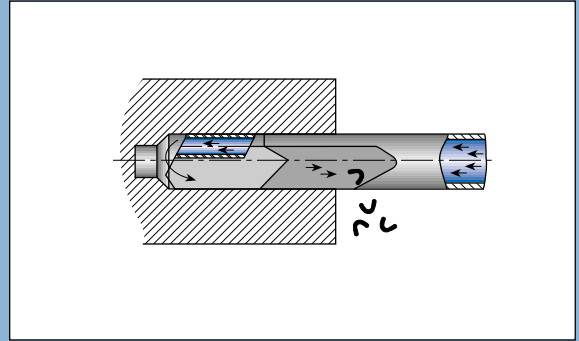
Std grind for diameters from .158" thru 1.260"					
—1=30	—2=20	d=D/4	—1=25	—2=30	b=0,3/0,5
—1=12	—2=12	—3=25	—1=25	—2=30	b=0,3/0,5

Other					
—1=	—2=	—3=	—1=	—2=	b=

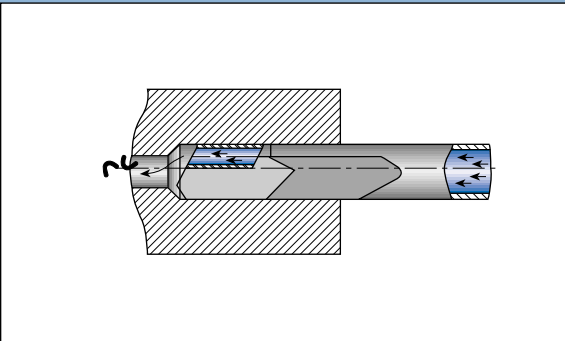
■ DEEP DRILLING APPLICATIONS



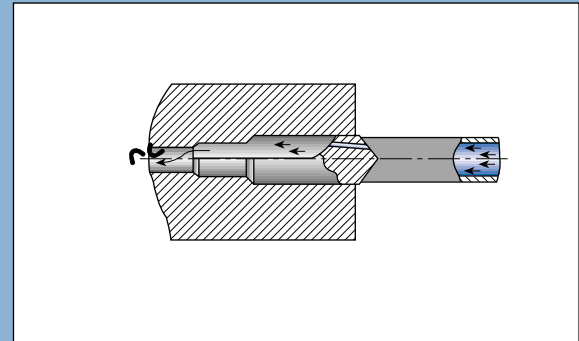
Gun drilling operation in blind hole when chips and coolant are evacuated back through the flute.



Gun drill boring operation in blind hole when chips and coolant are evacuated back through the flute.



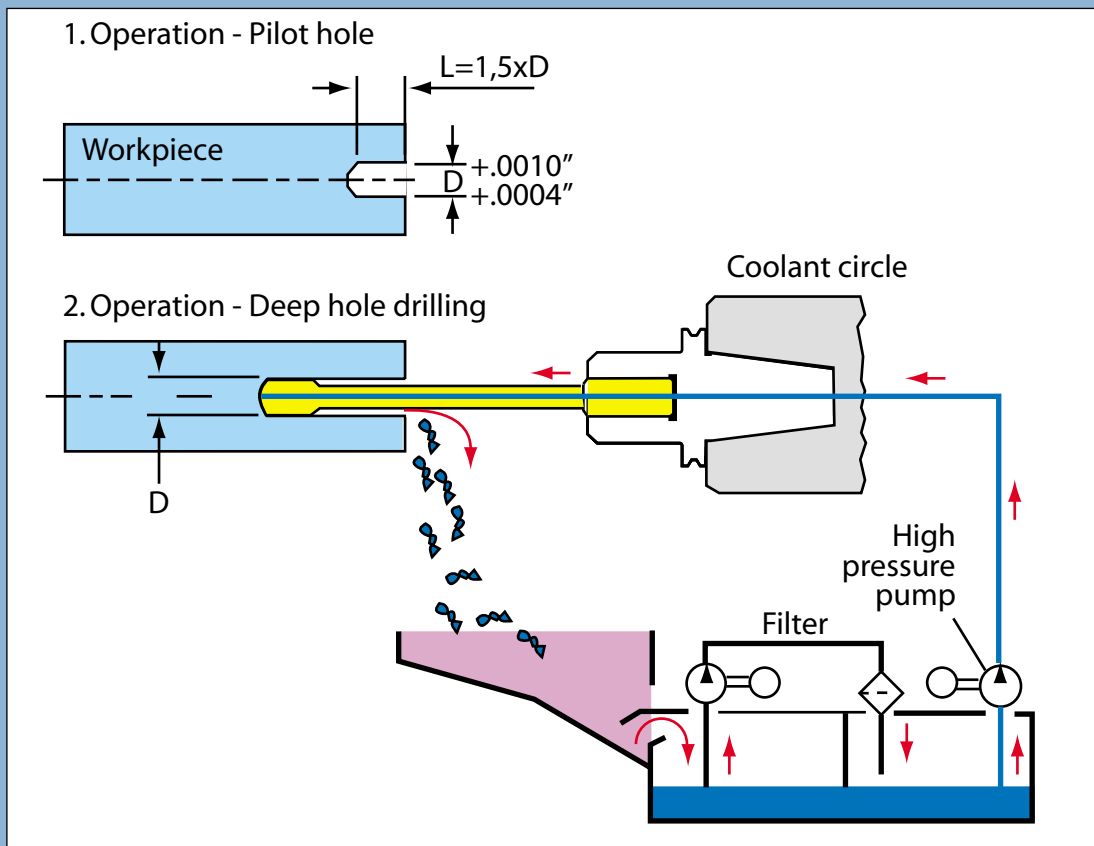
Gundrill boring operation in through hole when chips and coolant are evacuated ahead of the drill tip.



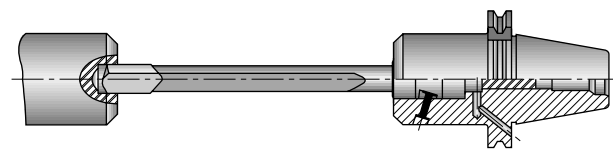
Stepped gundrill boring operation in through hole when chips and coolant are evacuated ahead of the drill tip.

■ GUN DRILL MACHINING CENTER APPLICATION

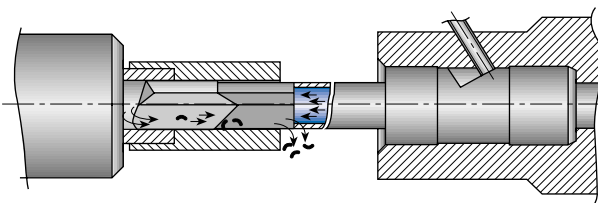
Deep Hole Drilling on Conventional Machine Tools



Gun Drills in Machining Centers



Centering/Guiding hole for
gundrill operation in
machining center



Bushing guide barrel for
Gun drill stabilizing in
machining center

GUN DRILL TROUBLESHOOTING GUIDE

Possible Cause	Drill Problems										Hole Problems					
	Cratering	Built-up edge	Damaged wear pad	Flute bending	Drill heat	Excessive flank wear	Excessive corner wear	Excessive margin wear	Poor drill life	Chipping	Breakage	Corved hole axis	Conical entrance	Runout	Rough surface finish	Undersized
Poor clamping								+			+	+		+		+
Insufficient coolant flow					+	+			+		+				+	+
Low coolant pressure									+		+				+	+
Incorrect coolant type	+	+	+			+	+	+	+						+	
Feed fluctuations		+		+					+	+	+	+		+	+	
Too high feed	+	+		+	+	+			+		+	+	+	+	+	+
Too low feed		+							+	+		+				
Spindle speed too high			+	+	+	+	+	+	+		+					
Spindle speed too low	+	+													+	
Material structure	+	+	+				+		+	+	+	+	+			
Material shrinking due to heat			+	+		+			+		+			+	+	+
Workpiece thin wall section									+		+					
Misalignment			+	+		+		+	+	+	+	+	+			+
Undersized hole			+		+	+		+	+	+	+			+		
Rough cutting edge finish	+	+					+		+	+	+	+	+			
Built up edge							+		+		+			+		+
Worn out edge	+	+					+	+	+	+	+	+	+	+		
Interrupted chip flow			+	+		+		+	+	+	+	+	+	+		+
Too small flute clearance			+		+	+		+	+	+		+	+			
Incoorrect drill profile	+	+	+	+			+	+	+		+	+	+	+	+	+
Incorrect head angles	+	+		+		+	+		+	+	+	+	+	+	+	+
Vibrations	+	+	+	+			+		+	+	+	+	+	+		+
Oversized bushing									+		+	+	+			+
A gap between bushing and workpiece						+			+		+	+	+	+	+	+
Bushing undersized			+	+		+		+	+	+	+			+	+	
Loss of coolant pressure		+	+	+	+				+		+		+		+	+
High coolant pressure												+				+
Overheating coolant	+		+		+	+	+	+	+					+		
Insufficient coolant	+	+	+	+	+				+		+	+	+	+		+
Head inside angle excessive wear			+	+					+					+	+	+
Head outside angle excessive wear		+		+			+		+					+	+	+
Too short carbide head	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Tool heel drag			+	+	+	+		+	+	+	+	+	+	+		+
Worn supporting pads	+		+	+	+		+		+		+		+			+
Tool whip - Reverse tool rotation	+	+	+	+			+		+	+	+		+	+	+	+



Ingersoll



TOOL HOLDERS

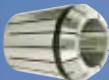
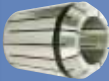
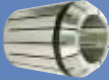
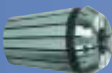
Cutting Tools



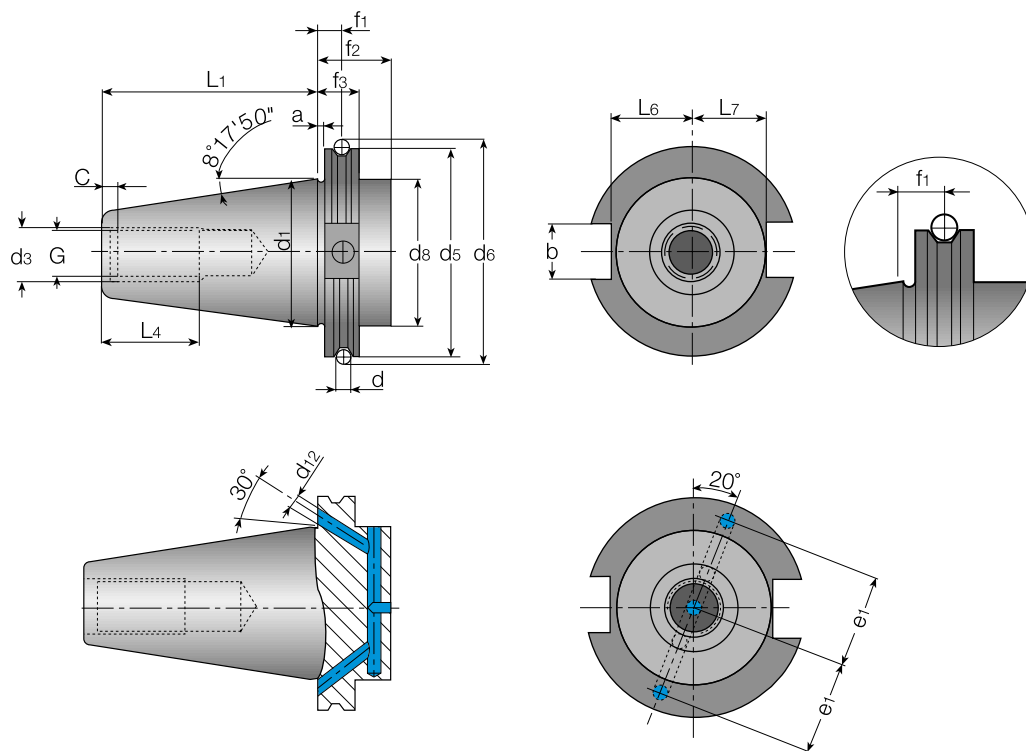
Member IMC Group
Ingersoll
Cutting Tools

TOOL HOLDERS

	Description	Detail	Page
	CAT-ER Collet Chuck	CAT-ER 16-20	57
	CAT-ER Collet Chuck	CAT-ER 25-50	58
	CAT-TG Collet Chuck	CAT-TG100	59
	CAT- Endmill Holder	CAT-EM	60
	HSK-ER Collet Chuck (Metric)	HSK E-ER16/ER20/ER32	63
	HSK-ER Mini Collet Chuck (Metric)	HSK A-ER-M	64
	HSK-ER Collet Chuck (Metric)	HSK A-ER	65
	HSK-ER Collet Chuck (Metric)	HSK A-ER	65
	HSK- Endmill Holder	HSK A-EM	67

	Description	Detail	Page
	ER Spring Collets .0004	ER-11,16,20,25-SPR / ER32,40-SPR	73
	ER Spring Collets .0004	ER50-SPR / ER-EX	74
	ER Spring Collets .0002	ER11,16,20-SPR-AA / ER25,32-SPR-AA	75
	ER Spring Collets .0002	ER40	76
	TG100 Collet + Spring Collets	TG100+-SPR / SET-TG100+-SPR	77
	ER Coolit - Sealed Jet Collets	ER16,20,25-SEAL / ER32,40-SEAL	78
	ER Coolit - Sealed Jet2 Collets	ER16,20,25-SEAL / JET2	79
	ER Coolit - Sealed Jet2 Spring Collets	ER32,40-SEAL-JET2	80
	TG100 Coolit-Sealed Spring Collets	TG100-SEAL	81
	ER Spring Collet Serts	—	82

CAT - TOOLHOLDER STANDARD



“B” Type

CAT A.N.S.I. B5.50

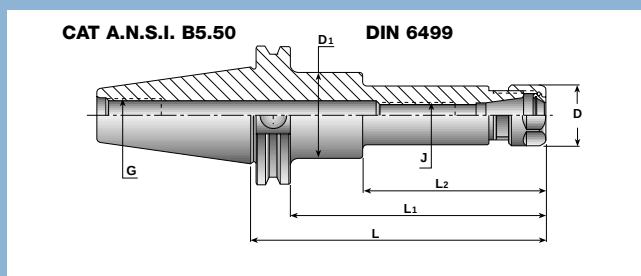
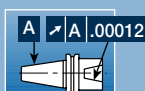
Shank	b ±.001	d	d ₁	G UNC-2B	d ₃ ±.01	C ±.01	d ₆ ±.002	d ₅ ±.002	d ₈ ±.005	f ₁ ±.005
CAT 30	.645	.2756	1.250	1/2-13	.590	.188	2.176	1.812	1.250	.4375
CAT 40	.645	.2756	1.750	5/8-11	.720	.188	2.863	2.500	1.750	.4375
CAT 50	1.02	.2756	2.750	1-8	1.125	.250	4.238	3.875	2.750	.4375

Shank	f ₂ MIN	f ₃ ±.002	L ₁ ±.005	L ₄ MIN	L ₆ .000-.015	L ₇ .000-.015	e ₁ ±.004	d ₁₂	a
CAT 30	1.38	.750	1.875	1.000	.735	.640	.826	.157	.125
CAT 40	1.38	.750	2.687	1.120	.985	.890	1.062	.157	.125
CAT 50	1.38	.750	4.000	1.750	1.485	1.390	1.653	.236	.125

Indersol

CAT - ER COLLET CHUCK CAT-ER 16-20

Add B suffix for coolant through flange.

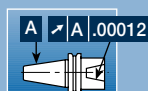


Designation	Range	L	L1	L2	D	D1	J	G
CAT30 ER16X2.750 *	.022-.396	2.750	2.000	1.370	1.102	1.248	M10	1/2-13
CAT40 ER16X2.750	.022-.396	2.750	2.000	1.370	1.102	1.752	M12	5/8-11
CAT40 ER16X3.937	.022-.396	3.937	3.187	2.560	1.102	1.752	M12	5/8-11
CAT40 ER16X5.906	.022-.396	5.906	5.156	3.350	1.102	1.752	M12	5/8-11
CAT40 ER20X3.937	.041-.514	3.937	3.187	2.560	1.339	1.752	M12	5/8-11
CAT40 ER20X4.000	.041-.514	4.000	3.250	2.620	1.339	1.752	M12	5/8-11
CAT40 ER20X5.906	.041-.514	5.906	5.156	3.780	1.339	1.752	M12	5/8-11
CAT50 ER16X3.937 *	.022-.396	3.937	3.187	2.560	1.102	2.752	M12	1-8
CAT50 ER16X5.906 *	.022-.396	5.906	5.156	3.490	1.102	2.752	M12	1-8
CAT50 ER16X8.000 *	.022-.396	8.000	7.250	2.980	1.102	2.752	M12	1-8
CAT50 ER20X3.937 *	.041-.514	3.937	3.187	2.560	1.349	2.752	M16	1-8
CAT50 ER20X5.906 *	.041-.514	5.906	5.156	4.530	1.349	2.752	M16	1-8
CAT50 ER20X8.000 *	.041-.514	8.000	7.250	4.620	1.339	2.752	M16	1-8

* Balanced to G6.3 12000 RPM.

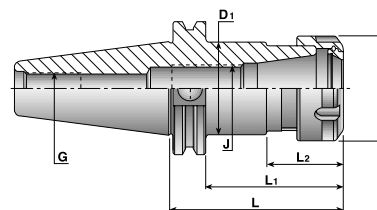
CAT - ER COLLET CHUCK CAT-ER 25-50

Add B suffix for coolant through flange.



CAT A.N.S.I. B5.50

DIN 6499



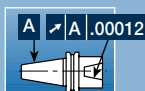
Designation	Range	L	L ₁	L ₂	D	D ₁	J	G
CAT30 ER32X3.268 *	.080-.789	3.268	2.518	1.890	1.968	1.248	M18X1.5	1/2-13
CAT40 ER25X2.562	.041-.632	2.562	1.812	1.180	1.654	1.752	M16	5/8-11
CAT40 ER25X4.000	.041-.632	4.000	3.250	2.620	1.654	1.752	M16	5/8-11
CAT40 ER25X6.000	.041-.632	6.000	5.250	4.620	1.654	1.752	M16	5/8-11
CAT40 ER32X2.562	.080-.789	2.562	1.812	-	1.968	1.752	M22X1.5	5/8-11
CAT40 ER32X 4.000	.080-.789	4.000	3.250	-	1.968	1.752	M22X1.5	5/8-11
CAT40 ER32X 6.000	.080-.789	6.000	5.250	-	1.968	1.752	M22X1.5	5/8-11
CAT40 ER40X3.359	.120-1.025	3.359	2.609	-	2.480	1.752	M28X1.5	5/8-11
CAT40 ER40X 4.000	.120-1.025	4.000	3.250	-	2.480	1.752	M28X1.8	5/8-11
CAT50 ER25X4.000 *	.041-.632	4.000	3.250	2.580	1.654	2.752	M16	1-8
CAT50 ER25X6.000 *	.041-.632	6.000	5.250	4.620	1.654	2.752	M16	1-8
CAT50 ER25X8.000 *	.041-.632	8.000	7.250	6.580	1.654	2.752	M16	1-8
CAT50 ER32X4.000 *	.080-.789	4.000	3.250	2.540	1.968	2.752	M22X1.5	1-8
CAT50 ER32 X6.000 *	.080-.789	6.000	5.250	4.580	1.968	2.752	M22X1.5	1-8
CAT50 ER32 X8.000 *	.080-.789	8.000	7.250	6.580	1.968	2.752	M22X1.5	1-8
CAT50 ER40 X4.000 *	.120-1.025	4.000	3.250	2.620	2.480	2.752	M28X1.5	1-8
CAT50 ER40 X6.000 *	.120-1.025	6.000	5.250	4.620	2.480	2.752	M28X1.5	1-8
CAT50 ER40 X8.000 *	.120-1.025	8.000	7.250	6.580	2.480	2.752	M28X1.5	1-8
CAT50 ER50 X4.000 *	.396-1.338	4.000	3.250	-	3.070	2.752	M36X1.5	1-8
CAT50 ER50 X6.000 *	.396-1.338	6.000	5.250	-	3.070	2.752	M36X1.5	1-8

Through-Flange coolant available.

* Balance to G6.3 12000 RPM.

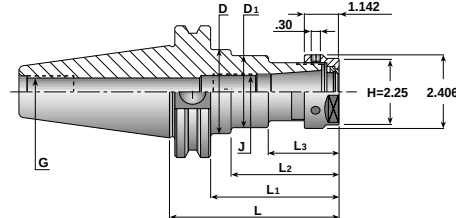
CAT - TG COLLET CHUCK CAT-TG100

Add B suffix for coolant through flange.



CAT A.N.S.I. B5.50

TG100⁽¹⁾



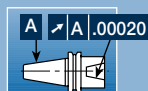
Designation	Range	L	L ₁	L ₂	L ₃	D	D ₁	J*	G
CAT40 TG100X3.000	.094-1.000	3.000	2.250	1.612	-	1.752	-	1-1/8-16	5/8-11
CAT40 TG100X4.000	.094-1.000	4.000	3.250	2.620	-	1.752	-	1-1/8-16	5/8-11
CAT40 TG100X6.000	.094-1.000	6.000	5.250	4.620	-	1.752	-	1-1/8-16	5/8-11
CAT50 TG100X3.000	.094-1.000	3.000	2.250	1.620	-	2.752	-	1-1/8-16	1-8
CAT50 TG100X3.500	.094-1.000	3.500	2.750	2.120	-	2.752	-	1-1/8-16	1-8
CAT50 TG100X5.500	.094-1.000	5.500	4.750	4.120	2.315	2.752	2.362	1-1/8-16	1-8
CAT50 TG100X7.500	.094-1.000	7.500	6.750	4.118	2.307	2.752	2.500	1-1/8-16	1-8

Through-Flange coolant available.

* Left-hand thread.

CAT - ENDMILL HOLDER CAT-EM

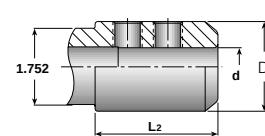
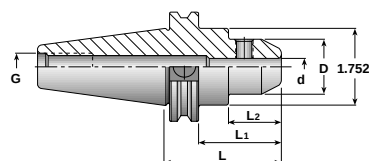
Add B suffix for coolant through flange.



CAT A.N.S.I. B5.50

WELDON

SHANK DIA. 7/8+"

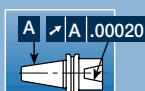


Designation	d	L	L ₁	L ₂	D	G
CAT40 EM 3/16X2.500	.187	2.500	1.750	1.121	.866	5/8-11
CAT40 EM 1/4X2.500	.250	2.500	1.750	1.121	1.000	5/8-11
CAT40 EM 3/8X2.500	.375	2.500	1.750	1.121	1.248	5/8-11
CAT40 EM 1/2X2.625	.500	2.625	1.875	-	-	5/8-11
CAT40 EM 5/8X3.750	.625	3.750	3.000	-	-	5/8-11
CAT40 EM 3/4X3.750	.750	3.750	3.000	-	-	5/8-11
CAT40 EM 7/8X4.000	.875	4.000	3.250	2.620	2.047	5/8-11
CAT40 EM 1X4.000	1.000	4.000	3.250	2.620	2.559	5/8-11
CAT40 EM 1-1/4X4.250	1.250	4.250	3.500	2.870	2.752	5/8-11
CAT40 EM 1-1/2X4.625	1.500	4.625	3.875	3.245	3.150	5/8-11

Through-Flange coolant available.

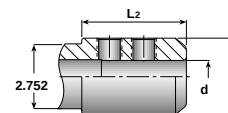
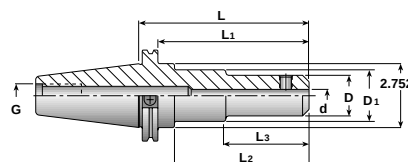
CAT - ENDMILL HOLDER CAT-EM

Add B suffix for coolant through flange.



**CAT A.N.S.I. WELDON
B5.50**

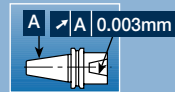
SHANK DIA. 7/8+"



Designation	d	L	L ₁	L ₂	L ₃	D	D ₁	G
CAT50 EM 1/4 X2.500	.250	2.500	1.750	1.120	-	1.000	-	1-8
CAT50 EM 1/4 X4.500	.250	4.500	3.750	3.150	-	1.000	-	1-8
CAT50 EM 1/4 X6.250	.250	6.250	5.500	4.870	2.756	1.000	1.969	1-8
CAT50 EM 3/8 X2.500	.375	2.500	1.750	1.120	-	1.248	-	1-8
CAT50 EM 3/8 X4.500	.375	4.500	3.750	3.120	-	1.248	-	1-8
CAT50 EM 3/8X6.500	.375	6.500	5.500	5.120	3.130	1.248	1.969	1-8
CAT50 EM 1/2 X2.625	.500	2.625	1.875	1.245	-	1.752	-	1-8
CAT50 EM 1/2 X4.625	.500	4.625	3.875	3.245	-	1.752	-	1-8
CAT50 EM 1/2X6.625	.500	6.625	5.875	5.245	3.248	1.752	2.205	1-8
CAT50 EM 5/8 X3.750	.625	3.750	3.000	2.370	-	1.752	-	1-8
CAT50 EM 5/8X5.750	.625	5.750	5.000	4.370	-	1.752	-	1-8
CAT50 EM 5/8X7.750	.625	7.750	7.000	6.370	4.390	1.752	2.165	1-8
CAT50 EM 3/4 X3.750	.750	3.750	3.000	2.370	-	1.772	-	1-8
CAT50 EM 3/4 X5.750	.750	5.750	5.000	3.150	-	1.772	-	1-8
CAT50 EM 3/4X7.750	.750	7.750	7.000	6.370	3.150	1.772	2.264	1-8
CAT50 EM 7/8 X3.750	.875	3.750	3.000	2.370	-	2.047	-	1-8
CAT50 EM 7/8X5.750	.875	5.750	5.000	3.150	-	2.047	-	1-8
CAT50 EM 7/8X7.750	.875	7.750	7.000	3.150	-	2.047	-	1-8
CAT50 EM 1 X4.000	1.000	4.000	3.250	2.620	-	2.559	-	1-8
CAT50 EM 1 X6.000	1.000	6.000	5.250	4.620	-	2.559	-	1-8
CAT50 EM 1 X8.000	1.000	8.000	7.250	4.625	-	2.559	-	1-8
CAT50 EM 1-1/4X4.000	1.250	4.000	3.250	-	-	-	-	1-8
CAT50 EM 1-1/4X6.000	1.250	6.000	5.250	-	-	-	-	1-8
CAT50 EM 1-1/4X8.000	1.250	8.000	7.250	-	-	-	-	1-8
CAT50 EM 1-1/2X4.000	1.500	4.000	3.250	2.620	-	3.150	-	1-8
CAT50 EM 1-1/2X6.000	1.500	6.000	5.250	4.620	-	3.150	-	1-8
CAT50 EM 1-1/2X8.000	1.500	8.000	7.250	6.620	-	3.150	-	1-8
CAT50 EM 2 X5.625	2.000	5.625	4.875	4.245	-	3.740	-	1-8

■ HSK - STANDARD TOOL HOLDER DIN69893 FORM A STANDARD

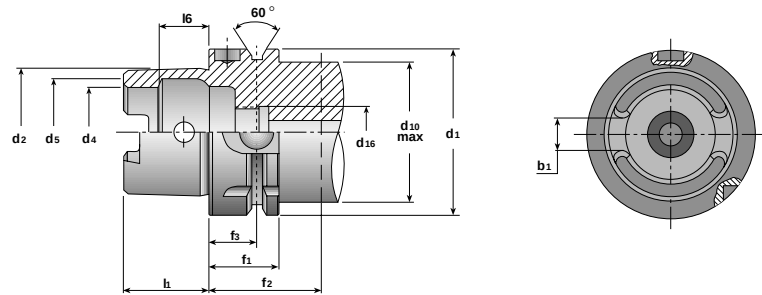
Add B suffix for coolant through flange.



58-60 HRC

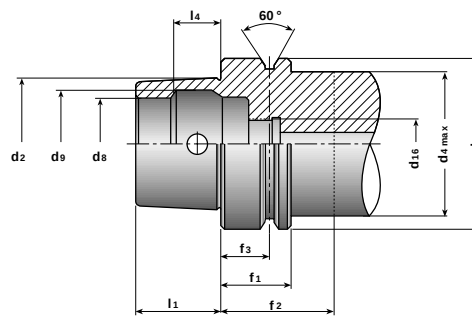
Ra 4µin

DIN 64893



HSK-A	d ₁	d ₂	d ₄	d ₅	d ₁₀	d ₁₆	l ₁	l ₆	b ₁	f ₁	f ₂	f ₃
40	40	30	21	25.5	34	M12x1	20	11.42	8.05	20	35	16
50	50	38	26	32.0	42	M16x1	25	14.13	10.54	26	42	18
63	63	48	34	40.0	53	M18x1	32	18.13	12.54	26	42	18
80	80	60	42	50.0	67	M20x1.5	40	22.85	16.04	26	42	18
100	100	75	53	63.0	85	M24x1.5	50	28.56	20.02	29	45	20

■ HSK - STANDARD TOOL HOLDER DIN69893 FORM E STANDARD

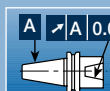


HSK-E	d ₁	d ₂	d ₄	d ₈	d ₉	d ₁₆	l ₁	l ₄	f ₁	f ₂	f ₃
40	40	30	34	21	25.5	M12X1	20	11.42	20	35	16
50	50	38	42	26	32.0	M16X1	25	14.13	26	42	18
63	63	48	53	34	40.0	M18X1	32	18.13	26	42	18

■ HSK - ER COLLET CHUCK (METRIC)

HSK E-ER16 / ER20 / ER25 / ER32

Add B suffix for coolant through flange.

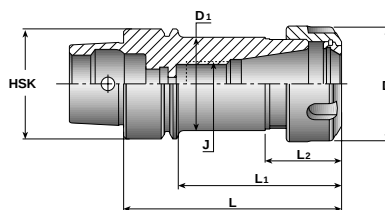


58-60 HRC

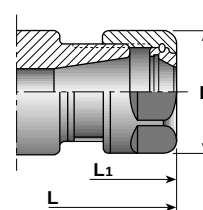


HSK DIN 69896
Form E

ER DIN 6499



ER25,32



ER16,20

Designation	HSK-E	Range	D	D ₁	L	L ₁	L ₂	J
HSK E 40 ER16X 60	40	0.5-10	28	-	60	40	-	-
HSK E 40 ER16X 80	40	0.5-10	28	-	80	60	-	M10
HSK E 40 ER20X 80	40	1.0-13	34	-	80	60	-	M12
HSK E 40 ER25X 80	40	1.0-16	42	34.0	80	60	28	M18x1.5
HSK E 40 ER32X 80	40	2.0-20	50	40.1	80	60	31	M22x1.5
HSK E 50 ER16X 80 *	50	0.5-10	28	-	80	54	-	M10
HSK E 50 ER16X 100 *	50	0.5-10	28	-	100	74	-	M10
HSK E 50 ER20X 80 *	50	1.0-13	34	-	80	54	-	M10
HSK E 50 ER25X 80 *	50	1.0-16	42	32.4	80	54	28	-
HSK E 50 ER32X 80 *	50	2.0-20	50	40.4	80	54	31	-
HSK E 50 ER32X 100 *	50	2.0-20	50	40.4	100	74	31	M22x1.5
HSK E 63 ER16X 80 **	63	0.5-10	28	-	80	54	-	M10
HSK E 63 ER16X 100 **	63	0.5-10	28	-	100	74	-	M10
HSK E 63 ER32X 80 **	63	2.0-20	50	40.4	80	54	31	-
HSK E 63 ER32X 100 **	63	2.0-20	50	-	100	75	-	M22x1.5

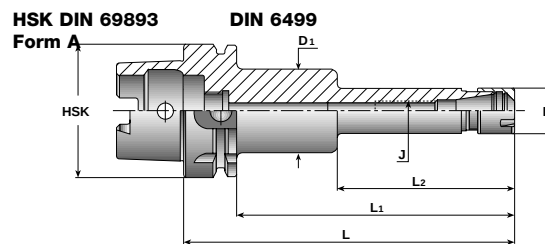
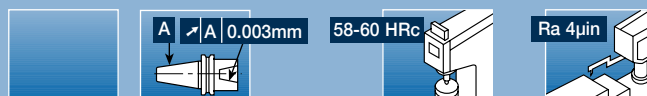
* Balance G2.5 35.000 RPM.

** Balance G2.5 30.000 RPM.

Coolant tube not included.

■ HSK - ER MINI COLLET CHUCK (METRIC) HSK A-ER-M

Add B suffix for coolant through flange.

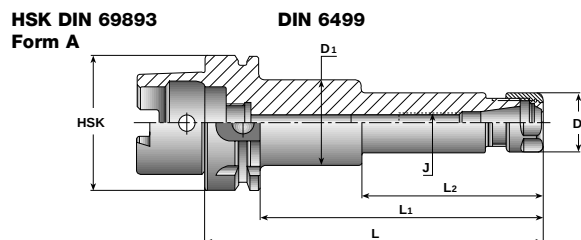
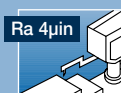
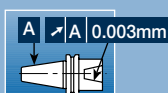


Designation	HSK-A	Range	D	D ₁	L	L ₁	L ₂	J
HSK A 50 ER16X100 M	50	0.5-10	22	-	100	74	-	M10
HSK A 50 ER16X120 M	50	0.5-10	22	-	120	94	-	M10
HSK A 50 ER20X100 M	50	1.0-13	28	-	100	74	-	M12
HSK A 50 ER20X120 M	50	1.0-13	28	-	120	94	-	M12
HSK A 63 ER16X100 M	63	0.5-10	22	-	100	74	-	M10
HSK A 63 ER16X120 M	63	0.5-10	22	40	120	94	78	M10
HSK A 63 ER16X160 M	63	0.5-10	22	40	160	134	85	M10
HSK A 63 ER20X100 M	63	1.0-13	28	-	100	74	-	M12
HSK A 63 ER20X120 M	63	1.0-13	28	-	120	94	-	M12
HSK A 63 ER20X160 M	63	1.0-13	28	45	160	134	85	M12
HSK A 100 ER16X100 M*	100	0.5-10	22	-	100	71	-	M10
HSK A 100 ER16X160 M*	100	0.5-10	22	40	160	131	85	M10
HSK A 100 ER20X100 M*	100	1.0-13	28	-	100	71	-	M12
HSK A 100 ER20X160 M*	100	1.0-13	28	45	160	131	85	M12

* Balance to G6.3 12,000 RPM.
Coolant tube not included.

■ HSK - ER COLLET CHUCK (METRIC) HSK A-ER

Add B suffix for coolant through flange.

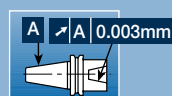


Designation	HSK-A	Range	D	D ₁	L	L ₁	L ₂	J
HSK A 40 ER16X80	40	0.5-10	28	-	80	60	-	M10
HSK A 40 ER16X100	40	0.5-10	28	-	100	80	-	M10
HSK A 50 ER16X100	50	0.5-10	28	-	100	74	-	M10
HSK A 50 ER16X120	50	0.5-10	28	-	120	94	-	M10
HSK A 50 ER20X100	50	1.0-13	34	-	100	74	-	M12
HSK A 50 ER20X120	50	1.0-13	34	-	120	94	-	M12
HSK A 63 ER16X100	63	0.5-10	28	-	100	74	-	M10
HSK A 63 ER16X120	63	0.5-10	28	-	120	94	-	M10
HSK A 63 ER16X160	63	0.5-10	28	40	160	134	85.6	M10
HSK A 63 ER20X100	63	1.0-13	34	-	100	74	-	M12
HSK A 63 ER20X120	63	1.0-13	34	-	120	94	-	M12
HSK A 63 ER20X160	63	1.0-13	34	45	160	134	85.0	M12
HSK A 100 ER16X100*	100	0.5-10	28	-	100	71	-	M10
HSK A 100 ER16X160*	100	0.5-10	28	40	160	131	85.0	M10
HSK A 100 ER20X100*	100	1.0-13	34	-	100	71	-	M12
HSK A 100 ER20X160*	100	1.0-13	34	45	160	131	85.0	M12

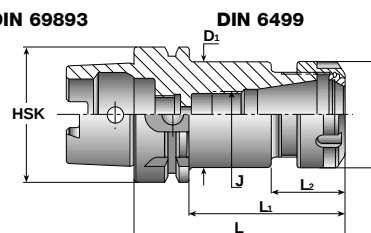
* Balance to G6.3 12,000 RPM.
Coolant tube not included.

■ HSK - ER COLLET CHUCK (METRIC) HSK A-ER

Add B suffix for coolant through flange.



**HASK DIN 69893
Form A**

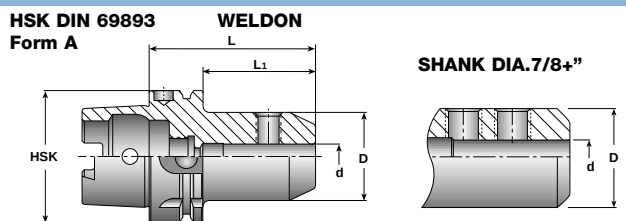
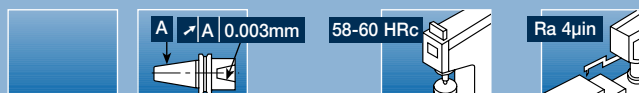


Designation	HSK-A	Range	D	D ₁	L	L ₁	L ₂	J
HSK A 40 ER25X80	40	1-16	42	32.4	80	60	28.0	M18x1.5
HSK A 40 ER25X100	40	1-16	42	32.4	100	80	28.0	M16
HSK A 40 ER32X100	40	2-20	50	40.4	100	80	31.0	M22x1.5
HSK A 50 ER25X 80	50	1-16	42	32.4	80	54	28.0	M16
HSK A 50 ER25X100	50	1-16	42	41.8	100	74	28.5	M16
HSK A 50 ER32X100	50	2-20	50	40.4	100	74	31.0	M22x1.5
HSK A 50 ER32X120	50	2-20	50	41.8	120	94	35.0	M22x1.5
HSK A 63 ER25X 80	63	1-16	42	-	80	54	-	M16
HSK A 63 ER25X100	63	1-16	42	-	100	74	-	M16
HSK A 63 ER25X120	63	1-16	42	-	120	94	-	M16
HSK A 63 ER25X160	63	1-16	42	-	160	134	-	M16
HSK A 63 ER32X 80	63	2-20	50	40.4	80	54	31.0	M22x1.5
HSK A 63 ER32X100	63	2-20	50	-	100	74	-	M22x1.5
HSK A 63 ER32X120	63	2-20	50	-	120	94	-	M22x1.5
HSK A 63 ER32X140	63	2-20	50	-	140	114	-	M22x1.5
HSK A 63 ER32X160	63	2-20	50	-	160	134	-	M22x1.5
HSK A 63 ER40X 80	63	3-26	63	50.4	80	54	34.0	M28x1.5
HSK A 63 ER40X100	63	3-26	63	50.4	100	74	34.0	M28x1.5
HSK A 63 ER40X120	63	3-26	63	50.4	120	94	34.0	M28x1.5

Coolant tube not included.

HSK - ENDMILL HOLDER HSK A-EM

Add B suffix for coolant through flange.



Designation	HSK-A	d	L	D	L ₁
HSK A 50 EM3/16 X2.562	50	.188	2.562	.866	1.538
HSK A 50 EM1/4 X2.562	50	.250	2.562	1.000	1.538
HSK A 50 EM3/8 X2.562	50	.375	2.562	1.378	1.538
HSK A 50 EM1/2 X3.125	50	.500	3.125	1.614	2.101
HSK A 50 EM5/8 X3.125	50	.625	3.125	1.752	2.101
HSK A 50 EM3/4 X3.125	50	.750	3.125	1.937	2.101
HSK A 50 EM7/8 X4.000	50	.875	4.000	2.205	2.976
HSK A 50 EM1 X4.250	50	1.000	4.250	2.563	3.226
HSK A 63 EM3/16 X2.562	63	.188	2.562	.866	1.538
HSK A 63 EM1/4 X2.562	63	.250	2.562	1.000	1.538
HSK A 63 EM3/8 X2.562	63	.375	2.562	1.378	1.538
HSK A 63 EM1/2 X3.125	63	.500	3.125	1.614	2.101
HSK A 63 EM5/8 X3.125	63	.625	3.125	1.752	2.101
HSK A 63 EM3/4 X3.150	63	.750	3.150	1.937	2.101
HSK A 63 EM7/8 X4.000	63	.875	4.000	2.047	2.976
HSK A 63 EM1 X4.250	63	1.000	4.250	2.563	3.226
HSK A 63 EM1-1/4X4.250	63	1.250	4.250	2.813	3.226
HSK A100 EM3/16 X3.125	100	.188	3.125	.866	1.983
HSK A100 EM1/4 X3.125	100	.250	3.125	1.000	1.983
HSK A100 EM3/8 X3.125	100	.375	3.125	1.378	1.983
HSK A100 EM1/2 X3.125	100	.500	3.125	1.614	1.983
HSK A100 EM5/8 X4.000	100	.625	4.000	1.752	2.858
HSK A100 EM3/4 X4.000	100	.750	4.000	1.937	2.858
HSK A100 EM7/8 X4.000	100	.875	4.000	2.047	2.858
HSK A100 EM1 X4.000	100	1.000	4.000	2.563	2.858
HSK A100 EM1-1/4X4.000	100	1.250	4.000	2.813	2.858
HSK A100 EM1-1/2X4.000	100	1.500	4.000	3.000	2.858

Coolant tube not included.

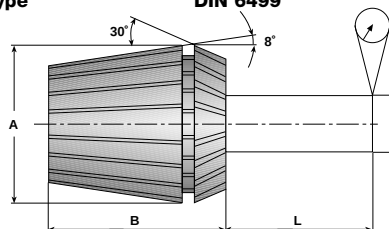
* Metric styles available. Call for delivery information.

ER COLLET - STANDARD RUNOUT PRECISION

Add B suffix for coolant through flange.

ER Collet Type

DIN 6499



L Inch	L mm	D Inch	D mm	Ingersoll Precision Standard Inch	Ingersoll Precision Standard mm	Ingersoll "AA" Ultra Precision Inch	Ingersoll "AA" Ultra Precision mm	DIN 6499*	DIN 6499*
.24	6	.039- .063	1.0- 1.6	.0004	0.01	.0002	0.005		
.39	10	.063- .118	1.6- 3.0	.0004	0.01	.0002	0.005	.0006	0.015
.63	16	.118- .236	3.0- 6.0	.0004	0.01	.0002	0.005	.0006	0.015
.98	25	.236- .394	6.0-10.0	.0004	0.01	.0002	0.005	.0006	0.015
1.57	40	.394- .709	10.0-18.0	.0004	0.01	.0002	0.005	.0008	0.020
1.97	50	.709-1.024	18.0-26.0	.0004	0.01	.0002	0.005	.0008	0.020
2.36	60	1.024-1.339	26.0-34.0					.0010	0.025

*ER50 DIN6499

ER Sizes

Type	A Inch	A mm	B Inch	B mm
ER-11	.45	11.5	.71	18
ER-16	.67	17	1.06	27
ER-20	.83	21	1.22	31
ER-25	1.02	26	1.38	35
ER-32	1.30	33	1.57	40
ER-40	1.61	41	1.81	46
ER-50	2.05	52	2.36	60

ER COLLET - SEALED COLLET

Application:

For use with solid and coolant through tools. Ideal for high speed machining as well as conventional machining. Can be used on machining centers, lathes and other machine types.

Features:

- Front sealed design
- .040" (1mm) range
- Improved coolant delivery can increase tool life
- Two styles available: ER JET and JET2

Advantages:

- Can be used with high pressure coolant 1450 PSI max.
- Designed for use with Weldon shanks, cylindrical shanks and whistle notch styles.

Notes:

- Minimum clamping length: 2X shank diameter, to insure minimum run-out and maximum clamping.
- When using JET2 style collets, tool should be rotated to direct coolant flow to flutes for optimum chip evacuation.



■ ER COLLET - ER COOLIT SEALED COLLET

Two types:



Sealed Collet jet

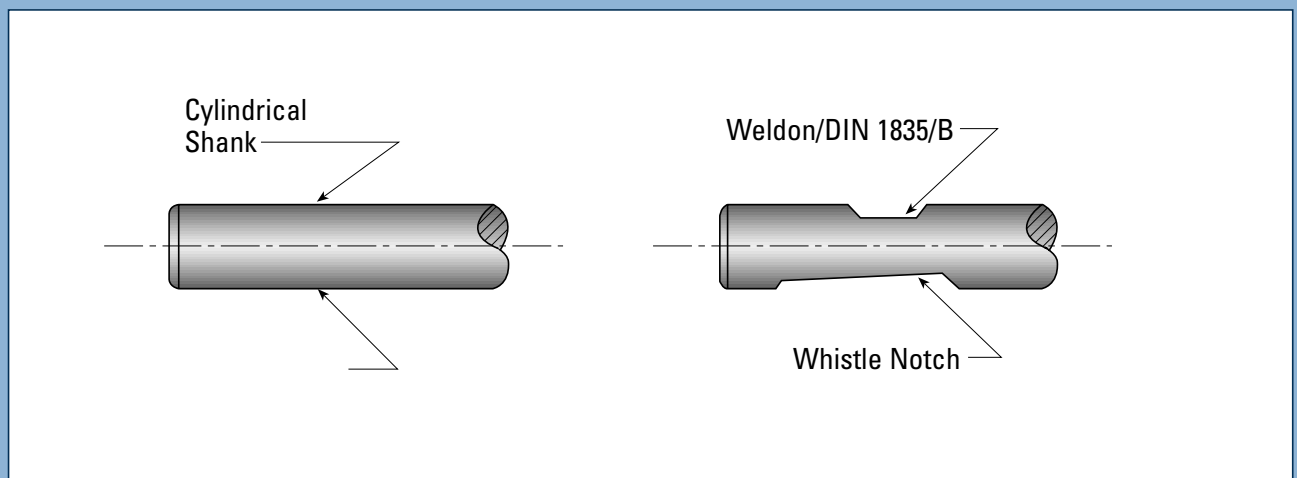
For straight shank cutting tools with coolant through.



Sealed Collet jet2

With angular double nozzle. Coolant flow should be directed to flutes of cutting tool.

Shank Standards



ER COLLET - ER TOP CLAMPING NUT DIN 6499

Description:

Precision ER retention nut. Two-piece design incorporating a specialized, two-piece friction mechanism which is self centering.

Features:

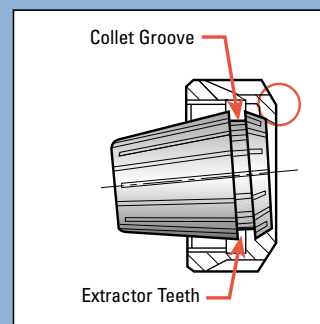
- Friction/bearing design offers 50%-100% greater torque transfer than conventional ER collet chucks.
- Balanced, allowing much higher RPM, due to unique extractor teeth.
- Compact style, no longer than standard ER retention nut.
- Designed for use with sealed collets.

Operation:

Always insert collet INTO nut BEFORE threading nut onto the collet chuck.

Assembly Procedure:

1. Angle collet into nut, inserting the extractor teeth into the groove on collet.
2. Place collet/nut onto a flat work surface.
3. Press collet into nut until it "snaps" into place; thread collet/nut onto collet chuck; insert tool shank and tighten to proper torque for that size collet.



■ ER COLLET - ER TOP CLAMPING NUT DIN 6499

Important: Do not insert any ER collet parallel to the extractor ring. Damage to the ring and teeth may occur. When removing the nut during disassembly, the collet will easily release from the ring.

To Disassemble

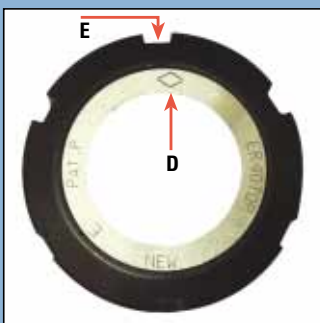
1. After removing the nut/collet assembly from the collet chuck, align the engraved "diamond" (**D**) with a key slot (**E**) on the nut.
2. Place the nut/collet on a flat surface as shown in figure **F**.
3. Insert a flat blade screwdriver between the nut and collet.
4. Using a minimum force, tilt the screwdriver outward, while applying opposite pressure by hand to remove the collet.

Recommended Clamping Torque for Standard ER & ER-Top Clamping Nut

Nut type	FT./LBS	Kg×M
E-11	36	5
ER-11M	21	3
ER-16	50	7
ER-16M	29	4
ER-20	86	12
ER-20M	58	8
ER-25	144	20
ER-32	160	22
ER-40	180	25
ER-50	252	35

Important:

Torque values have been calculated based on maximum diameter capacity. The torque spec may be reduced based on smaller diameter shank sizes.



F

Note:

For maximum performance, the clamping nut thread and collet taper must be cleaned and oiled before use.

ER COLLET - ER SPRING COLLETS DIN 6499

ER-11,16,20,25-SPR

Designation	Diameter Range	Diameter Range (mm)
ER11 SPR .022-.041	1/32 (.022-.041)	0.5-1
ER11 SPR .041-.080	1/16 (.041-.080)	1-2
ER11 SPR .080-.120	3/32 (.080-.120)	2-3
ER11 SPR .120-.159	1/8 (.120-.159)	3-4
ER11 SPR .159-.199	3/16 (.159-.199)	4-5
ER11 SPR .199-.238	7/32 (.199-.238)	5-6
ER11 SPR .238-.278	1/4 (.238-.278)	6-7
ER16 SPR .022-.041	1/32 (.022-.041)	0.5-1
ER16 SPR .041-.080	1/16 (.041-.080)	1-2
ER16 SPR .080-.120	3/32 (.080-.120)	2-3
ER16 SPR .120-.159	1/8 (.120-.159)	3-4
ER16 SPR .159-.199	3/16 (.159-.199)	4-5
ER16 SPR .199-.238	7/32 (.199-.238)	5-6
ER16 SPR .238-.278	1/4 (.238-.278)	6-7
ER16 SPR .278-.317	5/16 (.278-.317)	7-8
ER16 SPR .317-.356	11/32 (.317-.356)	8-9
ER16 SPR .356-.396	3/8 (.356-.396)	9-10
ER20 SPR .041-.080	1/16 (.041-.080)	1-2
ER20 SPR .080-.120	3/32 (.080-.120)	2-3
ER20 SPR .120-.159	1/8 (.120-.159)	3-4
ER20 SPR .159-.199	3/16 (.159-.199)	4-5
ER20 SPR .199-.238	7/32 (.199-.238)	5-6
ER20 SPR .238-.278	1/4 (.238-.278)	6-7
ER20 SPR .278-.317	5/16 (.278-.317)	7-8
ER20 SPR .317-.356	11/32 (.317-.356)	8-9
ER20 SPR .356-.396	3/8 (.356-.396)	9-10
ER20 SPR .396-.435	13/32 (.396-.435)	10-11
ER20 SPR .435-.474	7/16 (.435-.474)	11-12
ER20 SPR .474-.514	1/2 (.474-.514)	12-13
ER25 SPR .041-.080	1/16 (.041-.080)	1-2
ER25 SPR .080-.120	3/32 (.080-.120)	2-3
ER25 SPR .120-.159	1/8 (.120-.159)	3-4
ER25 SPR .159-.199	3/16 (.159-.199)	4-5
ER25 SPR .199-.238	7/32 (.199-.238)	5-6
ER25 SPR .238-.278	1/4 (.238-.278)	6-7
ER25 SPR .278-.317	5/16 (.278-.317)	7-8
ER25 SPR .317-.356	11/32 (.317-.356)	8-9
ER25 SPR .356-.396	3/8 (.356-.396)	9-10
ER25 SPR .396-.435	13/32 (.396-.435)	10-11
ER25 SPR .435-.474	7/16 (.435-.474)	11-12
ER25 SPR .474-.514	1/2 (.474-.514)	12-13
ER25 SPR .514-.553	17/32 (.514-.553)	13-14
ER25 SPR .553-.593	9/16 (.553-.593)	14-15
ER25 SPR .593-.632	5/8 (.593-.632)	15-16



ER32,40-SPR

Designation	Diameter Range	Diameter Range (mm)
ER32 SPR .080-.120	3/32 (.080-.120)	2-3
ER32 SPR .120-.159	1/8 (.120-.159)	3-4
ER32 SPR .159-.199	3/16 (.159-.199)	4-5
ER32 SPR .199-.238	7/32 (.199-.238)	5-6
ER32 SPR .238-.278	1/4 (.238-.278)	6-7
ER32 SPR .278-.317	5/16 (.278-.317)	7-8
ER32 SPR .317-.356	11/32 (.317-.356)	8-9
ER32 SPR .356-.396	3/8 (.356-.396)	9-10
ER32 SPR .396-.435	13/32 (.396-.435)	10-11
ER32 SPR .435-.474	7/16 (.435-.474)	11-12
ER32 SPR .474-.514	1/2 (.474-.514)	12-13
ER32 SPR .514-.553	17/32 (.514-.553)	13-14
ER32 SPR .553-.593	9/16 (.553-.593)	14-15
ER32 SPR .593-.632	5/8 (.593-.632)	15-16
ER32 SPR .632-.671	21/32 (.632-.671)	16-17
ER32 SPR .671-.711	11/16 (.671-.711)	17-18
ER32 SPR .711-.750	3/4 (.711-.750)	18-19
ER32 SPR .750-.789	25/32 (.750-.789)	19-20
ER40 SPR .120-.159	1/8 (.120-.159)	3-4
ER40 SPR .159-.199	3/16 (.159-.199)	4-5
ER40 SPR .199-.238	7/32 (.199-.238)	5-6
ER40 SPR .238-.278	1/4 (.238-.278)	6-7
ER40 SPR .278-.317	5/16 (.278-.317)	7-8
ER40 SPR .317-.356	11/32 (.317-.356)	8-9
ER40 SPR .356-.396	3/8 (.356-.396)	9-10
ER40 SPR .396-.435	13/32 (.396-.435)	10-11
ER40 SPR .435-.474	7/16 (.435-.474)	11-12
ER40 SPR .474-.514	1/2 (.474-.514)	12-13
ER40 SPR .514-.553	17/32 (.514-.553)	13-14
ER40 SPR .553-.593	9/16 (.553-.593)	14-15
ER40 SPR .593-.632	5/8 (.593-.632)	15-16
ER40 SPR .632-.671	21/32 (.632-.671)	16-17
ER40 SPR .671-.711	11/16 (.671-.711)	17-18
ER40 SPR .711-.750	3/4 (.711-.750)	18-19
ER40 SPR .750-.789	25/32 (.750-.789)	19-20
ER40 SPR .789-.829	13/16 (.789-.829)	20-21
ER40 SPR .829-.868	27/32 (.829-.868)	21-22
ER40 SPR .868-.907	7/8 (.868-.907)	22-23
ER40 SPR .907-.947	15/16 (.907-.947)	23-24
ER40 SPR .947-.986	31/32 (.947-.986)	24-25
ER40 SPR .986-1.025	1 (.986-1.025)	25-26

ER COLLET - ER SPRING COLLETS DIN 6499



ER50-SPR

Designation	Diameter Range	Diameter Range (mm)
ER50 SPR .396-.474	13/32, 7/16 (.396-.474)	10-12
ER50 SPR .474-.553	1/2, 17/32 (.474-.553)	12-14
ER50 SPR .553-.632	9/16, 5/8 (.553-.632)	14-16
ER50 SPR .632-.711	21/32, 11/16 (.632-.711)	16-18
ER50 SPR .711-.789	3/4, 25/32 (.711-.789)	18-20
ER50 SPR .789-.868	13/16, 27/32 (.789-.868)	20-22
ER50 SPR .868-.947	7/8, 15/16 (.868-.947)	22-24
ER50 SPR .947-1.025	31/32, 1 (.947-1.025)	24-26
ER50 SPR 1.025-1.102	1-1/16 (1.025-1.102)	26-28
ER50 SPR 1.102-1.181	1-1/8 (1.102-1.181)	28-30
ER50 SPR 1.181-1.260	1-1/4 (1.181-1.260)	30-32
ER50 SPR 1.260-1.338	1-5/16 (1.260-1.338)	32-34

ER-EX* (Single-diameter spring collets)

Designation	Diameter	Diameter Range (mm)
ER32 EX .125	.125 (1/8)	3.175
ER32 EX .250	.250 (1/4)	6.350
ER32 EX .312	.312 (5/16)	7.924
ER32 EX .375	.375 (3/8)	9.525
ER32 EX .500	.500 (1/2)	12.700
ER32 EX .625	.625 (5/8)	15.875
ER32 EX .750	.750 (3/4)	19.050
ER40 EX .250	.250 (1/4)	6.350
ER40 EX .312	.312 (5/16)	7.924
ER40 EX .375	.375 (3/8)	9.525
ER40 EX .500	.500 (1/2)	12.700
ER40 EX .625	.625 (5/8)	15.875
ER40 EX .750	.750 (3/4)	19.050
ER40 EX .875	.875 (7/8)	22.225
ER40 EX 1.000	1.000	25.400

* Recommended for improved runout and clamping torque.

ER COLLET - ER SPRING COLLETS DIN 6499



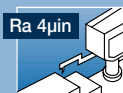
ER11,16,20-SPR-AA

Designation	Diameter Range	Diameter Range (mm)
ER11 SPR .022-.041 AA	1/32 (.022-.041)	0.5-1
ER11 SPR .041-.080 AA	1/16 (.041-.080)	1-2
ER11 SPR .080-.120 AA	3/32 (.080-.120)	2-3
ER11 SPR .120-.159 AA	1/8 (.120-.159)	3-4
ER11 SPR .159-.199 AA	3/16 (.159-.199)	4-5
ER11 SPR .199-.238 AA	7/32 (.199-.238)	5-6
ER11 SPR .238-.278 AA	1/4 (.238-.278)	6-7
ER16 SPR .022-.041 AA	1/32 (.022-.041)	0.5-1
ER16 SPR .041-.080 AA	1/16 (.041-.080)	1-2
ER16 SPR .080-.120 AA	3/32 (.080-.120)	2-3
ER16 SPR .120-.159 AA	1/8 (.120-.159)	3-4
ER16 SPR .159-.199 AA	3/16 (.159-.199)	4-5
ER16 SPR .199-.238 AA	7/32 (.199-.238)	5-6
ER16 SPR .238-.278 AA	1/4 (.238-.278)	6-7
ER16 SPR .278-.317 AA	5/16 (.278-.317)	7-8
ER16 SPR .317-.356 AA	11/32 (.317-.356)	8-9
ER16 SPR .356-.396 AA	3/8 (.356-.396)	9-10
ER20 SPR .041-.080 AA	1/16 (.041-.080)	1-2
ER20 SPR .080-.120 AA	3/32 (.080-.120)	2-3
ER20 SPR .120-.159 AA	1/8 (.120-.159)	3-4
ER20 SPR .159-.199 AA	3/16 (.159-.199)	4-5
ER20 SPR .199-.238 AA	7/32 (.199-.238)	5-6
ER20 SPR .238-.278 AA	1/4 (.238-.278)	6-7
ER20 SPR .278-.317 AA	5/16 (.278-.317)	7-8
ER20 SPR .317-.356 AA	11/32 (.317-.356)	8-9
ER20 SPR .356-.396 AA	3/8 (.356-.396)	9-10
ER20 SPR .396-.435 AA	13/32 (.396-.435)	10-11
ER20 SPR .435-.474 AA	7/16 (.435-.474)	11-12
ER20 SPR .474-.514 AA	1/2 (.474-.514)	12-13

ER25,32-SPR-AA

Designation	Diameter Range	Diameter Range (mm)
ER25 SPR .041-.080 AA	1/16 (.041-.080)	1-2
ER25 SPR .080-.120 AA	3/32 (.080-.120)	2-3
ER25 SPR .120-.159 AA	1/8 (.120-.159)	3-4
ER25 SPR .159-.199 AA	3/16 (.159-.199)	4-5
ER25 SPR .199-.238 AA	7/32 (.199-.238)	5-6
ER25 SPR .238-.278 AA	1/4 (.238-.278)	6-7
ER25 SPR .278-.317 AA	5/16 (.278-.317)	7-8
ER25 SPR .317-.356 AA	11/32 (.317-.356)	8-9
ER25 SPR .356-.396 AA	3/8 (.356-.396)	9-10
ER25 SPR .396-.435 AA	13/32 (.396-.435)	10-11
ER25 SPR .435-.474 AA	7/16 (.435-.474)	11-12
ER25 SPR .474-.514 AA	1/2 (.474-.514)	12-13
ER25 SPR .514-.553 AA	17/32 (.514-.553)	13-14
ER25 SPR .553-.593 AA	9/16 (.553-.593)	14-15
ER25 SPR .593-.632 AA	5/8 (.593-.632)	15-16
ER32 SPR .080-.120 AA	3/32 (.080-.120)	2-3
ER32 SPR .120-.159 AA	1/8 (.120-.159)	3-4
ER32 SPR .159-.199 AA	3/16 (.159-.199)	4-5
ER32 SPR .199-.238 AA	7/32 (.199-.238)	5-6
ER32 SPR .238-.278 AA	1/4 (.238-.278)	6-7
ER32 SPR .278-.317 AA	5/16 (.278-.317)	7-8
ER32 SPR .317-.356 AA	11/32 (.317-.356)	8-9
ER32 SPR .356-.396 AA	3/8 (.356-.396)	9-10
ER32 SPR .396-.435 AA	13/32 (.396-.435)	10-11
ER32 SPR .435-.474 AA	7/16 (.435-.474)	11-12
ER32 SPR .474-.514 AA	1/2 (.474-.514)	12-13
ER32 SPR .514-.553 AA	17/32 (.514-.553)	13-14
ER32 SPR .553-.593 AA	9/16 (.553-.593)	14-15
ER32 SPR .593-.632 AA	5/8 (.593-.632)	15-16
ER32 SPR .632-.671 AA	21/32 (.632-.671)	16-17
ER32 SPR .671-.711 AA	11/16 (.671-.711)	17-18
ER32 SPR .711-.750 AA	3/4 (.711-.750)	18-19
ER32 SPR .750-.789 AA	25/32 (.750-.789)	19-20

■ ER COLLET - ER SPRING COLLETS DIN 6499 "AA"



Designation	Diameter Range	Diameter Range (mm)
ER40 SPR .120-.159 AA	1/8 (.120-.159)	3-4
ER40 SPR .159-.199 AA	3/16 (.159-.199)	4-5
ER40 SPR .199-.238 AA	7/32 (.199-.238)	5-6
ER40 SPR .238-.278 AA	1/4 (.238-.278)	6-7
ER40 SPR .278-.317 AA	5/16 (.278-.317)	7-8
ER40 SPR .317-.356 AA	11/32 (.317-.356)	8-9
ER40 SPR .356-.396 AA	3/8 (.356-.396)	9-10
ER40 SPR .396-.435 AA	13/32 (.396-.435)	10-11
ER40 SPR .435-.474 AA	7/16 (.435-.474)	11-12
ER40 SPR .474-.514 AA	1/2 (.474-.514)	12-13
ER40 SPR .514-.553 AA	17/32 (.514-.553)	13-14
ER40 SPR .553-.593 AA	9/16 (.553-.593)	14-15
ER40 SPR .593-.632 AA	5/8 (.593-.632)	15-16
ER40 SPR .632-.671 AA	21/32 (.632-.671)	16-17
ER40 SPR .671-.711 AA	11/16 (.671-.711)	17-18
ER40 SPR .711-.750 AA	3/4 (.711-.750)	18-19
ER40 SPR .750-.789 AA	25/32 (.750-.789)	19-20
ER40 SPR .789-.829 AA	13/16 (.789-.829)	20-21
ER40 SPR .829-.868 AA	27/32 (.829-.868)	21-22
ER40 SPR .868-.907 AA	7/8 (.868-.907)	22-23
ER40 SPR .907-.947 AA	15/16 (.907-.947)	23-24
ER40 SPR .947-.986 AA	31/32 (.947-.986)	24-25
ER40 SPR .986-1.025 AA	1 (.986-1.025)	25-26

■ TG100 COLLET - TG100 + SPRING COLLET



↑ .0004

**ULTRA
PRECISION
'AA'**

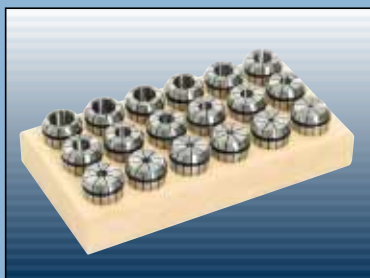


TG100+-SPR

Designation	Diameter Range	Diameter Range (mm)
TG100+ SPR .093-.150	1/8, 9/64 (.093-.150)	2.5-3.5
TG100+ SPR .150-.199	5/32, 11/64, 3/16 (.150-.199)	4-5
TG100+ SPR .199-.238	13/64, 7/32, 15/64 (.199-.238)	5-6
TG100+ SPR .238-.278	1/4, 17/64 (.238-.278)	6-7
TG100+ SPR .278-.317	9/32, 19/64, 5/16 (.278-.317)	7-8
TG100+ SPR .317-.356	21/64, 11/32 (.317-.356)	8-9
TG100+ SPR .356-.396	23/64, 3/8, 25/64 (.356-.396)	9-10
TG100+ SPR .396-.435	13/32, 27/64 (.396-.435)	10-11
TG100+ SPR .435-.474	7/16, 29/64, 15/32 (.435-.474)	11-12
TG100+ SPR .474-.514	31/64, 1/2 (.474-.514)	12-13
TG100+ SPR .514-.553	33/64, 17/32, 35/64 (.514-.553)	13-14
TG100+ SPR .553-.593	9/16, 37/64, 19/32 (.553-.593)	14-15
TG100+ SPR .593-.632	39/64, 5/8 (.593-.632)	15-16
TG100+ SPR .632-.671	41/64, 21/32, 43/64 (.632-.671)	16-17
TG100+ SPR .671-.711	11/16, 45/64 (.671-.711)	17-18
TG100+ SPR .711-.750	23/32, 47/32, 3/4 (.711-.750)	18-19
TG100+ SPR .750-.789	49/64, 25/32 (.750-.789)	19-20
TG100+ SPR .789-.829	51/64, 13/16, 53/64 (.789-.829)	20-21
TG100+ SPR .829-.868	27/32, 55/64 (.829-.868)	21-22
TG100+ SPR .868-.907	7/8, 57/64, 29/32 (.868-.907)	22-23
TG100+ SPR .907-.947	59/64, 15/16 (.907-.947)	23-24
TG100+ SPR .947-.986	61/64, 31/32, 63/64 (.947-.986)	24-25
TG100+ SPR .986-1.025	1 (.986-1.025)	25-26

⁽¹⁾Expanded collapsibility range (.04")

SET-TG100+-SPR Spring Collets



Designation	Diameter Range	Diameter Range (mm)	Pcs.
SET TG100+ SPR .093-1.025 23	1/8-1 (.093-1.025)	2.5-26	23
SET TG100+ SPR .093-.514 10	1/8-1/2 (.093-.514)	2.5-13	10
SET TG100+ SPR .511-1.025 13	33/64-1 (.511-1.025)	13-26	13

ER COOLIT - SEALED JET COLLET 1450 PSI



ER16, 20, 25-SEAL

Designation	Diameter Range	Diameter Range (mm)
ER16 SEAL .120-.159	1/8 (.120-.159)	3-4
ER16 SEAL .159-.199	3/16 (.159-.199)	4-5
ER16 SEAL .199-.238	7/32 (.199-.238)	5-6
ER16 SEAL .238-.278	1/4 (.238-.278)	6-7
ER16 SEAL .278-.317	5/16 (.278-.317)	7-8
ER16 SEAL .317-.356	11/32 (.317-.356)	8-9
ER16 SEAL .356-.396	3/8 (.356-.396)	9-10
ER20 SEAL .120-.159	1/8 (.120-.159)	3-4
ER20 SEAL .159-.199	3/16 (.159-.199)	4-5
ER20 SEAL .199-.238	7/32 (.199-.238)	5-6
ER20 SEAL .238-.278	1/4 (.238-.278)	6-7
ER20 SEAL .278-.317	5/16 (.278-.317)	7-8
ER20 SEAL .317-.356	11/32 (.317-.356)	8-9
ER20 SEAL .356-.396	3/8 (.356-.396)	9-10
ER20 SEAL .396-.435	13/32 (.396-.435)	10-11
ER20 SEAL .435-.474	7/16 (.435-.474)	11-12
ER20 SEAL .474-.514	1/2 (.474-.514)	12-13
ER25 SEAL .120-.159	1/8 (.120-.159)	3-4
ER25 SEAL .159-.199	3/16 (.159-.199)	4-5
ER25 SEAL .199-.238	7/32 (.199-.238)	5-6
ER25 SEAL .238-.278	1/4 (.238-.278)	6-7
ER25 SEAL .278-.317	5/16 (.278-.317)	7-8
ER25 SEAL .317-.356	11/32 (.317-.356)	8-9
ER25 SEAL .356-.396	3/8 (.356-.396)	9-10
ER25 SEAL .396-.435	13/32 (.396-.435)	10-11
ER25 SEAL .435-.474	7/16 (.435-.474)	11-12
ER25 SEAL .474-.514	1/2 (.474-.514)	12-13
ER25 SEAL .514-.553	17/32 (.514-.553)	13-14
ER25 SEAL .553-.593	9/16 (.553-.593)	14-15
ER25 SEAL .593-.632	5/8 (.593-.632)	15-16

ER32, 40-SEAL

Designation	Diameter Range	Diameter Range (mm)
ER32 SEAL .120-.159	1/8 (.120-.159)	3-4
ER32 SEAL .159-.199	3/16 (.159-.199)	4-5
ER32 SEAL .199-.238	7/32 (.199-.238)	5-6
ER32 SEAL .238-.278	1/4 (.238-.278)	6-7
ER32 SEAL .278-.317	5/16 (.278-.317)	7-8
ER32 SEAL .317-.356	11/32 (.317-.356)	8-9
ER32 SEAL .356-.396	3/8 (.356-.396)	9-10
ER32 SEAL .396-.435	13/32 (.396-.435)	10-11
ER32 SEAL .435-.474	7/16 (.435-.474)	11-12
ER32 SEAL .474-.514	1/2 (.474-.514)	12-13
ER32 SEAL .514-.553	17/32 (.514-.553)	13-14
ER32 SEAL .553-.593	9/16 (.553-.593)	14-15
ER32 SEAL .593-.632	5/8 (.593-.632)	15-16
ER32 SEAL .632-.671	21/32 (.632-.671)	16-17
ER32 SEAL .671-.711	11/16 (.671-.711)	17-18
ER32 SEAL .711-.750	3/4 (.711-.750)	18-19
ER32 SEAL .750-.789	25/32 (.750-.789)	19-20
ER40 SEAL .120-.159	1/8 (.120-.159)	3-4
ER40 SEAL .159-.199	3/16 (.159-.199)	4-5
ER40 SEAL .199-.238	7/32 (.199-.238)	5-6
ER40 SEAL .238-.278	1/4 (.238-.278)	6-7
ER40 SEAL .278-.317	5/16 (.278-.317)	7-8
ER40 SEAL .317-.356	11/32 (.317-.356)	8-9
ER40 SEAL .356-.396	3/8 (.356-.396)	9-10
ER40 SEAL .396-.435	13/32 (.396-.435)	10-11
ER40 SEAL .435-.474	7/16 (.435-.474)	11-12
ER40 SEAL .474-.514	1/2 (.474-.514)	12-13
ER40 SEAL .514-.553	17/32 (.514-.553)	13-14
ER40 SEAL .553-.593	9/16 (.553-.593)	14-15
ER40 SEAL .593-.632	5/8 (.593-.632)	15-16
ER40 SEAL .632-.671	21/32 (.632-.671)	16-17
ER40 SEAL .671-.711	11/16 (.671-.711)	17-18
ER40 SEAL .711-.750	3/4 (.711-.750)	18-19
ER40 SEAL .750-.789	25/32 (.750-.789)	19-20
ER40 SEAL .789-.829	13/16 (.789-.829)	20-21
ER40 SEAL .829-.868	27/32 (.829-.868)	21-22
ER40 SEAL .868-.907	7/8 (.868-.907)	22-23
ER40 SEAL .907-.947	15/16 (.907-.947)	23-24
ER40 SEAL .947-.986	31/32 (.947-.986)	24-25
ER40 SEAL .986-1.025	1 (.986-1.025)	25-26

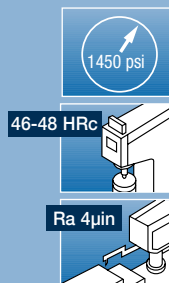
ER COOLIT - SEALED JET2 SPRING COLLETS 1450 PSI



ER16, 20, 25-SEAL-JET2

Designation	Diameter Range	Diameter Range (mm)
ER16 SEAL .120-.159 JET2	1/8 (.120-.159)	3-4
ER16 SEAL .159-.199 JET2	3/16 (.159-.199)	4-5
ER16 SEAL .199-.238 JET2	7/32 (.199-.238)	5-6
ER16 SEAL .238-.278 JET2	1/4 (.238-.278)	6-7
ER16 SEAL .278-.317 JET2	5/16 (.278-.317)	7-8
ER16 SEAL .317-.356 JET2	11/32 (.317-.356)	8-9
ER16 SEAL .356-.396 JET2	3/8 (.356-.396)	9-10
ER20 SEAL .120-.159 JET2	1/8 (.120-.159)	3-4
ER20 SEAL .159-.199 JET2	3/16 (.159-.199)	4-5
ER20 SEAL .199-.238 JET2	7/32 (.199-.238)	5-6
ER20 SEAL .238-.278 JET2	1/4 (.238-.278)	6-7
ER20 SEAL .278-.317 JET2	5/16 (.278-.317)	7-8
ER20 SEAL .317-.356 JET2	11/32 (.317-.356)	8-9
ER20 SEAL .356-.396 JET2	3/8 (.356-.396)	9-10
ER20 SEAL .396-.435 JET2	13/32 (.396-.435)	10-11
ER20 SEAL .435-.474 JET2	7/16 (.435-.474)	11-12
ER20 SEAL .474-.514 JET2	1/2 (.474-.514)	12-13
ER25 SEAL .120-.159 JET2	1/8 (.120-.159)	3-4
ER25 SEAL .159-.199 JET2	3/16 (.159-.199)	4-5
ER25 SEAL .199-.238 JET2	7/32 (.199-.238)	5-6
ER25 SEAL .238-.278 JET2	1/4 (.238-.278)	6-7
ER25 SEAL .278-.317 JET2	5/16 (.278-.317)	7-8
ER25 SEAL .317-.356 JET2	11/32 (.317-.356)	8-9
ER25 SEAL .356-.396 JET2	3/8 (.356-.396)	9-10
ER25 SEAL .396-.435 JET2	13/32 (.396-.435)	10-11
ER25 SEAL .435-.474 JET2	7/16 (.435-.474)	11-12
ER25 SEAL .474-.514 JET2	1/2 (.474-.514)	12-13
ER25 SEAL .514-.553 JET2	17/32 (.514-.553)	13-14
ER25 SEAL .553-.593 JET2	9/16 (.553-.593)	14-15
ER25 SEAL .593-.632 JET2	5/8 (.593-.632)	15-16

ER COOLIT - SEALED JET2 SPRING COLLETS 1450 PSI



ER32, 40-SEAL-JET2

Designation	Diameter Range	Diameter Range (mm)
ER32 SEAL .120-.159 JET2	1/8 (.120-.159)	3-4
ER32 SEAL .159-.199 JET2	3/16 (.159-.199)	4-5
ER32 SEAL .199-.238 JET2	7/32 (.199-.238)	5-6
ER32 SEAL .238-.278 JET2	1/4 (.238-.278)	6-7
ER32 SEAL .278-.317 JET2	5/16 (.278-.317)	7-8
ER32 SEAL .317-.356 JET2	11/32 (.317-.356)	8-9
ER32 SEAL .356-.396 JET2	3/8 (.356-.396)	9-10
ER32 SEAL .396-.435 JET2	13/32 (.396-.435)	10-11
ER32 SEAL .435-.474 JET2	7/16 (.435-.474)	11-12
ER32 SEAL .474-.514 JET2	1/2 (.474-.514)	12-13
ER32 SEAL .514-.553 JET2	17/32 (.514-.553)	13-14
ER32 SEAL .553-.593 JET2	9/16 (.553-.593)	14-15
ER32 SEAL .593-.632 JET2	5/8 (.593-.632)	15-16
ER32 SEAL .632-.671 JET2	21/32 (.632-.671)	16-17
ER32 SEAL .671-.711 JET2	11/16 (.671-.711)	17-18
ER32 SEAL .711-.750 JET2	3/4 (.711-.750)	18-19
ER32 SEAL .750-.789 JET2	25/32 (.750-.789)	19-20
ER40 SEAL .120-.159 JET2	1/8 (.120-.159)	3-4
ER40 SEAL .159-.199 JET2	3/16 (.159-.199)	4-5
ER40 SEAL .199-.238 JET2	7/32 (.199-.238)	5-6
ER40 SEAL .238-.278 JET2	1/4 (.238-.278)	6-7
ER40 SEAL .278-.317 JET2	5/16 (.278-.317)	7-8
ER40 SEAL .317-.356 JET2	11/32 (.317-.356)	8-9
ER40 SEAL .356-.396 JET2	3/8 (.356-.396)	9-10
ER40 SEAL .396-.435 JET2	13/32 (.396-.435)	10-11
ER40 SEAL .435-.474 JET2	7/16 (.435-.474)	11-12
ER40 SEAL .474-.514 JET2	1/2 (.474-.514)	12-13
ER40 SEAL .514-.553 JET2	17/32 (.514-.553)	13-14
ER40 SEAL .553-.593 JET2	9/16 (.553-.593)	14-15
ER40 SEAL .593-.632 JET2	5/8 (.593-.632)	15-16
ER40 SEAL .632-.671 JET2	21/32 (.632-.671)	16-17
ER40 SEAL .671-.711 JET2	11/16 (.671-.711)	17-18
ER40 SEAL .711-.750 JET2	3/4 (.711-.750)	18-19
ER40 SEAL .750-.789 JET2	25/32 (.750-.789)	19-20
ER40 SEAL .789-.829 JET2	13/16 (.789-.829)	20-21
ER40 SEAL .829-.868 JET2	27/32 (.829-.868)	21-22
ER40 SEAL .868-.907 JET2	7/8 (.868-.907)	22-23
ER40 SEAL .907-.947 JET2	15/16 (.907-.947)	23-24
ER40 SEAL .947-.986 JET2	31/32 (.947-.986)	24-25
ER40 SEAL .986-1.025 JET2	1 (.986-1.025)	25-26

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■ TG100 COOLIT - SEALED SPRING COLLETS 500 PSI



TG100-SEAL

Designation	Diameter Range
TG100 SEAL .172-.187	3/16 (.172-.187)
TG100 SEAL .188-.203	13/64 (.188-.203)
TG100 SEAL .204-.219	7/32 (.204-.219)
TG100 SEAL .219-.234	15/64 (.219-.234)
TG100 SEAL .235-.250	1/4 (.235-.250)
TG100 SEAL .251-.266	17/64 (.251-.266)
TG100 SEAL .266-.281	9/32 (.266-.281)
TG100 SEAL .282-.297	19/64 (.282-.297)
TG100 SEAL .297-.313	5/16 (.297-.313)
TG100 SEAL .313-.328	21/64 (.313-.328)
TG100 SEAL .329-.344	11/32 (.329-.344)
TG100 SEAL .344-.359	23/64 (.344-.359)
TG100 SEAL .360-.375	3/8 (.360-.375)
TG100 SEAL .376-.391	25/64 (.376-.391)
TG100 SEAL .391-.406	13/32 (.391-.406)
TG100 SEAL .407-.422	27/64 (.407-.422)
TG100 SEAL .422-.437	7/16 (.422-.437)
TG100 SEAL .438-.453	29/64 (.438-.453)
TG100 SEAL .454-.469	15/32 (.454-.469)
TG100 SEAL .469-.484	31/64 (.469-.484)
TG100 SEAL .485-.500	1/2 (.485-.500)
TG100 SEAL .501-.516	33/64 (.501-.516)
TG100 SEAL .516-.531	17/32 (.516-.531)
TG100 SEAL .532-.547	35/64 (.532-.547)
TG100 SEAL .547-.562	9/16 (.547-.562)
TG100 SEAL .563-.578	37/64 (.563-.578)
TG100 SEAL .579-.594	19/32 (.579-.594)

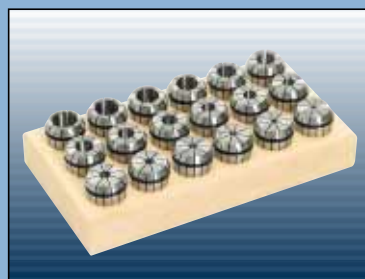
TG100-SEAL

Designation	Diameter Range
TG100 SEAL .594-.609	39/64 (.594-.609)
TG100 SEAL .610-.625	5/8 (.610-.625)
TG100 SEAL .626-.641	41/64 (.626-.641)
TG100 SEAL .641-.656	21/32 (.641-.656)
TG100 SEAL .657-.672	43/64 (.657-.672)
TG100 SEAL .673-.688	11/16 (.673-.688)
TG100 SEAL .688-.703	45/64 (.688-.703)
TG100 SEAL .704-.719	23/32 (.704-.719)
TG100 SEAL .719-.734	47/64 (.719-.734)
TG100 SEAL .735-.750	3/4 (.735-.750)
TG100 SEAL .751-.766	49/64 (.751-.766)
TG100 SEAL .766-.781	25/32 (.766-.781)
TG100 SEAL .782-.797	51/64 (.782-.797)
TG100 SEAL .798-.813	13/16 (.798-.813)
TG100 SEAL .813-.828	53/64 (.813-.828)
TG100 SEAL .829-.844	27/32 (.829-.844)
TG100 SEAL .844-.859	55/64 (.844-.859)
TG100 SEAL .860-.875	7/8 (.860-.875)
TG100 SEAL .876-.891	57/64 (.876-.891)
TG100 SEAL .891-.906	29/32 (.891-.906)
TG100 SEAL .907-.922	59/64 (.907-.922)
TG100 SEAL .923-.938	15/16 (.923-.938)
TG100 SEAL .938-.953	61/64 (.938-.953)
TG100 SEAL .954-.968	31/32 (.954-.968)
TG100 SEAL .968-.984	63/64 (.969-.984)
TG100 SEAL .985-1.00	1 (.985-1.00)

ER SPRING COLLET SETS

SET-ER SPR SPRING COLLETS DIN 6499

Designation	Pcs.	Diameter Range	Diameter Range (mm)
SET ER11 SPR 7	7	.022-.278	0.5-7
SET ER16 SPR 10	10	.022-.396	0.5-10
SET ER20 SPR 12	12	.041-.514	1-13
SET ER25 SPR 15	15	.041-.632	1-16
SET ER32 SPR 18	18	.080-.789	2-20
SET ER40 SPR 23	23	.120-1.025	3-26
SET ER50 SPR 12	12	.396-1.338	10-34



SET-ER-SPR-AA SPRING COLLETS DIN 6499 "AA"

Designation	Pcs.	Diameter Range	Diameter Range (mm)
SET ER11 SPR 7 AA	7	.022-.278	0.5-7
SET ER16 SPR 10 AA	10	.022-.396	0.5-10
SET ER20 SPR 12 AA	12	.041-.514	1-13
SET ER25 SPR 15 AA	15	.041-.632	1-16
SET ER32 SPR 18 AA	18	.080-.789	2-20
SET ER40 SPR 23 AA	23	.120-1.025	3-26



ER COOLIT - SEALED JETS COLLET SETS 1450- PSI

SET ER-SEAL COLLETS 6499

Designation	Pcs.	Diameter Range	Diameter Range (mm)
SET ER16 SEAL 7	7	.120-.396	3-10
SET ER20 SEAL 10	10	.120-.514	3-13
SET ER25 SEAL 13	13	.120-.632	3-16
SET ER32 SEAL 17	17	.120-.789	3-20
SET ER40 SEAL 23	23	.120-1.025	3-26



SET ER-SEAL-JET2 COLLETS DIN 6499

Designation	Pcs.	Diameter Range	Diameter Range (mm)
SET ER16 SEAL 7 JET2	7	.120-.396	3-10
SET ER20 SEAL 10 JET2	10	.120-.514	3-13
SET ER25 SEAL 13 JET2	13	.120-.632	3-16
SET ER32 SEAL 17 JET2	17	.120-.789	3-20
SET ER40 SEAL 23 JET2	23	.120-1.025	3-26

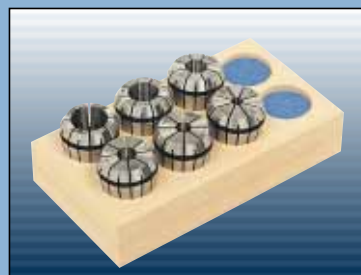


ER SPRING EMI COLLET SETS DIN 6490

SET ER SPR-EMI (1)

Designation	Pcs.	Collet Sizes
SET ER16 SPR 5 EMI	5	1/8, 3/16, 1/4, 5/16, 3/8
SET ER20 SPR 5 EMI	5	3/16, 1/4, 5/16, 3/8, 1/2
SET ER25 SPR 6 EMI	6	3/16, 1/4, 5/16, 3/8, 1/2, 5/8
SET ER32 SPR 6 EMI	6	1/4, 3/16, 5/16, 3/8, 1/2, 5/8, 3/4
SET ER40 SPR 7 EMI	7	1/4, 3/16, 5/16, 3/8, 1/2, 5/8, 3/4, 1

(1) EMI-Endmill cutter inch sizes



ER COOLIT - SEALED JET EMI COLLET SETS

SET-ER SEAL-EMI(1)

Designation	Pcs.	Collet Sizes
SET ER 16 SEAL 5 EMI	5	1/8, 3/16, 1/4, 5/16, 3/8
SET ER 20 SEAL 5 EMI	5	1/8, 3/16, 1/4, 5/16, 3/8, 1/2
SET ER 25 SEAL 6 EMI	6	1/8, 3/16, 1/4, 5/16, 3/8, 1/2, 5/8
SET ER 32 SEAL 6 EMI	6	3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4
SET ER 40 SEAL 7 EMI	7	3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 1

(1) EMI-Endmill cutter inch sizes



SET-ER SEAL-EMI JET2

Designation	Set Pcs.	Collet Sizes
SET ER 16 SEAL 5 EMI JET2	5	1/8, 3/16, 1/4, 5/16, 3/8
SET ER 20 SEAL 5 EMI JET2	5	1/8, 3/16, 1/4, 5/16, 3/8, 1/2
SET ER 25 SEAL 6 EMI JET2	6	1/8, 3/16, 1/4, 5/16, 3/8, 1/2, 5/8
SET ER 32 SEAL 6 EMI JET2	6	3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4
SET ER 40 SEAL 7 EMI JET2	7	3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 1



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STANDARD GRADE DESCRIPTIONS

	Grade Number	Industry Class	ISO Rating	Coating	Workpiece Materials
UNC (Uncoated)	IN30M	C-1/C-2	K20-K50 M20-M40	None	Cast iron, aluminum, non-ferrous materials, high-temp alloys
	IN40P	C-5/C-6	P20-P35	None	Steels
CVD (Chemical Vapor Deposition)	IN6515	C-1/C-3 C-5/C-7	K15-K35 P20-P30	MT-CVD Al ₂ O ₃	Cast iron, steels
	IN6530	C-2/C-1 C-5/C-6	K20-K50 M25-M40 P25-P45	MT-CVD Al ₂ O ₃	Cast iron, steels, stainless, high-temp alloys
PVD (Physical Vapor Deposition)	IN1030	C-1/C-2	K20-K30 M20-M40	PVD TiCN	Cast iron, aluminum, stainless, titanium
	IN1040	C-5/C-7	P20-P40	PVD TiCN	Steels, stainless
	IN1505	C-1/C-7	P10-P30 M10-M30	TiCN-TiN	Cast iron, steels, stainless, high-temp alloys
	IN1530	C-1/C-5	K25-K40 M30-M40	PVD TiCN-TiN	Steels, stainless, titanium, high-temp alloys
	IN2005	C-1/C-8	K50-P01	PVD TiAlN	Cast iron, steels, stainless, high-temp alloys
	IN2030	C-1/C-5	K25-K40 M30-M40	TiAlN	Cast iron, steels, stainless, high-temp alloys

CARBIDE SELECTION GUIDE

Direction of Use		Wear Resistance →										Wear Resistance →					Wear Resistance →											
		← Toughness										← Toughness					← Toughness											
		← Increase Feed										← Increase Feed					← Increase Feed											
		Increase Speed →										Increase Speed →					Increase Speed →											
Material		Short Chipping Malleable Iron, Non-Ferrous Metal, Hardened Iron, Chilled Iron, Cast Iron										High-Temp Alloys, Alloy Iron, Steel Casting, Manganese					Free Cutting Steels, Malleable Iron, Steel Casting, Steel											
Grade	Coating	C1					C2			C3		C4							C5				C6		C7		C8	
		K50	K45	K40	K35	K30	K25	K20	K15	K10	K05	K01	M50	M40	M30	M20	M10	P50	P45	P40	P35	P30	P25	P20	P15	P10	P05	P01

IN30M	Uncoated	IN30M										IN30M																								
IN40P																																				
IN6515	CVD				IN6515																				IN6515											
IN6530		IN6530																IN6530																		
IN1030	PVD				IN1030																															
IN1040																IN1030																				
IN1505																																				
IN1530				IN1530																																
IN2005				IN2005																																
IN2030				IN2030																																

INGERSOLL ISO MATERIAL GROUPS

ISO	Material	Condition	Tensile Strength (Kpsi)	Hardness HB	Material Number
P	Non - Alloy Steels <0.25% C	Annealed	61	125	1
	Steel Castings =>0.25% C	Annealed	94	190	2
	Free Machining Steel	<0.55% C Quenched & Tempered	123	250	3
		=>0.55% C Annealed	109	220	4
		=>0.55% C Quenched & Tempered	145	300	5
	Low - Alloy Steels and Steel Castings (less than 5% of alloying elements)	Annealed	87	200	6
		Quenched & Tempered	135	275	7
			145	300	8
			174	350	9
	High - Alloy Steels, Steel Castings & Tool Steels	Annealed	99	200	10
		Quenched & Tempered	160	325	11
M	Stainless Steels and Stainless Steel Castings	Ferritic/Martensitic	99	200	12
		Martensitic	119	240	13
		Austenitic & P.H.	87	180	14
K	Nodular Cast Iron (GGG)	Ferritic / Pearlitic		180	15
		Pearlitic		260	16
	Grey Cast Iron (GG)	Ferritic		160	17
		Pearlitic		250	18
	Malleable Cast Iron	Ferritic		130	19
		Pearlitic		230	20
N	Aluminum wrought alloy	As cast		60	21
		Forged		100	22
	Cast Aluminum alloyed	<=12% Si As cast		75	23
		> 12% Si Forged		90	24
		High Temperature		130	25
		Free Cutting		110	26
	Copper Alloys	Brass		90	27
		Electrolitic Copper		100	28
	Non Metallic	Duroplastics & Fiberplastics			29
		Hard Rubber			30
S	High Temp Alloys	Fe Based Annealed		200	31
		Cured		280	32
		Ni or Co Based Annealed		250	33
		Cured		350	34
		Cast		320	35
	Titanium and Ti Alloys		58		36
		Alpha+Beta alloys cured	152		37
H	Hardened Steel			55 HRc	38
				60 HRc	39
	Chilled Cast Iron	Cast		400	40
	Cast Iron	Hardened		55 HRc	41

● = P ● = M ● = K ● = N ● = S ● = H

INGERSOLL MATERIAL GROUPS

Material Group	AISI/SAE Material Spec	DIN Material Spec
1	1010	Ck10
1	1025	C25E, Ck25
1	1213	9SMn28
1	1215	9SMn36
1	1015, 1017	CK15
1	1016	C15
1	1020, 1023	C22
1	1022, 1518	20Mn5
1	11 L 08	10SPb20
1	12 L 13	9SMnPb28
1	12 L 14	9SMnPb36
1	A27 65-35	GS-45
2	1035	C35, Cf35
2	1039	40Mn4
2	1040	C40
2	1042	Ck45
2	1043, 1045	C45
2	1050	Cf53
2	1140	35S20
2	1146	45S20
2	A148 80 40	GS-60
2	A27 70-36	GS-52
2	A537 1	19Mn6
2	A662 C	Ast45
2	A738	Ast52
2	1335	36Mn5
2	1330	28Mn6
4	1055	C55, Ck55
4	1060	C60
4	1064	Ck60
4	1070	Ck67
4	1080	Ck75
4	1095	Ck101
4	W110	C105W1
4	9255	55Si7
6	1006	St36
6	A515 65	H1
6	A573 81	St44-3
6	A573 81 65	St37-3
6	8620, 8617	21NiCrMo2
6	8740, 8640, 8742	40NiCrMo22
6	4317	17CrNiMo6
6	5015	15Cr3
6	5132	34Cr4
6	5140	41Cr4
6	5155	55Cr3
6	5120	St52-3
6	9262	1.0961

Material Group	AISI/SAE Material Spec	DIN Material Spec
6	4520	16Mo5
6	ASTM A350LF5	14Ni6
6	L1	34MoCrS4G
6	5140	42Cr4
6	5115	16MnCr5
6		14MoV6 3
6		31CeMo12
6		39CrMoV13 9
6-7	4130	25CrMo4
6-7	4135, 4137	34CrMo4
6-7	4142	41CrMo4
6-7	4140	42CrMo4
6-9	L3	100Cr6
6-9		105WCr6
6-9	L6	55NiCrMoV6
6-9	L6	50NiCr13
6-9	9840	36CrNiMo4
6-9	6150	50CrV4
6-9	ASTM A290	41CrAlMo7
7		15CrMo5
7	A570-36	RSt37-2
7	4340	35CrNiMo6
9	52100	100Cr6
9	ASTM A204 Gr. A	15Mo3
9	3135	36NiCr6
9	3415	14NiCr10
9	3310	14NiCr14
9	ASTM A182 F-12	13CrMo44
9	ASTM A387 12-2	16CrMo44
9		32CrMo12
10	ASM A353	X8Ni9
10	2515, 2517	12Ni19
10	9310	14NiCrMo13-4
10	D3	X210Cr12
10		X42Cr13
10	H13	X40CrMoV51
10	A2	X100CrMoV51
10	S1	45WCrV7
10	H21	X30WCrV93
10		X165CrMoV12
10	M35	S6/5/2/5
10	M2	S6/5/2
10	M7	S2/9/2
10	HW3	X45CrSi93
11	D2	X155CrVMo121
11	D4, D6	X210CrW12
11	630	1.4542/1.4548
12	430F	X12CrMoS17

INGERSOLL MATERIAL GROUPS

Material Group	AISI/SAE Material Spec	DIN Material Spec
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12		X5CrNi134
12	430	X10CrA118
12	405	X10CrA113
12	434	X6CrMo17
12	HNV6	X80CrNiSi20
12	446	X10CrA124
12	EV8	X53CrMnNiN219
12	S32900	X8CrNiMo
12	440B	X90CrMoV18
12		X46Cr13
12	403	X7Cr13
12	410	X10Cr13
12	420	1.4021
12	431	X22CrNi17
13	ASTM A128 75	G-X120Mn12
14	303	X12CrNiS188
14	304L	X2CrNiN189
14	304	X5CrNi189
14	301	X12CrNi177
14	304LN	X4CrNiN1810
14	316	X5CrNiMo1810
14	316LN	X2CrNiMoN1813
14	316L	X2CrNiMo1812
14	317L	X2CrNiMo1816
14	S32304	X2CrNiN234
14	S31803	X2CrNiMoN2253
14	321	X10CrNiTi189
14	347	X10CrNiNb
14	316Ti	X10CrNiMoTi18
14	318	X10CrNiMoNb18
14	309	X15CrNiSi2012
14	310S	X12CrNi2521
14	S31254	
14	17-7PH	1.4568/1.4504
15		GGG 35.3
15	60-40-18	GGG 40
15		GGG 40.3
15	80-55-06	GGG 50
16		GGG 60
16	100-70-03	GGG 70
17	A48 20B	GG 10
17	A48 25B	GG15
17	A48 30B	GG 20
18	A48 40B	
18	A48 35B	GG 25
18	A48 45B	GG 30
18	A48 50B	GG 35
18	A48 60B	GG 40

Material Group	AISI/SAE Material Spec	DIN Material Spec
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19	32510	GTS-35
20	40010	GTS-45
20	50005	GTS-55
20	70003	GTS-65
23-24	A356-72	
23-24	356.1	
23-24	A360.2	G-AlSi10Mg
23-24	A413.2	G-AlSi12
23-24	A413.1	G-AlSi12(Cu)
23-24	A413.0	GD-AlSi12
23-24	A380.1	GD-AlSi8Cu3
31	330	X12NiCrSi
31		G-X40NiCrSi
33	5390A	2.4603
33		NiCr20Ti
33	5666	NiCr22Mo9N
34	5537C	CoCr20W15
34	4676	NiCu30Al
34		NiCr20TiAk
34	AMS 5399	NiCr19Co11
34	5391	S-NiCr13A16
34	5660	NiFe35Cr14
34	5383	NiCr19Fe19
34	AMS 5544	NiCr19Fe19
34	AMS 5772	CoCr22W14
35	AMS 5397	NiCo15Cr10
37		TiAl4Mo4Sn4Si0.5
37	AMS R54520	TiAl5Sn2.5
37	AMS R56400	TiAl6V4
37	AMS R56401	TiAl6V4ELI

SERIES "FAK" DRILL

ISO	Material Number	Cutting Speed (SFM)	Feed (in./rev.) ø.189-ø.292
P	1	450 - 550	.001" - .003"
	2	450 - 550	.001" - .003"
	3	450 - 550	.001" - .003"
	4	450 - 550	.001" - .003"
	5	450 - 550	.001" - .003"
	6	450 - 550	.001" - .003"
	7	450 - 550	.001" - .003"
	8	450 - 550	.001" - .003"
	9	450 - 550	.001" - .003"
	10	450 - 550	.001" - .003"
	11	450 - 550	.001" - .003"
M	12	400 - 500	.001" - .003"
	13	300 - 400	.001" - .003"
	14	400 - 500	.001" - .003"
K	15	300 - 400	.002" - .004"
	16	300 - 400	.002" - .004"
	17	450 - 550	.002" - .004"
	18	450 - 550	.002" - .004"
	19	450 - 550	.002" - .004"
	20	450 - 550	.002" - .004"
N	21	1500 - 3000	.002" - .004"
	22	1500 - 3000	.002" - .004"
	23	1500 - 3000	.002" - .004"
	24	1500 - 3000	.002" - .004"
	25	1500 - 3000	.002" - .004"
	26	1500 - 3000	.002" - .004"
	27	1500 - 3000	.002" - .004"
	28	1500 - 3000	.002" - .004"
	29		
	30		
S	31	100 - 200	.001" - .003"
	32	100 - 200	.001" - .003"
	33	100 - 200	.001" - .003"
	34	100 - 200	.001" - .003"
	35	100 - 200	.001" - .003"
	36	130 - 230	.001" - .003"
	37	130 - 230	.001" - .003"
H	38	50 - 100	.001" - .003"
	39	50 - 100	.001" - .003"
	40	50 - 100	.001" - .003"
	41	50 - 100	.001" - .003"

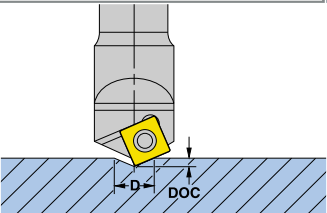
SERIES "Y" (SPOT IN) DRILL

ISO	Material Number	Cutting Speed (SFM)	Feed (in./rev.) ø.189-ø.292
P	1	260 - 430	.006" - .010"
	2	260 - 430	.006" - .010"
	3	230 - 390	.006" - .010"
	4	230 - 390	.006" - .010"
	5	230 - 390	.006" - .010"
	6	130 - 430	.006" - .010"
	7	130 - 430	.006" - .010"
	8	130 - 430	.006" - .010"
	9	130 - 430	.006" - .010"
	10	130 - 260	.005" - .008"
	11	130 - 260	.005" - .008"
M	12	70 - 160	.004" - .006"
	13	70 - 160	.004" - .006"
	14	70 - 160	.004" - .006"
K	15	260 - 460	.010" - .014"
	16	260 - 460	.010" - .014"
	17	300 - 590	.010" - .014"
	18	300 - 590	.010" - .014"
	19	300 - 590	.010" - .014"
	20	300 - 590	.010" - .014"
N	21	260 - 520	.010" - .014"
	22	260 - 520	.010" - .014"
	23	260 - 520	.010" - .014"
	24	260 - 520	.010" - .014"
	25	260 - 520	.010" - .014"
	26	260 - 520	.010" - .014"
	27	260 - 520	.010" - .014"
	28	260 - 520	.010" - .014"
	29		
	30		
S	31	70 - 160	.003" - .005"
	32	70 - 160	.003" - .005"
	33	70 - 160	.003" - .005"
	34	70 - 160	.003" - .005"
	35	70 - 160	.003" - .005"
	36	70 - 160	.004" - .006"
	37	70 - 160	.004" - .006"
H	38	70 - 160	.004" - .006"
	39	70 - 160	.004" - .006"
	40	70 - 160	.004" - .006"
	41	70 - 160	.004" - .006"

○ = P ● = M ● = K ● = N ● = S ● = H

Z-Axis DOC to Spot Diameter Chart (FAK)

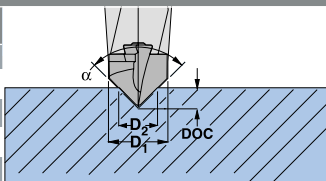
α Included Angle	D Spot Diameter												
	.060	.090	.120	.150	.210	.270	.330	.390	.480	.570	.660	.750	.840
82°	.035	.052	.069	.086	.121	.155	.190	.224	.276	.328	.380	.431	-
90°	.030	.045	.060	.075	.105	.135	.165	.195	.240	.285	.330	.375	.420
118°	.018	.027	.036	.045	.063	.081	.099	.117	.144	.171	.198	-	-
135°	.012	.019	.025	.031	.043	.056	.068	.081	.099	.118	.137	-	-
144°	.010	.015	.019	.024	.034	.044	.054	.063	.078	.093	.107	-	-



*Z-axis DOC is measured to theoretical sharp corner.

Z-Axis DOC to Spot Diameter Chart (SPOT IN)

D ₁ Cutter Dia.		α Included Angle	D ₂ Spot Diameter											
inch	mm		.060	.090	.120	.150	.200	.250	.310	.380	.470	.500	.560	.630
.630	16,0	90°	.030	.045	.060	.075	.100	.125	.155	.190	.235	.250	.280	.315
.630	16,0	140°	.011	.016	.022	.027	.036	.045	.056	.069	.086	.091	.102	.115
.472	12,0	90°	.030	.045	.060	.075	.100	.125	.155	.190	.235	-	-	-
.472	12,0	140°	.011	.016	.022	.027	.036	.045	.056	.069	.086	-	-	-



*Z-axis DOC is measured to theoretical sharp corner.

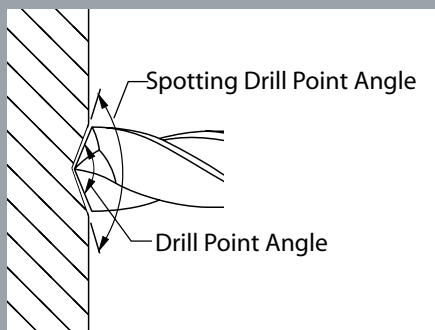
Insert Loading:



Insert loading is easy and fast. Simply insert the drill point into the special dovetail bayonet pocket. Then turn it to the locked position using the proper clamping wrench provided with each drill body.

SPOTTING DRILL RECOMMENDATIONS

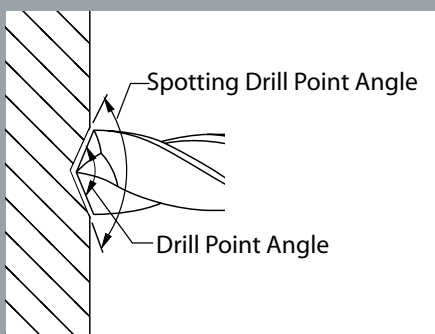
SPOTTING DRILL RECOMMENDATIONS FOR SOLID CARBIDE AND QWIK TWIST DRILLS



BEST

Spotting drill angle is greater than the drill point angle.

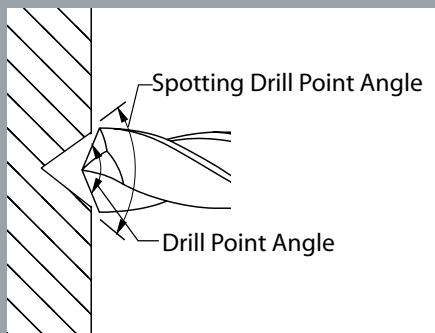
- First contact is at the drill point.
- Best drill centering possibility.
- Drill loading increases with penetration.



ACCEPTABLE

Spotting drill angle is the same as the drill point angle.

- Tool loading problems can occur due to immediate full engagement.
- Chatter may be a problem.
- Reduced feed at entry recommended.
- Good drill centering.



NOT RECOMMENDED WITH CARBIDE

Spotting drill angle is less than the drill point angle.

- Point contact along cutting lips or corner - drill point should contact spotted hole first..
- Chipping likely in these areas.

■ DR SOLID CARBIDE DRILLS OPERATING GUIDELINES

ISO	Material Number	Cutting Speed (SFM)	Feed (in/rev) Ø.118 - Ø.185	Feed (in/rev) Ø.189 - Ø.292	Feed (in/rev) Ø.295 - Ø.396	Feed (in/rev) Ø.397 - Ø.500
P	1	250 - 450	.002" - .006"	.003" - .007"	.005" - .010"	.006" - .012"
	2	250 - 450	.002" - .006"	.003" - .007"	.005" - .010"	.006" - .012"
	3	150 - 400	.002" - .004"	.003" - .005"	.005" - .008"	.006" - .010"
	4	150 - 400	.002" - .004"	.003" - .005"	.005" - .008"	.006" - .010"
	5	150 - 400	.002" - .004"	.003" - .005"	.005" - .008"	.006" - .010"
	6	120 - 250	.002" - .004"	.002" - .005"	.004" - .007"	.005" - .009"
	7	120 - 250	.002" - .004"	.002" - .005"	.004" - .007"	.005" - .009"
	8	120 - 250	.002" - .004"	.002" - .005"	.004" - .007"	.005" - .009"
	9	120 - 250	.002" - .004"	.002" - .005"	.004" - .007"	.005" - .009"
	10	100 - 240	.002" - .004"	.002" - .004"	.004" - .006"	.005" - .009"
	11	100 - 240	.002" - .004"	.002" - .004"	.004" - .006"	.005" - .009"
M	12	190 - 230	.002" - .004"	.002" - .004"	.003" - .006"	.005" - .008"
	13	160 - 200	.002" - .004"	.002" - .005"	.004" - .007"	.006" - .009"
	14	110 - 200	.002" - .004"	.002" - .004"	.003" - .006"	.005" - .008"
K	15	230 - 300	.005" - .008"	.007" - .011"	.009" - .015"	.012" - .020"
	16	230 - 300	.005" - .008"	.007" - .011"	.009" - .015"	.012" - .020"
	17	260 - 330	.006" - .010"	.008" - .013"	.011" - .017"	.013" - .024"
	18	260 - 330	.006" - .010"	.008" - .013"	.011" - .017"	.013" - .024"
	19	260 - 330	.006" - .010"	.008" - .013"	.011" - .017"	.013" - .024"
	20	260 - 330	.006" - .010"	.008" - .013"	.011" - .017"	.013" - .024"
N	21	300 - 400	.004" - .010"	.007" - .014"	.009" - .017"	.012" - .020"
	22	300 - 400	.004" - .010"	.007" - .014"	.009" - .017"	.012" - .020"
	23	300 - 400	.004" - .010"	.007" - .014"	.009" - .017"	.012" - .020"
	24	300 - 400	.004" - .010"	.007" - .014"	.009" - .017"	.012" - .020"
	25	300 - 400	.004" - .010"	.007" - .014"	.009" - .017"	.012" - .020"
	26	300 - 400	.003" - .007"	.007" - .014"	.009" - .017"	.012" - .020"
	27	300 - 400	.003" - .007"	.007" - .014"	.009" - .017"	.012" - .020"
	28	300 - 400	.003" - .007"	.007" - .014"	.009" - .017"	.012" - .020"
	29					
	30					
S	31	30 - 80	.001" - .003"	.002" - .003"	.003" - .004"	.004" - .005"
	32	30 - 80	.001" - .003"	.002" - .003"	.003" - .004"	.004" - .005"
	33	30 - 80	.001" - .003"	.002" - .003"	.003" - .004"	.004" - .005"
	34	30 - 80	.001" - .003"	.002" - .003"	.003" - .004"	.004" - .005"
	35	30 - 80	.001" - .003"	.002" - .003"	.003" - .004"	.004" - .005"
	36	70 - 140	.001" - .003"	.002" - .004"	.003" - .006"	.004" - .008"
	37	70 - 140	.001" - .003"	.002" - .004"	.003" - .006"	.004" - .008"
H	38	50 - 100	.001" - .002"	.001" - .003"	.001" - .003"	.002" - .004"
	39	50 - 100	.001" - .002"	.001" - .003"	.001" - .003"	.002" - .004"
	40	50 - 100	.001" - .002"	.001" - .003"	.001" - .003"	.002" - .004"
	41	50 - 100	.001" - .002"	.001" - .003"	.001" - .003"	.002" - .004"

● = P ● = M ● = K ● = N ● = S ● = H

ISO	Material Number	Cutting Speed Vc sfm	Feed vs. Drill Diameter ipr					
			D=.268-.429	D=.433-.508	D=.512-.587	D=.591-.665	D=.669-.823	D=.827-1.020
P	1	160-430	.005-.008	.006-.010	.008-.012	.010-.014	.010-.018	.010-.018
	2	330-390						
	3	300-360						
	4	300-390						
	5	230-300						
	6	160-360	.005-.008	.006-.010	.008-.012	.010-.014	.012-.016	.012-.018
	7	230-360						
	8	200-300						
	9	130-230						
	10	160-260	.005-.008	.005-.009	.006-.010	.008-.011	.010-.013	.010-.014
	11	130-230						
M	12	70-160	.003-.006	.005-.009	.005-.006	.006-.008	.006-.009	.006-.011
	13							
	14							
K	15	300-460	.008-.012	.010-.014	.012-.016	.014-.018	.016-.020	.016-.024
	16	260-430						
	17	330-590						
	18	300-520						
	19							
	20							
N	21	300-520	.008-.014	.010-.016	.012-.018	.014-.018	.016-.024	.016-.026
	22							
	23							
	24							
	25	260-390						
	26	300-520						
	27							
	28							
	29							
	30							
S	31	100-160	.002-.004	.003-.005	.004-.006	.005-.007	.005-.008	.005-.009
	32	70-130						
	33							
	34							
	35	70-160	.002-.005	.004-.006	.005-.007	.006-.008	.006-.009	.006-.010
	36							
	37							
H	38	70-160	.002-.005	.004-.006	.005-.007	.006-.008	.006-.009	.006-.010
	39							
	40							
	41							

DRILL POINT REPLACEMENT INDICATIONS

1. Limit cutting edge wear to .008" to .012".
(see Fig. 1)
2. Power consumption exceeds 125% of normal.
(see Fig. 2)
3. Drilled hole diameter variation.
(see Fig. 3)
4. Deterioration of surface finish of the drilled hole.
(see Fig. 4)
5. Significant increase in noise or vibration.
(see Fig. 5)

Fig. 1: Wear Limit

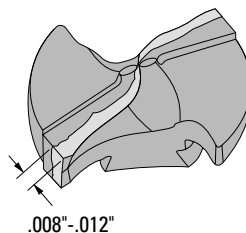


Fig. 2: Power Restriction

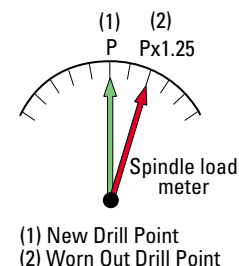


Fig. 3: Diameter Change

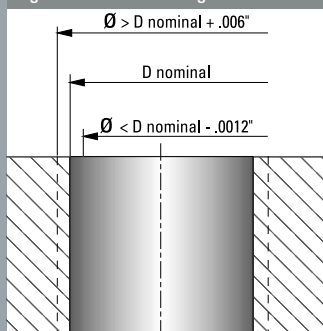


Fig. 4: Surface Finish Decline

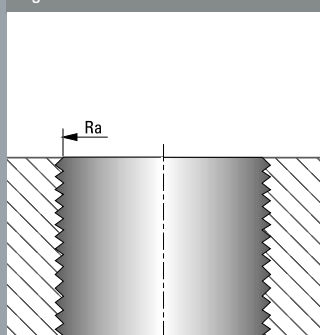
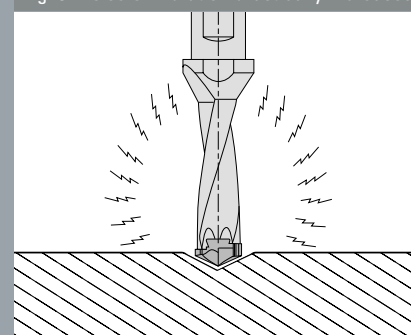
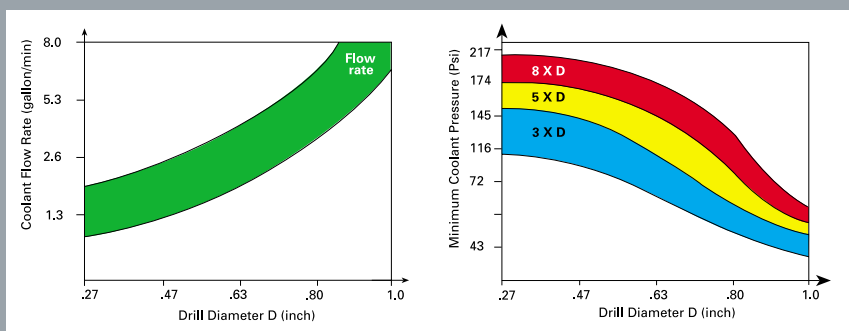


Fig. 5: Noise or vibration drastically increases



RECOMMENDED COOLANT PRESSURE AND FLOW RATE



For proper chip evacuation, the coolant must flow through the tool. If the machine is not equipped with coolant through the spindle, we recommend using a coolant inducer. External coolant supply can be used if the hole depth is less than 1xD and reduced cutting parameters are applied.

Coolant Mix

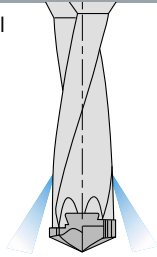
Recommended coolant concentration is 6% to 8%. When drilling stainless and high strength steels, a 10% concentration is recommended.

Dry Drilling

It is possible to drill without coolant in cast iron. oil mist through the drill is required (2xD max hole depth).

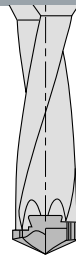
COOLANT

Through the tool
Coolant



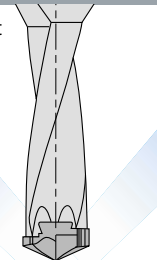
Most Recommended

No Coolant



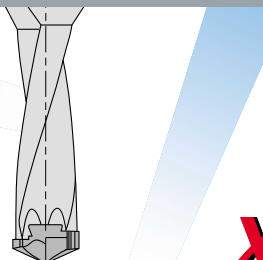
Not Recommended

External Coolant

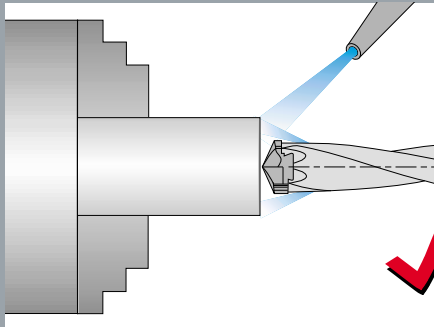


Acceptable up to Depth=2xDiam.

External Coolant

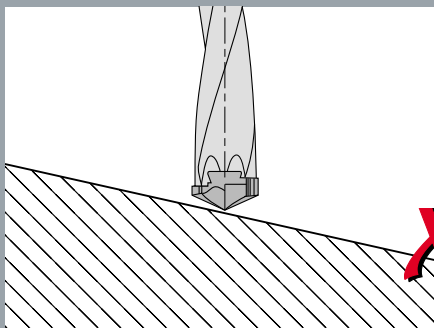


Wrong Coolant Direction

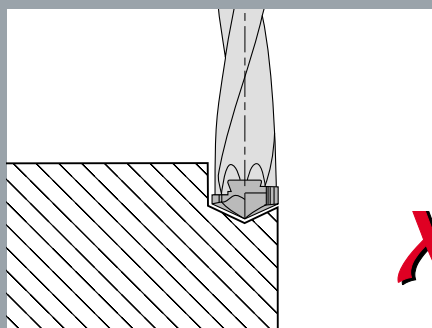


In stationary drill applications both through the tool and external coolant is recommended.

DRILLING LIMITATIONS

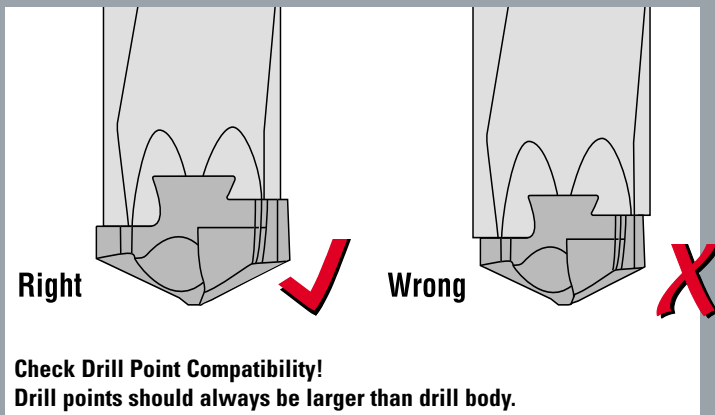
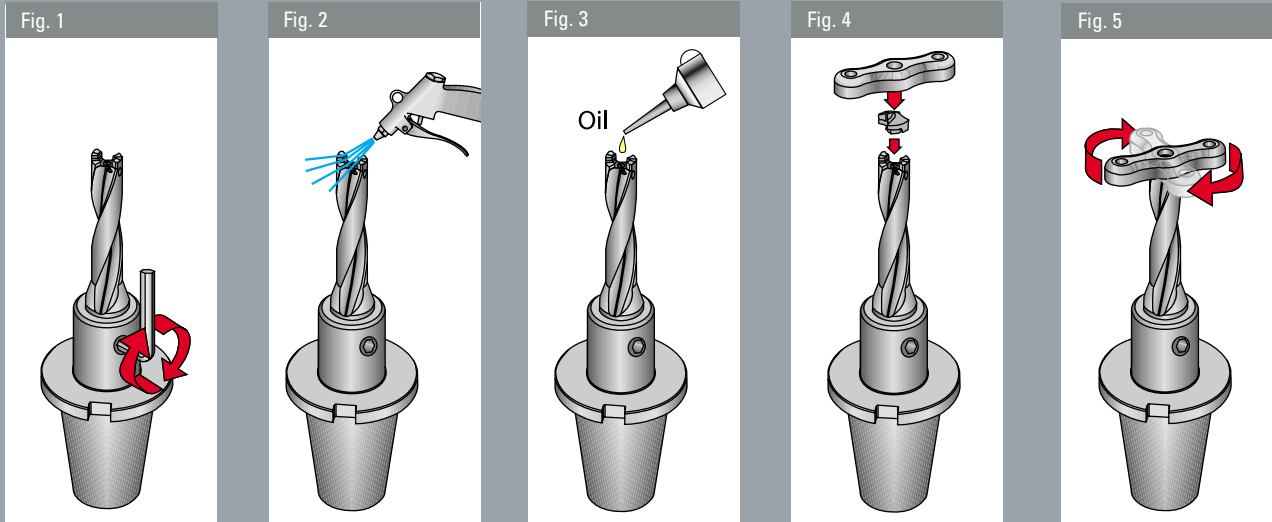


Angular or Irregular Surfaces (Maximum 6° angle)

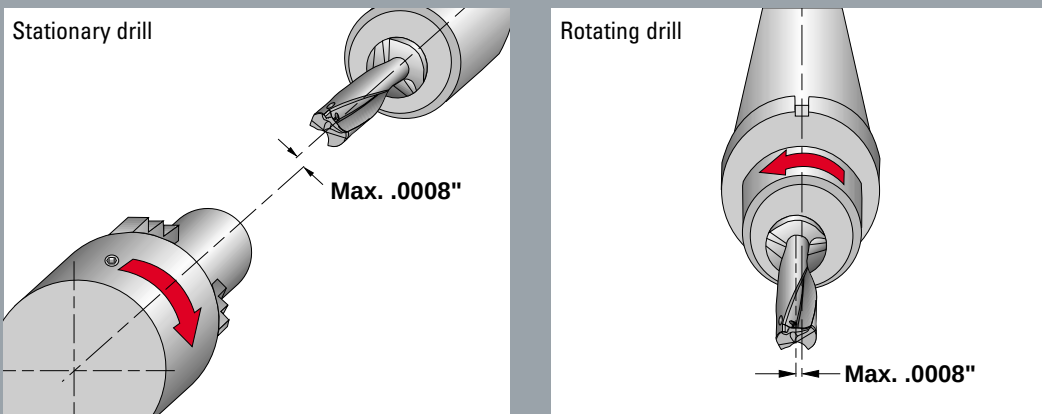


Interrupted or Partial Holes

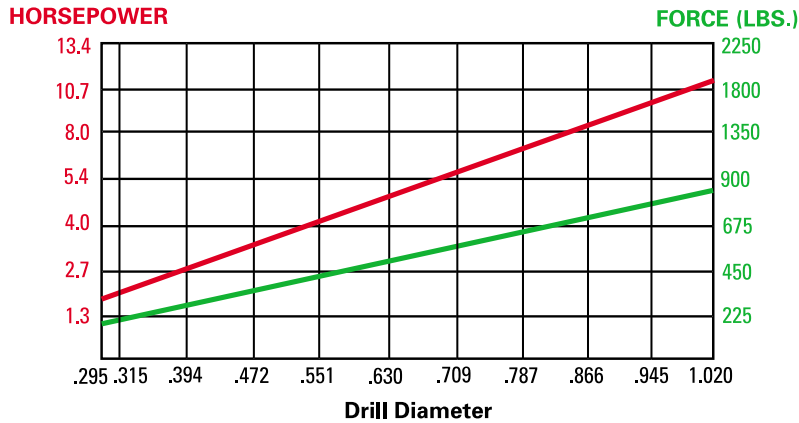
MOUNTING A DRILL POINT



SET-UP: RUN-OUT TOLERANCE



POWER/FORCE REQUIREMENTS

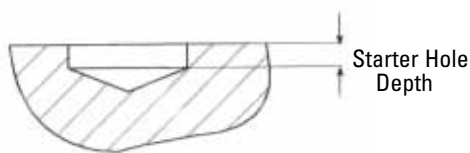


Material: SAE 4340
Speed: 330 SFM
Feed: .008 ipr

Values change according to different materials and drilling conditions.

QWIK•TWIST 8:1 DRILLS

- In case of stationary applications- on lathes- a high degree of radial and angular alignment between the chuck and the turret is required.
- The recommended cutting parameters for 8:1 drills is 20% lower than the cutting speeds used for the 3:1 and 5:1 drills.



Starter Hole Guide

Hole Diameter Range		Drill Body Number 8:1	Starter Hole Depth	Starter Hole Body Number 3:1
.3937	.4291	YD1000080C0R01	.20	YD1000030C0R01
.4331	.4685	YD1100088C0R01	.20	YD1100033C0R01
.4724	.5079	YD1200096C0R01	.20	YD1200036C0R01
.5118	.5472	YD1300104C0R01	.20	YD1300039C0R01
.5512	.5866	YD1400112C0R01	.20	YD1400042C0R01
.5906	.6260	YD150012018R01	.20	YD150004518R01
.6299	.6654	YD160012818R01	.20	YD160004818R01
.6693	.7047	YD170013618R01	.20	YD170005118R01
.7087	.7441	YD1800144C8R01	.20	YD1800054C8R01
.7480	.7835	YD1900152C8R01	.20	YD1900057C8R01
.7874	.8228	YD2000160C8R01	.20	YD2000060C8R01
.8268	.8622	YD2100168C8R01	.20	YD2100063C8R01
.8661	.9016	YD2200176C8R01	.20	YD2200066C8R01
.9055	.9409	YD2300184C8R01	.20	YD2300069C8R01
.9449	.9803	YD2400192C8R01	.20	YD2400072C8R01
.9843	1.0197	YD2500200C8R01	.20	YD2500075C8R01

We strongly recommend the use of a 3:1 Qwik•Twist drill of the same diameter to drill a centering starter hole. The use of a centering starter hole improves hole location, accuracy, roundness, straightness and surface finish.

CHAMFER RINGS

DRILLING AND CHAMFERING IN ONE OPERATION

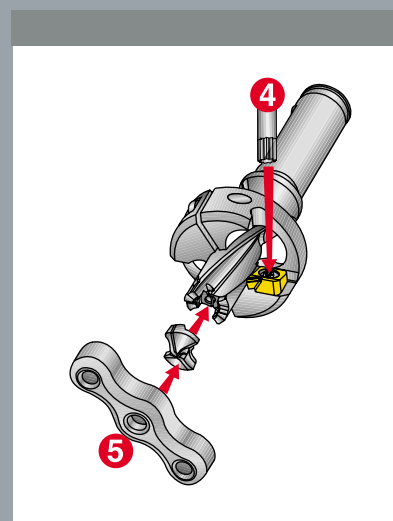
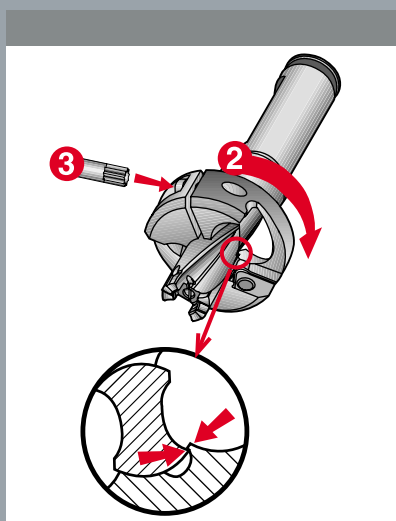
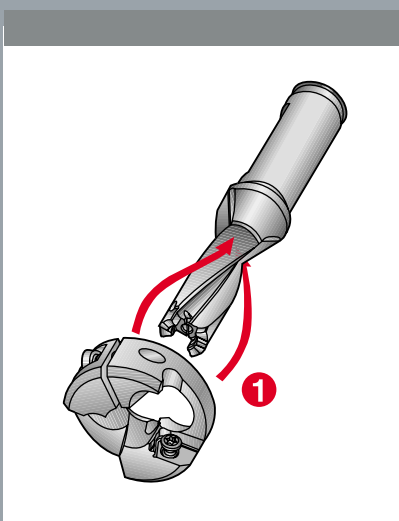
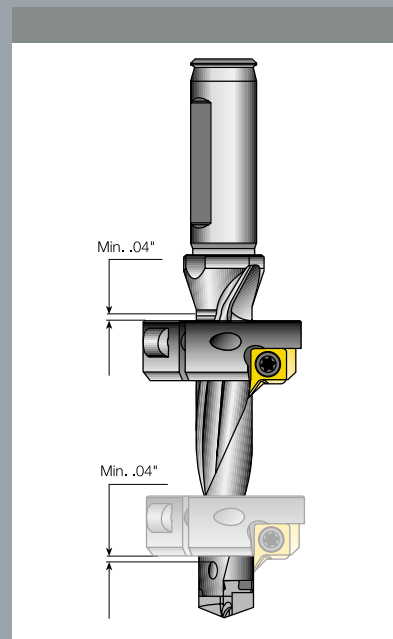
Mounting Instructions:

- 1 Insert the Chamfer Ring on the drill body and slide to the desired position ⁽¹⁾.
- 2 Rotate the ring clockwise until the stopper engages the flute edge.
- 3 Tighten the ring clamp screw according to the maximum tightening torque indicated in the table below.
- 4 Mount the chamfer insert. (Torque 35 in. lbs.).
- 5 Mount the Qwik•Twist Drill Point.

⁽¹⁾ Mount the ring on the drill body subject to the limitations shown in the drawing to the right and the position possibilities in the table "Chamfer Ring Position Range" on the next page.

Maximum Tightening Torque- Ring Clamp Screw

Ring Number	Ring Clamp Screw	Torque
CB100-01 thru CB150-01	SD050-A5	62 in. lbs.
CB160-01 thru CB200-01	SD060-20	88 in. lbs.



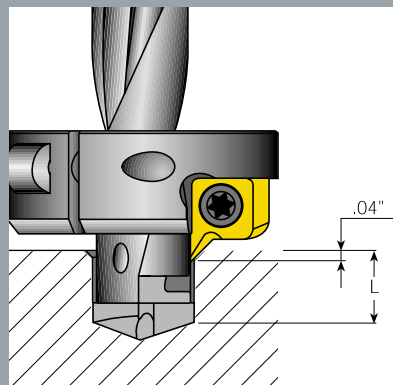
Before drilling insure that:

- There exists a very small gap between the chamfer insert and the drill body, but without contact (i.e., chamfer insert should not be in contact with the drill body).
- The cutting edge point (45°) is aligned with the flute edge.



Chamfer Ring Position Range

Drill Diameter	Drill Body 3xD L (min-max)	Drill Body 5xD L (min-max)	Maximum Chamfer Size
.394	.31-.63	.59-1.42	.06
.413	.31-.71	.67-1.54	
.433	.31-.75	.71-1.61	
.453	.31-.83	.79-1.73	
.472	.31-.87	.83-1.81	
.492	.31-.94	.91-1.93	
.512	.31-.98	.94-2.01	
.531	.31-1.06	1.02-2.13	
.551	.35-1.14	1.10-2.24	
.571	.35-1.22	1.18-2.36	
.591	.35-1.18	1.14-2.36	.08
.630	.35-1.30	1.26-2.56	
.699	.43-1.38	1.34-2.72	
.709	.43-1.50	1.46-2.91	
.748	.43-1.65	1.61-3.15	
.787	.43-1.77	1.73-3.35	

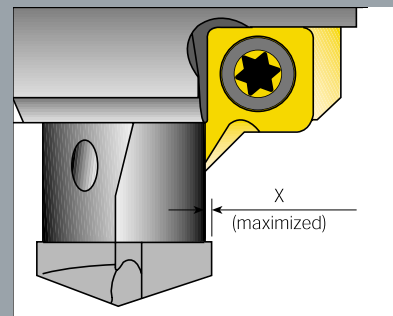


The "L" dimension shown is for a .04" chamfer. For other sizes, adjust "L" accordingly.

User Guide

Recommendation for better stability:

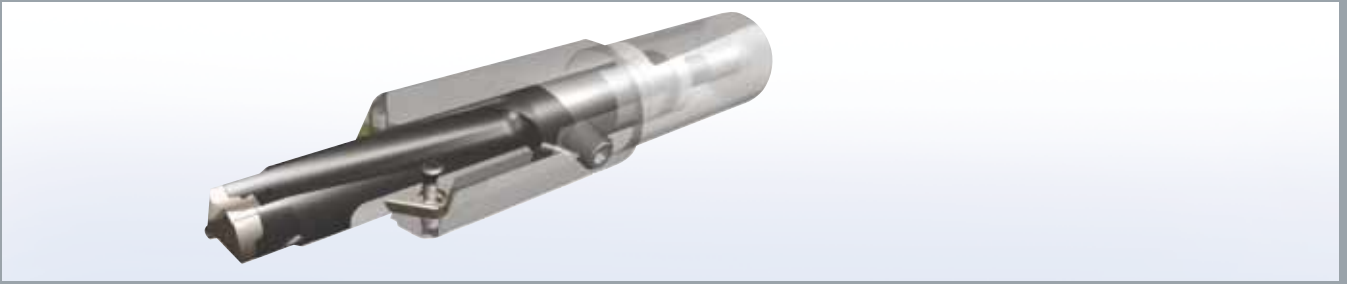
- Use 3xD drill instead of 5xD, if possible.
- Mount the ring as close as possible to the drill shank.
- In order to get better chamfer insert life, it is suggested to apply coolant to the chamfer insert in addition to the through the drill coolant and/or external coolant..
- A wider difference "X" between the drill body and the replaceable point size is preferred (i.e., for .575" replaceable point select .551" drill body rather than .571"). A slightly larger "X" dimension can dramatically increase the chamfer insert life.



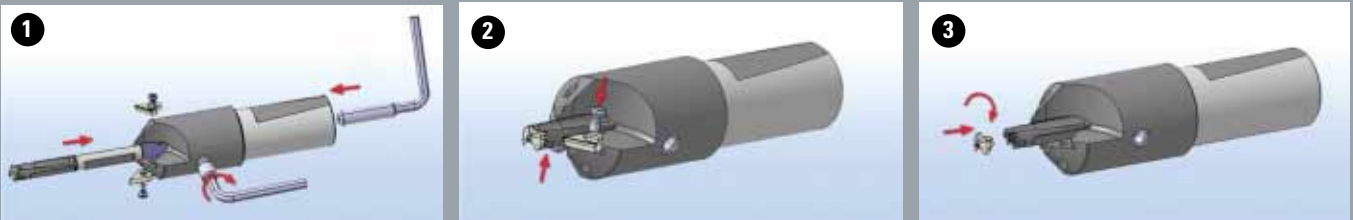
Trouble Shooting

- Bad chamfer surface finish (vibrations)
 - Solutions:
 - Use a shorter drill.
 - Move the ring closer to the drill shank.
 - Reduce the cutting speed while cutting th chamfer.
- Chips packed on the ring flutes:
 - Ensure that the ring is positioned as shown in the mounting instructions.
 - Adjust the cutting speed.
 - Use a pecking cycle.

CONSTRUCTION

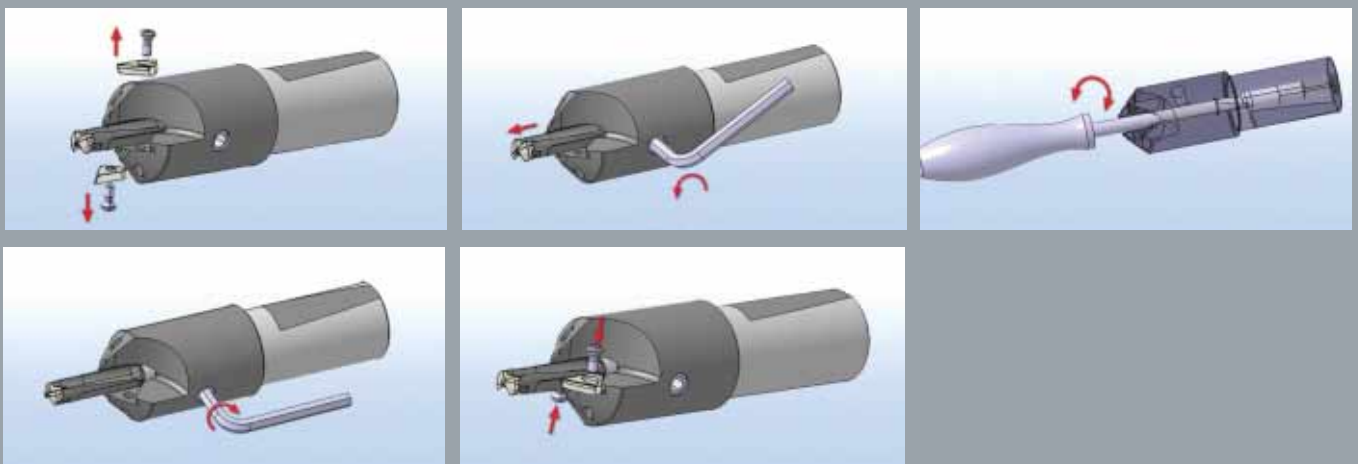


CHAMFER SHANK / SLIP FIT DRILL INITIAL SET-UP



- 1 Unscrew the Chamfer Shank side lock screw, the chamfer insert screws, and remove inserts. Insert the proper Slip Fit Drill into the Chamfer Shank and position it against the rear adjusting screw. Slightly tighten the side lock screw for initial tension with the Slip Fit Drill.
- 2 In order to achieve symmetrical positioning of the chamfering inserts and to avoid edge damage, tighten the insert screws gradually and alternately from side to side insuring the inserts are tightly clamped against the side walls of the peripheral guiding surfaces. Tighten the side lock screw.
- 3 Install the proper size Qwik Twist Drill point on the Slip Fit Drill.

DRILL DEPTH ADJUSTMENT ADJUSTMENT



- 1 Remove Chamfer inserts.
- 2 Loosen the side lock screw and remove the Slip Fit Drill.
- 3 Adjust the rear adjusting screw with a flat point screw driver.
- 4 Insert Slip Fit Drill and slightly tighten the side lock screw.
- 5 Re-install Chamfer Inserts as per Initial Set-up Instructions #2. Tighten side lock screw.

GENERAL APPLICATION INFORMATION

QuadDrills are One-Effective. Indexable drills are one-effective cutting geometry regardless of the number of inserts in the tool. This is extremely important when establishing feeds and speeds for a given operation.

Rigidity. A high degree of rigidity of the machine and fixturing is critical for indexable drilling.

Spindle Rigidity. If the spindle is not tight or properly adjusted, the drill will cut off-center, producing oversize holes. Insert chipping or low tool life may also result and hole finish will be affected.

Fixture Rigidity. Workpiece strength is essential. Flimsy or inadequately supported workpieces will render indexable drills virtually ineffective.

Chip Control. Chip control is essential for indexable drilling. Proper chip control directly enhances chip evacuation, which extends tool life and improves hole tolerance and finish (see Fig. 2).

Large, long chips will restrict the flutes' capacity to evacuate chips, and cause insert chipping and possible drill failure.

Operating parameters should be adjusted to fall within recommended guidelines to achieve optimum form or figure "9" chips that can successfully evacuate along the drill flutes.

Coolant. In drilling, heat and chips are generated in a confined area at the bottom of the hole. Coolant must be used as a carrier to extract heat and chips from the bottom of the hole, along the drill flutes and out of the hole.

Through the tool water base or synthetic coolant is strongly recommended.

Do not operate indexable drills over 1:1 diameter to length ratios with air, air mist or dry. Running drills under those conditions can result in drill failure.

Fig. 2: Chip Formation



Optimum form



Too tight: Increase speed within recommended limit. If unsatisfactory, decrease feed.



Too long: May clog drill flutes. Reduce speed or increase feed within recommended limits.

QUADODRILL™ QUADODRILL+™ OPERATING GUIDELINES

Recommendations are starting parameters only and can be effected by cutting conditions such as spindal and fixture rigidity. Minimum 150 psi coolant through the tool is required for proper drill performance. If not possible, then cutting parameters may have to be reduced. Start at the midpoint of the range and adjust the cutting parameters according to your cutting conditions.

For drills that are 4:1 length to diameter ratio, it may be necessary to reduce your feed by 40% for the first .06" of drilling depth. Then increase to full feed rate for the remainder of the cut.

ISO	Material Number	Cutting Speed (SFM)	Feed (in/rev) $\phi.500 - \phi.594$	Feed (in/rev) $\phi.625 - \phi.813$	Feed (in/rev) $\phi.843 - \phi1.063$	Feed (in/rev) $\phi1.094 - \phi1.312$	Feed (in/rev) $\phi1.343 - \phi1.625$
P	1	800 - 1000	.002" - .004"	.0025" - .004"	.0025" - .005"	.003" - .005"	.003" - .006"
	2	800 - 1000	.002" - .004"	.0025" - .004"	.0025" - .005"	.003" - .005"	.003" - .006"
	3	500 - 800	.002" - .004"	.003" - .006"	.004" - .007"	.005" - .0085"	.005" - .0095"
	4	800 - 1000	.002" - .004"	.003" - .006"	.004" - .007"	.005" - .0085"	.005" - .0095"
	5	600 - 800	.002" - .004"	.003" - .006"	.004" - .007"	.005" - .0085"	.005" - .0095"
	6	500 - 800	.002" - .004"	.003" - .0055"	.004" - .007"	.005" - .0085"	.005" - .009"
	7	400 - 700	.002" - .005"	.003" - .006"	.004" - .007"	.005" - .008"	.006" - .009"
	8	400 - 600	.002" - .005"	.003" - .006"	.004" - .007"	.005" - .008"	.006" - .009"
	9	300 - 550	.002" - .005"	.003" - .006"	.004" - .007"	.005" - .008"	.006" - .009"
	10	400 - 600	.002" - .005"	.003" - .006"	.004" - .007"	.005" - .008"	.006" - .009"
	11	400 - 550	.002" - .005"	.003" - .006"	.004" - .008"	.005" - .009"	.006" - .0095"
M	12	550 - 800	.002" - .004"	.003" - .006"	.003" - .006"	.0035" - .0065"	.004" - .007"
	13	500 - 700	.002" - .004"	.003" - .006"	.003" - .006"	.0035" - .0065"	.004" - .007"
	14	500 - 700	.002" - .004"	.003" - .006"	.003" - .006"	.0035" - .0065"	.004" - .007"
K	15	500 - 800	.002" - .004"	.003" - .0065"	.005" - .008"	.006" - .010"	.006" - .011"
	16	500 - 800	.002" - .004"	.003" - .0065"	.005" - .008"	.006" - .010"	.006" - .011"
	17	600 - 800	.002" - .004"	.003" - .0065"	.005" - .008"	.006" - .010"	.006" - .011"
	18	600 - 800	.002" - .004"	.003" - .0065"	.005" - .008"	.006" - .010"	.006" - .011"
	19	600 - 800	.002" - .004"	.003" - .0065"	.005" - .008"	.006" - .010"	.006" - .011"
	20	500 - 700	.002" - .004"	.003" - .0065"	.005" - .008"	.006" - .010"	.006" - .011"
N	21	1300 - 2000	.002" - .005"	.003" - .006"	.004" - .008"	.005" - .009"	.0055" - .009"
	22	1000 - 1300	.002" - .005"	.003" - .006"	.004" - .008"	.005" - .009"	.0055" - .009"
	23	1300 - 2000	.002" - .005"	.003" - .006"	.004" - .008"	.005" - .009"	.0055" - .009"
	24	1000 - 1300	.002" - .005"	.003" - .006"	.004" - .008"	.005" - .009"	.0055" - .009"
	25	1000 - 1300	.002" - .005"	.003" - .006"	.004" - .008"	.005" - .009"	.0055" - .009"
	26	800 - 1000	.002" - .005"	.003" - .006"	.004" - .008"	.005" - .009"	.0055" - .009"
	27	750 - 900	.002" - .005"	.003" - .006"	.004" - .008"	.005" - .009"	.0055" - .009"
	28	800 - 1000	.002" - .005"	.003" - .006"	.004" - .008"	.005" - .009"	.0055" - .009"
	29						
S	30						
	31	100 - 250	.002" - .004"	.0025" - .0055"	.003" - .007"	.004" - .0085"	.0055" - .009"
	32	100 - 250	.002" - .004"	.0025" - .0055"	.003" - .007"	.004" - .0085"	.0055" - .009"
	33	100 - 250	.002" - .004"	.0025" - .0055"	.003" - .007"	.004" - .0085"	.0055" - .009"
	34	100 - 250	.002" - .004"	.0025" - .0055"	.003" - .007"	.004" - .0085"	.0055" - .009"
	35	100 - 250	.002" - .004"	.0025" - .0055"	.003" - .007"	.004" - .0085"	.0055" - .009"
	36	100 - 250	.002" - .004"	.0025" - .0055"	.003" - .007"	.004" - .0085"	.0055" - .009"
	37	100 - 200	.002" - .004"	.0025" - .0055"	.003" - .007"	.004" - .0085"	.0055" - .009"
H	38	50 - 150	.001" - .002"	.001" - .002"	.001" - .003"	.002" - .003"	.002" - .003"
	39	50 - 150	.001" - .002"	.001" - .002"	.001" - .003"	.002" - .003"	.002" - .003"
	40	50 - 150	.001" - .002"	.001" - .002"	.001" - .003"	.002" - .003"	.002" - .003"
	41	50 - 150	.001" - .002"	.001" - .002"	.001" - .003"	.002" - .003"	.002" - .003"

○=P ●=M ●=K ●=N ●=S ○=H



Feed (in/rev)
0.003

[illegible]

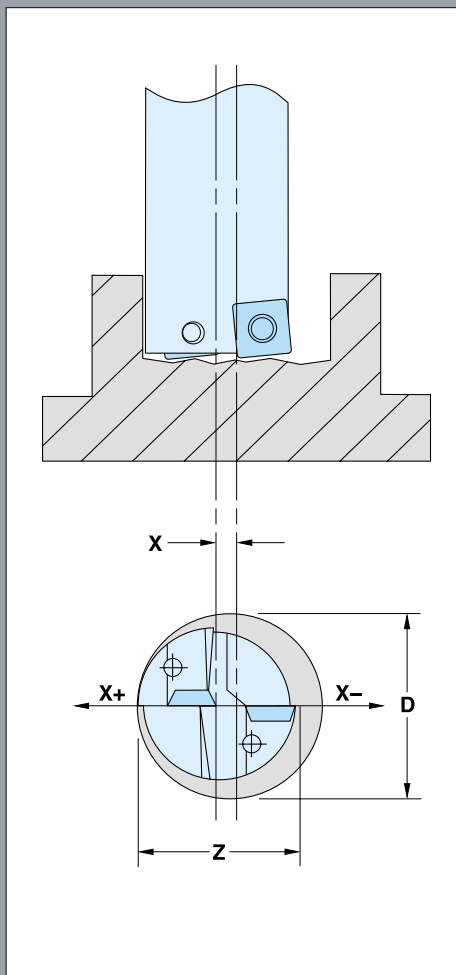
.006" - .0095"	.0035" - .0085"	.005" - .010"	.006" - .011"	.007" - .0115"
.006" - .0095"	.0035" - .0085"	.005" - .010"	.006" - .011"	.007" - .0115"
.006" - .0095"	.0035" - .0085"	.005" - .010"	.006" - .011"	.007" - .0115"
.006" - .0095"	.0035" - .0085"	.005" - .010"	.006" - .011"	.007" - .0115"
.006" - .0095"	.0035" - .0085"	.005" - .010"	.006" - .011"	.007" - .0115"
.006" - .0095"	.0035" - .0085"	.005" - .010"	.006" - .011"	.007" - .0115"
.006" - .0095"	.0035" - .0085"	.005" - .010"	.006" - .011"	.007" - .0115"
.006" - .0095"	.0035" - .0085"	.005" - .010"	.006" - .011"	.007" - .0115"
.002" - .004"	.001" - .0035"	.0025" - .0035"	.0025" - .0035"	.0025" - .0045"
.002" - .004"	.001" - .0035"	.0025" - .0035"	.0025" - .0035"	.0025" - .0045"
.002" - .004"	.001" - .0035"	.0025" - .0035"	.0025" - .0035"	.0025" - .0045"
.002" - .004"	.001" - .0035"	.0025" - .0035"	.0025" - .0035"	.0025" - .0045"

OFFSETTING ROTATING INDEXABLE DRILLS

Offsetting indexable drills in a positive direction has proven to be beneficial in several ways. Reports indicate that it improves chip evacuation when applied to machines with inadequate coolant.

Offsetting can reduce chatter and noticeably improve surface finish when cutting materials like 316 stainless steel. It also allows drilling a full range of hole diameters with a minimum of drill sizes.

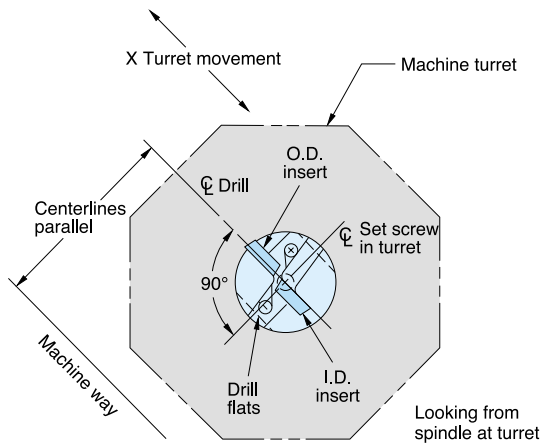
A complete list of "Maximum Offset" dimensions for each standard drill size is shown here. Remember, only 2:1 and 3:1 L/D ratio drills are recommended for this type of work because of their rigidity.



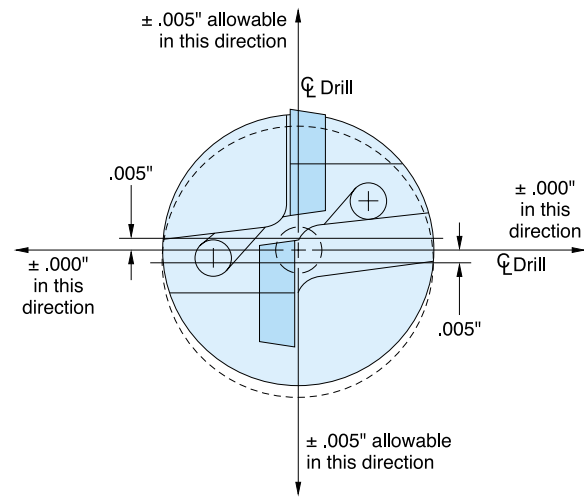
Z Drill Diameter	X Max. Radial Offset	Max. offset Dia.
.500	.010	.520
.531	.010	.551
.563	.010	.583
.594	.010	.614
.625	.020	.665
.657	.020	.697
.688	.020	.728
.719	.020	.759
.750	.020	.790
.781	.020	.821
.813	.010	.833
.844	.020	.884
.875	.020	.915
.906	.020	.946
.938	.020	.978
.969	.020	1.009
1.000	.010	1.020
1.031	.010	1.051
1.063	.010	1.083
1.094	.020	1.134
1.125	.020	1.165
1.156	.020	1.196
1.187	.020	1.227
1.219	.010	1.239
1.250	.010	1.270
1.281	.010	1.301
1.312	.010	1.332
1.343	.020	1.383
1.375	.020	1.415
1.406	.020	1.446
1.437	.020	1.477
1.468	.020	1.508
1.500	.020	1.540
1.531	.020	1.571
1.562	.010	1.582
1.594	.010	1.614
1.625	.010	1.645
1.687	.020	1.727
1.719	.020	1.759
1.750	.020	1.790
1.781	.020	1.821
1.813	.020	1.853
1.875	.010	1.895
1.937	.010	1.957
1.969	0.00 - no offset possible	
2.000	0.00 - no offset possible	
2.125	.010	2.145
2.250	.040	2.330
2.375	.015	2.405
2.500	.015	2.530
2.625	.015	2.655
2.750	0.00 - no offset possible	
2.875	.020	2.915
3.000	.015	3.030
3.250	.060	3.370



STATIONARY DRILLING



When setting up an indexable drill, it is always a good idea to locate the drill in the turret in an attitude that puts the inserts parallel to the machine ways. Most lathes have more than one set of screws in the turret that allows this.



When using drills on the lathe, the drills must be properly aligned prior to taking the first cut. Plus, periodic alignment checks must be made to insure the continued accuracy of the setup.

DRILLING CONDITIONS

Common drilling applications with flat or convex surfaces generally require no speed or feed adjustment during the drilling cycle.

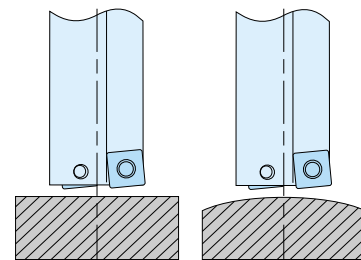
Special situations however, may necessitate temporary adjustments. In the examples below, reductions to feed and/or speed may be required to minimize deflection or tool wear.

Material surface conditions such as case hardening or scale may require slowing penetration to some degree. Interior con-

ditions such as porosity, sandy castings, etc., also have some effect on tool life. Operating parameters may have to be adjusted accordingly.

Feedrates on 4:1 drills may need to be reduced even more than the recommendations below indicate. Generally, this reduced feedrate is required until the first .200" DOC after full engagement is reached.

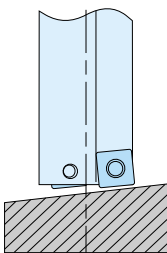
Most Common Conditions



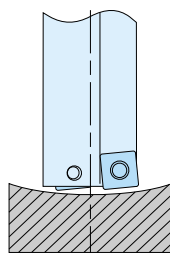
Flat

Convex

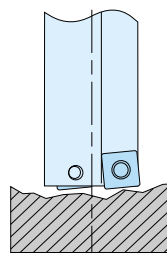
Less Common Conditions



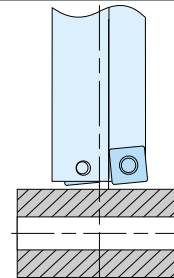
Sloped: If slope exceeds 5°, reduce feed by 50% during penetration.



Concave: Reduce feed by 60% during penetration.



Irregular: Reduce speed during penetration.



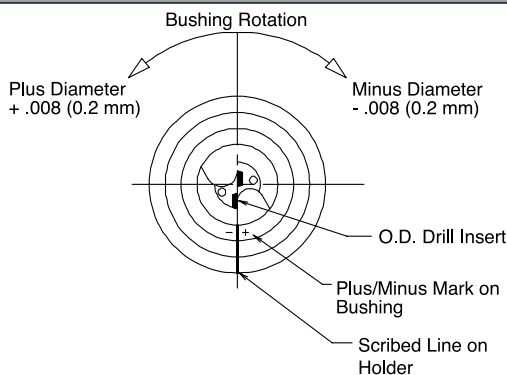
Interrupted: Reduce feed when crossing and before penetration.

ASSEMBLY, SET-UP AND ADJUSTMENT PROCEDURES

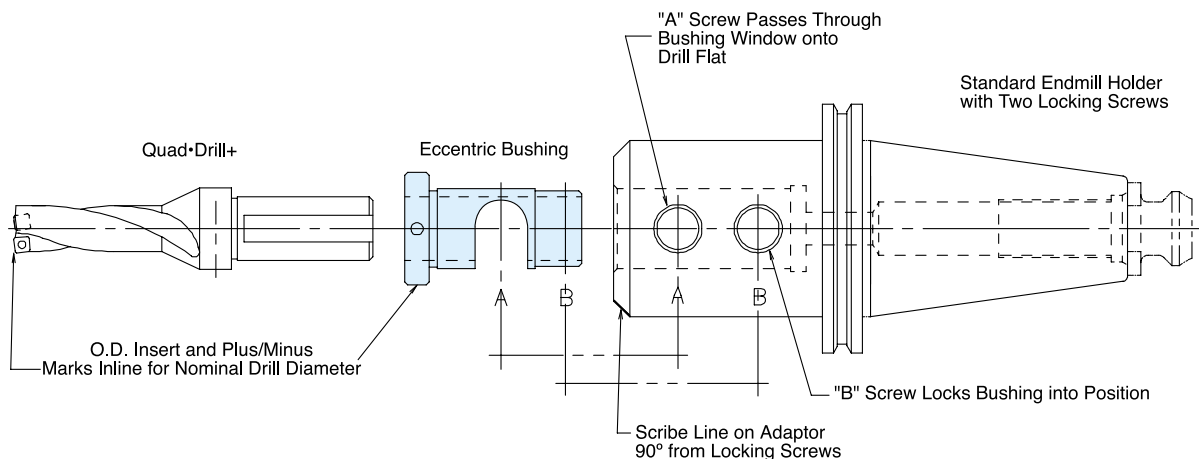


Recommend using Weldon style end mill adapter that uses two side locking screws.

1. Scribe line on front face of adapter exactly 90 degrees from locking screws.
2. Load eccentric bushing over drill shank and into adapter lining up the scribed line on adapter and bushing.
3. Before locking the set screws in adapter, line up OD insert in drill with both scribed lines on the bushing and adapter. The drill in this position will drill a nominal (drill size) hole diameter.
4. With the drill and bushing loaded into the adapter and the OD insert in line with the scribed lines, apply the rear set screw (B) in adapter locking the bushing in place. Use only hand pressure to tighten the screw. Applying the set screw to the bushing provides positive axial retention of the bushing and hand tightening allows radial adjustment.
5. Rotate the bushing either plus or minus to desired position then lock the (B) set screw using a wrench. This will lock the radial position setting in preparation for drilling.
6. Lock the front (A) set screw in the adapter using a wrench to lock the drill into the holder.



You are now ready to drill. Please check to make sure all screws are tight and assembly is rigid before drilling. Once you produce a hole with the current setting and inspect the diameter, you can repeat procedures #5 & 6 if required to achieve desired diameter.



QUADBORE™ 15S OPERATING GUIDELINES

ISO	Material Number	Cutting Speed (SFM)	Feed (in/rev) E.500 - E.750	Feed (in/rev) E1.000	Feed (in/rev) E.813 - E1.500	Feed (in/rev) E1.625 - E2.000	Insert Grade*
P	1	500 - 1000	.002" - .006"	.004" - .007"	.005" - .008"	.006" - .010"	IN 2005
	2	500 - 1000	.002" - .006"	.004" - .007"	.005" - .008"	.006" - .010"	
	3	400 - 900	.002" - .006"	.003" - .006"	.004" - .007"	.005" - .0085"	
	4	700 - 900	.002" - .006"	.003" - .006"	.004" - .007"	.005" - .0085"	
	5	700 - 900	.002" - .006"	.003" - .006"	.004" - .007"	.005" - .0085"	
	6	500 - 800	.002" - .006"	.003" - .0055"	.004" - .007"	.005" - .0085"	IN 1030
	7	500 - 800	.002" - .005"	.003" - .006"	.004" - .007"	.005" - .008"	
	8	500 - 800	.002" - .005"	.003" - .006"	.004" - .007"	.005" - .008"	IN 6515
	9	500 - 800	.002" - .005"	.003" - .006"	.004" - .007"	.005" - .008"	
	10	350 - 550	.002" - .005"	.003" - .006"	.004" - .007"	.005" - .008"	
	11	350 - 550	.002" - .005"	.003" - .006"	.004" - .008"	.005" - .009"	
M	12	450 - 750	.002" - .005"	.004" - .006"	.007" - .009"	.008" - .010"	IN 2005
	13	375 - 600	.002" - .005"	.004" - .006"	.007" - .009"	.008" - .010"	IN 1030
	14	375 - 600	.002" - .005"	.004" - .006"	.007" - .009"	.008" - .010"	
K	15	500 - 800	.002" - .005"	.003" - .0065"	.004" - .007"	.005" - .008"	IN 6515
	16	500 - 800	.002" - .005"	.003" - .0065"	.004" - .007"	.005" - .008"	
	17	600 - 800	.002" - .005"	.003" - .0065"	.004" - .007"	.005" - .008"	IN 2005
	18	600 - 800	.002" - .005"	.003" - .0065"	.004" - .007"	.005" - .008"	
	19	600 - 800	.002" - .005"	.003" - .0065"	.004" - .007"	.005" - .008"	IN 1030
	20	500 - 700	.002" - .005"	.003" - .0065"	.004" - .007"	.005" - .008"	
N	21	1100 - 1800	.003" - .006"	.004" - .006"	.006" - .008"	.007" - .010"	IN 30M
	22	800 - 1100	.003" - .006"	.004" - .006"	.006" - .008"	.007" - .010"	
	23	1100 - 1800	.003" - .006"	.004" - .006"	.006" - .008"	.007" - .010"	
	24	800 - 1100	.003" - .006"	.004" - .006"	.006" - .008"	.007" - .010"	IN 1030
	25	800 - 1100	.003" - .006"	.004" - .006"	.006" - .008"	.007" - .010"	
	26	600 - 800	.003" - .006"	.004" - .006"	.006" - .008"	.007" - .010"	IN 2005
	27	550 - 700	.003" - .006"	.004" - .006"	.006" - .008"	.007" - .010"	
	28	600 - 800	.003" - .006"	.004" - .006"	.006" - .008"	.007" - .010"	IN 1030
	29						
	30						
S	31	100 - 250	.002" - .004"	.003" - .005"	.004" - .006"	.005" - .007"	IN 2005
	32	100 - 250	.002" - .004"	.003" - .005"	.004" - .006"	.005" - .007"	
	33	100 - 250	.002" - .004"	.003" - .005"	.004" - .006"	.005" - .007"	
	34	100 - 250	.002" - .004"	.003" - .005"	.004" - .006"	.005" - .007"	
	35	100 - 250	.002" - .004"	.003" - .005"	.004" - .006"	.005" - .007"	
	36	100 - 250	.002" - .004"	.003" - .005"	.004" - .006"	.005" - .007"	IN 1030
	37	100 - 200	.002" - .004"	.003" - .005"	.004" - .006"	.005" - .007"	
H	38	50 - 150	.001" - .002"	.001" - .002"	.001" - .003"	.002" - .003"	IN 6515
	39	50 - 150	.001" - .002"	.001" - .002"	.001" - .003"	.002" - .003"	IN 2005
	40	50 - 150	.001" - .002"	.001" - .002"	.001" - .003"	.002" - .003"	
	41	50 - 150	.001" - .002"	.001" - .002"	.001" - .003"	.002" - .003"	

○ = P ● = M ● = K ● = N ● = S ○ = H

QUAD[®]BORE™ 15C OPERATING GUIDELINES

ISO	Material Number	Cutting Speed (SFM)	Feed (in/rev) E.438 - ø.719	Feed (in/rev) E.812	Feed (in/rev) E1.000 - ø1.500	Feed (in/rev) E1.750 - ø2.000	Insert Grade*
P	1	500 - 1000	.004" - .010"	.006" - .011"	.008" - .014"	.010" - .016"	IN 2005
	2	500 - 1000	.004" - .010"	.006" - .011"	.008" - .014"	.010" - .016"	
	3	400 - 900	.004" - .010"	.004" - .011"	.007" - .012"	.010" - .017"	
	4	700 - 900	.004" - .010"	.004" - .011"	.007" - .012"	.010" - .017"	
	5	700 - 900	.004" - .010"	.004" - .011"	.007" - .012"	.010" - .017"	IN 1030
	6	500 - 800	.004" - .010"	.004" - .011"	.007" - .012"	.010" - .017"	
	7	500 - 800	.004" - .009"	.004" - .011"	.007" - .012"	.009" - .015"	IN 6515
	8	500 - 800	.004" - .009"	.004" - .011"	.007" - .012"	.009" - .015"	
	9	500 - 800	.004" - .009"	.004" - .011"	.007" - .012"	.009" - .015"	
	10	350 - 550	.004" - .009"	.004" - .011"	.007" - .012"	.009" - .015"	
	11	350 - 550	.004" - .009"	.004" - .011"	.008" - .014"	.010" - .016"	
M	12	450 - 750	.004" - .009"	.006" - .010"	.012" - .016"	.014" - .018"	IN 2005
	13	375 - 600	.004" - .009"	.006" - .010"	.012" - .016"	.014" - .018"	IN 1030
	14	375 - 600	.004" - .009"	.006" - .010"	.012" - .016"	.014" - .018"	
K	15	500 - 800	.004" - .009"	.004" - .010"	.007" - .013"	.010" - .015"	IN 6515
	16	500 - 800	.004" - .009"	.004" - .010"	.007" - .013"	.010" - .015"	
	17	600 - 800	.004" - .009"	.004" - .010"	.007" - .013"	.010" - .015"	IN 2005
	18	600 - 800	.004" - .009"	.004" - .010"	.007" - .013"	.010" - .015"	
	19	600 - 800	.004" - .009"	.004" - .010"	.007" - .013"	.010" - .015"	IN 1030
	20	500 - 700	.004" - .009"	.004" - .010"	.007" - .013"	.010" - .015"	
N	21	1100 - 1800	.006" - .011"	.006" - .010"	.012" - .015"	.013" - .018"	IN 30M
	22	800 - 1100	.006" - .011"	.006" - .010"	.012" - .015"	.013" - .018"	
	23	1100 - 1800	.006" - .011"	.006" - .010"	.012" - .015"	.013" - .018"	
	24	800 - 1100	.006" - .011"	.006" - .010"	.012" - .015"	.013" - .018"	
	25	800 - 1100	.006" - .011"	.006" - .010"	.012" - .015"	.013" - .018"	IN 1030
	26	600 - 800	.006" - .011"	.006" - .010"	.012" - .015"	.013" - .018"	
	27	550 - 700	.006" - .011"	.006" - .010"	.012" - .015"	.013" - .018"	IN 1030
	28	600 - 800	.006" - .011"	.006" - .010"	.012" - .015"	.013" - .018"	
	29						
	30						
S	31	100 - 250	.004" - .007"	.004" - .008"	.007" - .011"	.009" - .013"	IN 2005
	32	100 - 250	.004" - .007"	.004" - .008"	.007" - .011"	.009" - .013"	
	33	100 - 250	.004" - .007"	.004" - .008"	.007" - .011"	.009" - .013"	
	34	100 - 250	.004" - .007"	.004" - .008"	.007" - .011"	.009" - .013"	
	35	100 - 250	.004" - .007"	.004" - .008"	.007" - .011"	.009" - .013"	IN 1030
	36	100 - 250	.004" - .007"	.004" - .008"	.007" - .011"	.009" - .013"	
	37	100 - 200	.004" - .007"	.004" - .008"	.007" - .011"	.009" - .013"	
H	38	50 - 150	.002" - .003"	.002" - .003"	.002" - .005"	.004" - .006"	IN 6515
	39	50 - 150	.002" - .003"	.002" - .003"	.002" - .005"	.004" - .006"	IN 2005
	40	50 - 150	.002" - .003"	.002" - .003"	.002" - .005"	.004" - .006"	
	41	50 - 150	.002" - .003"	.002" - .003"	.002" - .005"	.004" - .006"	

● = P ● = M ● = K ● = N ● = S ● = H



■ GUN DRILL OPERATING GUIDELINES

ISO	Material Number	Cutting Speed (SFM) ø.078 - ø.197	Cutting Speed (SFM) ø.198 - ø.512	Cutting Speed (SFM) ø.513 - ø1.575
P	1	230 - 300	260 - 360	230 - 330
	2	230 - 300	260 - 360	230 - 330
	3	165 - 230	200 - 260	165 - 230
	4	230 - 300	260 - 360	230 - 330
	5	165 - 230	200 - 260	165 - 230
	6	200 - 260	230 - 300	200 - 260
	7	165 - 230	200 - 260	165 - 230
	8	165 - 230	200 - 260	165 - 230
	9	165 - 230	200 - 260	165 - 230
	10	165 - 230	200 - 260	165 - 230
	11	165 - 230	200 - 260	165 - 230
M	12	165 - 230	165 - 230	165 - 230
	13	165 - 230	165 - 230	165 - 230
	14	165 - 230	165 - 230	165 - 230
K	15	200 - 260	230 - 300	230 - 300
	16	200 - 260	230 - 300	230 - 300
	17	200 - 260	230 - 300	230 - 300
	18	200 - 260	230 - 300	230 - 300
	19	200 - 260	230 - 300	230 - 300
	20	200 - 260	230 - 300	230 - 300
N	21	230 - 590	330 - 1000	330 - 1000
	22	230 - 590	330 - 1000	330 - 1000
	23	230 - 590	330 - 1000	330 - 1000
	24	230 - 590	330 - 1000	330 - 1000
	25	230 - 590	330 - 1000	330 - 1000
	26	230 - 390	330 - 520	260 - 530
	27	230 - 390	330 - 520	260 - 530
	28	230 - 390	330 - 520	260 - 530
	29			
	30			
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GUN DRILL COOLANT AND OPERATING GUIDELINES

THE RIGHT COOLANT

Neat Oil

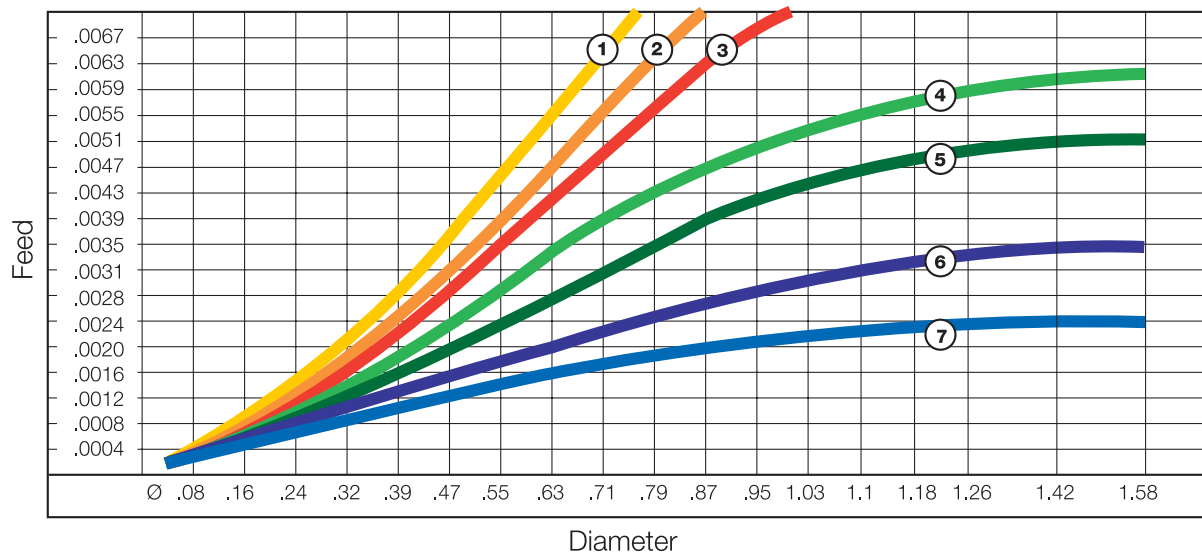
- Oil is preferred over water soluble coolant
- Most conventional gundrilling machines use oil
- Provides superior lubricity, better tool life and surface finish
- No worry about concentration levels
- Does not evaporate

Water Soluble

- Used on most CNC machines

<8% = unacceptable
10-12% = acceptable
12-15% = preferred

CUTTING CONDITIONS

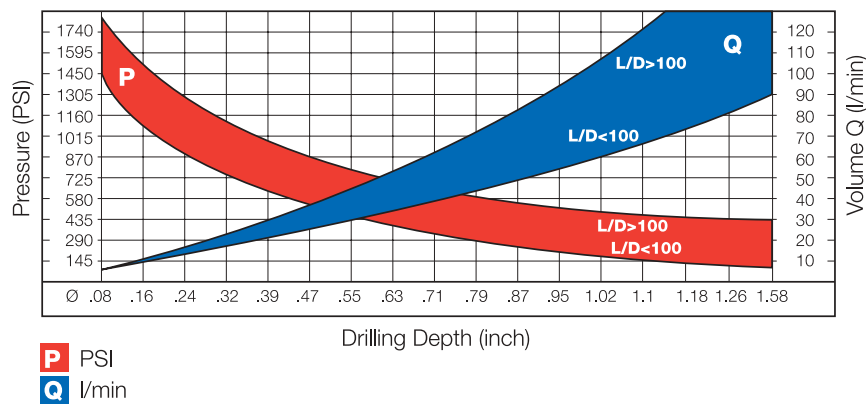
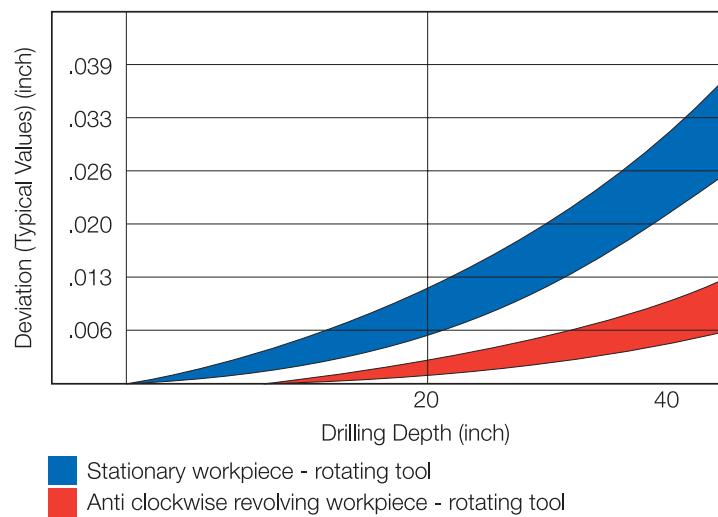
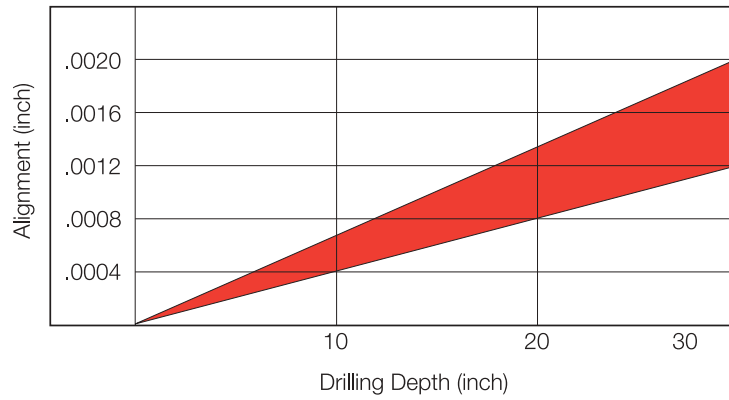


- ① Aluminum Alloy
- ② Grey Cast Iron
- ③ Nodular Cast Iron
- ④ Structural and Free Cutting Steel
- ⑤ High Temper Alloys
- ⑥ Super Alloys
- ⑦ Ferritic and Austenitic Stainless Steel

Ingersoll

GUN DRILL OPERATING GUIDELINES

CUTTING CONDITIONS



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