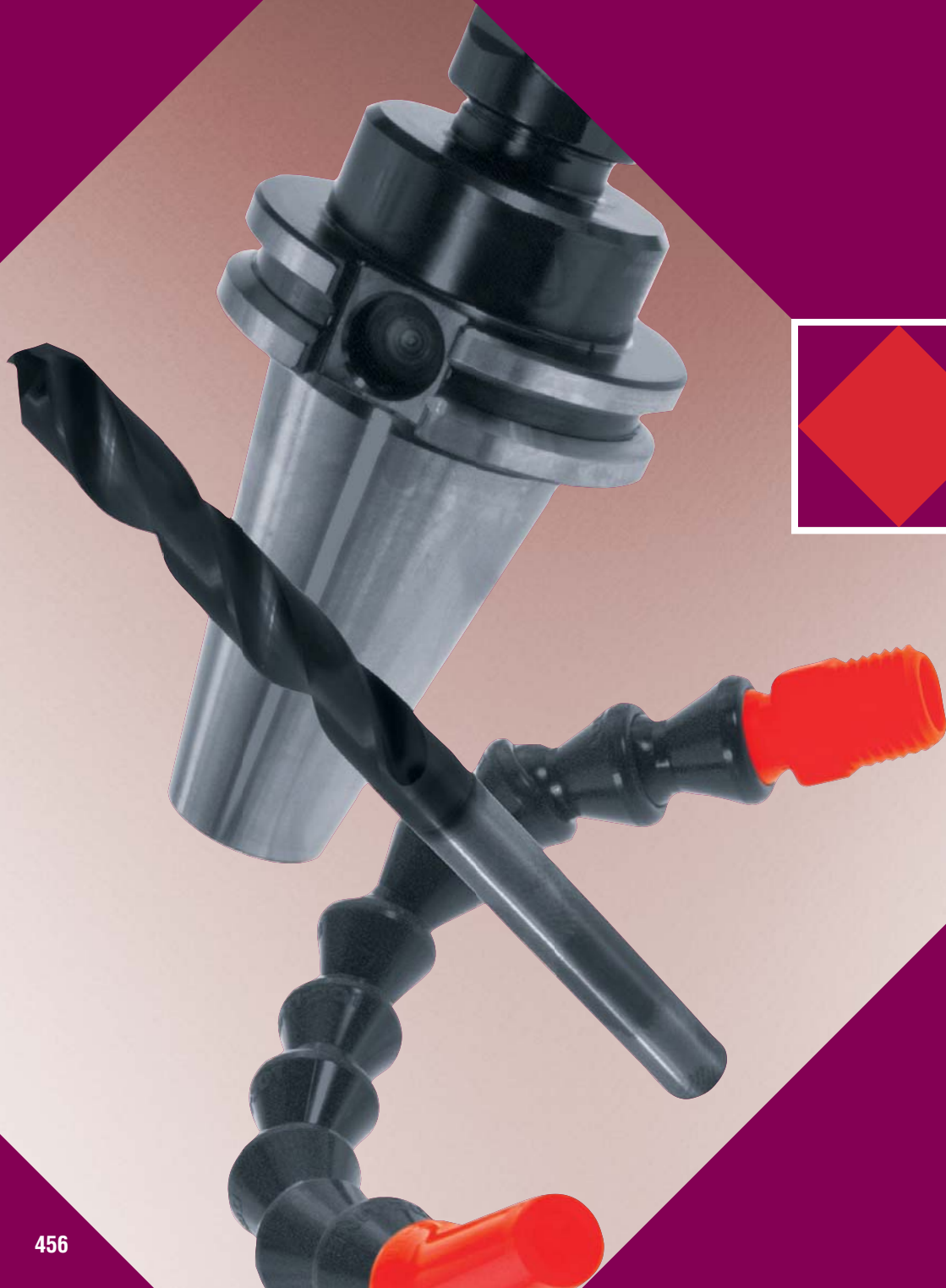


# CUTTING & MACHINING



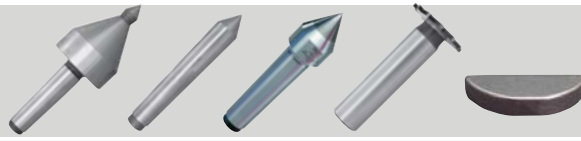
**Broaches & Bushings**

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**Centers, Cutters & Woodruff Keys**

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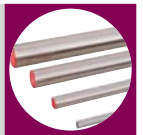
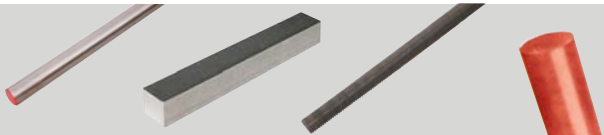
**Metal Marking**

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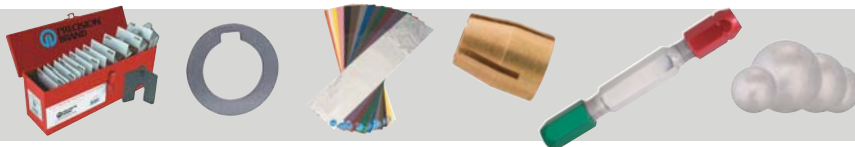
**Raw Materials**

**466 - 467, 510**



**Shims & Gauges**

**462 - 465**



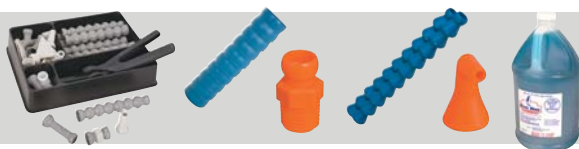
**Taps, Dies & Punches**

**470 - 473, 512**



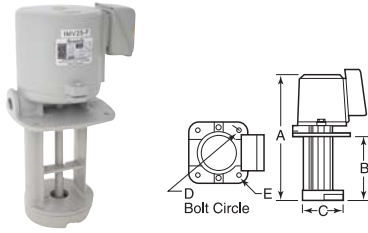
**Vacuum, Coolant & Lubrication Systems**

**458 - 461**



**Coolant Pumps - Centrifugal**

**Graymills**



Graymills pumps feature totally enclosed motors with sealed, permanently lubricated bearings. Pumps are dependable, economical replacement for original equipment on foreign manufactured machine tools such as Fuji, Hitachi, Mitsubishi, Toshiba and Yasukawa and U.S. made machines. No bearings, seals, or packing are immersed in liquid, making them ideal for pumping liquids containing fine contaminants. All models have a maximum viscosity of 550 SSU. Pump body and volute are made of cast iron. Shaft is made from carbon steel. Impeller is plastic. All motors are 230/460, 3 phase, 60/50 Hertz, 3450 rpm.

Item No.	Graymills	HP	Max. Flow Rate GPM	A	B	C	D	E	Pack Qty.
GRP-1	IMV-08F	1/8	10	1 13/16	6	3 1/2	5 5/64	1/4	1
GRP-2	IMV-25F	1/4	20	1 4 1/16	7	4 3/4	6 1/4	1/4	1

**Cooling Systems  
Kool Mist Kit**



- One gallon stainless steel tank
- Magnetic nozzle positioner
- One gallon Formula 78 concentrate
- One four oz. sample Formula 77 concentrate

Compressed air siphons coolant, vaporizes it and propels it onto the cut as a conical mist. More efficient than flooding because mist cooling absorbs heat only from the cutting surface. Easily added to machines with no coolant provisions because collection tanks are not necessary. Can be used anywhere in the shop. A few of the benefits include heavier roughing cuts and feeds, better finishes, increased production and longer tool life. Comes with air/coolant mixing valve, hose and adjustable spray nozzle.

Item No.	Description	Pack Qty.
KM-500	Kool Mist Kit - 500	1

**Coolant Concentrates**



**Formula 78 - Light Duty**

Dissolves in water to a clear solution. Can be used on any metal or alloy. Meets all OSHA standards.

**Formula 77 - Tough Duty**

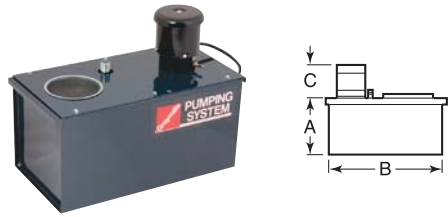
Designed for tough machining conditions requiring greater lubricity. Particularly useful where tool pressure is great or where the material is abrasive.

Item No.	Description	Pack Qty.
KM-77	1 Gallon Formula 77	1
KM-78	1 Gallon Formula 78	1

**Note:** One gallon makes 33 gallons of biodegradable solution.

**Rectangular Tank Systems**

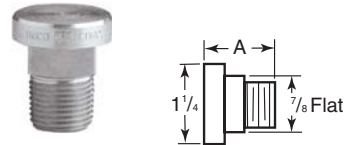
**Graymills**



- Used on mills, lathes, grinders, drill presses
- Constructed of 18 gauge steel
- 18 mesh screen collecting bowl
- Standard 3/8" ID flexible metal nozzle with valve and 4' neoprene 1/2" ID hose
- Six gallon tank capacity
- 10 GPM @ 4' of hose
- 115 V 60/50 Hz 1 Phase standard

Item No.	Graymills	HP	RPM	Viscosity Max. SSU	A	B	Max. C	Width	Discharge NPT	Pack Qty.
GRP-7	6-HR35A	1/25	1,500	150	9	18	7 3/8	9 1/2	3/8	1
GRP-8	6-HR45A	1/8	1,725	500	9	18	7 3/8	9 1/2	1/2	1

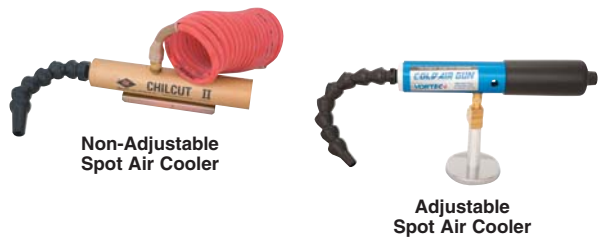
**Breather Vents**



Specifically designed for centrifugal pumps or other applications requiring an exchange of air. Available with a 40 micron internal filter for applications where contamination must be minimized to extend equipment life.

w/o Filter		w/ Filter		Connection NPT	A	Pack Qty.
Item No.	Item No.					
TMC-31050	TMC-31053	1/4	1 1/16			1
TMC-31051	TMC-31054	3/8	1 1/16			1
TMC-31052	TMC-31055	1/2	1 1/4			1

**Vortex Tube Systems  
Spot Air Coolers**



**Non-Adjustable-** cools air 50 degree Fahrenheit lower than inlet air. The temperature is not adjustable. The kit includes the spot air cooler, flexible hose and 12' coil air supply line.

**Adjustable-** cools air up to 100 degree Fahrenheit lower than inlet air (normal operating drop is 85 degree Fahrenheit). The airflow rate and temperature are adjustable. Includes 5 micron filter and flexible nozzle. 15 SCFM.

Compressed air is passed through a spin chamber creating a vortex within the unit. Allows cooling in operations and testing where the use of liquid is infeasible or undesirable. Effectively removes heat and chips from the work. Mounted with a magnetic base, they can easily be used anywhere there is shop air. No moving parts or freon. 1/4" NPT inlet.

Item No.	Description	Pack Qty.
SAC-1	Non-Adjustable Spot Air Cooler Kit	1
SAC-2	Non-Adjustable Spot Air Cooler Only	1
VOR-610	Adjustable Spot Air Cooler Kit	1

# ADJUSTABLE VACUUM & COOLANT HOSE



Designed to be added to an existing central vacuum system to extract smoke, dust, fumes and particles at the source. Can be used in soldering, wet grinding and machining applications,

especially mist, graphite and particles. Can also be used to control chemical odors and fumes (except acids) and in woodworking. Easy to position within a work area. Can be mounted to a 3" thin walled PVC pipe or a 3" sheet metal duct. Hand adjustable 360 degrees Fahrenheit and self-supporting up to 3' for staying in position. Bending radius of 5.75" for tight turns. Hose lengths can be changed by popping together the elements and three nozzles are available for varying applications. Made of premium grade acetal copolymer which is resistant to most chemicals. **Caution: This material is not fire retardant and would pose a fire hazard in applications where high temperatures or flames exist. Melting point is 329 degrees Fahrenheit, maximum operating temperature is 170 degrees Fahrenheit.**

### Adjustable Vacuum Hose Elements - 2 1/2" ID



Item No.	Length (feet)	Pack Qty.
LP-81201	1	9
LP-81202	2	9
LP-89220	20	20

### Adjustable Vacuum Hose Accessories Round Nozzle



Item No.	Description	Pack Qty.
LP-81203	Round Nozzle 4-1/2"	1

### Adjustable Vacuum Hose Accessories Tapered Oval Nozzle



Item No.	Description	Pack Qty.
LP-81205	Tapered Oval Nozzle	1

### Rectangular Nozzles



Item No.	Size	Pack Qty.
LP-81204	6 x 3 1/2	1
LP-89224	6 x 3 1/2	10

### Adjustable Vacuum Hose Accessories PVC Adapter



Item No.	Description	Pack Qty.
LP-81206	PVC Adapter 3"	1

### Adjustable Vacuum Hose Accessories Sheet Metal Adapter



Item No.	Size	Pack Qty.
LP-81207	3	1
LP-89227	3	10

### Snap-Loc Starter Kits



For coolant hose set-up and quick maintenance.

Item No.	Cedarberg	Description	Pack Qty.
CSL-282	8525-282	<b>1/4" Kit Includes:</b> <ul style="list-style-type: none"> <li>(4) 1/4" x 12" Hose Assembly</li> <li>(1) 1/4" Extension Segment</li> <li>(2 ea.) 1/16", 1/8", 1/4" Round Nozzles</li> <li>(2) 1" Flare Nozzles</li> <li>(3 ea.) 1/8", 1/4" Connectors</li> <li>(2) 1/2" Y</li> <li>(1) 1/4" Double Socket</li> <li>(1) 1/4" Assembly Pliers</li> </ul>	1
CSL-321	8550-321	<b>1/2" Kit Includes:</b> <ul style="list-style-type: none"> <li>(4) 1/2" x 12" Hose Assembly</li> <li>(1) 1/2" Extension Segment</li> <li>(2 ea.) 1/4", 3/8", 1/2" Round Nozzles</li> <li>(2) 2" Flare Nozzles</li> <li>(3 ea.) 3/8", 1/2" Connectors</li> <li>(2) 1/2" Y</li> <li>(1) 1/2" Y x 1/4" Reducer Y</li> <li>(1) 1/2" Double Socket</li> <li>(1) 1/2" x 1/4" Adapter</li> <li>(1) 1/2" Assembly Pliers</li> </ul>	1
CSL-322	8550-322	<b>1/4" and 1/2" Combination Kit Includes:</b> <ul style="list-style-type: none"> <li>(3 ea.) 1/4" x 12", 1/2" x 12" Hose Assembly</li> <li>(1 ea.) 1/4", 1/2" Extension Segment</li> <li>(2 ea.) 1/4" x 1/16", 1/4" x 1/8", 1/4" x 1/4", 1/2" x 1/4", 1/2" x 3/8", 1/2" x 1/2" Round Nozzles</li> <li>(2 ea.) 1/4" x 1", 1/2" x 2" Flare Nozzles</li> <li>(3 ea.) 1/4" x 1/8", 1/4" x 1/4", 1/2" x 3/8", 1/2" x 1/2" Connectors</li> <li>(1 ea.) 1/4", 1/2" Y</li> <li>(1) 1/2" x 1/4" Y Reducer</li> <li>(1 ea.) 1/4", 1/2" Double Socket</li> <li>(1 ea.) 1/4", 1/2" Adapter</li> <li>(1 ea.) 1/4", 1/2" Assembly Pliers</li> </ul>	1

### Snap-Loc Adjustable Coolant Hose 1/4" Individual Components



Item No.	Cedarberg	Description	Pack Qty.
<b>Hose</b>			
CSL-10	8425-11	12" Hose; 1/16", 1/8" and 1/4" Nozzles	1
CSL-20	8425-12	12" Hose Pack	1
CSL-30	8425-21	25' Hose Pack	1
<b>Adapters</b>			
CSL-60	8425-17	1/2" MPT to 1/4" Male Hose	4
CSL-70	8425-18	1/4" MPT to 1/4" Male Hose	4
CSL-80	8525-199	1/8" FPT to 1/4" Male Hose	4
<b>Nozzles</b>			
CSL-130	8425-14	1/16" Round Nozzles	4
CSL-140	8425-15	1/8" Round Nozzles	4
CSL-160	8425-19	1" Flare Nozzles	2
<b>Ball Valves - Plastic</b>			
CSL-240R	8525-346	1/4" FPT x MPT	1

### Snap-Loc Adjustable Coolant Hose 1/2" Individual Components



Item No.	Cedarberg	Description	Pack Qty.
<b>Hose</b>			
CSL-300	8450-11	12" Hose; 1/4", 3/8" and 1/2" Nozzles	1
CSL-310	8450-12	12" Hose Pack	1
<b>Adapters</b>			
CSL-40	8450-20	1/2" to 1/4" Reducers	2
CSL-390	8550-105	1/2" MPT to 1/2" Female Hose	2
<b>Nozzles</b>			
CSL-440	8450-19	2" Flare Nozzles	2
<b>Assembly Pliers</b>			
CSL-490	8701-007	Assembly Plier	1



LOC-LINE® is not designed for high pressure applications. To avoid movement due to jetting, maximum flow rates for a 13 inch line are as follows:

Pressure Limitations			
Nozzle	1/4"	3/8"	1/2"
Gals./Hr.	250	478	1,140
PSI	30-50	20-30	10-20



## NPT Connectors



Item No.	Size	Pack Qty.
LP-41405	1/4 x 1/8	4
LP-49425	1/4 x 1/8	50
LP-51804	1/2 x 3/8	4
LP-59864	1/2 x 3/8	50
LP-41406	1/4 x 1/4	4
LP-49426	1/4 x 1/4	50
LP-51805	1/2 x 1/2	4
LP-59865	1/2 x 1/2	50
LP-61505	3/4 x 3/4	4

## "Y" Fittings



Item No.	Size	Pack Qty.
LP-41408	1/4	2
LP-49428	1/4	20
LP-51808	1/2	2
LP-59868	1/2	20
LP-61511	3/4	2

## "Y" Reducers



Item No.	Size	Pack Qty.
LP-51822	1/2 to 1/4	2
LP-61512	3/4 to 1/2	2

## Adapters



Item No.	Size	Pack Qty.
LP-51821	1/2 to 1/4	2
LP-59869	1/2 to 1/4	20
LP-61508	3/4 to 1/2	2

## Double Sockets



Item No.	Size	Pack Qty.
LP-41409	1/4	4
LP-49429	1/4	20
LP-51811	1/2	4
LP-61514	3/4	4

## Sockets



Item No.	Size	Pack Qty.
LP-41411	1/4 x 1/8 FNPT	4
LP-49431	1/4 x 1/8 FNPT	20

## Flare Nut Adapters



Item No.	Size	Pack Qty.
LP-49432	1/4 x 3/8	20
LP-41414	1/4 x 1/4	4
LP-49434	1/4 x 1/4	20
LP-51823	1/2 x 3/8	4

## Elbow Fittings



Item No.	Size	Pack Qty.
LP-41415	1/4	2
LP-49435	1/4	20
LP-51824	1/2	2
LP-59874	1/2	20

## "T" Fittings



Item No.	Size	Pack Qty.
LP-41416	1/4	2
LP-51825	1/2	2

## Quick Set Shield Kits

All quick-set shield kits include a 14" adjustable 3/4" Loc-Line arm, magnetic base and fitting for fixed mounting.



Item No.	Size	Pack Qty.
LP-60525	6 x 8	1
LP-60526	7 1/2 x 10	1
LP-60527	8 1/2 x 12	1

## Shield Mounting Elbows



Item No.	Description	Pack Qty.
LP-60531	2 Shield Mounting Elbows 3/4"	2

## Shield Fixed Mount



Item No.	Description	Pack Qty.
LP-60533	2 Fixed Mounts 3/4"	2

## Hose Assembly Pliers



Item No.	Size	Pack Qty.
LP-78001	1/4	1
LP-78002	1/2	1
LP-78004	3/4	1
LP-78003	1/4 and 1/2 Set	1

## Male NPT Valves



Item No.	Size	Pack Qty.
LP-21192	1/4	2
LP-29452	1/4	10
LP-32092	1/2	2
LP-39852	1/2	10

## Female NPT Valves



Item No.	Size	Pack Qty.
LP-21193	1/4	2
LP-29453	1/4	10
LP-32093	1/2	2

## In-Line Valves



Item No.	Size	Pack Qty.
LP-21194	1/4	2
LP-29454	1/4	10
LP-32094	1/2	2
LP-39854	1/2	10

## In-Line Check Valve



Item No.	Size	Pack Qty.
LP-21191	1/4	2

## Modular Manifold Systems



Includes: Three "T" fittings, one elbow fitting, one manifold bracket and three mounting screws.

Item No.	Size	Pack Qty.
LP-21199	1/4	1
LP-32099	1/2	1

## Flow Control Manifold Systems



Includes: One modular manifold system and five in line valves.

Item No.	Size	Pack Qty.
LP-21198	1/4	1
LP-32098	1/2	1

## Manifold Brackets



Item No.	Size	Pack Qty.
LP-21195	1/4	2
LP-32095	1/2	2

## Magnetic Base Manifold



Includes: Magnetic base manifold, three 1/4" plugs and one 1/4" barb fitting.

Item No.	Description	Pack Qty.
LP-40400	Magnetic Base Manifold	1

## Magnetic Base Manifold Kit



Includes: One magnetic base manifold, two 1/4" segments, one 1/4" MNPT valve, one flare nozzle, one 1/4" round nozzle, one 1/8" round nozzle, one 1/16" round nozzle, three 1/4" plugs and one 1/4" barb fitting.

Item No.	Description	Pack Qty.
LP-40463	Magnetic Base Manifold	1

## Magnetic Base Manifold Super Kit



Includes: One magnetic base manifold, eight 1/4" segments, five 1/4" MNPT valves, two flare nozzles, two 1/4" round nozzles, two 1/8" round nozzles, two 1/16" round nozzles, two 1/4" plugs and one 1/4" barb fitting.

Item No.	Description	Pack Qty.
LP-40480	Magnetic Base Manifold Super Kit	1

# ADJUSTABLE COOLANT HOSE & ACCESSORIES



## Hose Kits



Item No.	Description	Pack Qty.
LP-40413	13" Length with Fittings: 1/4", 1/8", 1/16" Nozzles 1/4" and 1/2" MPT Connectors 1/2" Hose Kit	1
LP-50813	13" Length with Fittings: 1/4", 3/8", 1/2" Nozzles 3/8" and 1/2" MPT Connectors 3/4" Hose Kit	1
LP-60513	14" Length with Fittings: 5/8" and 3/4" Nozzles 3/4" MPT Connector	1

## 1/4" Flared Tubing Replacement Pack



Item No.	Description	Pack Qty.
LP-40452	1/4" Flared Tubing Replacement Pack (8) Segments, 5 3/4" Long (4) Flare Nut Adapters, 3/8" (4) Round Nozzles, 1/8" (4) Round Nozzles, 1/4" (1) Flare Nozzle, 1"	1

## Nozzle Kits - 90 Degree Spray Bar



Item No.	ID	Nozzles	Pack Qty.
LP-41474	1/4	1/16, 1/8, 1/4	1
LP-51832	1/2	1/4, 3/8, 1/2	1

## Extended Element Kits



Includes 4 extended elements 3 3/4" long and 4 element clamps with screws.

Item No.	Size	Pack Qty.
LP-41475	1/4	1
LP-51835	1/2	1

## Circle Flow Nozzle Kits



Includes 15 side flow nozzles and one end cap.

Item No.	Size	Pack Qty.
LP-41479	1/4	1
LP-51837	1/2	1

## Adjustable Coolant Hose



Item No.	Lgth.	Package	Pack Qty.
<b>1/4" Hose I.D.</b>			
LP-41401	5 3/4"	Bag	2
LP-49420	5 3/4"	Box	55
LP-49421	50'	Spool	1
<b>1/2" Hose I.D.</b>			
LP-51801	5 1/2"	Bag	2
LP-59860	5 1/2"	Box	59
LP-59861	50'	Spool	1
<b>3/4" Hose I.D.</b>			
LP-61501	5 3/4"	Bag	2
LP-69540	5 3/4"	Box	54

## 1/4" Round Nozzles



Item No.	Size	Pack Qty.
LP-41402	1/4 x 1/16	4
LP-49422	1/4 x 1/16	50
LP-41403	1/4 x 1/8	4
LP-49423	1/4 x 1/8	50
LP-41404	1/4 x 1/4	4
LP-49424	1/4 x 1/4	50

## 1/2" and 3/4" Round Nozzles



Item No.	Size	Pack Qty.
LP-51806	1/2 x 1/4	4
LP-59866	1/2 x 1/4	50
LP-51802	1/2 x 3/8	4
LP-59862	1/2 x 3/8	50
LP-51803	1/2 x 1/2	4
LP-59863	1/2 x 1/2	50
LP-61503	3/4 x 3/8	4
LP-61502	3/4 x 3/4	4

## 1/4" Flat Nozzle Assortment



Item No.	Description	Pack Qty.
LP-41487	1/4" Flat Nozzle Assortment (2) Flat Slot Nozzles - one .040" and one .060" slot width (1) Flat 5-Hole Nozzle - .060" slot width (1) Flat 7-Hole Nozzle - .040" slot	1

## Flat Slot Nozzles



Item No.	Slot Width	Pack Qty.
LP-41483	.04	4
LP-49451	.04	20
LP-41484	.06	4
LP-49452	.06	20

## Multi-Hole Nozzles



Item No.	No. of Holes	Slot Width	Pack Qty.
LP-41485	5	.06	4
LP-49453	5	.06	20
LP-41486	7	.04	4
LP-49454	7	.04	20

## Flare Nozzles



Item No.	Size	Pack Qty.
LP-41407	1/4 x 1	2
LP-49427	1/4 x 1	20
LP-51807	1/2 x 1 1/4	2
LP-59867	1/2 x 1 1/4	20
LP-51809	1/2 x 2 1/2	2
LP-59871	1/2 x 2 1/2	20
LP-61507	3/4 x 3	2
LP-69547	3/4 x 3	20

## 90 Degree Nozzles



Item No.	Size	Pack Qty.
LP-41470	1/4 x 1/16	4
LP-41471	1/4 x 1/8	4
LP-49440	1/4 x 1/8	20
LP-41472	1/4 x 1/4	4
LP-49441	1/4 x 1/4	20
LP-51828	1/2 x 1/4	4
LP-51829	1/2 x 3/8	4

## 90 Degree Spray Bar Nozzles



Item No.	Size	Pack Qty.
LP-41473	1/4	2
LP-49442	1/4	20
LP-51831	1/2	2

## 1/4" Swivel Nozzles



Item No.	Hole Size	Pack Qty.
LP-41481	.04	2
LP-49449	.04	20
LP-41482	.06	2

## Extended Elements



Item No.	Size	Pack Qty.
LP-41476	1/4	4
LP-51833	1/2	4

## Element Clamps



Item No.	Size	Pack Qty.
LP-41477	1/4	4
LP-49446	1/4	20
LP-51834	1/2	4
LP-59884	1/2	20

## 1/4" Side Flow Nozzles



Item No.	Description	Pack Qty.
LP-41478	4 Side Flow Nozzles 1/4"	4

## End Caps



Item No.	Size	Pack Qty.
LP-49447	1/4	20
LP-51838	1/2	4



## SHIM STOCK &amp; FEELER STOCK

Feeler Gauge Assortments  
Steel and Stainless Steel

Thickness	Included In Set	Thickness	Included In Set	Thickness	Included In Set	Thickness	Included In Set
.001	A, B, C	.006	A, B, C	.014	A, B	.022	A, B
.0015	A, B, C	.007	A, B, C	.015	A, B, C	.024	A
.002	A, B, C	.008	A, B, C	.016	A, B	.025	A, B, C
.003	A, B, C	.009	A, B, C	.018	A, B	.030	B
.004	A, B, C	.010	A, B, C	.020	A, B, C	.031	C
.005	A, B, C	.012	A, B, C				

Sturdy vinyl case with individual sleeves keeps gauges clean. Fits conveniently in your pocket. Each set contains 20 gauges with the sizes as indicated below. Each gauge is 1/2" wide and is marked with the thickness. The metric set is from .05mm and 1.00mm by .05mm. Stainless is made from 301 stainless steel.

Item No.	Set	Description	Pack Qty.
PSW-19G20	A	5" Steel Gage Set - Inch	1
PSW-19G40	B	12" Steel Gage Set - Inch	1
PSW-19G60	B	5" Brass Gage Set - Inch	1
PSW-19G80	C	5" Stainless Steel Gage Set - Inch (2) each of thickness: .001, .0015, .002, .003 (1) each of: .004, .005, .006, .007, .008, .009, .010, .012, .015, .020, .025, .031	1
PSW-19G90	—	5" Steel Gage Set - Metric	1

Used for close spacing and extremely tight tolerance situations. Steel shims are made from close grain C1095 high carbon steel, hardened and tempered to Rc 48-62. Stainless steel shims are made from 1/2" wide, 300 series stainless steel, hardened and tempered to Rc 45-55. Flat lengths have rounded ends and are marked for size. Coiled lengths are etched every 6" and can be easily cut to length.

Feeler Gauge Stock  
High Carbon Steel

1/2" x 5" Flat	1/2" x 12" Flat	1/2" x 25" Coil	Thickness	Pack Qty.
PBI-1	PBK-1	PBH-1	.001	1
PBI-1X	PBK-1X	PBH-1X	.0015	1
PBI-2	PBK-2	PBH-2	.002	1
—	PBK-2X	—	.0025	1
PBI-3	PBK-3	PBH-3	.003	1
PBI-4	PBK-4	PBH-4	.004	1
PBI-5	PBK-5	PBH-5	.005	1
—	PBK-6	PBH-6	.006	1
—	PBK-7	—	.007	1
—	PBK-8	PBH-8	.008	1
—	PBK-9	—	.009	1
PBI-10	PBK-10	PBH-10	.010	1
—	PBK-11	—	.011	1
—	PBK-12	—	.012	1
—	PBK-13	—	.013	1
PBI-14	PBK-14	—	.014	1
PBI-15	PBK-15	PBH-15	.015	1
—	PBK-16	—	.016	1
—	PBK-17	—	.017	1
PBI-18	PBK-18	—	.018	1
—	PBK-19	—	.019	1
PBI-20	PBK-20	PBH-20	.020	1
—	PBK-21	PBH-21	.021	1
—	PBK-22	—	.022	1
—	PBK-23	—	.023	1
—	PBK-24	—	.024	1
PBI-25	PBK-25	—	.025	1
—	PBK-28	—	.028	1
—	PBK-30	—	.03	1
—	PBK-40	—	.04	1
—	PBK-50	—	.05	1

## Stainless Steel



1/2" x 12" Flat	1/2" x 25" Coil	1/2" x 5" Flat	Thickness	Pack Qty.
PBK-05SS	PBH-05SS	—	.0005	1
PBK-1SS	PBH-1SS	PBI-1SS	.001	1
PBK-1XSS	PBH-1XSS	PBI-1XSS	.0015	1
PBK-2SS	PBH-2SS	PBI-2SS	.002	1
PBK-3SS	PBH-3SS	PBI-3SS	.003	1
PBK-4SS	PBH-4SS	PBI-4SS	.004	1
PBK-5SS	PBH-5SS	PBI-5SS	.005	1
PBK-6SS	PBH-6SS	PBI-6SS	.006	1
PBK-7SS	PBH-7SS	PBI-7SS	.007	1
PBK-8SS	PBH-8SS	PBI-8SS	.008	1
PBK-9SS	PBH-9SS	PBI-9SS	.009	1
PBK-10SS	PBH-10SS	PBI-10SS	.010	1
PBK-12SS	PBH-12SS	PBI-12SS	.012	1
PBK-15SS	PBH-15SS	PBI-15SS	.015	1
PBK-20SS	PBH-20SS	PBI-20SS	.020	1
PBK-25SS	PBH-25SS	PBI-25SS	.025	1
PBK-31SS	PBH-31SS	PBI-31SS	.031	1

Buy One or  
Buy Bulk & SAVE

Used for tool and die work, machine repair, bearing adjustments, prototype work and short run production. Rolled to precision tolerances. Rolls are packaged in convenient dispenser. No. 2 finish. Assortment sheets are 6 x 18 inches, packed in a fold type carton with sizes clearly marked. Steel is SAE 1010 and oiled to resist rusting and staining. Stainless is made from 302 stainless steel.

Shim Stock  
Individual Rolls

Item No.	Thickness	Size	Pack Qty.	Item No.	Thickness	Size	Pack Qty.
SAE 1010 Steel - Cold Rolled and Oiled				SAE 1010 Steel - Cold Rolled and Oiled			
DE-SH-1	.001	6 x 100	1	DE-SR-5	.0050	6 x 180	1
DE-SH-2	.002	6 x 100	1	DE-SR-20	.0200	6 x 180	1
DE-SH-3	.003	6 x 100	1	Brass - Cold Rolled Hard Temper			
DE-SH-4	.004	6 x 100	1	DE-BH-1	.001	6 x 100	1
DE-SH-5	.005	6 x 100	1	DE-BH-2	.002	6 x 100	1
DE-SH-8	.008	6 x 100	1	DE-BH-3	.003	6 x 100	1
DE-SH-10	.010	6 x 100	1	DE-BH-5	.005	6 x 100	1
DE-SH-15	.015	6 x 100	1	DE-BH-7	.007	6 x 100	1
DE-SH-20	.020	6 x 100	1	DE-BH-8	.008	6 x 100	1
DE-SH-25	.025	6 x 100	1	DE-BH-10	.010	6 x 100	1
DE-SH-31	.031	6 x 100	1	DE-BH-12	.012	6 x 100	1
302 Stainless Steel - Full Hard Cold Rolled				DE-BH-15	.015	6 x 100	1
DE-SS-1	.001	6 x 60	1	DE-BH-20	.020	6 x 100	1
DE-SS-3	.003	6 x 60	1	DE-BH-25	.025	6 x 100	1
DE-SS-4	.004	6 x 60	1	DE-BH-31	.031	6 x 100	1
DE-SS-5	.005	6 x 60	1				
DE-SS-6	.006	6 x 60	1				
DE-SS-10	.010	6 x 60	1				
DE-SS-20	.020	6 x 60	1				
DE-SS-25	.025	6 x 60	1				

Shim Stock  
Assortments

Item No.	Description	Pack Qty.
SAE 1010 Steel - Cold Rolled and Oiled		
DE-SAL-12	8 Rolls: 1 each of .001 through .015	1
DE-SAL-15	11 Rolls: 1 each of .001 through .031	1



Solves alignment and leveling problems on pumps, generators and other machinery. Tabs eliminate need to place hands under machinery. Conforms to standard bolt and stud sizes. Made from 300 series stainless. The stainless sets contain 20 each of the thicknesses listed below. Comes in metal box.

Slotted Shims  
Stainless Steel Assortments

Item No.	Shim Size	Slot Size	Pack Qty.	Item No.	Shim Size	Slot Size	Pack Qty.
PS-42900	2 x 2	3/8	1000	PS-42910	3 x 3	3/8	1000

Slotted Shims  
Individual Stainless Shim Packages

2 x 2		3 x 3		4 x 4		Thickness	Pack Qty.
Item No.	Item No.	Item No.	Item No.	Item No.	Item No.		
PS-42205	—	—	—	—	—	.001	20
PS-42210	PS-42310	—	—	—	—	.002	20
PS-42220	—	—	—	—	—	.004	20
PS-42225	PS-42325	—	—	—	—	.005	20
PS-42230	PS-42330	PS-42430	—	—	—	.010	20
PS-42235	—	—	—	—	—	.015	10
PS-42240	—	PS-42440	—	—	—	.020	10
PS-42245	PS-42345	—	—	—	—	.025	10
PS-42250	PS-42350	PS-42450	—	—	—	.050	5
PS-42255	—	—	—	—	—	.075	5
PS-42260	—	—	—	—	—	.100	5
PS-42265	PS-42365	PS-42465	—	—	—	.125	5



These spacers and shims are used for fast and accurate spacing of milling cutters, gang cutters, saws, slitting blades and grinding tools. Made of 1010 cold rolled, low carbon, bright finish, full hardened (RB80 minimum) steel. ID tolerance  $-.000/+0.011$ ", OD tolerance  $\pm .002$ .



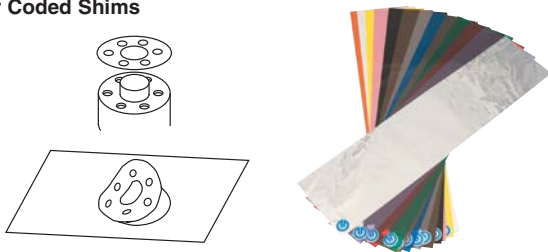
**Arbor Shims**  
Steel



Item No.	Thickness	Pack Qty.	Item No.	Thickness	Pack Qty.
<b>1/2" ID x 3/4" OD</b>					
PB-25121	.001	10	PB-25192	.015	10
PB-25123	.002	10	PB-25194	.025	10
PB-25124	.003	10	PB-25195	.031	10
PB-25125	.004	10	PB-25196	.047	10
PB-25126	.005	10	PB-25197	.062	10
PB-25127	.006	10	PB-25198	.093	10
PB-25129	.008	10	<b>1" ID x 1 1/2" OD</b>		
PB-25130	.010	10	PB-25201	.001	10
PB-25131	.012	10	PB-25203	.002	10
PB-25132	.015	10	PB-25204	.003	10
PB-25133	.020	10	PB-25206	.005	10
PB-25134	.025	10	PB-25207	.006	10
PB-25135	.031	10	PB-25208	.007	10
PB-25136	.047	10	PB-25209	.008	10
PB-25137	.062	10	PB-25210	.010	10
PB-25138	.093	10	PB-25212	.015	10
PB-25139	.125	10	PB-25213	.020	10
PB-25140*	Assortment	1	PB-25214	.025	10
<b>5/8" ID x 1" OD</b>					
PB-25141	.001	10	PB-25215	.031	10
PB-25143	.002	10	PB-25217	.062	10
PB-25144	.003	10	PB-25218	.093	10
PB-25146	.005	10	PB-25219	.125	10
PB-25147	.006	10	PB-25220*	Assortment	1
PB-25148	.007	10	<b>1 1/4" ID x 1 3/4" OD</b>		
PB-25149	.008	10	PB-25243	.002	10
PB-25150	.010	10	PB-25244	.003	10
PB-25151	.012	10	PB-25245	.004	10
PB-25152	.015	10	PB-25246	.005	10
PB-25153	.020	10	PB-25250	.010	10
PB-25154	.025	10	PB-25251	.012	10
PB-25155	.031	10	PB-25252	.015	10
PB-25156	.047	10	PB-25253	.020	10
PB-25157	.062	10	PB-25255	.031	10
PB-25158	.093	10	PB-25256	.047	10
PB-25159	.125	10	PB-25257	.062	10
PB-25160*	Assortment	1	PB-25259	.125	10
<b>3/4" ID x 1 1/8" OD</b>					
PB-25161	.001	10	PB-25260*	Assortment	1
PB-25163	.002	10	<b>1 1/2" ID x 2 1/8" OD</b>		
PB-25165	.004	10	PB-25443	.002	10
PB-25166	.005	10	PB-25444	.003	10
PB-25167	.006	10	PB-25446	.005	10
PB-25169	.008	10	PB-25450	.010	10
PB-25170	.010	10	PB-25452	.015	10
PB-25171	.012	10	PB-25453	.020	10
PB-25172	.015	10	PB-25455	.031	10
PB-25173	.020	10	PB-25457	.062	10
PB-25174	.025	10	PB-25458	.093	10
PB-25175	.031	10	PB-25459	.125	10
PB-25177	.062	10	PB-25460*	Assortment	1
PB-25178	.093	10	<b>2" ID x 2 3/4" OD</b>		
PB-25179	.125	10	PB-25463	.002	10
PB-25180*	Assortment	1	PB-25464	.003	10
<b>7/8" ID x 1 1/4" OD</b>					
PB-25183	.002	10	PB-25465	.004	10
PB-25184	.003	10	PB-25466	.005	10
PB-25185	.004	10	PB-25470	.010	10
PB-25186	.005	10	PB-25473	.020	10
PB-25190	.010	10	PB-25474	.025	10
			PB-25475	.031	10
			PB-25477	.062	10
			PB-25478	.093	10

\* Assortment includes 19 pieces (.001, .0015, .002, .003, .004, .005, .006, .007, .008, .010, .012, .015, .020, .025, .031, .047, .062, .093, .125)

**Color Coded Shims**



Used to make shims, gaskets and other parts. Made from high quality plastic for consistent performance. Color coded for easy identification. Cuts easily and resists oil. All sheets are 5" x 20" and sold by the package. The assortment (PSS-905) contains one each of thickness .0005" through .030".

**Arbor Spacers**  
Steel



Item No.	Thickness	Pack Qty.	Item No.	Thickness	Pack Qty.
<b>1/2" ID x 3/4" OD</b>					
PB-24126	.005	10	PB-24243	.002	10
PB-24130	.010	10	PB-24246	.005	10
PB-24137	.062	10	PB-24250	.010	10
PB-24139	.125	10	PB-24252	.015	10
<b>5/8" ID x 1" OD</b>					
PB-24146	.005	10	PB-24255	.031	10
PB-24150	.010	10	PB-24257	.062	10
PB-24153	.020	10	PB-24259	.125	10
PB-24154	.025	10	PB-24260*	Assortment	1
PB-24155	.031	10	<b>1 1/2" ID x 2 1/4" OD</b>		
PB-24156	.047	10	PB-24443	.002	10
PB-24157	.005	10	PB-24446	.005	10
PB-24159	.125	10	PB-24450	.010	10
PB-24160*	Assortment	1	PB-24452	.015	10
<b>3/4" ID x 1 1/8" OD</b>					
PB-24166	.005	10	PB-24453	.020	10
PB-24170	.010	10	PB-24454	.025	10
PB-24172	.015	10	PB-24457	.062	10
PB-24173	.020	10	PB-24459	.125	10
PB-24179	.125	10	<b>2" ID x 2 3/4" OD</b>		
PB-24180*	Assortment	1	PB-24463	.002	10
<b>7/8" ID x 1 1/4" OD</b>					
PB-24195	.031	10	PB-24470	.010	10
PB-24199	.125	10	PB-24472	.015	10
<b>1" ID x 1 1/2" OD</b>					
PB-24206	.005	10	PB-24473	.020	10
PB-24210	.010	10	PB-24474	.025	10
PB-24219	.125	10	PB-24475	.031	10
PB-24220*	Assortment	1	PB-24477	.062	10

\* Assortment includes 19 pieces (.001, .0015, .002, .003, .004, .005, .006, .007, .008, .010, .012, .015, .020, .025, .031, .047, .062, .093, .125)

**Arbor Shim Assortment Kits**



A convenient assortment kit for on-site jobs. Includes 10 pieces of each thickness and size. 150 pieces total. Packaged in plastic case.

Item No.	Thickness	ID x OD	Pack Qty.
PB-25998	.005, .010, .015	3/8 x 5/8, 1/2 x 3/4, 5/8 x 1, 3/4 x 1 1/8, 7/8 x 1 1/8	1
PB-25999	.020, .031, .125	3/8 x 5/8, 1/2 x 3/4, 5/8 x 1, 3/4 x 1 1/8, 1 x 1 1/2	1

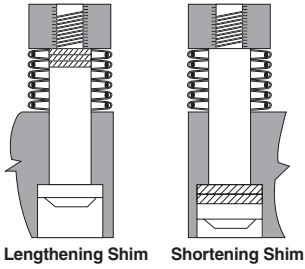


Item No.	Thickness	Color	Pack Qty.
PSS-505	.0005	Silver	5
PSS-510	.001	Amber	5
PSS-520	.002	Red	5
PSS-525	.003	Green	5
PSS-535	.005	Blue	10
PSS-545	.010	Brown	10
PSS-555	.015	Pink	10
PSS-560	.020	Yellow	10
PSS-565	.025	White	10
PSS-570	.030	Coral	10
PSS-585	.060	Clear	3
PSS-905	Assortment		1





**Lengthening and Shortening Shims Provide Precision Adjustment of Die Stripper Travel**



Lengthening shims fit perfectly over the stripper screw threads and under the shoulder, which in effect, lengthens the stripper screw length. Shortening shims fit around the screw shank and under the screw head, in effect shortening the screw length. Each kit contains 15 shims of each size to fit six shoulder screw sizes from 1/4" to 3/4" diameter.



Lengthening Shim Kit



Shortening Shim Kit

**Shim Kits**



See Page 270 for stripper bolts.

Item No.	Description	Pack Qty.
PB-1	Lengthening Shim Kit	1
PB-2	Shortening Shim Kit	1

**Lengthening and Shortening Shims**

Item No.	ID	OD	Screw Size	Gauge	Pack Qty.
<b>Lengthening Shims</b>					
PBL-1	.171	.248	1/4	.005	50
PBL-2	.171	.248	1/4	.015	50
PBL-3	.187	.248	1/4	.032	50
PBL-4	.234	.308	5/16	.005	50
PBL-5	.234	.308	5/16	.015	50
PBL-6	.234	.308	5/16	.032	50
PBL-7	.289	.371	3/8	.005	50
PBL-8	.289	.371	3/8	.015	50
PBL-9	.296	.371	3/8	.032	50
PBL-10	.352	.496	1/2	.005	50
PBL-11	.352	.496	1/2	.015	50
PBL-12	.352	.496	1/2	.032	50
PBL-13	.473	.621	5/8	.005	50
PBL-14	.473	.621	5/8	.015	50
PBL-15	.473	.621	5/8	.032	50
PBL-16	.598	.746	3/4	.005	50
PBL-17	.598	.746	3/4	.015	50
PBL-18	.598	.746	3/4	.032	50
<b>Shortening Shims</b>					
PBS-1	.252	.366	1/4	.005	50
PBS-2	.252	.366	1/4	.015	50
PBS-3	.252	.366	1/4	.032	50
PBS-4	.313	.424	5/16	.005	50
PBS-5	.313	.424	5/16	.015	50
PBS-6	.313	.424	5/16	.032	50
PBS-7	.376	.557	3/8	.005	50
PBS-8	.376	.557	3/8	.015	50
PBS-9	.376	.557	3/8	.032	50
PBS-10	.501	.738	1/2	.005	50
PBS-11	.501	.738	1/2	.015	50
PBS-12	.501	.738	1/2	.032	50
PBS-13	.626	.870	5/8	.005	50
PBS-14	.626	.870	5/8	.015	50
PBS-15	.626	.870	5/8	.032	50
PBS-16	.751	.995	3/4	.005	50
PBS-17	.751	.995	3/4	.015	50
PBS-18	.751	.995	3/4	.032	50

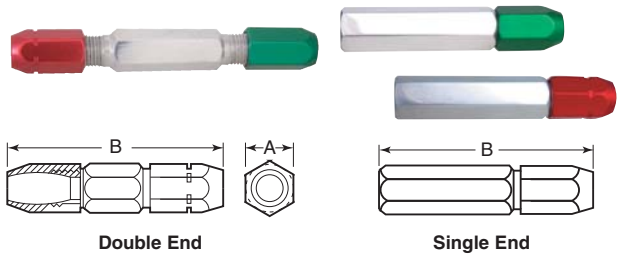
**Feeler Stock**



Smooth edges and rounded ends make stock easier to work with. Made of the finest tempered steel. Each piece marked with thickness, and in an individual envelope with convenient 3/16" hole (5mm) hole punched in the end for hanging. All thicknesses are 1/2" x 12".

Item No.	Thickness	Pack Qty.
STR-667-1	.001	1
STR-667-2	.002	1
STR-667-3	.003	1
STR-667-4	.004	1
STR-667-5	.005	1
STR-667-10	.010	1
STR-667-15	.015	1
STR-667-20	.020	1
STR-667-25	.025	1
STR-667-30	.030	1

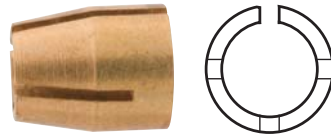
**Gauge Handles Single and Double End - Aluminum**



These handles are used to hold plug gauges for go and no-go gauging. Green end holds go gauge and red end holds no-go gauge. All handles are furnished without bushings.

Double End		Single End	Single End	Use For Plug Gauge Dia.	A	B	Pack Qty.
Go & No-Go Plug	Go Plug	No-Go Plug					
MEY-1	MEY-11	MEY-21		.010 - .075	1/4	2 1/4	1
MEY-2	MEY-12	MEY-22		.076 - .180	3/8	2 1/16	1
MEY-3	MEY-13	MEY-23		.181 - .281	9/16	3 3/16	1
MEY-4	MEY-14	MEY-24		.282 - .406	1 1/8	3 3/16	1
MEY-5	MEY-15	MEY-25		.407 - .510	1 1/8	4 1/4	1
MEY-6	MEY-16	—		.511 - .635	1 1/8	4 3/4	1
MEY-7	MEY-17	—		.636 - .760	1 1/8	4 3/4	1
MEY-8	MEY-18	—		.760 - 1.010	1 1/4	5 1/4	1

**Gauge Bushings Wire Type - Cylindrical**



These bushings are used with the gauge handles listed above. Material for range .005" through .510" is brass. Material for range above .510" is aluminum.

Item No.	Fits Gauges Above-Thru	Pack Qty.	Item No.	Fits Gauges Above-Thru	Pack Qty.	Item No.	Fits Gauges Above-Thru	Pack Qty.
MEY-013	.006-.013	1	MEY-138	.131-.138	1	MEY-311	.301-.311	1
MEY-020	.013-.020	1	MEY-145	.138-.145	1	MEY-321	.311-.321	1
MEY-025	.020-.025	1	MEY-152	.145-.152	1	MEY-331	.321-.331	1
MEY-030	.025-.030	1	MEY-159	.152-.159	1	MEY-341	.331-.341	1
MEY-035	.030-.035	1	MEY-166	.159-.166	1	MEY-351	.341-.351	1
MEY-040	.035-.040	1	MEY-173	.166-.173	1	MEY-361	.351-.361	1
MEY-050	.045-.050	1	MEY-180	.173-.180	1	MEY-371	.361-.371	1
MEY-055	.050-.055	1	MEY-188	.180-.188	1	MEY-382	.371-.382	1
MEY-060	.055-.060	1	MEY-196	.188-.196	1	MEY-394	.382-.394	1
MEY-065	.060-.065	1	MEY-204	.196-.204	1	MEY-406	.394-.406	1
MEY-070	.065-.070	1	MEY-212	.204-.212	1	MEY-435	.420-.435	1
MEY-075	.070-.075	1	MEY-220	.212-.220	1	MEY-450	.435-.450	1
MEY-082	.075-.082	1	MEY-228	.220-.228	1	MEY-480	.465-.480	1
MEY-089	.082-.089	1	MEY-236	.228-.236	1	MEY-510	.495-.510	1
MEY-096	.089-.096	1	MEY-244	.236-.244	1	MEY-547	.532-.547	1
MEY-103	.096-.103	1	MEY-252	.244-.252	1	MEY-563	.547-.563	1
MEY-110	.103-.110	1	MEY-261	.252-.261	1	MEY-750	.735-.750	1
MEY-117	.110-.117	1	MEY-271	.261-.271	1	MEY-760	.750-.760	1
MEY-124	.117-.124	1	MEY-281	.271-.281	1			
MEY-131	.124-.131	1	MEY-291	.281-.291	1			

**Z Class Steel Plug Gauge Sets**



Quality Z class gauge sets for measuring hole sizes and depths, to check locations and distances between holes, to set micrometers and go and no-go gauging. All gauges are 2" long. All English gauges are inspected within .0001" tolerance limit with centerless finish of 10 micro or better. No sharp edges. Made from 52100 bearing steel and heat treated to Rockwell C60 to C62. Available in plus or minus tolerance.

Plus		Minus		Gauge-Size	No. of Pieces	Pack Qty.
Item No.	Item No.					
MEY-MOP	MEY-MOM			.011-.060	50	1

# TUNGSTEN CARBIDE BALLS, GAUGES & GRIPPER CLIPS



- Grade: 24
- Sphericity: .000024 Inch
- Diameter Tolerance: +/- .0001 Inch
- Hardness: Rockwell A 90.5 to 91.5

Tungsten carbide balls are used where extreme hardness and wear resistance is required. Used for applications such as bearings, ball screws, valves, coining, pivots, detents and tips for gauges and tracers. Can also be used for ballizing, gauging and checking.

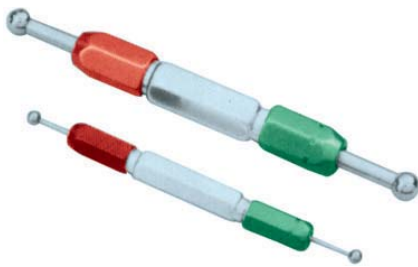
### Fractional Sizes

Item No.	Size	Pack Qty.	Item No.	Size	Pack Qty.	Item No.	Size	Pack Qty.	Item No.	Size	Pack Qty.
CB-20	3/64	1	CB-50	5/32	1	CB-80	11/32	1	CB-115	5/8	1
CB-25	1/16	1	CB-55	3/16	1	CB-85	3/8	1	CB-130	13/16	1
CB-30	5/64	1	CB-60	7/32	1	CB-90	19/32	1	CB-145	1	1
CB-35	3/32	1	CB-65	1/4	1	CB-100	19/32	1			
CB-40	7/64	1	CB-70	9/32	1	CB-105	1/2	1			
CB-45	1/8	1	CB-75	5/16	1	CB-110	9/16	1			

### Decimal Sizes

Item No.	Size	Pack Qty.	Item No.	Size	Pack Qty.	Item No.	Size	Pack Qty.	Item No.	Size	Pack Qty.
CB-0393	.0393 (1mm)	1	CB-1500	.1500	1	CB-2300	.2300	1	CB-2820	.2820	1
CB-0500	.0500	1	CB-1554	.1554	1	CB-2343	.2343	1	CB-3000	.3000	1
CB-0540	.0540	1	CB-1571	.1571	1	CB-2350	.2350	1	CB-3100	.3100	1
CB-0590	.0590	1	CB-1574	.1574 (4mm)	1	CB-2360	.2360	1	CB-3138	.3138	1
CB-0600	.0600	1	CB-1580	.1580	1	CB-2362	.2362 (6mm)	1	CB-3150	.3150	1
CB-0690	.0690	1	CB-1600	.1600	1	CB-2400	.2400	1	CB-3155	.3155	1
CB-0720	.0720	1	CB-1700	.1700	1	CB-2450	.2450	1	CB-3200	.3200	1
CB-0787	.0787 (2mm)	1	CB-1718	.1718	1	CB-2480	.2480	1	CB-3267	.3267	1
CB-0800	.0800	1	CB-1728	.1728	1	CB-2501	.2501	1	CB-3298	.3298	1
CB-0850	.0850	1	CB-1800	.1800	1	CB-2502	.2502	1	CB-3390	.3390	1
CB-0950	.0950	1	CB-1870	.1870	1	CB-2503	.2503	1	CB-3430	.3430	1
CB-0951	.0951	1	CB-1885	.1885	1	CB-2505	.2505	1	CB-3450	.3450	1
CB-0960	.0960	1	CB-1968	.1968 (5mm)	1	CB-2510	.2510	1	CB-3500	.3500	1
CB-0984	.0984	1	CB-2000	.2000	1	CB-2513	.2513	1	CB-3550	.3550	1
CB-1000	.1000	1	CB-2031	.2031	1	CB-2515	.2515	1	CB-3610	.3610	1
CB-1090	.1090	1	CB-2040	.2040	1	CB-2530	.2530	1	CB-3800	.3800	1
CB-1100	.1100	1	CB-2050	.2050	1	CB-2560	.2560	1	CB-3937	.3937 (10mm)	1
CB-1181	.1181 (3mm)	1	CB-2160	.2160	1	CB-2580	.2580	1	CB-4000	.4000	1
CB-1200	.1200	1	CB-2175	.2175	1	CB-2600	.2600	1	CB-4172	.4172	1
CB-1260	.1260	1	CB-2180	.2180	1	CB-2655	.2655	1	CB-4500	.4500	1
CB-1270	.1270	1	CB-2200	.2200	1	CB-2700	.2700	1	CB-4850	.4850	1
CB-1417	.1417	1	CB-2220	.2220	1	CB-2800	.2800	1	CB-5001	.5001	1
CB-1440	.1440	1	CB-2280	.2280	1	CB-2816	.2816	1			

### Ball Plug Gauges Tungsten Carbide



These custom made tungsten carbide ball plug gauges are quick and easy to use because they can be inserted at any angle. "Go" gauges go easily and "No-Go" gauges won't force or bind. Effective in giving a feel for bellmouth, barrel or taper. Sizes available in increments of .0001 inch, from .0500 to .7500 inch. The polished tungsten carbide balls up to 1.0 inch are class Z tolerance ("Go" is +.0001 inch; "No-Go" is .0001 inch). Stainless steel shank. Standard delivery is two weeks. Y, X and XX classes are also available. Please call for pricing. A simple-to-use customer order specification sheet needs to accompany your order. Call to obtain a copy. To order, specify type of gauge (Go or No-Go), tolerance and any special needs you may have.

See page 464 for handles and bushings (sold separately).

Ball Size Range	Shank Diameter	Shank Length
.05 - 0.75	.045 - .50	2.0 - 3.5

### Gripper Clips



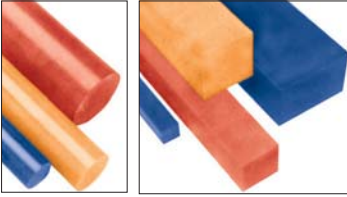
Utility clips available in six sizes. Designed to hold diameters ranging from 3/8" to 2 1/2". Mounting holes .188" diameter. Holds round objects to flat surfaces. Various applications, including warehouse, storage, and industrial assembly.

Item No.	A	B	Capacity (Dia.)	Color/Finish	Pack Qty.
GGT-1	1 1/16	1 3/8	3/8 - 5/8	Bright Zinc with Chromate Dip	1
GGT-2	1 1/4	1 5/8	3/4 - 1 1/8	Bright Zinc with Chromate Dip	1
GGT-3	1 1/2	1 3/4	1 - 1 1/2	Bright Zinc with Chromate Dip	1
GGT-4	1 5/8	1 7/8	3/8 - 5/8	Full Vinyl Coating	1
GGT-5	1 1/4	1 5/8	3/4 - 1 1/8	Full Vinyl Coating	1
GGT-6	1 1/4	1 3/4	1 - 1 1/2	Full Vinyl Coating	1
GGT-7	1 1/4	1 5/8	3/4 - 1 1/8	Half Vinyl Coating	1
GGT-8	1 1/4	1 3/4	1 - 1 1/2	Half Vinyl Coating	1
GGT-9*	1 1/8	1	1 1/2 - 1 7/8	Black Nylon Coating	1
GGT-10	2	2 3/16	2 - 2 1/2	Black Vinyl Coating	1

\*Two mounting holes .188" dia.



## Urethane Round Rods and Square Bars



Made from K-prene® urethane. Rods and bars are available in 80A, 90A, and 95A durometer. All are 48" long. 80A is orange, 90A is blue and 95A is red. Length tolerance is  $\pm 1/8"$ . Diameter or width is  $\pm 2\%$ .

80A	90A	95A	Diameter or Width	Pack Qty.
Item No.	Item No.	Item No.		
<b>Round Rod</b>				
AU-1	—	—	1/2	1
AU-10	—	AU-30	5/8	1
—	AU-21	AU-31	3/4	1
—	—	AU-32	7/8	1
—	AU-23	AU-33	1	1
—	AU-24	AU-34	1 1/4	1
—	AU-25	—	1 1/2	1
AU-16	—	AU-36	1 3/4	1
AU-17	—	AU-37	2	1
<b>Square Bar</b>				
—	AU-45	AU-50	3/4	1
AU-41	AU-46	AU-51	1	1
AU-42	—	—	1 1/4	1
AU-43	—	—	1 1/2	1
AU-44	—	—	2	1

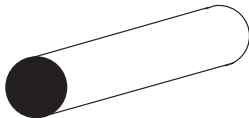
## Aluminum 6061 Extruded Flats



6061-T6511 extruded is the most versatile of the heat treatable aluminum alloys. It has most of the good qualities of aluminum, and it offers a wide range of mechanical properties and corrosion resistance. It can be fabricated by many of the commonly used techniques. Length tolerances are  $\pm 1"$ .

3 feet	6 feet	Item No.	Item No.	Size	Lbs. Per Foot	Pack Qty.	3 feet	6 feet	Item No.	Item No.	Size	Lbs. Per Foot	Pack Qty.
MES-640	MES-804	1/8 x 1	.15	1	MES-724	MES-888	3/4 x 1 1/2	1.32	1				
MES-658	MES-822	1/4 x 1	.29	1	MES-730	MES-894	3/4 x 3	2.65	1				
MES-662	MES-826	1/4 x 2	.59	1	MES-736	—	3/4 x 6	5.29	1				
MES-664	—	1/4 x 3	.88	1	MES-742	—	1 x 2	2.35	1				
MES-666	MES-830	1/4 x 4	1.18	1	MES-748	—	1 x 4	4.70	1				
MES-668	MES-832	1/4 x 6	1.76	1	MES-762	—	1 1/4 x 2	2.94	1				
MES-672	—	3/8 x 1	.44	1	MES-772	—	1 1/2 x 2	3.53	1				
MES-674	—	3/8 x 1 1/2	.66	1	MES-774	—	1 1/2 x 2 1/2	4.41	1				
MES-676	—	3/8 x 2	.88	1	MES-776	—	1 1/2 x 3	5.29	1				
MES-684	—	3/8 x 6	2.65	1	MES-778	—	1 1/2 x 4	7.05	1				
MES-688	—	1/2 x 1	.59	1	MES-780	—	1 1/2 x 6	10.58	1				
MES-690	MES-854	1/2 x 1 1/2	.88	1	MES-792	—	2 x 6	14.54	1				
MES-692	MES-856	1/2 x 2	1.18	1	—	MES-806	1/8 x 2	.30	1				
MES-694	MES-858	1/2 x 2 1/2	1.47	1	—	MES-808	1/8 x 3	.46	1				
MES-698	MES-862	1/2 x 4	2.35	1	—	MES-812	3/16 x 1	.23	1				
MES-702	—	1/2 x 6	3.53	1	—	MES-814	3/16 x 1 1/2	.33	1				
MES-704	—	1/2 x 8	4.70	1	—	MES-824	1/4 x 1 1/2	.44	1				
MES-712	—	5/8 x 2	1.47	1	—	MES-890	3/4 x 2	1.76	1				
MES-722	—	3/4 x 1	.88	1									

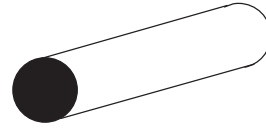
## Aluminum 6061 Extruded Rounds



6061-T6511 extruded is the most versatile of the heat treatable aluminum alloys. It has most of the good qualities of aluminum, and it offers a wide range of mechanical properties and corrosion resistance. It can be fabricated by many of the commonly used techniques. Length tolerances are  $\pm 1"$ .

3 feet	6 feet	Item No.	Item No.	Size	Lbs. Per Ft.	Pack Qty.
MES-432	MES-488	1/4	.06	1		
—	MES-490	3/16	.09	1		
—	MES-492	3/8	.13	1		
MES-438	MES-494	1/2	.23	1		
MES-440	—	5/8	.36	1		
MES-442	MES-498	3/4	.52	1		
MES-444	MES-500	7/8	.71	1		
MES-446	MES-502	1	.92	1		
MES-448	—	1 1/8	1.17	1		
MES-450	—	1 1/4	1.44	1		

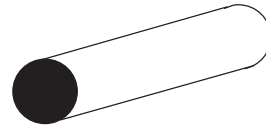
## Brass CA360 Rounds



This cold finished, nonferrous alloy 360 is a versatile, free cutting, 1/2 hard brass and is the standard of machinability (rated 100%) against which all nonferrous alloys are rated. It's an ideal metal for shop use where milling, drilling, tapping, knurling or turning is required. Brass is a corrosion resistant, rustproof metal that finishes well and is easily plated, soldered and brazed. Typical applications include nuts, bolts, rivets, valve stems, pump shafts and marine hardware. Conforms to ASTM B16. Length tolerances are  $\pm 1/2"$ .

3 feet	6 feet	Item No.	Item No.	Size	Lbs. Per Ft.	Pack Qty.
MES-320	MES-352	1/2	.74	1		
MES-322	MES-354	3/8	1.13	1		
MES-324	MES-356	3/4	1.63	1		
MES-326	MES-358	7/8	2.22	1		
MES-328	MES-360	1	2.89	1		
MES-330	—	1 1/8	3.66	1		
MES-332	—	1 1/4	4.52	1		

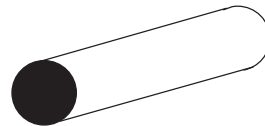
## Stainless Type 303 Rounds



Type 303 is highly corrosion resistant and non-magnetic. It has non-galling and non-seizing qualities which allow for easy machining and is better for lighter equipment if welding is not required. When cold worked, can become slightly magnetic. Free machining for heavier cuts in automatic machining operations. Corrosion resistant to atmospheric exposures, sterilizing solutions, most organic and many inorganic chemicals, most dyes, nitric acid and foods. Machinability is 70% (1212 crs = 100% and 1018 crs = 78%). Length tolerances are  $\pm 1"$ .

3 feet	6 feet	Item No.	Item No.	Size	Lbs. Per Ft.	Pack Qty.
MES-38	MES-92	3/16	.09	1		
MES-40	MES-94	1/4	.17	1		
MES-42	MES-96	5/16	.26	1		
MES-44	MES-98	3/8	.38	1		
MES-48	MES-102	1/2	.67	1		
MES-52	MES-106	5/8	1.04	1		
MES-54	MES-108	3/4	1.50	1		

## Stainless Type 316 Rounds



Best corrosion resistance of the standard stainless steels. Resists pitting and most chemicals used in paper, textile and photographic industries. High temperature strength. Non magnetic. Length tolerances are  $\pm 1"$ .

3 feet	6 feet	Item No.	Item No.	Size	Lbs. Per Ft.	Pack Qty.
MES-178	MES-222	3/16	.09	1		
MES-180	MES-224	1/4	.17	1		
MES-182	MES-226	5/16	.26	1		
MES-184	MES-228	3/8	.38	1		
MES-186	MES-230	1/2	.67	1		



Tolerances	
Up To 1/8" Diameter	+/- .0003"
3/16 to 1/4" Diameter	+/- .0005"
1/2 to 1 1/2" Diameter	+/- .001"

**Drill Rod  
Inch**

All rods come in 36" lengths and are AISI/SAE. Available in the following types:

**O-1** Oil-hardening for general tool room use. Good nondeforming characteristics. Moderate resistance to abrasion. Machinability 90%.

**S-7** Air-hardening molybdenum, chromium, shock resisting. High impact strength with moderate wear resistance. Machinability 95%.

**A-2** Air-hardening. Maximum abrasion resistance. Machinability 65%.

**W-1** Water hardening offers a combination of high abrasion resistance and toughness when hardened. Machinability 100%.

**D-2** Air hardening. Offers significantly better wear resistance and a high compressive strength. Machinability 65%.

O-1 Oil	S-7 Air	A-2 Air	W-1 Water	D-2 Air	Inch Dia.	Pack Qty.
ODR-30	ODR-40	—	ODR-420	—	1/8	1
ODR-50	ODR-60	ODR-55	ODR-430	—	3/16	1
ODR-70	ODR-80	ODR-75	ODR-440	—	1/4	1
ODR-90	—	ODR-95	ODR-450	—	5/16	1
ODR-110	ODR-120	ODR-115	ODR-460	ODR-125	3/8	1
ODR-130	—	ODR-135	ODR-470	—	7/16	1
ODR-150	ODR-160	ODR-155	ODR-480	—	1/2	1
ODR-170	—	—	—	—	9/16	1
ODR-190	—	ODR-195	ODR-500	—	5/8	1
ODR-210	ODR-220	ODR-215	ODR-510	—	3/4	1
ODR-230	—	—	—	—	7/8	1
ODR-250	—	ODR-255	ODR-530	—	1	1
ODR-270	—	—	—	—	1 1/8	1
ODR-290	—	—	—	—	1 1/4	1
ODR-310	—	—	—	—	1 1/2	1

**Drill Rod  
Metric**

Made of chrome vanadium alloy in one meter lengths. Accuracy h9. Heating: 1,490-1,580 degree Fahrenheit Oil, 1,470-1,510 degree Fahrenheit Water, HRC-62 - 400 degree Fahrenheit, HRC-60 - 485 degree Fahrenheit, HRC-56 - 570 degree Fahrenheit. Diameter is shown in millimeters.

Item No.	Dia.	Pack Qty.	Item No.	Dia.	Pack Qty.	Item No.	Dia.	Pack Qty.
MDR-03	2	1	MDR-10	6	1	MDR-18	14	1
MDR-04	2.5	1	MDR-11	7	1	MDR-19	15	1
MDR-05	3	1	MDR-12	8	1	MDR-20	16	1
MDR-07	4	1	MDR-14	10	1	MDR-22	18	1
MDR-09	5	1	MDR-16	12	1	MDR-23	20	1

**Drill Rod  
O-1 Oil Hardening 480 Series**



Tolerances	
Up to 1/4" Diameter	± .0003"
1/4" to 1/2" Diameter	± .0005"
1/2" to 2" Diameter	± .001"

All rods come in 36" lengths and are AISI/SAE. O-1 is a general purpose tool steel with good wear resistance, toughness and machinability.

Item No.	Dia.	Pack Qty.	Item No.	Dia.	Pack Qty.	Item No.	Dia.	Pack Qty.
SDS-68307	1/8	1	SDS-68324	25/64	1	SDS-68343	1 1/16	1
SDS-68309	7/32	1	SDS-68325	17/32	1	SDS-68347	3/4	1
SDS-68311	9/16	1	SDS-68327	7/16	1	SDS-68355	7/8	1
SDS-68315	1/4	1	SDS-68331	1/2	1	SDS-68363	1	1
SDS-68319	3/16	1	SDS-68332	39/64	1	SDS-68379	1 1/4	1
SDS-68321	11/32	1	SDS-68335	9/16	1			
SDS-68323	3/8	1	SDS-68339	5/8	1			



Made from high quality low carbon steel or stainless steel type 304 in 36" lengths. Coarse threads in steel available either with plain oil finish or electro zinc plated. Fine threads available plain oil finish only.

**Threaded Rod  
Inch - Fine Threads**

Item No.	Size	Pack Qty.
TR-57	10-32	1
TR-77	1/4-28	1
TR-87	5/16-24	1
TR-97	3/8-24	1
TR-117	1/2-20	1

**Threaded Rod  
Inch - Coarse Threads**

See page 778 for threaded studs.

Plain Oil		Electro Zinc Plated		Stainless Steel		Plain Oil		Electro Zinc Plated		Stainless Steel	
Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.	Item No.
TR-30	TR-35	TR-32	6-32	1	TR-110	TR-115	TR-112	1/2-13	1		
TR-40	TR-45	—	8-32	1	TR-130	TR-135	TR-132	3/8-11	1		
TR-50	TR-55	—	10-24	1	TR-140	TR-145	TR-142	3/4-10	1		
TR-70	TR-75	TR-72	1/4-20	1	TR-150	—	—	7/8-9	1		
TR-80	TR-85	TR-82	5/16-18	1	TR-160	—	—	1-8	1		
TR-90	TR-95	TR-92	3/8-16	1							

**Threaded Rod  
Metric**

One meter lengths. Mild steel. Available with plain finish or zinc plated finish.

Plain Steel		Zinc Plated Steel		Plain Steel		Zinc Plated Steel	
Item No.	Item No.	Size	Pack Qty.	Item No.	Item No.	Size	Pack Qty.
MTR-20	—	M4 x .70	1	MTR-60	MTR-130	M10 x 1.50	1
MTR-30	—	M5 x .80	1	MTR-70	MTR-135	M12 x 1.75	1
MTR-40	MTR-120	M6x1.00	1	MTR-80	—	M16 x 2.00	1
MTR-50	MTR-125	M8x1.25	1	MTR-90	—	M20 x 2.50	1



# CARBIDE ROTARY FILES

Buy One or Buy Bulk & SAVE

Used for deburring and smoothing metals. All have 1/4" heat treated steel shanks except those with 3/16" and 1/4" flute diameters which are solid carbide. Each shape is available in either standard, double or aluminum cut.

### Cylindrical Shape



GARR TOOL®

Standard Item No.	Double Item No.	Aluminum Item No.	Flute Dia.	Flute Lgth.	Pack Qty.
GAR-60010	GAR-60012	—	3/16	5/8	1
GAR-60020	GAR-60022	GAR-60021	1/4	5/8	1
GAR-60030	GAR-60032	—	5/16	3/4	1
GAR-60040	GAR-60042	GAR-60041	3/8	3/4	1
—	GAR-60052	—	7/16	1	1
GAR-60060	GAR-60062	GAR-60061	1/2	1	1
GAR-60070	GAR-60072	GAR-60071	5/8	1	1
GAR-60080	GAR-60082	GAR-60081	3/4	1	1
GAR-60090	GAR-60092	GAR-60091	1	1	1

### Cylindrical – Radius Shape



GARR TOOL®

Standard Item No.	Double Item No.	Aluminum Item No.	Flute Dia.	Flute Lgth.	Pack Qty.
GAR-61010	GAR-61012	—	3/16	5/8	1
GAR-61020	GAR-61022	GAR-61021	1/4	5/8	1
GAR-61030	GAR-61032	—	5/16	3/4	1
GAR-61040	GAR-61042	GAR-61041	3/8	3/4	1
—	GAR-61052	—	7/16	1	1
GAR-61060	GAR-61062	GAR-61061	1/2	1	1
GAR-61070	GAR-61072	GAR-61071	5/8	1	1
GAR-61080	GAR-61082	GAR-61081	3/4	1	1

### Ball Shape



GARR TOOL®

Standard Item No.	Double Item No.	Aluminum Item No.	Flute Dia.	Pack Qty.
GAR-62010	GAR-62012	—	3/16	1
GAR-62020	GAR-62022	GAR-62021	1/4	1
GAR-62030	GAR-62032	—	5/16	1
GAR-62040	GAR-62042	GAR-62041	3/8	1
GAR-62060	GAR-62062	GAR-62061	1/2	1
—	GAR-62072	GAR-62071	5/8	1
GAR-62080	GAR-62082	—	3/4	1
GAR-62090	GAR-62092	—	1	1

### Tree – Pointed Shape



GARR TOOL®

Standard Item No.	Double Item No.	Flute Dia.	Flute Lgth.	Pack Qty.	Standard Item No.	Double Item No.	Flute Dia.	Flute Lgth.	Pack Qty.
GAR-65010	GAR-65012	1/4	5/8	1	GAR-65040	GAR-65042	1/2	1	1
GAR-65020	GAR-65022	3/8	3/4	1	GAR-65060	GAR-65062	3/4	1	1
GAR-65030	GAR-65032	1/2	3/4	1	—	GAR-65052	5/8	1	1

### Tree – Radius Shape



GARR TOOL®

Standard Item No.	Double Item No.	Aluminum Item No.	Flute Dia.	Pack Qty.
GAR-64010	GAR-64012	GAR-64011	1/4	1
GAR-64020	GAR-64022	GAR-64021	3/8	1
GAR-64030	GAR-64032	GAR-64031	1/2	1
—	GAR-64042	GAR-64041	5/8	1
—	GAR-64052	—	3/4	1

### Egg Shape



GARR TOOL®

Standard Item No.	Double Item No.	Aluminum Item No.	Flute Dia.	Flute Lgth.	Pack Qty.
GAR-63010	GAR-63012	—	1/4	3/8	1
GAR-63020	GAR-63022	GAR-63021	3/8	5/8	1
GAR-63030	GAR-63032	GAR-63031	1/2	7/8	1
—	GAR-63042	GAR-63041	5/8	1	1
GAR-63050	GAR-63052	—	3/4	1	1



Standard Cut



Double Cut



Aluminum Cut

### Cone - Radius Shape (14 Degree Included Angle)



GARR TOOL®

Standard Item No.	Double Item No.	Aluminum Item No.	Flute Dia.	Flute Lgth.	Pack Qty.
GAR-69010	GAR-69012	—	1/4	5/8	1
GAR-69020	GAR-69022	—	5/16	7/8	1
GAR-69030	GAR-69032	GAR-69031	3/8	1 1/8	1
GAR-69040	GAR-69042	GAR-69041	1/2	1 1/8	1
—	GAR-69052	GAR-69051	5/8	1 3/8	1

### Cone - Flat Shape (No Radius)



GARR TOOL®

Standard Item No.	Double Item No.	Flute Dia.	Flute Lgth.	Included Angle Degrees	Pack Qty.
GAR-70010	GAR-70012	1/4	1/2	22	1
GAR-70020	GAR-70022	3/8	5/8	28	1
GAR-70030	GAR-70032	1/2	7/8	28	1
—	GAR-70042	5/8	1	31	1

### Flame Shape



GARR TOOL®

Standard Item No.	Double Item No.	Flute Dia.	Flute Lgth.	Pack Qty.
GAR-66010	GAR-66012	5/16	3/4	1
GAR-66020	GAR-66022	1/2	1 1/4	1
GAR-66040	—	3/4	1 3/4	1

### Taper Shape (60 Degree Included Angle)



GARR TOOL®

Standard Item No.	Double Item No.	Flute Dia.	Pack Qty.	Standard Item No.	Double Item No.	Flute Dia.	Pack Qty.
GAR-67010	GAR-67012	1/4	1	GAR-67050	—	3/4	1
GAR-67020	—	3/8	1	GAR-67060	GAR-67062	7/8	1
GAR-67030	GAR-67032	1/2	1	—	GAR-67042	5/8	1

### Taper Shape (90 Degree Included Angle)



GARR TOOL®

Standard Item No.	Double Item No.	Flute Dia.	Pack Qty.	Standard Item No.	Double Item No.	Flute Dia.	Pack Qty.
GAR-68010	GAR-68012	1/4	1	GAR-68050	GAR-68052	3/4	1
GAR-68020	GAR-68022	3/8	1	GAR-68060	GAR-68062	7/8	1
GAR-68030	GAR-68032	1/2	1	GAR-68070	GAR-68072	1	1
GAR-68040	GAR-68042	5/8	1	—	—	—	—

### Inverted Cone Shape



GARR TOOL®

Standard Item No.	Double Item No.	Flute Dia.	Flute Lgth.	Included Angle Degrees	Pack Qty.
GAR-71010	GAR-71012	1/4	5/16	10	1
GAR-71020	GAR-71022	3/8	5/8	13	1
GAR-71030	—	1/2	7/8	16	1
—	GAR-71042	5/8	1	19	1

# ROTARY FILES & ABRASIVES



Used for deburring and smoothing metals. All shapes available in either standard or double cut. All shanks are 1/8".



Standard Cut



Double Cut

**GARR TOOL**

**Carbide Rotary Files**  
 1/8" Heat Treated Steel Shank  
 1/16" to 1/8" Diameter



Standard Cut	Double Cut					
Item No.	Item No.	Tool Number	Flute Dia.	Flute Lgth.	Inc. Angle Degree	Pack Qty.
GAR-74010	GAR-74012	SA-41	1/16	1/4	—	1
GAR-74020	GAR-74022	SA-42	3/32	7/16	—	1
GAR-74030	GAR-74032	SA-43	1/8	3/16	—	1
GAR-74040	GAR-74042	SC-41	3/32	7/16	—	1
GAR-74050	GAR-74052	SC-42	1/8	3/16	—	1
GAR-74060	GAR-74062	SD-41	3/32	—	—	1
GAR-74070	GAR-74072	SD-42	1/8	—	—	1
GAR-74080	GAR-74082	SE-41	1/8	7/32	—	1
GAR-74090	GAR-74092	SF-42	1/8	1/2	—	1

Standard Cut	Double Cut					
Item No.	Item No.	Tool Number	Flute Dia.	Flute Lgth.	Inc. Angle Degree	Pack Qty.
GAR-74100	GAR-74102	SG-43	1/8	3/8	—	1
GAR-74110	GAR-74112	SH-41	1/8	1/4	—	1
GAR-74120	GAR-74122	SJ-42	1/8	—	60	1
GAR-74130	GAR-74132	SK-42	1/8	—	90	1
GAR-74140	GAR-74142	SL-41	1/8	3/8	14	1
GAR-74150	GAR-74152	SL-42	1/8	1/2	8	1
GAR-74160	GAR-74162	SM-41	1/8	3/8	12	1
GAR-74170	GAR-74172	SM-43	1/8	5/8	7	1
GAR-74180	GAR-74182	SN-42	1/8	3/16	10	1

**Carbide Rotary Files**  
 1/8" Heat Treated Steel Shank  
 1/4" Diameter

**GARR TOOL**



Standard Cut	Double Cut					
Item No.	Item No.	Tool Number	Flute Dia.	Flute Lgth.	Inc. Angle Degree	Pack Qty.
GAR-73010	GAR-73012	SA-51	1/4	1/2	—	1
GAR-73020	GAR-73022	SB-51	1/4	3/16	—	1
GAR-73030	GAR-73032	SC-51	1/4	1/2	—	1
GAR-73040	GAR-73042	SD-51	1/4	—	—	1
GAR-73050	GAR-73052	SE-51	1/4	3/8	—	1
GAR-73060	GAR-73062	SF-51	1/4	1/2	—	1
GAR-73070	GAR-73072	SG-51	1/4	1/2	—	1
GAR-73080	GAR-73082	SM-51	1/4	1/2	22	1
GAR-73090	GAR-73092	SN-51	1/4	1/4	10	1

**Norton Abrasives**  
 India Bench Stone



India bench stones, manufactured with aluminum oxide abrasive, are most popular for producing a strong, keen, long-lasting edge on high quality tools. A frequent choice of artisans, craftsmen and mechanics. Orange/brown in color.

Item No.	Norton	Size	Grit	Pack Qty.
NOR-85590	MB24	4 x 1 x 1/2	Medium	1

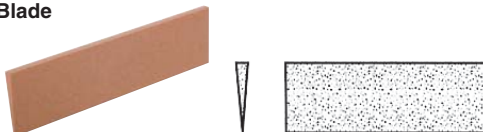
**Norton Abrasives**  
 India Combination Bench Stone



Manufactured with aluminum oxide abrasive, these stones provide both a coarse and a fine surface. Popular with artisans, craftsmen and mechanics for producing strong, keen, long lasting edges on quality tools. Orange/brown in color.

Item No.	Norton	Size	Grit	Pack Qty.
NOR-85565	IB8	8 x 2 x 1	Coarse/Fine	1

**Norton Abrasives**  
 India Knife Blade

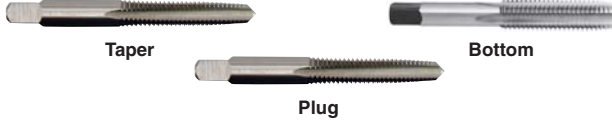


This knife blade quickly sharpens, hones and maintains the edge and point of cutting tools.

Item No.	Norton	Size	Grit	Pack Qty.
NOR-86775	MF724	4 x 1 x 1/8	Medium	1



Metric Hand Taps High Speed Steel



Metric Taps table with columns: Thread, Overall Length, Thread Length, Square Length, Shank Diameter, Square, Inch Blank

Table with columns: Taper, Plug, Bottoming (Item No., Thread, D Limit, No. of Flutes, Pack Qty.)

Taper Pipe NPT



Pipe Taps - Taper table with columns: Item No., Thread, Overall Length, Thread Length, Square Length, Shank Diameter, Square

Table with columns: Item No., Thread, No. of Flutes, Pack Qty.

\*Small shank \*\*Large shank

Taper Pipe NPT - Interrupted



Table with columns: Item No., Thread, No. of Flutes, Pack Qty.

\*Small shank

Pulley Taps High Speed Steel - 4-Flutes



Pulley Taps table with columns: Thread, Thread Length, Square Length, Shank Diameter, Square, Neck Length, Ground Length

Table with columns: Item No., Thread, GH Limit, No. of Flutes, Pack Qty.

Small Shank Extension Taps Spiral Point Plug High Speed Steel - Overall Length 6"



Small Shank Extension Taps table with columns: Thread, NC/NF, Thread Length, Square Length, Taps Shank Diameter, Square

Table with columns: Item No., Thread, GH Limit, No. of Flutes, Pack Qty.



**Metric Spiral Point Plug Taps**  
High Speed Steel - Ground Thread



Item No.	Thread	D Limit	No. of Flutes	Pack Qty.
TU-211847	M2 x .4	D3	2	1
TU-211858	M2.5 x .45	D3	2	1
TU-211869	M3 x .5	D3	2	1
TU-211880	M3.5 x .6	D4	2	1
TU-211891	M4 x .7	D4	2	1
TU-211902	M4.5 x .75	D4	2	1
TU-211913	M5 x .8	D4	2	1
TU-211924	M6 x 1	D5	2	1
TU-211935	M7 x 1	D5	2	1
TU-211946	M8 x 1.25	D5	2	1
TU-211957	M10 x 1.50	D6	3	1
TU-211968	M12 x 1.75	D6	3	1
TU-211979	M14 x 2.0	D7	3	1
TU-211990	M16 x 2.0	D7	3	1
TU-212001	M18 x 2.5	D7	3	1
TU-212012	M20 x 2.5	D7	4	1

**Spiral Point Plug Taps**  
Steam Oxide  
High Vanadium Powder Metal High Speed Steel



Screw Taps					
Thread	Overall Length	Thread Length	Square Length	Shank Diameter	Square
4	1 1/8	9/16	5/16	.141	.110
6	2	1 1/16	5/16	.141	.110
8	2 1/8	3/4	1/4	.168	.131
10	2 3/8	7/8	1/4	.194	.152
1/4	2 1/2	1	5/16	.255	.191
5/16	2 29/32	1 1/8	3/8	.318	.238
3/8	2 15/16	1 1/4	7/16	.381	.286
7/16	3 3/8	1 7/8	1 1/8	.323	.242
1/2	3 3/8	1 21/32	7/16	.367	.275
5/8	3 13/16	1 13/16	9/16	.480	.360
3/4	4 1/4	2	1 1/16	.590	.442

Item No.	Thread	GH Limit	No. of Flutes	Pack Qty.
TU-212793	4-40	H2	2	1
TU-212804	6-32	H3	2	1
TU-212815	8-32	H3	3	1
TU-212826	10-24	H3	3	1
TU-212837	10-32	H3	3	1
TU-212848	1/4-20	H3	3	1
TU-212859	1/4-28	H3	3	1
TU-212870	5/16-18	H3	3	1
TU-212881	5/16-24	H3	3	1
TU-212892	3/8-16	H3	3	1
TU-212903	3/8-24	H3	3	1
TU-212914	7/16-14	H3	4	1
TU-212925	7/16-20	H3	4	1
TU-212936	1/2-13	H3	4	1
TU-212947	1/2-20	H3	4	1
TU-212958	5/8-11	H3	4	1
TU-212969	5/8-18	H3	4	1
TU-212980	3/4-10	H3	4	1
TU-212991	3/4-16	H3	4	1

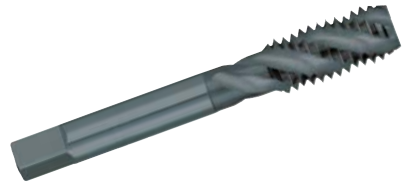
**Metric Spiral Point Plug Taps**  
Steam Oxide  
High Vanadium Powder Metal High Speed Steel



Metric Taps						
Thread	Overall Length	Thread Length	Square Length	Shank Diameter	Square	Blank
M3 x 0.50	1 15/16	5/8	3/16	.141	.110	#5
M4 x 0.70	2 1/8	3/4	1/4	.168	.131	#8
M5 x 0.80	2 3/8	7/8	1/4	.194	.152	#10
M6 x 1	2 1/2	1	5/16	.255	.191	1/4
M8 x 1.25	2 29/32	1 1/8	3/8	.318	.238	5/16
M10 x 1.50	2 15/16	1 1/4	7/16	.381	.286	3/8
M12 x 1.75	3 3/8	1 21/32	7/16	.367	.275	1/2

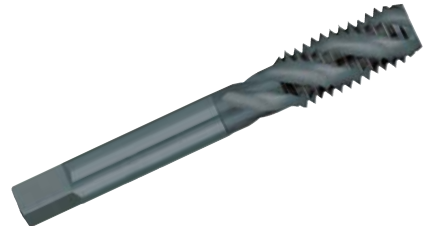
Item No.	Thread	D Limit	No. of Flutes	Pack Qty.
TU-214388	M3 x .5	D3	2	1
TU-214399	M4 x .7	D4	3	1
TU-214410	M5 x .8	D4	3	1
TU-214421	M6 x 1	D5	3	1
TU-214432	M8 x 1.25	D5	3	1
TU-214443	M10 x 1.5	D6	3	1
TU-214454	M12 x 1.75	D6	3	1

**Spiral Flute Taps**  
Steam Oxide  
High Vanadium Powder Metal High Speed Steel  
37 Degree Helix - Modified Bottom



Item No.	Thread	GH Limit	No. of Flutes	Pack Qty.
TU-213838	4-40	H2	3	1
TU-213849	6-32	H3	3	1
TU-213860	8-32	H3	3	1
TU-213871	10-24	H3	3	1
TU-213882	10-32	H3	3	1
TU-213893	1/4-20	H3	3	1
TU-213904	1/4-28	H3	3	1
TU-213915	5/16-18	H3	3	1
TU-213926	5/16-24	H3	3	1
TU-213937	3/8-16	H3	3	1
TU-213948	3/8-24	H3	3	1
TU-213959	7/16-14	H3	4	1
TU-213970	7/16-20	H3	4	1
TU-213981	1/2-13	H3	4	1
TU-213992	1/2-20	H3	4	1
TU-214003	5/8-11	H3	4	1
TU-214014	5/8-18	H3	4	1
TU-214025	3/4-10	H3	4	1
TU-214036	3/4-16	H3	4	1

**Metric Spiral Flute Taps**  
Steam Oxide  
High Vanadium Powder Metal High Speed Steel  
37 Degree Helix - Modified Bottom



Item No.	Thread	D Limit	No. of Flutes	Pack Qty.
TU-214619	M3 x .5	D3	2	1
TU-214630	M4 x .7	D4	3	1
TU-214641	M5 x .8	D4	3	1
TU-214652	M6 x 1	D5	3	1
TU-214663	M8 x 1.25	D5	3	1
TU-214674	M10 x 1.5	D6	3	1
TU-214685	M12 x 1.75	D6	3	1







Standard Round Adjustable Dies  
Inch and Metric



Used for cutting external right hand threads. Made of high speed steel.

Item No.	Size-Pitch	OD	Pack Qty.
<b>Inch</b>			
RBC-40178	10-32	1	1
RBC-40180	1/4-20	1	1
RBC-40181	1/4-28	1	1
RBC-40182	3/8-18	1	1
RBC-40183	3/8-24	1	1
RBC-40184	3/8-16	1	1
RBC-40185	3/8-24	1	1
RBC-40187	7/8-20	1	1
RBC-40204	3/8-16	1 1/2	1
RBC-40208	1/2-13	1 1/2	1
RBC-40211	3/8-18	1 1/2	1
RBC-40212	3/8-11	1 1/2	1
RBC-40213	3/8-18	1 1/2	1
RBC-40227	3/4-10	2	1
<b>Metric</b>			
MRD-5	M4 x .7	1	1
MRD-7	M6 x 1.0	1	1
MRD-8	M8 x 1.25	1	1
MRD-9	M10 x 1.5	1 1/2	1
MRD-10	M12 x 1.75	1 1/2	1

Round Die Stock



Item No.	For Dies w/ OD of	Lgth.	Pack Qty.
RBC-40271	1	10 1/2	1
RBC-40272	1 1/2	14 1/2	1
RBC-40273	2	18	1

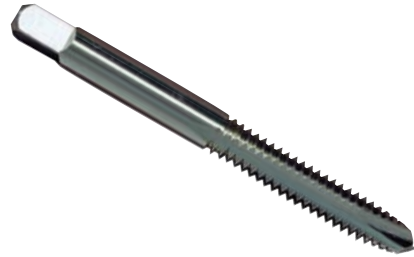
Metal Cutting Lubricant  
Tap-Ease



Extend tool life by using Tap Ease metal cutting lubricant. A must for tapping, drilling and reaming all ferrous and non-ferrous metals. Higher film strength outperforms liquids and won't evaporate. Convenient 1/2 ounce stick.

Item No.	Description	Pack Qty.
CE-1	1/2 ounce Tap Ease Stick	1

Premium Spiral Point Plug Taps  
High Speed Steel Ground Thread



Item No.	GH Thread	Limit	Pack Qty.	Item No.	GH Thread	Limit	Pack Qty.	Item No.	GH Thread	Limit	Pack Qty.
<b>2 Flute</b>				<b>2 Flute</b>				<b>3 Flute</b>			
TU-207172*	0-80	H2	1	TU-207821	10-24	H2	1	TU-208052	1/4-20	H3	1
TU-207227*	1-72	H1	1	TU-207832	10-24	H3	1	TU-208107	1/4-28	H2	1
TU-207238	1-72	H2	1	TU-207887	10-32	H2	1	TU-208228	3/8-18	H3	1
TU-207260	2-56	H1	1	TU-207898*	10-32	H3	1	TU-208250	3/8-18	H5	1
TU-207271	2-56	H2	1	TU-207953	12-24	H3	1	TU-208338	3/8-24	H4	1
TU-207337	3-48	H2	1	TU-207997	1/4-20	H1	1	TU-208360	3/8-16	H2	1
TU-207370	3-56	H2	1	TU-208008	1/4-20	H2	1	TU-208371*	3/8-16	H3	1
TU-207480	4-36	H2	1	TU-208019*	1/4-20	H3	1	TU-208404	3/8-16	H5	1
TU-207392	4-40	H1	1	TU-208063	1/4-20	H5	1	TU-208437	3/8-24	H3	1
TU-207403	4-40	H2	1	TU-208118*	1/4-28	H3	1	TU-208492	3/8-14	H3	1
TU-207436	4-48	H1	1	TU-208151	1/4-28	H4	1	TU-208547	3/8-20	H3	1
TU-207447	4-48	H2	1	TU-208173	3/8-18	H1	1	TU-208602	1/2-13	H2	1
TU-207524	5-40	H2	1	TU-208184	3/8-18	H2	1	TU-208613	1/2-13	H3	1
TU-207590	6-32	H1	1	TU-208195*	3/8-18	H3	1	TU-208679	1/2-20	H3	1
TU-207601	6-32	H2	1	TU-208239	3/8-18	H5	1	TU-208723	3/8-12	H3	1
TU-207612*	6-32	H3	1	TU-208294*	3/8-24	H3	1	TU-208756	3/8-18	H3	1
TU-207667	6-40	H2	1	TU-208327	3/8-24	H4	1	TU-208789	3/8-11	H3	1
TU-207700	8-32	H1	1					TU-208822	3/8-11	H5	1
TU-207711	8-32	H2	1					TU-208833	3/8-18	H3	1
TU-207722*	8-32	H3	1					TU-208866	3/8-10	H3	1
TU-207755	8-32	H7	1					TU-208899	3/8-10	H5	1
TU-207777	8-36	H2	1					TU-208910	3/8-16	H3	1

\*Standard H class of fit

Tap Extractors



Removes taps broken at or below the surface without damaging threads or workpiece. Simply slide extractor fingers into flutes of broken tap and tighten. Apply tap wrench and remove. Complete tap extractor includes tap extractor and fingers.

4 Flute Item No.	3 Flute Item No.	2 Flute Item No.	Tap Size	Pack Qty.
—	WAL-10043	WAL-10042	#4 (3.0 mm)	1
—	WAL-10063	WAL-130	#6 (3.5 mm)	1
WAL-10084	WAL-40	WAL-140	#8 (4.0 mm)	1
WAL-100	WAL-45	WAL-150	#10 (5.0 mm)	1
WAL-10124	—	—	#12 (5.5 mm)	1
WAL-105	WAL-50	WAL-160	3/4 (6.0 mm)	1
WAL-110	WAL-55	WAL-170	3/8 (8.0 mm)	1
WAL-115	WAL-60	—	3/8 (9.0 mm)	1
WAL-120	—	—	7/16 (11.0 mm)	1
WAL-125	—	—	1/2 (12.0 mm)	1
WAL-10564	—	—	9/16 (14.0 mm)	1
WAL-10754	—	—	3/4 (18.0 mm)	1



SPIRAL TAPS

New Geometry and Powder Metal

- Stable tool life, Reduced inventory cost, Less guesswork when selecting taps, Increased Inventory turns, Reduced tap breakage, Enhanced tool life, Added lubricity, Less chipping problems, Can handle a wide range of tough applications, Can tap in material up to 36 Rc, Lower machining costs

Spiral Point Taps MTT-X Dormer



Material and geometry specifications: HSS XS1, ANSI, 2.5 x D, P 3-5, and a cross-section diagram.

Table with 12 columns: Item No., Tap Size, OAL, Thread Lgth., Shank Dia., Square Dimension, No. of Flutes, Thread Limit, Tap Drill Size, Tap Drill Size (Metric), Neck + Thread Lgth., Pack Qty. Includes sections for UNC, UNF, and Metric.

Spiral Flute Taps MTT-X Dormer



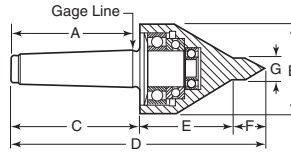
Material and geometry specifications: HSS XS1, ANSI, 2.5 x D, Semi-B, and a cross-section diagram.

Table with 12 columns: Item No., Tap Size, OAL, Thread Lgth., Shank Dia., Square Dimension, No. of Flutes, Thread Limit, Tap Drill Size, Tap Drill Size (Metric), Neck + Thread Lgth., Pack Qty. Includes sections for UNC, UNF, and Metric.





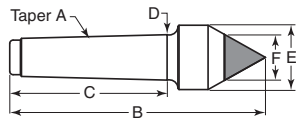
Versa-Turn Live Centers



Excellent for general shop use on manual engine lathes. Accommodates large diameter stock, pipes and tubes as well as allowing tool clearance for small diameter parts. Close fitting head eliminates seal, resulting in extremely free turning center. Thrust bearing provides a very high axial load capacity. Dual radial ball bearings for good work piece weight capacity. 60 degree included angle on both sections of point. +/- .0001" TIR guaranteed. Reduced knockout diameter prevents taper from mushrooming.

Item No.	Taper	A	B	C	D	E	F	G	Max. RPM	Weight of Workpiece	Thrust Load (Lbs.)	Comparative Load Rating	Pack Qty.
LC-10833	3	3 <sup>7</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>2</sub>	3 <sup>3</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	2 <sup>9</sup> / <sub>16</sub>	1 <sup>5</sup> / <sub>16</sub>	5/8	3,500	685	5,000	5,685	1
LC-10835	4	4 <sup>1</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>16</sub>	8 <sup>11</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>8</sub>	3/4	3,000	1,165	5,700	6,865	1

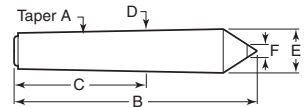
Oversized Carbide Point Dead Centers



Point is ground to an angle of 60 degrees and guaranteed to +/-0.0001" TIR. Oversized carbide point covers a wider range of center holes and provides great wear resistance. The large carbide tip is brazed into a close-tolerance socket for maximum strength and rigidity. Excellent for grinding and high precision.

Item No.	Taper	A	B	C	D	E	F	Pack Qty.
DC-11525	3	5 <sup>5</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>16</sub>	.938	1 <sup>1</sup> / <sub>4</sub>	1	1	1
DC-11526	4	6 <sup>3</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>16</sub>	1.231	1 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	1	1

Standard Dead Centers



60 degree included point angle. +/- .0001" TIR between shank and point. Made of high speed steel heat treated to RC 61-63.

Item No.	Taper	A	B	C	D	E	F	Pack Qty.
DC-11011	2	4 <sup>3</sup> / <sub>16</sub>	2 <sup>9</sup> / <sub>16</sub>	.700	.700	3/8	1	1
DC-11021	3	5 <sup>1</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>16</sub>	.938	.938	1/2	1	1

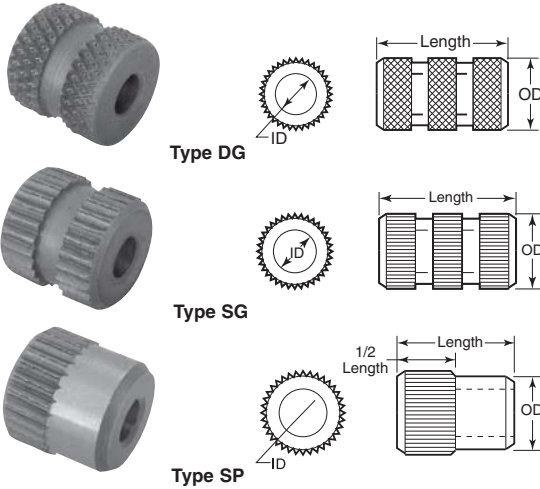
# SAME DAY SHIPPING!

We have over 1 billion components in stock—available for same day shipping!





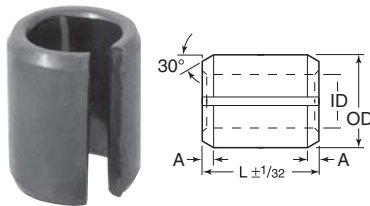
**For Soft Materials  
Type DG, SG and SP**



Type DG	Type SP	Type SG	ID	OD	Lgth.	Pack Qty.
BDG-10	—	—	40	1/4	1/4	1
BDG-30	—	—	1/8	3/16	1/2	1
BDG-40	BSP-40	—	—	3/16	1/2	1
BDG-70	—	—	30	3/16	3/8	1
—	BSP-90	—	5/32	3/16	1/2	1
BDG-100	—	—	5/32	1/2	1/2	1
BDG-150	BSP-150	BSG-150	11	1/2	1/2	1
BDG-170	—	—	11	19/32	1/2	1
BDG-180	—	—	10	3/4	3/4	1
BDG-190	—	—	7/32	19/32	1/2	1
BDG-200	—	—	1/4	19/32	1/4	1
BDG-210	—	—	1/4	19/32	3/8	1
BDG-220	—	—	1/4	19/32	1/2	1
—	BSP-230	BSG-230	1/4	1/2	5/16	1
BDG-240	BSP-240	—	1/4	1/2	1/2	1
BDG-250	—	—	1/4	1/2	3/4	1
—	BSP-280	—	5/16	1/2	1/2	1
BDG-300	—	—	5/16	5/8	3/4	1
—	BSP-310	BSG-310	3/8	5/8	1/2	1
BDG-320	BSP-320	BSG-320	3/8	5/8	3/4	1
—	BSP-330	—	3/8	3/4	1/2	1
—	BSP-350	BSG-350	1/2	3/4	1/2	1
—	—	BSG-360	1/2	3/4	3/4	1

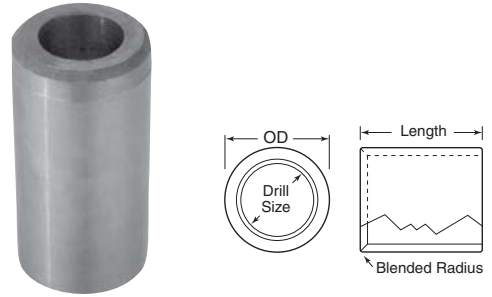
**Tension Bushings**

Tension bushings are hollow cylinders slit longitudinally over their entire length to permit compression and expansion, with a chamfered end to facilitate insertion. They are rolled from special high carbon spring steel with high elasticity, resilience and wear characteristics. Tension bushings are designed to replace solid steel tubular and case hardened bushings because they are close tolerance, self-retaining and through-hard (Rockwell C 45-50). The inherent elastic material provides constant radial tension for tight fit even if the bore hole becomes enlarged. Insertion can be easily accomplished with a hammer and a drift. Ideal for high-load/low-speed operation in articulating or continuous applications. Static load rating is 125,000 lbs. minimum. Dynamic load rating is 192 in/minute and bearing pressure up to 11,000 lbs. per square inch. Operating temperature up to 630 degree Fahrenheit.



Item No.	OD	ID	L	Recommended Hole-Size Max.-Min.	Outside Dia. Before Insertion Max.-Min.	Inside Dia. After Insertion Max.-Min.	A Max.-Min.	Pack Qty.
VT-100	3/4	1/2	3/4	.7511 - .7500	.790 - .770	.507 - .503	.09 - .06	1
VT-102	3/4	1/2	1	.7511 - .7500	.790 - .770	.507 - .503	.09 - .06	1
VT-104	1	3/4	3/4	1.0013 - 1.0000	1.040 - 1.020	.757 - .753	.12 - .08	1
VT-106	1	3/4	1	1.0013 - 1.0000	1.040 - 1.020	.757 - .753	.12 - .08	1
VT-108	1 1/4	1	1/2	1.2513 - 1.2500	1.290 - 1.270	1.007 - 1.003	.12 - .08	1
VT-110	1 1/4	1	1	1.2513 - 1.2500	1.290 - 1.270	1.007 - 1.003	.12 - .08	1
VT-112	1 1/2	1 1/4	1	1.5015 - 1.5000	1.540 - 1.520	1.257 - 1.253	.12 - .08	1
VT-114	1 1/2	1 1/4	1 1/2	1.5015 - 1.5000	1.540 - 1.520	1.257 - 1.253	.12 - .08	1
VT-116	1 3/4	1 1/2	3/4	1.7515 - 1.7500	1.790 - 1.770	1.507 - 1.503	.12 - .08	1
VT-120	2	1 1/2	2	2.0015 - 2.0000	2.040 - 2.020	1.512 - 1.504	.15 - .10	1

**Metric Drill Bushings  
Headless Press Fit - Type PM**



Bore Tolerance	
Drill Size	ID Tolerance
.35-3.00	+0.02 to +0.08
3.01-6.00	+0.04 to +0.12
6.01-10.00	+0.05 to +0.14
10.01-18.00	+0.06 to +0.17
18.01-30.00	+0.07 to +0.20

Dimensions are in millimeters.

Item No.	Drill Size	Lgth.	Pack Qty.	Item No.	Drill Size	Lgth.	Pack Qty.			
<b>6MM OD (+.019/+0.027)</b>				<b>15MM OD (+.028/+0.039)</b>						
DM-03008	3	8	1	DM-09512	9.5	12	1			
DM-03012	3	12	1	DM-09520	9.5	20	1			
DM-03016	3	16	1	DM-09712	9.7	12	1			
<b>7MM OD (+.023/+0.032)</b>				<b>DM-10012</b>				10	12	1
DM-04008	4	8	1	DM-10020	10	20	1			
DM-04012	4	12	1	DM-10025	10	25	1			
DM-04016	4	16	1	<b>18MM OD (+.028/+0.039)</b>						
<b>8MM OD (+.023/+0.032)</b>				DM-11025	11	25	1			
DM-04212	4.2	12	1	DM-12012	12	12	1			
DM-04516	4.5	16	1	DM-12020	12	20	1			
<b>10MM OD (+.023/+0.032)</b>				DM-12025	12	25	1			
DM-05520	5.5	20	1	<b>22MM OD (+.035/+0.048)</b>						
DM-06010	6	10	1	DM-14016	14	16	1			
DM-06016	6	16	1	DM-14028	14	28	1			
DM-06020	6	20	1	DM-15016	15	16	1			
<b>12MM OD (+.028/+0.039)</b>				DM-15028	15	28	1			
DM-06410	6.4	10	1	<b>26MM OD (+.035/+0.048)</b>						
DM-06810	6.8	10	1	DM-16016	16	16	1			
DM-07010	7	10	1	DM-16028	16	28	1			
DM-07016	7	16	1	DM-18016	18	16	1			
DM-07020	7	20	1	DM-18028	18	28	1			
DM-07510	7.5	10	1	DM-18036	18	36	1			
DM-08010	8	10	1	<b>30MM OD (+.035/+0.048)</b>						
DM-08016	8	16	1	DM-20020	20	20	1			
DM-08020	8	20	1	DM-20036	20	36	1			
<b>15MM OD (+.028/+0.039)</b>				DM-22036	22	36	1			
DM-08512	8.5	12	1	<b>35MM OD (+.043/+0.059)</b>						
DM-08520	8.5	20	1	DM-25020	25	20	1			
DM-08525	8.5	25	1	DM-25036	25	36	1			
DM-09012	9	12	1	<b>42MM OD (+.043/+0.059)</b>						
DM-09020	9	20	1	DM-30025	30	25	1			
DM-09025	9	25	1							

**Adapter Bushings  
Split Type**



Bushings are made of alloy steel, heat treated and tempered to RC 61-64. Bushings with thin walls are heat treated to RC 50-55. All bushings are .002" undersize to facilitate use with a tolerance of +.005/-0.000. Bushings are concentric within .0015 TIR.

Item No.	ID	OD	Lgth.	Pack Qty.	Item No.	ID	OD	Lgth.	Pack Qty.
SAB-99	1/4	3/4	1 1/4	1	SAB-326	3/4	1	1 1/4	1

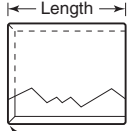
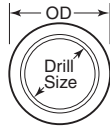








Drill Bushings Headless Press Fit Type L

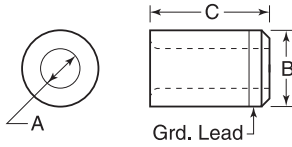


Bore Tolerances	
Drill Size	I.D. Tolerance
.0135 - .25	+0.001 to +0.004
.2510 - .75	+0.001 to +0.005
.7510 - 1.5	+0.002 to +0.006
1.5010 and up	+0.003 to +0.007

Used with fixed or slip renewable bushings. These liners are pressed permanently into the jig plate creating a precise location point.

Item No.	Drill Size	Lgth.	Pack Qty.	Item No.	Drill Size	Lgth.	Pack Qty.	Item No.	Drill Size	Lgth.	Pack Qty.	Item No.	Drill Size	Lgth.	Pack Qty.
<b>5/16" OD (+.0013/+0.016)</b>				<b>3/8" OD (+.0014/+0.017)</b>				<b>7/8" OD (+.0015/+0.018)</b>				<b>1 3/8" OD (+.0018/+0.022)</b>			
BP-16260	3/16	1/4	1	BP-50030	5/16	1/4	1	BP-40020	5/8	1/2	1	BP-50170	1	1	1
BP-16080	3/16	3/8	1	BP-31010	5/16	3/8	1	BP-40040	5/8	3/8	1	BP-49020	1	1 1/8	1
BP-16160	3/16	1/2	1	BP-31020	5/16	1/2	1	BP-40100	5/8	1 1/4	1	BP-50175	1	1 1/2	1
BP-16280	3/16	5/8	1	BP-50040	5/16	5/8	1	<b>1" OD (+.0015/+0.018)</b>				BP-50180	1	1 3/4	1
BP-16240	3/16	3/4	1	BP-31030	5/16	3/4	1	BP-43030	3/4	1/2	1	BP-50190	1	2 1/2	1
<b>7/16" OD (+.0014/+0.017)</b>				<b>5/8" OD (+.0014/+0.017)</b>				<b>1 1/4" OD (+.0017/+0.020)</b>				<b>1 3/4" OD (+.0019/+0.023)</b>			
BP-25020	1/4	1/4	1	BP-34080	7/16	1/2	1	BP-43060	3/4	3/4	1	BP-50200	1 3/8	3/4	1
BP-50010	1/4	5/16	1	BP-34160	7/16	5/8	1	BP-43090	3/4	1	1	BP-50125	3/4	1 1/4	1
BP-25040	1/4	3/8	1	BP-34260	7/16	3/4	1	BP-43130	3/4	1 3/8	1	BP-50205	1 3/8	1	1
BP-25060	1/4	1/2	1	BP-34280	7/16	1	1	BP-50125	3/4	1 3/4	1	BP-50215	1 3/8	1 1/2	1
BP-50015	1/4	5/8	1	<b>3/4" OD (+.0015/+0.018)</b>				BP-50140	3/4	3	1	BP-50220	1 3/8	1 3/4	1
BP-50020	1/4	3/4	1	BP-50080	1/2	5/8	1	<b>1 1/2" OD (+.0017/+0.020)</b>				BP-50225	1 3/8	2 1/8	1
<b>1/2" OD (+.0014/+0.017)</b>				BP-37020	1/2	3/8	1	BP-50155	7/8	3/4	1	BP-50230	1 3/8	2 1/2	1
BP-28410	5/16	1/4	1	BP-37040	1/2	1/2	1	BP-46010	7/8	1	1	BP-50235	1 3/8	3	1
BP-28430	5/16	5/16	1	BP-37080	1/2	3/4	1	BP-50160	7/8	1 1/4	1	<b>2 1/4" OD (+.0021/+0.025)</b>			
BP-28130	5/16	3/8	1	BP-37140	1/2	1 3/8	1	BP-46030	7/8	1 1/2	1	BP-50245	1 3/4	1	1
BP-28260	5/16	1/2	1	BP-50090	1/2	1 3/4	1	<b>1 3/8" OD (+.0018/+0.022)</b>				BP-50255	1 3/4	1 1/2	1
BP-50025	5/16	5/8	1	<b>7/8" OD (+.0015/+0.018)</b>				BP-49010	1	1/2	1	BP-50260	1 3/4	1 3/4	1
BP-28390	5/16	3/4	1	BP-40010	5/16	1/2	1	BP-50165	1	3/4	1	BP-50265	1 3/4	2 1/8	1

Drill Bushings Tungsten Carbide Bushings - Type PC



Made from solid tungsten carbide.

See page 812 for lock screws.

Item No.	A	B	C	Pack Qty.	Item No.	A	B	C	Pack Qty.
BTC-15	1/8	1/4	5/16	1	BTC-75	1/4	1/2	3/4	1
BTC-20	1/8	1/4	1/2	1	BTC-80	5/16	1/2	1/2	1
BTC-25	1/8	5/16	1/2	1	BTC-90	3/8	5/8	1/2	1
BTC-140	3/16	5/16	1/2	1	BTC-95	3/8	5/8	3/4	1
BTC-50	1/2	1/2	3/4	1	BTC-110	1/2	3/4	3/4	1
BTC-60	1/4	1 3/32	1/2	1	BTC-115	1/2	3/4	1	1
BTC-70	1/4	1/2	1/2	1	BTC-125	3/4	1	3/4	1

Drill & Tap Sets



These drill and tap sets provide a plug style tap and the proper size drill in a convenient metal index case. Tap dispensers and indexes are available separately.

See page 481 for tap dispensers and indexes.

Item No.	Type	Description	Pack Qty.
DTS-5	UNC	6-32/#36, 8-32/#29, 10-24/#25, 10-32/#21, 1/4-20/#7, 5/16-18/F, 3/8-16/5/16, 7/16-14/U, 1/2-13/27/64	1
DTS-15	UNC/UNF	6-40/#33, 6-32/#36, 8-36/#29, 8-32/#29, 10-32/#21, 10-24/#25, 12-28/#15, 12-24/#16, 1/4-28/#3, 1/4-20/#7, 5/16-24/1, 3/16-18/F, 3/8-24/Q, 3/8-16/5/16, 7/16-20/29/64, 7/16-14/U, 1/2-20/29/64, 1/2-13/27/64	1

Cutting Fluid



EP-Extra Aluminum Pro-Tap



Cutting fluids for a variety of cutting applications. Improves surface finish, machinability and tool life. Tap Magic with EP-EXTRA is ozone friendly for any cutting operation on any metal. Tap Magic Aluminum is used when the majority of work being done is on aluminum. Tap Magic Protap is biodegradable and is used when a fluid free of regulated chemicals is needed.

Item No.	Container	Pack Qty.
<b>w/EP-EXTRA</b>		
TM-10004E	4 oz.	1
TM-10016E	16 oz.	1
TM-10128E	1	1
<b>Aluminum</b>		
TM-20004A	4 oz.	1
TM-20016A	16 oz.	1
<b>Pro-Tap</b>		
TM-30004P	4 oz.	1
TM-30016P	16 oz.	1

# COLLETS & TOOL STORAGE



## Royal Ultra-Precision ER Collets



Royal Ultra-Precision ER Collets are extremely accurate. Runout is guaranteed to 0.0002" TIR or better. Wide gripping range containing 16 slots, providing a larger gripping range than other brands. Manufactured from high-grade alloy steel. All collets are hardened and ground for long life. A collet that exactly matches the cutting tool diameter improves grip force, accuracy, and rigidity, resulting in extended tool life and better surface finishes.

Item No.	Dia.	Range	Pack Qty.
<b>ER16</b>			
RY-53020	1/16	.062 - .043	1
RY-53022	3/32	.093 - .054	1
RY-53024	1/8	.125 - .086	1
RY-53026	9/32	.156 - .117	1
RY-53028	3/16	.187 - .148	1
RY-53030	7/32	.218 - .179	1
RY-53032	1/4	.250 - .211	1
RY-53034	9/32	.281 - .242	1
RY-53036	5/16	.312 - .273	1
RY-53038	11/32	.343 - .304	1
RY-53040	3/8	.375 - .336	1
<b>ER32</b>			
RY-53140	3/32	.093 - .054	1
RY-53144	5/32	.156 - .117	1
RY-53146	3/16	.187 - .148	1
RY-53148	7/32	.218 - .179	1
RY-53150	1/4	.250 - .211	1
RY-53152	9/32	.281 - .242	1
RY-53154	5/16	.312 - .273	1
RY-53156	11/32	.343 - .304	1
RY-53158	3/8	.375 - .336	1
RY-53160	13/32	.406 - .367	1
RY-53162	7/16	.437 - .398	1
RY-53164	15/32	.468 - .429	1
RY-53166	1/2	.500 - .461	1
RY-53168	17/32	.531 - .492	1
RY-53170	9/16	.562 - .523	1
RY-53172	19/32	.593 - .554	1
RY-53174	5/8	.625 - .586	1
RY-53176	21/32	.656 - .617	1
RY-53178	11/16	.687 - .648	1
RY-53180	23/32	.718 - .679	1
RY-53182	3/4	.750 - .711	1

## Tool Storage Drill Dispensers, Indexes and Stands



Dispenser



Index



Stand

Dispensers feature one piece drawer slides for long life. Stackable. Index panels stand upright. Fold down for compact storage. Stands can be hung or used on a bench. Cutting tools are not included.

Item No.	Type	Description	Pack Qty.
HTC-13000	Dispenser	1/16 to 1/2 by 64ths	1
HM-29	Index	1/16 to 1/2 by 64ths	1
HTC-11900	Stand	1/16 to 1/2 by 64ths	1
HM-60	Index	1 to 60 Wire	1

## Lyndex Precision Collets Heat Treated - Internally and Externally Threaded 5C Round Collets



Item No.	Size	Pack Qty.
500-008	1/8	1
500-012	3/16	1
500-013	13/64	1
500-016	1/4	1
500-020	5/16	1
500-022	11/32	1
500-028	7/16	1
500-030	15/32	1
500-032	1/2	1
500-048	3/4	1
500-056	7/8	1
500-064	1	1

## Lyndex Precision Collets Heat Treated - Internally and Externally Threaded R8 Round Collets



Item No.	Size	Pack Qty.
800-008	1/8	1
800-010	9/32	1
800-012	3/16	1
800-016	1/4	1
800-020	5/16	1
800-024	3/8	1
800-028	7/16	1
800-032	1/2	1
800-040	5/8	1
800-048	3/4	1
800-056	7/8	1
800-064	1	1

## Lyndex Precision Collets 5C Emergency Collets



Item No.	Size	Material	Pack Qty.
560-001S	1/16	Steel	1
560-001B	Pilot Hole	Brass	1

## Collet Wrench



Simplifies installing and removing collets in CNC lathes. One piece construction with hard coat anodize finish.

Item No.	Description	Pack Qty.
MB-1005C	5C Collet Wrench	1

## R8 Collet Caddy®



The Collet Caddy® fits Bridgeport style mills. Stores up to 16 R8 collets, arbors or specialty cutters. Keeps collets up out of the chip path, yet within easy reach of operation for improved efficiency and productivity. Installs in seconds. Includes rotating rack, mounting bracket and hardware.

Item No.	Description	Pack Qty.
IR-8	R8 Collet Caddy	1

Gold-P Coated Drills  
Jobber Length  
HSS Straight Shank

Right hand spiral, wider flutes. 135 degree split point, .059 diameter and over. Bright body with TiN coating on working length. For drilling in steel, cast steel, alloyed and non-alloyed metals, grey cast iron, graphite and malleable cast iron.

Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.	Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
<b>Fractional</b>						<b>Wire Gauge</b>					
YG1-D1GP113003**	3/64	.04688	3/4	1 1/4	1	YG1-D1GP134201**	56	.0465	3/4	1 1/4	1
YG1-D1GP182004**	1/16	.06250	7/8	1 7/8	1	YG1-D1GP134202**	55	.0520	7/8	1 7/8	1
YG1-D1GP182005**	3/64	.07813	1	2	1	YG1-D1GP134203**	54	.0550	7/8	1 7/8	1
YG1-D1GP182006**	3/32	.09375	1 1/4	2 1/4	1	YG1-D1GP134204**	53	.0595	7/8	1 7/8	1
YG1-D1GP182007**	7/64	.10938	1 1/2	2 3/4	1	YG1-D1GP138205**	52	.0635	7/8	1 7/8	1
YG1-D1GP182008**	1/8	.12500	1 3/4	2 3/4	1	YG1-D1GP138206**	51	.0670	1	2	1
YG1-D1GP182009**	3/64	.14063	1 3/4	2 3/4	1	YG1-D1GP138207**	50	.0700	1	2	1
YG1-D1GP182010**	3/32	.15625	2	3 1/4	1	YG1-D1GP138208**	49	.0730	1	2	1
YG1-D1GP182011**	1/64	.17188	2 1/4	3 1/4	1	YG1-D1GP138209**	48	.0760	1	2	1
YG1-D1GP182012**	3/16	.18750	2 1/2	3 1/2	1	YG1-D1GP138210**	47	.0785	1	2	1
YG1-D1GP182013**	1/32	.20313	2 1/2	3 3/4	1	YG1-D1GP138211**	46	.0810	1 1/8	2 1/8	1
YG1-D1GP182014**	7/32	.21875	2 1/2	3 3/4	1	YG1-D1GP138212**	45	.0820	1 1/8	2 1/8	1
YG1-D1GP182015**	1/64	.23438	2 3/4	3 3/4	1	YG1-D1GP138213**	44	.0860	1 1/8	2 1/8	1
YG1-D1GP182016**	1/4	.25000	2 3/4	4	1	YG1-D1GP138214**	43	.0890	1 1/4	2 1/4	1
YG1-D1GP182017**	1/32	.26563	2 3/4	4 1/4	1	YG1-D1GP138215**	42	.0935	1 1/4	2 1/4	1
YG1-D1GP182018**	3/32	.28125	2 1/2	4 1/4	1	YG1-D1GP138216**	41	.0960	1 3/8	2 3/8	1
YG1-D1GP182019**	1/64	.29688	3 1/8	4 3/4	1	YG1-D1GP138217**	40	.0980	1 3/8	2 3/8	1
YG1-D1GP182020**	3/16	.31250	3 3/16	4 1/2	1	YG1-D1GP138218**	39	.0995	1 3/8	2 3/8	1
YG1-D1GP182021*	1/64	.32813	3 3/16	4 1/2	1	YG1-D1GP138219**	38	.1015	1 7/16	2 1/2	1
YG1-D1GP182022*	1/32	.34375	3 3/16	4 3/4	1	YG1-D1GP138220**	37	.1040	1 7/16	2 1/2	1
YG1-D1GP182023*	3/64	.35938	3 1/2	4 3/4	1	YG1-D1GP138221**	36	.1065	1 7/16	2 1/2	1
YG1-D1GP182024*	1/8	.37500	3 3/8	5	1	YG1-D1GP138222**	35	.1100	1 1/2	2 3/8	1
YG1-D1GP182025*	3/64	.39063	3 3/4	5 1/8	1	YG1-D1GP138223**	34	.1110	1 1/2	2 3/8	1
YG1-D1GP182026*	1/32	.40625	3 3/8	5 1/4	1	YG1-D1GP138224**	33	.1130	1 1/2	2 3/8	1
YG1-D1GP182027*	1/64	.42188	3 1/2	5 1/8	1	YG1-D1GP138226**	31	.1200	1 3/4	2 3/4	1
YG1-D1GP182028*	1/16	.43750	4 1/16	5 1/2	1	YG1-D1GP138227**	30	.1285	1 3/4	2 3/4	1
YG1-D1GP182029*	3/64	.45313	4 3/16	5 3/8	1	YG1-D1GP138228**	29	.1360	1 3/4	2 3/4	1
YG1-D1GP182030*	1/32	.46875	4 3/8	5 3/4	1	YG1-D1GP138229**	28	.1405	1 3/4	2 3/4	1
YG1-D1GP182031*	3/64	.48438	4 3/8	5 3/4	1	YG1-D1GP138230**	27	.1440	1 3/4	3	1
YG1-D1GP182032*	1/2	.50000	4 1/2	6	1	YG1-D1GP138231**	26	.1470	1 3/4	3	1
<b>Letter</b>						<b>YG1-D1GP138232**</b>					
YG1-D1GP139101**	A	.2340	2 3/8	3 3/8	1	YG1-D1GP138233**	25	.1495	1 3/8	3	1
YG1-D1GP139102**	B	.2380	2 3/4	4	1	YG1-D1GP138234**	24	.1520	2	3 3/8	1
YG1-D1GP139103**	C	.2420	2 3/4	4	1	YG1-D1GP138235**	23	.1540	2	3 3/8	1
YG1-D1GP139104**	D	.2460	2 3/4	4	1	YG1-D1GP138236**	22	.1570	2	3 3/8	1
YG1-D1GP139105**	E	.2500	2 3/4	4	1	YG1-D1GP138237**	21	.1590	2 1/8	3 1/4	1
YG1-D1GP139106**	F	.2570	2 3/4	4 1/8	1	YG1-D1GP138238**	20	.1610	2 1/8	3 1/4	1
YG1-D1GP139107**	G	.2610	2 3/4	4 1/8	1	YG1-D1GP138239**	19	.1660	2 1/8	3 1/4	1
YG1-D1GP139108**	H	.2660	2 3/4	4 1/8	1	YG1-D1GP138240**	18	.1695	2 1/8	3 1/4	1
YG1-D1GP139109**	I	.2720	2 3/4	4 1/8	1	YG1-D1GP138241**	17	.1730	2 3/16	3 3/8	1
YG1-D1GP139110**	J	.2770	2 3/4	4 1/8	1	YG1-D1GP138242**	16	.1770	2 3/16	3 3/8	1
YG1-D1GP139111**	K	.2810	2 1/2	4 1/4	1	YG1-D1GP138243**	15	.1800	2 3/16	3 3/8	1
YG1-D1GP139112**	L	.2900	2 1/2	4 1/4	1	YG1-D1GP138244**	14	.1820	2 3/16	3 3/8	1
YG1-D1GP139113**	M	.2950	3 1/16	4 3/8	1	YG1-D1GP138245**	13	.1850	2 3/16	3 3/8	1
YG1-D1GP139114**	N	.3020	3 1/16	4 3/8	1	YG1-D1GP138246**	12	.1890	2 3/16	3 3/8	1
YG1-D1GP139115**	O	.3160	3 3/16	4 3/8	1	YG1-D1GP138247**	11	.1910	2 3/16	3 3/8	1
YG1-D1GP139116**	P	.3230	3 3/16	4 3/8	1	YG1-D1GP138248**	10	.1935	2 3/16	3 3/8	1
YG1-D1GP139117**	Q	.3320	3 3/16	4 3/8	1	YG1-D1GP138249**	9	.1960	2 3/16	3 3/8	1
YG1-D1GP139118*	R	.3390	3 3/16	4 3/8	1	YG1-D1GP138250**	8	.1990	2 3/16	3 3/8	1
YG1-D1GP139119*	S	.3480	3 1/2	4 3/4	1	YG1-D1GP138251**	7	.2010	2 3/16	3 3/8	1
YG1-D1GP139120*	T	.3580	3 1/2	4 3/4	1	YG1-D1GP138252**	6	.2040	2 1/2	3 3/4	1
YG1-D1GP139121*	U	.3680	3 3/8	5	1	YG1-D1GP138253**	5	.2055	2 1/2	3 3/4	1
YG1-D1GP139122*	V	.3770	3 3/8	5	1	YG1-D1GP138254**	4	.2090	2 1/2	3 3/4	1
YG1-D1GP139123*	W	.3860	3 3/8	5 1/8	1	YG1-D1GP138255**	3	.2130	2 1/2	3 3/4	1
YG1-D1GP139124*	X	.3970	3 3/8	5 1/8	1	YG1-D1GP138256**	2	.2210	2 3/8	3 3/8	1
YG1-D1GP139125*	Y	.4040	3 3/8	5 1/8	1						
YG1-D1GP139126*	Z	.4130	3 3/8	5 1/8	1						

\* 5 per package  
\*\* 10 per package

## Step Drills



For use in thin metal, wood and plastic; these step drills can drill as many as 13 different hole sizes with just one bit. The proper size hole is achieved by simply counting the steps as they penetrate the work. Made from high speed molybdenum steel, heat treated. The set contains one of each ATC-10101, 10102 and 10103 in a vinyl case.

Item No.	No. of Holes	Hole Size	Increments	Step Thickness	Shank Size	Pack Qty.
ATC-10101	13	1/8 to 1/2	1/32	1/8	1/4	1
ATC-10102	6	3/16 to 1/2	1/16	3/8	1/4	1
ATC-10103	9	1/4 to 3/4	1/16	1/8	3/8	1
ATC-10104*	12	3/16 to 7/8	1/16	1/8	3/8	1
ATC-10502						1

Set of (3) Unibit Step Drills

\*Not included in set





Useful in the tool room and machine shop as turned and boring tools, construction pins, hinge pins, arbors, pin gauges, dowels, perforating punches. They can also be ground to make special cutting tools such as mills, spotfacers, angle or radii cutters, etc.

**Drill Blanks**  
High Speed Steel - Hardened - Ground  
Inch

Item No.	Size	Dec. Equiv.	Lgth.	Pack Qty.	Item No.	Size	Dec. Equiv.	Lgth.	Pack Qty.
<b>Fractional Sizes</b>					<b>Number Sizes</b>				
DB-2	1/32	.03125	1 1/2	1	DB-59	60	.0400	1 1/2	1
DB-3	3/64	.04687	1 3/4	1	DB-60	59	.0410	1 1/2	1
DB-4	1/16	.06250	1 7/8	1	DB-62	57	.0430	1 1/2	1
DB-5	3/64	.07812	2	1	DB-63	56	.0465	1 3/4	1
DB-6	3/32	.09375	2 1/4	1	DB-64	55	.0520	1 1/2	1
DB-7	7/64	.10937	2 1/2	1	DB-65	54	.0550	1 1/2	1
DB-8	1/8	.12500	2 3/4	1	DB-66	53	.0595	1 1/2	1
DB-9	3/64	.14062	2 7/8	1	DB-67	52	.0635	1 1/2	1
DB-10	3/32	.15625	3	1	DB-68	51	.0670	2	1
DB-11	1/64	.17187	3 1/4	1	DB-69	50	.0700	2	1
DB-12	3/16	.18750	3 1/2	1	DB-70	49	.0730	2	1
DB-13	1/64	.20312	3 3/4	1	DB-71	48	.0760	2	1
DB-14	1/32	.21875	3 3/4	1	DB-72	47	.0785	2	1
DB-15	1/64	.23437	3 3/4	1	DB-73	46	.0810	2 1/2	1
DB-16	1/4	.25000	4	1	DB-74	45	.0820	2 1/2	1
DB-17	1/64	.26562	4 1/8	1	DB-75	44	.0860	2 1/2	1
DB-18	3/32	.28125	4 1/4	1	DB-76	43	.0890	2 1/4	1
DB-19	1/64	.29687	4 3/8	1	DB-77	42	.0935	2 1/4	1
DB-20	5/16	.31250	4 1/2	1	DB-78	41	.0960	2 3/8	1
DB-21	3/64	.32812	4 3/4	1	DB-79	40	.0980	2 3/8	1
DB-22	1/32	.34375	4 3/4	1	DB-80	39	.0995	2 3/4	1
DB-23	3/64	.35937	4 3/4	1	DB-81	38	.1015	2 1/2	1
DB-24	3/8	.37500	5	1	DB-82	37	.1040	2 1/2	1
DB-25	3/64	.39062	5 1/8	1	DB-83	36	.1065	2 1/2	1
DB-26	1/32	.40625	5 1/4	1	DB-84	35	.1100	2 3/8	1
DB-27	3/64	.42187	5 1/4	1	DB-86	33	.1130	2 3/4	1
DB-28	7/16	.43750	5 1/2	1	DB-87	32	.1160	2 3/4	1
DB-29	3/64	.45312	5 1/4	1	DB-88	31	.1200	2 3/4	1
DB-30	1/32	.46875	5 3/4	1	DB-89	30	.1285	2 3/4	1
DB-31	3/64	.48437	5 3/4	1	DB-90	29	.1360	2 3/4	1
DB-32	1/2	.50000	6	1	DB-91	28	.1405	2 1/2	1
<b>Letter Sizes</b>					DB-92	27	.1440	3	1
DB-33	A	.234	3 3/8	1	DB-93	26	.1470	3	1
DB-34	B	.238	4	1	DB-94	25	.1495	3	1
DB-35	C	.242	4	1	DB-95	24	.1520	3 1/8	1
DB-36	D	.246	4	1	DB-96	23	.1540	3 3/8	1
DB-37	E	.250	4	1	DB-97	22	.1570	3 1/4	1
DB-38	F	.257	4 1/8	1	DB-98	21	.1590	3 1/4	1
DB-39	G	.261	4 1/8	1	DB-99	20	.1610	3 1/4	1
DB-40	H	.266	4 1/8	1	DB-100	19	.1660	3 1/4	1
DB-41	I	.272	4 1/8	1	DB-101	18	.1695	3 1/4	1
DB-42	J	.277	4 1/8	1	DB-104	15	.1800	3 3/8	1
DB-43	K	.281	4 1/4	1	DB-105	14	.1820	3 3/8	1
DB-44	L	.290	4 1/4	1	DB-106	13	.1850	3 1/2	1
DB-45	M	.295	4 3/8	1	DB-107	12	.1890	3 1/2	1
DB-46	N	.302	4 3/8	1	DB-108	11	.1910	3 1/2	1
DB-47	O	.316	4 1/2	1	DB-109	10	.1935	3 3/4	1
DB-48	P	.323	4 3/8	1	DB-110	9	.1960	3 3/4	1
DB-49	Q	.332	4 3/4	1	DB-111	8	.1990	3 3/4	1
DB-50	R	.339	4 3/4	1	DB-112	7	.2010	3 3/4	1
DB-51	S	.348	4 3/4	1	DB-114	5	.2055	3 3/4	1
DB-52	T	.358	4 3/4	1	DB-115	4	.2090	3 3/4	1
DB-53	U	.368	5	1	DB-117	2	.2210	3 3/4	1
DB-54	V	.377	5	1	DB-118	1	.2280	3 3/4	1
DB-55	W	.386	5 1/8	1					
DB-56	X	.397	5 1/8	1					
DB-57	Y	.404	5 1/4	1					
DB-58	Z	.413	5 1/4	1					

**Drill Blanks**  
High Speed Steel - Hardened - Ground  
Metric

Item No.	Size	Decimal Equiv.	Lgth. (mm)	Pack Qty.	Item No.	Size	Decimal Equiv.	Lgth. (mm)	Pack Qty.
MMB-1	1.0	.03937	34	1	MMB-53	4.30	.16929	82.5	1
MMB-5	1.20	.04724	38	1	MMB-54	4.40	.17323	85.7	1
MMB-6	1.25	.04921	38	1	MMB-55	4.50	.17716	87.5	1
MMB-9	1.40	.05511	40	1	MMB-56	4.60	.18110	87.5	1
MMB-11	1.50	.05905	40	1	MMB-57	4.70	.18504	88.9	1
MMB-13	1.60	.06299	43	1	MMB-58	4.75	.18701	88.9	1
MMB-14	1.65	.06496	43	1	MMB-59	4.80	.18897	88.9	1
MMB-15	1.70	.06692	43	1	MMB-61	5.00	.19685	92	1
MMB-16	1.75	.06890	46	1	MMB-62	5.10	.20079	92	1
MMB-17	1.80	.07086	46	1	MMB-64	5.25	.20669	95.2	1
MMB-19	1.90	.07480	46	1	MMB-65	5.30	.20866	95.2	1
MMB-21	2.00	.07874	49	1	MMB-66	5.40	.21260	95.2	1
MMB-22	2.05	.08070	49	1	MMB-67	5.50	.21653	95.2	1
MMB-24	2.15	.08464	53	1	MMB-68	5.60	.22047	98.4	1
MMB-25	2.20	.08661	53	1	MMB-69	5.70	.22441	98.4	1
MMB-26	2.25	.08858	53	1	MMB-70	5.75	.22638	98.4	1
MMB-27	2.30	.09055	53	1	MMB-72	5.90	.23228	98.4	1
MMB-29	2.40	.09448	57	1	MMB-73	6.00	.23622	101.6	1
MMB-30	2.45	.09645	57	1	MMB-76	6.25	.24606	101.6	1
MMB-31	2.50	.09842	57	1	MMB-77	6.30	.24803	101.6	1
MMB-32	2.60	.10236	57	1	MMB-78	6.40	.25197	104.8	1
MMB-33	2.70	.10629	61	1	MMB-79	6.50	.25591	104.8	1
MMB-34	2.75	.10826	63.5	1	MMB-80	6.60	.25984	104.8	1
MMB-35	2.80	.11023	61	1	MMB-81	6.70	.26378	104.8	1
MMB-36	2.90	.11417	61	1	MMB-82	6.75	.26575	104.8	1
MMB-37	3.00	.11811	61	1	MMB-83	6.80	.26772	104.8	1
MMB-38	3.10	.12204	65	1	MMB-85	7.00	.27559	104.8	1
MMB-39	3.20	.12599	63.5	1	MMB-87	7.20	.28347	107.9	1
MMB-40	3.25	.12795	63.5	1	MMB-91	7.50	.29528	111.1	1
MMB-41	3.30	.12992	73	1	MMB-95	7.80	.30709	114.3	1
MMB-42	3.40	.13386	73	1	MMB-97	8.00	.31496	114.3	1
MMB-43	3.50	.13779	73	1	MMB-98	8.10	.31890	117.5	1
MMB-44	3.60	.14173	76.2	1	MMB-103	8.50	.33465	120.6	1
MMB-45	3.70	.14567	76.2	1	MMB-109	9.00	.35433	123.8	1
MMB-46	3.75	.14764	76.2	1	MMB-115	9.50	.37402	127	1
MMB-47	3.80	.14960	79.4	1	MMB-118	9.75	.38386	130.1	1
MMB-48	3.90	.15354	79.4	1	MMB-121	10.00	.39370	130.1	1
MMB-49	4.00	.15748	82.5	1	MMB-123	11.00	.43307	139.7	1
MMB-50	4.10	.16142	82.5	1	MMB-124	11.50	.45276	142.9	1
MMB-51	4.20	.16535	82.5	1	MMB-125	12.00	.47244	149.2	1
MMB-52	4.25	.16732	82.5	1	MMB-126	12.50	.49213	152.4	1

**MORE CHOICE!**

We have over **1 billion** components in stock—available for same day shipping!



Designed to perform in a board range of materials. Available in bright finish.

**Fractional Sizes**  
Series R10 (Black Oxide)  
High Speed Steel  
General Purpose  
118 Degree Conventional Point



**Wire Sizes**  
Series R18 (Black Oxide)  
Series R18P (Bright)  
High Speed Steel  
General Purpose  
118 Degree Conventional Point



See page 487 for drill sharpeners.

Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
PTD-10001	1/64	.0156	3/16	3/4	1
PTD-10002	1/32	.0312	1/2	1 1/8	1
PTD-10003	3/64	.0469	3/4	1 1/4	1
PTD-10004	1/16	.0625	7/8	1 7/8	1
PTD-10005	3/64	.0781	1	2	1
PTD-10006	3/32	.0938	1 1/4	2 1/4	1
PTD-10007	7/64	.1094	1 1/2	2 3/4	1
PTD-10008	1/8	.1250	1 5/8	2 3/4	1
PTD-10009	9/64	.1406	1 3/4	2 7/8	1
PTD-10010	5/32	.1562	2	3 3/8	1
PTD-10011	1 1/64	.1719	2 1/8	3 1/4	1
PTD-10012	3/16	.1875	2 1/2	3 1/2	1
PTD-10013	1 3/64	.2031	2 3/8	3 3/4	1
PTD-10014	7/32	.2188	2 1/2	3 3/4	1
PTD-10015	1 5/64	.2344	2 3/4	3 3/4	1
PTD-10016	1/4	.2500	2 3/4	4	1
PTD-10017	1 7/64	.2656	2 7/8	4 1/8	1
PTD-10018	9/32	.2812	2 5/8	4 1/4	1
PTD-10019	1 9/64	.2969	3 1/8	4 3/8	1
PTD-10020	5/16	.3125	3 1/8	4 1/2	1
PTD-10021	2 1/64	.3281	3 1/4	4 3/4	1
PTD-10022	1 1/32	.3438	3 1/2	4 3/4	1
PTD-10023	2 3/64	.3594	3 1/2	4 3/4	1
PTD-10024	3/8	.3750	3 3/4	5	1
PTD-10025	2 5/64	.3906	3 3/4	5 1/8	1
PTD-10026	1 1/32	.4062	3 3/4	5 1/4	1
PTD-10027	2 7/64	.4219	3 1 1/8	5 1/4	1
PTD-10028	7/16	.4375	4 1/8	5 1/2	1
PTD-10029	2 9/64	.4531	4 1/8	5 1/4	1
PTD-10030	1 5/32	.4688	4 1/8	5 3/4	1
PTD-10031	3 1/64	.4844	4 3/8	5 3/4	1
PTD-10032	1/2	.5000	4 1/2	6	1

**Letter Sizes**  
Series R15 (Black Oxide)  
High Speed Steel  
General Purpose  
118 Degree Conventional Point



See page 487 for drill sharpeners.

Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
PTD-15001	A	.2340	2 5/8	3 3/8	1
PTD-15002	B	.2380	2 3/4	4	1
PTD-15003	C	.2420	2 3/4	4	1
PTD-15004	D	.2460	2 3/4	4	1
PTD-15005	E	.2500	2 3/4	4	1
PTD-15006	F	.2570	2 7/8	4 1/8	1
PTD-15007	G	.2610	2 7/8	4 1/8	1
PTD-15008	H	.2660	2 7/8	4 1/8	1
PTD-15009	I	.2720	2 7/8	4 1/8	1
PTD-15010	J	.2770	2 1 1/8	4 1/4	1
PTD-15011	K	.2810	2 1 1/8	4 1/4	1
PTD-15012	L	.2900	2 1 1/8	4 1/4	1
PTD-15013	M	.2950	3 1/8	4 3/4	1
PTD-15014	N	.3020	3 1/8	4 3/4	1
PTD-15015	O	.3160	3 3/8	4 3/4	1
PTD-15016	P	.3230	3 3/8	4 3/4	1
PTD-15017	Q	.3320	3 3/8	4 3/4	1
PTD-15018	R	.3390	3 3/8	4 3/4	1
PTD-15019	S	.3480	3 1/2	4 3/4	1
PTD-15020	T	.3580	3 1/2	4 3/4	1
PTD-15021	U	.3680	3 3/4	5	1
PTD-15022	V	.3770	3 3/4	5	1
PTD-15023	W	.3860	3 3/4	5 1/8	1
PTD-15024	X	.3970	3 3/4	5 1/8	1
PTD-15025	Y	.4040	3 3/4	5 1/4	1
PTD-15026	Z	.4130	3 3/4	5 1/4	1

See page 487 for drill sharpeners.

R18		R18P		Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
Item No.	Item No.	Item No.	Item No.					
PTD-18001	—	—	—	1	.2280	2 5/8	3 3/8	1
PTD-18002	—	—	—	2	.2210	2 5/8	3 3/8	1
PTD-18003	—	PTD-18603	—	3	.2130	2 1/2	3 3/4	1
PTD-18004	—	—	—	4	.2090	2 1/2	3 3/4	1
PTD-18005	—	—	—	5	.2055	2 1/2	3 3/4	1
PTD-18006	—	—	—	6	.2040	2 1/2	3 3/4	1
PTD-18007	—	PTD-18607	—	7	.2010	2 1/8	3 3/8	1
PTD-18008	—	—	—	8	.1990	2 1/8	3 3/8	1
PTD-18009	—	PTD-18609	—	9	.1960	2 1/8	3 3/8	1
PTD-18010	—	PTD-18610	—	10	.1935	2 1/8	3 3/8	1
PTD-18011	—	—	—	11	.1910	2 1/8	3 1/2	1
PTD-18012	—	—	—	12	.1890	2 1/8	3 1/2	1
PTD-18013	—	—	—	13	.1850	2 1/8	3 1/2	1
PTD-18014	—	—	—	14	.1820	2 3/16	3 3/8	1
PTD-18015	—	—	—	15	.1800	2 3/16	3 3/8	1
PTD-18016	—	—	—	16	.1770	2 3/16	3 3/8	1
PTD-18017	—	—	—	17	.1730	2 3/16	3 3/8	1
PTD-18018	—	—	—	18	.1695	2 1/8	3 3/4	1
PTD-18019	—	—	—	19	.1660	2 1/8	3 3/4	1
PTD-18020	—	—	—	20	.1610	2 1/8	3 3/4	1
PTD-18021	—	PTD-18621	—	21	.1590	2 1/8	3 3/4	1
PTD-18022	—	—	—	22	.1570	2	3 3/8	1
PTD-18023	—	—	—	23	.1540	2	3 3/8	1
PTD-18024	—	—	—	24	.1520	2	3 3/8	1
PTD-18025	—	PTD-18625	—	25	.1495	1 7/8	3	1
PTD-18026	—	—	—	26	.1470	1 7/8	3	1
PTD-18027	—	—	—	27	.1440	1 7/8	3	1
PTD-18028	—	—	—	28	.1405	1 3/4	2 7/8	1
PTD-18029	—	PTD-18629	—	29	.1360	1 3/4	2 7/8	1
PTD-18030	—	PTD-18630	—	30	.1285	1 3/8	2 3/4	1
PTD-18031	—	PTD-18631	—	31	.1200	1 3/8	2 3/4	1
PTD-18032	—	—	—	32	.1160	1 3/8	2 3/4	1
PTD-18033	—	—	—	33	.1130	1 1/2	2 5/8	1
PTD-18034	—	—	—	34	.1110	1 1/2	2 5/8	1
PTD-18035	—	—	—	35	.1100	1 1/2	2 5/8	1
PTD-18036	—	PTD-18636	—	36	.1065	1 1/8	2 1/2	1
PTD-18037	—	PTD-18637	—	37	.1040	1 1/8	2 1/2	1
PTD-18038	—	PTD-18638	—	38	.1015	1 1/8	2 1/2	1
PTD-18039	—	—	—	39	.0995	1 3/8	2 3/8	1
PTD-18040	—	—	—	40	.0980	1 3/8	2 3/8	1
PTD-18041	—	PTD-18641	—	41	.0960	1 3/8	2 3/8	1
PTD-18042	—	—	—	42	.0935	1 1/4	2 1/4	1
PTD-18043	—	—	—	43	.0890	1 1/4	2 1/4	1
PTD-18044	—	—	—	44	.0860	1 1/4	2 1/4	1
PTD-18045	—	—	—	45	.0820	1 1/8	2 1/8	1
PTD-18046	—	—	—	46	.0810	1	2	1
PTD-18047	—	—	—	47	.0785	1	2	1
PTD-18048	—	—	—	48	.0760	1	2	1
PTD-18049	—	—	—	49	.0730	1	2	1
PTD-18050	—	—	—	50	.0700	1	2	1
PTD-18051	—	PTD-18651	—	51	.0670	1	2	1
PTD-18052	—	—	—	52	.0635	7/8	1 7/8	1
PTD-18053	—	—	—	53	.0595	7/8	1 7/8	1
PTD-18054	—	—	—	54	.0550	7/8	1 7/8	1
PTD-18055	—	—	—	55	.0520	7/8	1 7/8	1
PTD-18056	—	—	—	56	.0465	3/4	1 3/4	1
PTD-18057	—	—	—	57	.0430	3/4	1 3/4	1
PTD-18058	—	—	—	58	.0420	1 1/16	1 5/8	1
PTD-18059	—	—	—	59	.0410	1 1/16	1 5/8	1
PTD-18060	—	—	—	60	.0400	1 1/16	1 5/8	1
PTD-18061	—	PTD-18661	—	61	.0390	1 1/16	1 5/8	1
PTD-18062	—	PTD-18662	—	62	.0380	3/8	1 1/2	1
PTD-18063	—	PTD-18663	—	63	.0370	3/8	1 1/2	1
PTD-18064	—	—	—	64	.0360	3/8	1 1/2	1
PTD-18065	—	—	—	65	.0350	3/8	1 1/2	1
PTD-18066	—	—	—	66	.0330	1/2	1 3/8	1
PTD-18067	—	—	—	67	.0320	1/2	1 3/8	1
PTD-18068	—	—	—	68	.0310	1/2	1 3/8	1
PTD-18069	—	PTD-18669	—	69	.0292	1/2	1 3/8	1
PTD-18070	—	PTD-18670	—	70	.0280	3/8	1 1/4	1
PTD-18071	—	PTD-18671	—	71	.0260	3/8	1 1/4	1
PTD-18072	—	PTD-18672	—	72	.0250	3/16	1 1/8	1
PTD-18073	—	PTD-18673	—	73	.0240	3/16	1 1/8	1
PTD-18074	—	PTD-18674	—	74	.0225	1/4	1	1
PTD-18075	—	PTD-18675	—	75	.0210	1/4	1	1
PTD-18076	—	PTD-18676	—	76	.0200	3/16	7/8	1
PTD-18077	—	PTD-18677	—	77	.0180	3/16	7/8	1
PTD-18078	—	PTD-18678	—	78	.0160	3/16	7/8	1
PTD-18079	—	PTD-18679	—	79	.0145	1/8	3/4	1
PTD-18080	—	PTD-18680	—	80	.0135	1/8	3/4	1



**Taper Length Drills**  
**Fractional Sizes**  
**Series R51**  
**High Speed Steel**  
**General Purpose**  
**118 Degree Conventional Point**



Used when a length longer than jobber length is required.  
 Designed to perform on a wide range of materials.

Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
<b>Bright</b>					
PTD-51001	1/64	.0156	5/16	1 1/2	1
PTD-51002	1/32	.0312	3/4	2	1
PTD-51003	3/64	.0469	1 1/8	2 1/4	1
PTD-51004	1/16	.0625	1 3/4	3	1
PTD-51005	5/64	.0781	2	3 3/4	1
PTD-51006	3/32	.0938	2 1/4	4 1/4	1
PTD-51007	7/64	.1094	2 1/2	2 1/2	1
PTD-51008	1/8	.1250	2 3/4	5 1/8	1
PTD-51009	9/64	.1406	3	5 3/8	1
PTD-51010	5/32	.1562	3	5 3/8	1
PTD-51011	11/64	.1719	3 3/8	1 1/2	1
PTD-51012	3/16	.1875	3 3/8	5 3/4	1
PTD-51013	13/64	.2031	3 3/8	6	1
PTD-51014	7/32	.2188	3 3/8	6	1
PTD-51015	15/64	.2344	3 3/4	6 1/8	1
PTD-51016	1/4	.2500	3 3/4	6 1/8	1
PTD-51017	17/64	.2656	3 3/8	6 1/4	1
PTD-51018	9/32	.2812	3 3/8	6 1/4	1
PTD-51019	19/64	.2969	4	6 3/8	1
PTD-51020	5/16	.3125	4	6 3/8	1
PTD-51021	21/64	.3281	4 1/8	6 1/2	1
PTD-51022	11/32	.3438	4 1/8	6 1/2	1
PTD-51023	23/64	.3594	4 1/4	6 3/4	1
PTD-51024	3/8	.3750	4 1/4	6 3/4	1
PTD-51025	25/64	.3906	4 3/8	7	1
PTD-51026	13/32	.4062	4 3/8	7	1
PTD-51027	27/64	.4219	4 3/8	7 1/4	1
PTD-51028	7/16	.4375	4 3/8	7 1/4	1
PTD-51029	29/64	.4531	4 3/4	7 1/2	1
PTD-51030	15/32	.4688	4 3/4	7 1/2	1
PTD-51031	31/64	.4844	4 3/4	7 3/4	1
PTD-51032	1/2	.5000	4 3/4	7 3/4	1
PTD-51033	33/64	.5156	4 3/4	8	1
PTD-51034	17/32	.5312	4 3/4	8	1
PTD-51035	35/64	.5469	4 3/8	8 1/4	1
PTD-51036	9/16	.5625	4 3/8	8 1/4	1
PTD-51037	37/64	.5781	4 3/8	8 1/4	1
PTD-51038	19/32	.5938	4 3/8	8 1/4	1
PTD-51039	39/64	.6094	4 3/8	8 1/4	1
PTD-51040	5/8	.6250	4 3/8	8 1/4	1
PTD-51041	41/64	.6406	5 1/8	9	1
PTD-51042	21/32	.6562	5 1/8	9	1
PTD-51043	43/64	.6719	5 1/8	9 1/4	1
PTD-51044	11/16	.6875	5 1/8	9 1/4	1
<b>Black Oxide</b>					
PTD-51045	45/64	.7031	5 3/8	9 1/2	1
PTD-51046	23/32	.7188	5 3/8	9 1/2	1
PTD-51047	47/64	.7344	5 3/8	9 3/4	1
PTD-51048	3/4	.7500	5 3/8	9 3/4	1
PTD-51049	49/64	.7656	6	9 3/8	1
PTD-51050	25/32	.7812	6	9 3/8	1
PTD-51051	51/64	.7969	6 1/8	10	1
PTD-51053	53/64	.8281	6 1/8	10	1
PTD-51052	13/16	.8125	6 1/8	10	1
PTD-51054	27/32	.8438	6 1/8	10	1
PTD-51055	55/64	.8594	6 1/8	10	1
PTD-51056	7/8	.8750	6 1/8	10	1
PTD-51057	57/64	.8906	6 1/8	10	1
PTD-51058	29/32	.9062	6 1/8	10	1
PTD-51059	59/64	.9219	6 1/8	10 1/4	1
PTD-51060	15/16	.9375	6 1/8	10 1/2	1
PTD-51061	61/64	.9531	6 3/8	11	1
PTD-51062	31/32	.9688	6 3/8	11	1
PTD-51063	63/64	.9844	6 3/8	11	1
PTD-51100	1	1.000	6 3/8	11	1
PTD-51108	1 1/8	1.1250	7 1/8	11 3/4	1

**Taper Shank Drills**  
**Fractional Sizes**  
**Series 209 (Black Oxide)**  
**High Speed Steel**  
**Regular Shank**  
**General Purpose**  
**118 Degree Conventional Point**



Drills made to fit Morse Taper holders. Designed to perform on a broad range of material.

Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Morse Shank No.	Pack Qty.
PTD-20016	1/4	.2500	2 1/8	6 1/8	1	1
PTD-20017	17/64	.2656	3	6 1/4	1	1
PTD-20018	9/32	.2812	3	6 1/4	1	1
PTD-20019	19/64	.2969	3 1/8	6 3/8	1	1
PTD-20020	5/16	.3125	3 1/8	6 3/8	1	1
PTD-20021	21/64	.3281	3 1/4	6 1/2	1	1
PTD-20022	11/32	.3438	3 1/4	6 1/2	1	1
PTD-20023	23/64	.3594	3 1/2	6 3/4	1	1
PTD-20024	3/8	.3750	3 1/2	6 3/4	1	1
PTD-20025	25/64	.3906	3 3/8	7	1	1
PTD-20026	13/32	.4062	3 3/8	7	1	1
PTD-20027	27/64	.4219	3 3/8	7 1/4	1	1
PTD-20028	7/16	.4375	3 3/8	7 1/4	1	1
PTD-20029	29/64	.4531	4 1/8	7 1/2	1	1
PTD-20030	15/32	.4688	2 1/8	7 1/2	1	1
PTD-20031	31/64	.4844	4 3/8	8 1/4	2	1
PTD-20032	1/2	.5000	4 3/8	8 1/4	2	1
PTD-20033	33/64	.5156	4 3/8	8 1/2	2	1
PTD-20034	17/32	.5312	4 3/8	8 1/2	2	1
PTD-20035	35/64	.5469	4 3/8	8 3/4	2	1
PTD-20036	9/16	.5625	4 3/8	8 3/4	2	1
PTD-20037	37/64	.5781	4 3/8	8 3/4	2	1
PTD-20038	19/32	.5938	4 3/8	8 3/4	2	1
PTD-20039	39/64	.6094	4 3/8	8 3/4	2	1
PTD-20040	5/8	.6250	4 3/8	8 3/4	2	1
PTD-20041	41/64	.6406	5 1/8	9	2	1
PTD-20042	21/32	.6562	5 1/8	9	2	1
PTD-20043	43/64	.6719	5 3/8	9 1/4	2	1
PTD-20044	11/16	.6875	5 3/8	9 1/4	2	1
PTD-20045	45/64	.7031	5 3/8	9 1/2	2	1
PTD-20046	23/32	.7188	2 1/8	9 1/2	2	1
PTD-20047	47/64	.7344	5 3/8	9 3/4	2	1
PTD-20048	3/4	.7500	5 3/8	9 3/4	2	1
PTD-20049	49/64	.7656	6	9 3/8	2	1
PTD-20050	25/32	.7812	6	10 1/4	2	1
PTD-20051	51/64	.7969	6 1/8	10 3/4	3	1
PTD-20052	13/16	.8125	6 1/8	10 3/4	3	1
PTD-20053	27/32	.8281	6 1/8	10 3/4	3	1
PTD-20054	27/32	.8438	6 1/8	10 3/4	3	1
PTD-20055	55/64	.8594	6 1/8	10 3/4	3	1
PTD-20056	7/8	.8750	6 1/8	10 3/4	3	1
PTD-20057	57/64	.8906	6 1/8	10 3/4	3	1
PTD-20058	29/32	.9062	6 1/8	10 3/4	3	1
PTD-20059	59/64	.9219	6 1/8	10 3/4	3	1
PTD-20060	15/16	.9375	6 1/8	10 3/4	3	1
PTD-20061	61/64	.9531	6 3/8	11	3	1
PTD-20062	31/32	.9688	6 3/8	11	3	1
PTD-20063	63/64	.9844	2 1/8	11	3	1
PTD-21000	1	1.00	2 1/8	11	3	1
PTD-21001	1 1/64	1.0156	6 1/2	11 3/8	3	1
PTD-21002	1 1/32	1.0312	2 1/8	11 3/8	3	1
PTD-21004	1 1/8	1.0625	6 1/2	11 3/4	3	1
PTD-21005	1 1/64	1.0781	6 1/2	12 1/2	4	1
PTD-21006	1 1/32	1.0938	6 1/2	12 1/2	4	1
PTD-21007	1 1/64	1.1094	7 1/8	12 3/4	4	1
PTD-21008	1 1/8	1.1250	2 1/8	12 3/4	4	1
PTD-21010	1 1/32	1.1562	7 1/4	12 3/4	4	1
PTD-21012	1 1/16	1.1875	7 3/8	13	4	1
PTD-21014	1 1/32	1.2188	7 1/2	13 3/4	4	1
PTD-21016	1 1/4	1.2500	7 3/8	13 3/4	4	1
PTD-21020	1 1/16	1.3125	8 3/8	14 1/4	4	1



**Reduced Shank Drills**  
**Fractional Sizes**  
**Series R56 (Black Oxide, Round Shank)**  
**High Speed Steel**  
**General Purpose**  
**Silver and Deming**  
**1/2" Reduced Shank**  
**118 Degree Point**



Performs on medium and low tensile material.

Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
PTD-91433	33/64	.5156	3	6	1
PTD-91434	17/32	.5312	3	6	1
PTD-91435	39/64	.5469	3	6	1
PTD-91436	9/16	.5625	3	6	1
PTD-91437	37/64	.5781	3	6	1
PTD-91438	19/32	.5938	3	6	1
PTD-91439	39/64	.6094	3	6	1
PTD-91440	3/8	.6250	3	6	1
PTD-91441	41/64	.6406	3	6	1
PTD-91442	21/32	.6562	3	6	1
PTD-91443	43/64	.6719	3	6	1
PTD-91444	11/16	.6875	3	6	1
PTD-91445	45/64	.7031	3	6	1
PTD-91446	23/32	.7188	3	6	1
PTD-91447	47/64	.7344	3	6	1
PTD-91448	3/4	.7500	3	6	1
PTD-91449	49/64	.7656	3	6	1
PTD-91450	25/32	.7812	3	6	1
PTD-91451	51/64	.7969	3	6	1
PTD-91452	13/16	.8125	3	6	1
PTD-91453	53/64	.8281	3	6	1
PTD-91454	27/32	.8438	3	6	1
PTD-91455	55/64	.8594	3	6	1
PTD-91456	7/8	.8750	3	6	1
PTD-91457	57/64	.8906	3	6	1
PTD-91458	29/32	.9062	3	6	1
PTD-91459	59/64	.9219	3	6	1
PTD-91460	15/16	.9375	3	6	1
PTD-91461	61/64	.9531	3	6	1
PTD-91462	31/32	.9688	3	6	1
PTD-91463	63/64	.9844	3	6	1
PTD-91464	1	1.0000	3	6	1
PTD-91468	1 1/16	1.0625	3	6	1
PTD-91470	1 3/32	1.0930	3	6	1
PTD-91471	1 1/64	1.1094	3	6	1
PTD-91472	1 1/8	1.1250	3	6	1
PTD-91476	1 3/16	1.1875	3	6	1
PTD-91483	1 3/8	1.3750	3	6	1
PTD-91486	1 1/2	1.0312	3	6	1
PTD-91487	1 5/32	1.1562	3	6	1
PTD-91488	1 1/2	1.2188	3	6	1

**Screw Machine Drills**  
**High Speed Steel**  
**Fractional Sizes**  
**Series R40 (Bright)**  
**General Purpose**  
**118 Degree Conventional Point**



Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
PTD-40003	3/64	.0469	1/2	1 3/8	1
PTD-40004	7/16	.0625	1/2	1 3/8	1
PTD-40005	3/64	.0781	11/16	1 1/4	1
PTD-40006	3/32	.0938	3/4	1 3/4	1
PTD-40007	7/64	.1094	3/4	1 3/16	1
PTD-40008	3/8	.1250	7/8	1 7/8	1
PTD-40009	3/64	.1406	15/16	1 5/8	1
PTD-40010	3/32	.1562	1	2 1/16	1
PTD-40011	11/64	.1719	1 1/16	2 1/8	1
PTD-40012	3/16	.1875	1 1/8	2 3/16	1
PTD-40013	13/64	.2031	1 3/16	2 1/4	1
PTD-40014	7/32	.2188	1 1/4	2 3/8	1
PTD-40015	15/64	.2344	1 5/16	2 1/2	1
PTD-40016	3/4	.2500	1 3/8	2 1/2	1
PTD-40017	17/64	.2656	1 7/16	2 3/8	1
PTD-40018	9/32	.2812	1 1/2	2 11/16	1
PTD-40019	19/64	.2969	1 5/16	2 3/4	1
PTD-40020	9/16	.3125	1 3/8	2 3/8	1
PTD-40021	21/64	.3281	1 11/16	2 13/16	1
PTD-40022	11/32	.3438	1 11/16	3	1
PTD-40023	23/64	.3594	1 3/4	3 1/16	1
PTD-40024	3/8	.3750	1 13/16	3 1/8	1
PTD-40025	25/64	.3906	1 7/8	3 1/4	1
PTD-40026	13/32	.4062	1 15/16	3 3/8	1
PTD-40027	27/64	.4219	2	3 3/8	1
PTD-40028	7/16	.4375	2 1/16	3 1/2	1
PTD-40029	29/64	.4531	2 1/8	3 1/2	1
PTD-40030	15/32	.4688	2 1/8	3 3/8	1
PTD-40031	31/64	.4844	2 3/16	3 11/16	1
PTD-40032	1/2	.5000	2 1/4	3 3/4	1

**Extra Length Drills**  
**Fractional Sizes**  
**Series 1290 (Bright, Black Oxide)**  
**High Speed Steel**  
**Straight Shank**  
**118 Degree Conventional Point**



For applications where extra length is required. Performs on a wide range of materials.

Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
<b>Bright</b>					
PTD-59608	1/8	.1250	9	12	1
PTD-59609	1/8	.1250	9	12	1
PTD-59610	9/32	.1562	9	12	1
PTD-59611	11/64	.1719	9	12	1
PTD-59612	3/16	.1875	9	12	1
PTD-59613	19/64	.2031	9	12	1
PTD-59614	7/32	.2188	9	12	1
PTD-59615	19/64	.2344	9	12	1
PTD-59616	1/4	.2500	9	12	1
PTD-59617	17/64	.2656	9	12	1
PTD-59618	9/32	.2812	9	12	1
PTD-59619	19/64	.2969	9	12	1
PTD-59620	5/16	.3125	9	12	1
PTD-59621	21/64	.3281	9	12	1
PTD-59622	11/32	.3438	9	12	1
PTD-59623	23/64	.3438	9	12	1
PTD-59624	3/8	.3750	9	12	1
PTD-59625	25/64	.3906	9	12	1
PTD-59626	13/32	.4062	9	12	1
<b>Black Oxide</b>					
PTD-59627	27/64	.4219	9	12	1
PTD-59628	7/16	.4375	9	12	1
PTD-59629	29/64	.4531	9	12	1
PTD-59630	15/32	.4688	9	12	1
PTD-59631	31/64	.4844	9	12	1
PTD-59632	1/2	.5000	9	12	1

**Extra Length Drills**  
**Fractional Sizes**  
**Series QC0860P (Bright)**  
**High Speed Steel**  
**Wide Land Parabolic Flute Design**  
**135 Degree Self-Centering Split Point**



Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
PTD-55608	1/8	.1250	6	8	1
PTD-55610	9/32	.1562	6	8	1
PTD-55612	3/16	.1875	6	8	1
PTD-55616	1/4	.2500	6	8	1
PTD-55618	9/32	.2812	6	8	1
PTD-55621	21/64	.3281	6	8	1
PTD-55622	11/32	.3438	6	8	1
PTD-55624	3/8	.3750	6	8	1
PTD-55632	1/2	.5000	6	8	1

**Fractional Sizes**  
**Series QC21 (Black Oxide)**  
**High Speed Steel**  
**Wide Land Parabolic Flute Design**  
**135 Degree Self-Centering Split Point**



The wide land parabolic design provides superior performance in a greater range of materials and applications. Especially effective in deep hole drilling. Feed rates and speeds do not have to be reduced like other drills - saving time and increasing efficiency. The unique flute design produces closer tolerances due to improved chip and coolant flow and higher torsional rigidity.

Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
PTD-81607	7/64	.1094	1 1/2	2 3/8	1
PTD-81614	7/32	.2188	2 1/2	3 3/4	1
PTD-81621	21/64	.3281	3 3/16	4 3/8	1
PTD-81624	3/8	.3750	3 3/8	5	1
PTD-81625	25/64	.3906	3 3/4	5 1/8	1
PTD-81626	13/32	.4062	3 3/8	5 1/4	1
PTD-81630	15/32	.4688	4 3/16	5 3/4	1



**Drill Sets  
 High Speed Steel**



**Black Oxide**

**Bright**

Item No.	Finish	Description	Pack Qty.
<b>Metric</b>			
PTD-99988	Black Oxide	25 pcs. - 1mm to 13mm by .5mm	1
PTD-99987	Bright	25 pcs. - 1mm to 13mm by .5mm	1
PTD-99985	Black Oxide	50 pcs. - 1mm to 5.9mm by .1mm	1

**Drill Sets  
 High Speed Steel**



**29 Piece  
 Taper Length**



**29 Piece  
 Jobber Length**



**60 Piece  
 Jobber Length**



**20 Piece  
 Jobber Length**

Item No.	Description	Pack Qty.
PTD-90154	Taper Length 29 Piece Drill Set in Metal Box Fractional Sizes 1/16 to 1/2 by 64ths High Speed Steel, right Finish	1
PTD-99977	Jobber Length 29 Piece Drill Set in Metal Box Fractional Sizes 1/16 to 1/2 inch by 64ths High Speed Steel, Black Oxide	1
PTD-99976	Jobber Length 60 Piece Drill Set in Metal Box Wire Sizes #1 to #60 High Speed Steel, Black Oxide	1
PTD-99981	Jobber Length 20 Piece Drill Set Wire Sizes #61 to #80 High Speed Steel, Black Oxide	1

**118 Degree Jobber Length Drill Set**



**29 Piece Set**

- High speed surface treated steel
- Fractional sizes
- Metal box

Item No.	Description	Pack Qty.
BT-62914	29 Piece Fractional Size Drill Set (1/16 - 1/2 by 64ths)	1

**Carbide Tipped Drills  
 Die Drill 118 Degree Point**



Run at 75 to 100 surface feet per minute with a steady hand feed. Designed for drilling hardened steels in the range of 45-65 Rc. Gray satin finish. Made in the U.S.

Item No.	Dia.	Dec. Equiv.	Flute Lgth.	OAL	Nominal Shank Size	Pack Qty.
HD-5	3/16	.1875	1 1/2	3 1/2	1 1/64	1
HD-36	1 7/64	.2656	2 1/4	4 1/4	1 5/64	1
HD-39	2 1/64	.3281	2 3/4	4 3/4	1 9/64	1
HD-11	3/8	.3750	3	5	1 1/32	1

**Drill Bit Sharpener  
 Drill Doctor**



The Drill Doctor® can conveniently and properly sharpen drills in less than a minute. The Drill Doctor® will sharpen carbide, high speed steel, masonry, split point, cobalt, TIN coated and parabolic twist drill bits. Drill Doctor® will sharpen 2 flute drills in fractional metric, numbers, letters, sizes with 118 degree or 135 degree points up to 3/4" in diameter. Uses 120V and is made of high impact resistant plastic casing with 6' long cord. Includes 1/2" diamond wheel. Training video included.

Item No.	Description	Pack Qty.
DBS-750	Model 750, 3/32"- 3/4" Drill Sharpener Includes 3/32"- 1/2" Chuck and 1/2"- 3/4" Chuck	1



**3xD 2 Flute**  
**135 Degree Preliminary/Secondary Drill Point**

- Titanium, inconel, hastalloy and waspalloy
- Excellent heat resistance/lubricity
- Up to 40% faster than uncoated
- Heavy web for extra rigidity and added strength
- Thinned point
- 15 degree helix

Item No.	+0.000/-0.005 Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.	Item No.	+0.000/-0.005 Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
GAR-19071	1/16	.0625	5/8	1 1/8	1	GAR-19396	#5	.2055	1 1/4	2 3/8	1
GAR-19076	#52	.0635	1 1/16	1 1/16	1	GAR-19401	#4	.2090	1 1/4	2 3/8	1
GAR-19081	#51	.0670	1 1/16	1 1/16	1	GAR-19406	#3	.2130	1 1/4	2 3/8	1
GAR-19086	#50	.0700	1 1/16	1 1/16	1	GAR-19411	5.5	.2165	32	60	1
GAR-19091	#49	.0730	1 1/16	1 1/16	1	GAR-19416	7/32	.2188	1 1/4	2 3/8	1
GAR-19096	#48	.0760	1 1/16	1 1/16	1	GAR-19421	#2	.2210	1 1/16	2 1/16	1
GAR-19101	5/64	.0781	1 1/16	1 1/16	1	GAR-19426	#1	.2280	1 1/16	2 1/16	1
GAR-19106	#47	.0785	3/4	1 3/4	1	GAR-19431	A	.2340	1 1/16	2 1/16	1
GAR-19116	2	.0787	19	44.5	1	GAR-19436	1 5/64	.2344	1 1/16	2 1/16	1
GAR-19121	#46	.0810	3/4	1 3/4	1	GAR-19441	6	.2362	35	63.5	1
GAR-19126	#45	.0820	3/4	1 3/4	1	GAR-19446	B	.2380	1 1/8	2 1/2	1
GAR-19131	#44	.0860	3/4	1 3/4	1	GAR-19451	C	.2420	1 3/8	2 3/8	1
GAR-19136	#43	.0890	3/4	1 3/4	1	GAR-19456	D	.2460	1 3/8	2 1/2	1
GAR-19141	#42	.0935	3/4	1 3/4	1	GAR-19461	1/4(E)	.2500	1 3/8	2 1/2	1
GAR-19146	3/32	.0938	3/4	1 3/4	1	GAR-19466	6.5	.2559	37	67	1
GAR-19151	#41	.0960	1 1/16	1 1/16	1	GAR-19471	F	.2570	1 1/16	2 3/8	1
GAR-19156	#40	.0980	1 1/16	1 1/16	1	GAR-19476	G	.2610	1 1/16	2 3/8	1
GAR-19161	2.5	.0984	21	46	1	GAR-19481	1 1/64	.2656	1 1/16	2 3/8	1
GAR-19166	#39	.0995	1 1/16	1 1/16	1	GAR-19486	H	.2660	1 1/2	2 1 1/16	1
GAR-19171	#38	.1015	1 1/16	1 1/16	1	GAR-19491	I	.2720	1 1/2	2 1 1/16	1
GAR-19176	#37	.1040	1 1/16	1 1/16	1	GAR-19496	7	.2756	38	68	1
GAR-19181	#36	.1065	1 1/16	1 1/16	1	GAR-19501	J	.2770	1 1/2	2 1 1/16	1
GAR-19186	3/64	.1094	1 1/16	1 1/16	1	GAR-19506	K	.2810	1 1/2	2 1 1/16	1
GAR-19191	#35	.1100	7/8	1 7/8	1	GAR-19511	3/32	.2812	1 1/2	2 1 1/16	1
GAR-19196	#34	.1110	7/8	1 7/8	1	GAR-19516	L	.2900	1 1/16	2 3/4	1
GAR-19201	#33	.1130	7/8	1 7/8	1	GAR-19521	M	.2950	1 1/16	2 3/4	1
GAR-19206	#32	.1160	7/8	1 7/8	1	GAR-19526	7.5	.2953	40	70	1
GAR-19211	3	.1181	22	48	1	GAR-19531	1 5/64	.2969	1 1/16	2 3/4	1
GAR-19216	#31	.1200	7/8	1 7/8	1	GAR-19536	N	.3020	1 3/8	2 1 1/16	1
GAR-19221	1/8	.1250	7/8	1 7/8	1	GAR-19541	5/16	.3125	1 3/8	2 1 1/16	1
GAR-19226	#30	.1285	1 1/16	1 1/16	1	GAR-19546	8	.3150	43	75	1
GAR-19231	#29	.1360	1 1/16	1 1/16	1	GAR-19551	O	.3160	1 1/16	2 1 1/16	1
GAR-19236	3.5	.1378	24	49	1	GAR-19556	P	.3230	1 1/16	2 1 1/16	1
GAR-19241	#28	.1405	1 1/16	1 1/16	1	GAR-19561	2 1/64	.3281	1 1/16	2 1 1/16	1
GAR-19246	3/64	.1406	1 1/16	1 1/16	1	GAR-19566	Q	.3320	1 1/16	3	1
GAR-19251	#27	.1440	1	2 1/16	1	GAR-19571	8.5	.3346	43	76	1
GAR-19256	#26	.1470	1	2 1/16	1	GAR-19576	R	.3390	1 1/16	3	1
GAR-19261	#25	.1495	1	2 1/16	1	GAR-19581	1 1/32	.3438	1 1/16	3	1
GAR-19266	#24	.1520	1	2 1/16	1	GAR-19586	S	.3480	1 3/4	3 1/4	1
GAR-19271	#23	.1540	1	2 1/16	1	GAR-19591	9	.3543	44	78	1
GAR-19276	5/32	.1562	1	2 1/16	1	GAR-19596	T	.3580	1 3/4	3 1/4	1
GAR-19281	#22	.1570	1 1/16	2 1/16	1	GAR-19601	2 3/64	.3594	1 3/4	3 1/4	1
GAR-19286	4	.1575	27	54	1	GAR-19606	U	.3680	1 1 1/16	3 1/4	1
GAR-19291	#21	.1590	1 1/16	2 1/16	1	GAR-19611	9.5	.3740	46	79	1
GAR-19296	#20	.1610	1 1/16	2 1/16	1	GAR-19616	3/8	.3750	1 1/16	3 1/4	1
GAR-19301	#19	.1660	1 1/16	2 1/16	1	GAR-19621	V	.3770	1 1/8	3 1/4	1
GAR-19306	#18	.1695	1 1/16	2 1/16	1	GAR-19626	W	.3860	1 1/8	3 1/4	1
GAR-19311	1 1/64	.1719	1 1/16	2 1/16	1	GAR-19631	2 3/64	.3906	1 1/8	3 1/4	1
GAR-19316	#17	.1730	1 1/8	1 3/8	1	GAR-19636	10	.3937	49	84	1
GAR-19321	#16	.1770	1 1/8	2 3/16	1	GAR-19641	X	.3970	1 1/16	3 5/16	1
GAR-19326	4.5	.1772	29	56	1	GAR-19646	Y	.4040	1 1/16	3 5/16	1
GAR-19331	#15	.1800	1 1/8	2 3/16	1	GAR-19651	1 3/32	.4062	1 1/16	3 5/16	1
GAR-19336	#14	.1820	1 1/8	2 3/16	1	GAR-19656	Z	.4130	2	3 3/8	1
GAR-19341	#13	.1850	1 1/8	2 3/16	1	GAR-19661	10.5	.4134	51	86	1
GAR-19346	3/16	.1875	1 1/8	2 3/16	1	GAR-19666	2 1/64	.4219	2	3 3/8	1
GAR-19351	#12	.1890	1 3/16	2 1/4	1	GAR-19671	11	.4331	52	87	1
GAR-19356	#11	.1910	1 3/16	2 1/4	1	GAR-19676	7/16	.4375	2 1/16	3 1/8	1
GAR-19361	#10	.1935	1 3/16	2 1/4	1	GAR-19681	11.5	.4528	54	90.5	1
GAR-19366	#9	.1960	1 3/16	2 1/4	1	GAR-19686	2 3/64	.4531	2 1/8	3 1/8	1
GAR-19371	5	.1969	30	57	1	GAR-19691	1 5/32	.4688	2 1/8	3 3/8	1
GAR-19376	#8	.1990	1 3/16	2 1/4	1	GAR-19696	12	.4724	56	94	1
GAR-19381	#7	.2010	1 3/16	2 1/4	1	GAR-19701	3 1/64	.4844	2 3/16	3 1 1/16	1
GAR-19386	1 3/64	.2031	1 3/16	2 1/4	1	GAR-19706	12.5	.4921	56	95	1
GAR-19391	#6	.2040	1 1/4	2 3/4	1	GAR-19711	1/2	.5000	2 1/4	3 3/4	1



3xD 2 Flute  
140 Degree High Performance Drill Point



- High performance, high penetration
- Extended tool life and greater surface finishes through faster SFM rates
- Up to 50% faster than standard carbide drills
- 30 degree helix for better chip evacuation
- Honed cutting edge

Item No.	+0.000/-0.005 Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.	Item No.	+0.000/-0.005 Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
GAR-20301	3	.1181	16	46	1	GAR-20591	J	.2770	1 <sup>11</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>16</sub>	1
GAR-20306	#31	.1200	5/8	1 <sup>13</sup> / <sub>16</sub>	1	GAR-20596	K	.2810	1 <sup>11</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>16</sub>	1
GAR-20311	1/8	.1250	1 <sup>1</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>16</sub>	1	GAR-20601	9/32	.2812	1 <sup>11</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>16</sub>	1
GAR-20316	#30	.1285	1 <sup>15</sup> / <sub>16</sub>	1 <sup>15</sup> / <sub>16</sub>	1	GAR-20606	L	.2900	1 <sup>11</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>16</sub>	1
GAR-20321	#29	.1360	3/4	2 <sup>1</sup> / <sub>16</sub>	1	GAR-20611	M	.2950	1 <sup>11</sup> / <sub>32</sub>	2 <sup>1</sup> / <sub>16</sub>	1
GAR-20326	3.5	.1378	19	52	1	GAR-20616	7.5	.2953	34	74.6	1
GAR-20331	#28	.1405	3/4	2 <sup>1</sup> / <sub>16</sub>	1	GAR-20621	1 <sup>9</sup> / <sub>64</sub>	.2969	1 <sup>15</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>32</sub>	1
GAR-20336	3/64	.1406	3/4	2 <sup>1</sup> / <sub>16</sub>	1	GAR-20626	N	.3020	1 <sup>15</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>32</sub>	1
GAR-20341	#27	.1440	3/4	2 <sup>1</sup> / <sub>16</sub>	1	GAR-20631	5/16	.3125	1 <sup>15</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>32</sub>	1
GAR-20346	#26	.1470	1 <sup>3</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>16</sub>	1	GAR-20636	8	.3150	37	78.6	1
GAR-20351	#25	.1495	1 <sup>3</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>16</sub>	1	GAR-20641	O	.3160	1 <sup>15</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>32</sub>	1
GAR-20356	#24	.1520	1 <sup>3</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>16</sub>	1	GAR-20646	P	.3230	1 <sup>15</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>32</sub>	1
GAR-20361	#23	.1540	1 <sup>3</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>16</sub>	1	GAR-20651	2 <sup>1</sup> / <sub>64</sub>	.3281	1 <sup>15</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>32</sub>	1
GAR-20366	3/32	.1562	1 <sup>3</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>16</sub>	1	GAR-20656	Q	.3320	1 <sup>15</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>32</sub>	1
GAR-20371	#22	.1570	1 <sup>3</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>16</sub>	1	GAR-20661	8.5	.3346	37	78.6	1
GAR-20376	4	.1575	20.6	55.5	1	GAR-20666	R	.3390	1 <sup>1</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>16</sub>	1
GAR-20381	#21	.1590	1 <sup>3</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>16</sub>	1	GAR-20671	1 <sup>1</sup> / <sub>32</sub>	.3438	1 <sup>1</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>16</sub>	1
GAR-20386	#20	.1610	1 <sup>3</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>16</sub>	1	GAR-20676	S	.3480	1 <sup>1</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>16</sub>	1
GAR-20391	#19	.1660	1 <sup>5</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>32</sub>	1	GAR-20681	9	.3543	40	84	1
GAR-20396	#18	.1695	1 <sup>5</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>32</sub>	1	GAR-20686	T	.3580	1 <sup>1</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>16</sub>	1
GAR-20401	1 <sup>1</sup> / <sub>64</sub>	.1719	1 <sup>5</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>32</sub>	1	GAR-20691	2 <sup>3</sup> / <sub>64</sub>	.3594	1 <sup>1</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>16</sub>	1
GAR-20406	#17	.1730	1 <sup>5</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>32</sub>	1	GAR-20696	U	.3680	1 <sup>1</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>16</sub>	1
GAR-20411	#16	.1770	1 <sup>5</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>32</sub>	1	GAR-20701	9.5	.3740	40	84	1
GAR-20416	4.5	.1772	24	58	1	GAR-20706	3/8	.3750	1 <sup>11</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-20421	#15	.1800	1 <sup>5</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>32</sub>	1	GAR-20711	V	.3770	1 <sup>11</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-20426	#14	.1820	1 <sup>5</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>32</sub>	1	GAR-20716	W	.3860	1 <sup>11</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-20431	#13	.1850	1 <sup>5</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>32</sub>	1	GAR-20721	2 <sup>5</sup> / <sub>64</sub>	.3906	1 <sup>11</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-20436	3/16	.1875	1	2 <sup>13</sup> / <sub>32</sub>	1	GAR-20726	10	.3937	43	89	1
GAR-20441	#12	.1890	1	2 <sup>13</sup> / <sub>32</sub>	1	GAR-20731	X	.3970	1 <sup>11</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-20446	#11	.1910	1	2 <sup>13</sup> / <sub>32</sub>	1	GAR-20736	Y	.4040	1 <sup>11</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-20451	#10	.1935	1	2 <sup>13</sup> / <sub>32</sub>	1	GAR-20741	1 <sup>13</sup> / <sub>32</sub>	.4062	1 <sup>11</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-20456	#9	.1960	1	2 <sup>13</sup> / <sub>32</sub>	1	GAR-20746	Z	.4130	1 <sup>11</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-20461	5	.1969	25	61	1	GAR-20751	10.5	.4134	43	89	1
GAR-20466	#8	.1990	1	2 <sup>13</sup> / <sub>32</sub>	1	GAR-20756	2 <sup>7</sup> / <sub>64</sub>	.4219	1 <sup>13</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>4</sub>	1
GAR-20471	#7	.2010	1	2 <sup>13</sup> / <sub>32</sub>	1	GAR-20761	11	.4331	46	95	1
GAR-20476	1 <sup>9</sup> / <sub>64</sub>	.2031	1	2 <sup>13</sup> / <sub>32</sub>	1	GAR-20766	7/16	.4375	1 <sup>13</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>4</sub>	1
GAR-20481	#6	.2040	1	2 <sup>13</sup> / <sub>32</sub>	1	GAR-20771	11.5	.4528	46	95	1
GAR-20486	#5	.2055	1	2 <sup>13</sup> / <sub>32</sub>	1	GAR-20776	2 <sup>9</sup> / <sub>64</sub>	.4531	1 <sup>13</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>4</sub>	1
GAR-20491	#4	.2090	1	2 <sup>13</sup> / <sub>32</sub>	1	GAR-20781	1 <sup>15</sup> / <sub>32</sub>	.4688	1 <sup>15</sup> / <sub>16</sub>	4	1
GAR-20496	#3	.2130	1 <sup>13</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>8</sub>	1	GAR-20786	12	.4724	49	101.6	1
GAR-20501	5.5	.2165	28	67	1	GAR-20791	3 <sup>1</sup> / <sub>64</sub>	.4844	1 <sup>15</sup> / <sub>16</sub>	4	1
GAR-20506	7/32	.2188	1 <sup>13</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>8</sub>	1	GAR-20796	12.5	.4921	49	101.6	1
GAR-20511	#2	.2210	1 <sup>13</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>8</sub>	1	GAR-20801	1/2	.5000	1 <sup>15</sup> / <sub>16</sub>	4	1
GAR-20516	#1	.2280	1 <sup>13</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>8</sub>	1	GAR-20806	13	.5118	53	107	1
GAR-20521	A	.2340	1 <sup>13</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>8</sub>	1	GAR-20811	3 <sup>3</sup> / <sub>64</sub>	.5156	2 <sup>3</sup> / <sub>32</sub>	4 <sup>7</sup> / <sub>32</sub>	1
GAR-20526	1 <sup>15</sup> / <sub>64</sub>	.2344	1 <sup>13</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>8</sub>	1	GAR-20816	1 <sup>17</sup> / <sub>32</sub>	.5312	2 <sup>3</sup> / <sub>32</sub>	4 <sup>7</sup> / <sub>32</sub>	1
GAR-20531	6	.2362	28	67	1	GAR-20821	13.5	.5315	56	109.5	1
GAR-20536	B	.2380	1 <sup>13</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>4</sub>	1	GAR-20826	3 <sup>5</sup> / <sub>64</sub>	.5469	2 <sup>7</sup> / <sub>32</sub>	4 <sup>9</sup> / <sub>16</sub>	1
GAR-20541	C	.2420	1 <sup>13</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>4</sub>	1	GAR-20831	14	.5512	56	109.5	1
GAR-20546	D	.2460	1 <sup>13</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>4</sub>	1	GAR-20836	9/16	.5625	2 <sup>15</sup> / <sub>32</sub>	4 <sup>9</sup> / <sub>16</sub>	1
GAR-20551	1/4(E)	.2500	1 <sup>7</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>4</sub>	1	GAR-20841	14.5	.5709	63	116	1
GAR-20556	6.5	.2559	31	70	1	GAR-20846	3 <sup>7</sup> / <sub>64</sub>	.5781	2 <sup>9</sup> / <sub>16</sub>	4 <sup>11</sup> / <sub>16</sub>	1
GAR-20561	F	.2570	1 <sup>7</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>4</sub>	1	GAR-20851	15	.5906	65	125	1
GAR-20566	G	.2610	1 <sup>7</sup> / <sub>32</sub>	2 <sup>5</sup> / <sub>4</sub>	1	GAR-20856	1 <sup>19</sup> / <sub>32</sub>	.5938	2 <sup>9</sup> / <sub>16</sub>	4 <sup>11</sup> / <sub>16</sub>	1
GAR-20571	1 <sup>1</sup> / <sub>64</sub>	.2656	1 <sup>11</sup> / <sub>32</sub>	2 <sup>15</sup> / <sub>16</sub>	1	GAR-20861	3 <sup>9</sup> / <sub>64</sub>	.6094	2 <sup>13</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>16</sub>	1
GAR-20576	H	.2660	1 <sup>11</sup> / <sub>32</sub>	2 <sup>15</sup> / <sub>16</sub>	1	GAR-20866	15.5	.6102	71	128.6	1
GAR-20581	I	.2720	1 <sup>11</sup> / <sub>32</sub>	2 <sup>15</sup> / <sub>16</sub>	1	GAR-20871	5/8	.6250	3 <sup>1</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	1
GAR-20586	7	.2756	34	74.6	1	GAR-20876	16	.6299	79	133	1

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Item No.	+0.000/-0.005 Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.	Item No.	+0.000/-0.005 Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
GAR-21301	3	.1181	19	51	1	GAR-21591	J	.2770	1 <sup>1</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-21306	#31	.1200	3/4	2	1	GAR-21596	K	.2810	1 <sup>3</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-21311	1/8	.1250	3/4	2	1	GAR-21601	L	.2812	1 <sup>3</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-21316	#30	.1285	3/4	2 <sup>1</sup> / <sub>4</sub>	1	GAR-21606	L	.2900	1 <sup>3</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1
GAR-21321	#29	.1360	7/8	2 <sup>1</sup> / <sub>4</sub>	1	GAR-21611	M	.2950	1 <sup>3</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>4</sub>	1
GAR-21326	3.5	.1378	22	57	1	GAR-21616	7.5	.2953	44	95	1
GAR-21331	#28	.1405	7/8	2 <sup>1</sup> / <sub>4</sub>	1	GAR-21621	1 <sup>5</sup> / <sub>64</sub>	.2969	1 <sup>7</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	1
GAR-21336	5/64	.1406	7/8	2 <sup>1</sup> / <sub>4</sub>	1	GAR-21626	N	.3020	1 <sup>7</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	1
GAR-21341	#27	.1440	7/8	2 <sup>1</sup> / <sub>4</sub>	1	GAR-21631	3/16	.3125	1 <sup>7</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	1
GAR-21346	#26	.1470	7/8	2 <sup>1</sup> / <sub>4</sub>	1	GAR-21636	8	.3150	48	95	1
GAR-21351	#25	.1495	1 <sup>5</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>4</sub>	1	GAR-21641	O	.3160	1 <sup>7</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	1
GAR-21356	#24	.1520	1 <sup>5</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>4</sub>	1	GAR-21646	P	.3230	2 <sup>3</sup> / <sub>32</sub>	3 <sup>3</sup> / <sub>4</sub>	1
GAR-21361	#23	.1540	1 <sup>5</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>4</sub>	1	GAR-21651	2 <sup>1</sup> / <sub>64</sub>	.3281	2 <sup>3</sup> / <sub>32</sub>	4	1
GAR-21366	3/32	.1562	1 <sup>5</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>2</sub>	1	GAR-21656	Q	.3320	2 <sup>3</sup> / <sub>32</sub>	4	1
GAR-21371	#22	.1570	1 <sup>5</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>2</sub>	1	GAR-21661	8.5	.3346	53	101.6	1
GAR-21376	4	.1575	24	63.5	1	GAR-21666	R	.3390	2 <sup>3</sup> / <sub>32</sub>	4	1
GAR-21381	#21	.1590	1 <sup>5</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>2</sub>	1	GAR-21671	1 <sup>1</sup> / <sub>32</sub>	.3438	2 <sup>3</sup> / <sub>16</sub>	4	1
GAR-21386	#20	.1610	1 <sup>5</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>2</sub>	1	GAR-21676	S	.3480	2 <sup>3</sup> / <sub>16</sub>	4	1
GAR-21391	#19	.1660	1	2 <sup>1</sup> / <sub>2</sub>	1	GAR-21681	9	.3543	55.5	101.6	1
GAR-21396	#18	.1695	1	2 <sup>1</sup> / <sub>2</sub>	1	GAR-21686	T	.3580	2 <sup>3</sup> / <sub>32</sub>	4 <sup>1</sup> / <sub>4</sub>	1
GAR-21401	1 <sup>1</sup> / <sub>64</sub>	.1719	1	2 <sup>1</sup> / <sub>2</sub>	1	GAR-21691	2 <sup>3</sup> / <sub>64</sub>	.3594	2 <sup>3</sup> / <sub>32</sub>	4 <sup>1</sup> / <sub>4</sub>	1
GAR-21406	#17	.1730	1	2 <sup>1</sup> / <sub>2</sub>	1	GAR-21696	U	.3680	2 <sup>3</sup> / <sub>32</sub>	4 <sup>1</sup> / <sub>4</sub>	1
GAR-21411	#16	.1770	1	2 <sup>1</sup> / <sub>2</sub>	1	GAR-21701	9.5	.3740	58	108	1
GAR-21416	4.5	.1772	25	63.5	1	GAR-21706	3/8	.3750	2 <sup>3</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>4</sub>	1
GAR-21421	#15	.1800	1	2 <sup>3</sup> / <sub>4</sub>	1	GAR-21711	V	.3770	2 <sup>3</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>4</sub>	1
GAR-21426	#14	.1820	1	2 <sup>3</sup> / <sub>4</sub>	1	GAR-21716	W	.3860	2 <sup>3</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	1
GAR-21431	#13	.1850	1 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	1	GAR-21721	2 <sup>5</sup> / <sub>64</sub>	.3906	2 <sup>3</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	1
GAR-21436	3/16	.1875	1 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	1	GAR-21726	10	.3937	60	114	1
GAR-21441	#12	.1890	1 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	1	GAR-21731	X	.3970	2 <sup>1</sup> / <sub>2</sub>	4 <sup>1</sup> / <sub>2</sub>	1
GAR-21446	#11	.1910	1 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	1	GAR-21736	Y	.4040	2 <sup>3</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>2</sub>	1
GAR-21451	#10	.1935	1 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	1	GAR-21741	1 <sup>3</sup> / <sub>32</sub>	.4062	2 <sup>3</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>2</sub>	1
GAR-21456	#9	.1960	1 <sup>1</sup> / <sub>2</sub>	3	1	GAR-21746	Z	.4130	2 <sup>3</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	1
GAR-21461	5	.1969	33	76	1	GAR-21751	10.5	.4134	67	114	1
GAR-21466	#8	.1990	1 <sup>1</sup> / <sub>2</sub>	3	1	GAR-21756	2 <sup>1</sup> / <sub>64</sub>	.4219	2 <sup>1</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>2</sub>	1
GAR-21471	#7	.2010	1 <sup>1</sup> / <sub>2</sub>	3	1	GAR-21761	11	.4331	68	114	1
GAR-21476	1 <sup>3</sup> / <sub>64</sub>	.2031	1 <sup>1</sup> / <sub>2</sub>	3	1	GAR-21766	7/16	.4375	2 <sup>1</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>2</sub>	1
GAR-21481	#6	.2040	1 <sup>3</sup> / <sub>8</sub>	3	1	GAR-21771	11.5	.4528	71	121	1
GAR-21486	#5	.2055	1 <sup>3</sup> / <sub>8</sub>	3	1	GAR-21776	2 <sup>3</sup> / <sub>64</sub>	.4531	2 <sup>3</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>4</sub>	1
GAR-21491	#4	.2090	1 <sup>3</sup> / <sub>8</sub>	3	1	GAR-21781	1 <sup>5</sup> / <sub>32</sub>	.4688	2 <sup>3</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>4</sub>	1
GAR-21496	#3	.2130	1 <sup>3</sup> / <sub>8</sub>	3	1	GAR-21786	12	.4724	73	121	1
GAR-21501	5.5	.2165	35	76	1	GAR-21791	3 <sup>1</sup> / <sub>64</sub>	.4844	3	5 <sup>1</sup> / <sub>16</sub>	1
GAR-21506	7/32	.2188	1 <sup>3</sup> / <sub>8</sub>	3	1	GAR-21796	12.5	.4921	76	135	1
GAR-21511	#2	.2210	1 <sup>3</sup> / <sub>8</sub>	3	1	GAR-21801	1/2	.5000	3 <sup>1</sup> / <sub>16</sub>	5 <sup>3</sup> / <sub>8</sub>	1
GAR-21516	#1	.2280	1 <sup>3</sup> / <sub>8</sub>	3	1	GAR-21806	13	.5118	78	136.5	1
GAR-21521	A	.2340	1 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>4</sub>	1	GAR-21811	3 <sup>3</sup> / <sub>64</sub>	.5156	3 <sup>1</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>8</sub>	1
GAR-21526	1 <sup>5</sup> / <sub>64</sub>	.2344	1 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>4</sub>	1	GAR-21816	1 <sup>7</sup> / <sub>32</sub>	.5312	3 <sup>3</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>16</sub>	1
GAR-21531	6	.2362	38	82.5	1	GAR-21821	13.5	.5315	84	144	1
GAR-21536	B	.2380	1 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	1	GAR-21826	3 <sup>5</sup> / <sub>64</sub>	.5469	3 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>16</sub>	1
GAR-21541	C	.2420	1 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	1	GAR-21831	14	.5512	86	148	1
GAR-21546	D	.2460	1 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	1	GAR-21836	9/16	.5625	3 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>16</sub>	1
GAR-21551	1/4(E)	.2500	1 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	1	GAR-21841	14.5	.5709	89	151	1
GAR-21556	6.5	.2559	41	82.5	1	GAR-21846	3 <sup>7</sup> / <sub>64</sub>	.5781	3 <sup>1</sup> / <sub>2</sub>	6	1
GAR-21561	F	.2570	1 <sup>1</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>4</sub>	1	GAR-21851	15	.5906	90	152.4	1
GAR-21566	G	.2610	1 <sup>1</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1	GAR-21856	1 <sup>3</sup> / <sub>32</sub>	.5938	3 <sup>3</sup> / <sub>16</sub>	6	1
GAR-21571	1 <sup>7</sup> / <sub>64</sub>	.2656	1 <sup>1</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1	GAR-21861	3 <sup>5</sup> / <sub>64</sub>	.6094	3 <sup>1</sup> / <sub>16</sub>	6 <sup>3</sup> / <sub>16</sub>	1
GAR-21576	H	.2660	1 <sup>1</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1	GAR-21866	15.5	.6102	94	157	1
GAR-21581	I	.2720	1 <sup>1</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	1	GAR-21871	5/8	.6250	3 <sup>3</sup> / <sub>4</sub>	6 <sup>3</sup> / <sub>16</sub>	1
GAR-21586	7	.2756	43	89	1	GAR-21876	16	.6299	95	160	1

5xD 2 Flute  
118 Degree Cam Drill Point  
135 Degree 4-Facet Drill Point



Excellent heat resistance/lubricity, 25 degree helix, up to 40% faster than uncoated.

118 Degree		135 Degree		+ .0000/- .0005 Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.	118 Degree		135 Degree		+ .0000/- .0005 Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
Item No.	Item No.	Item No.	Item No.						Item No.	Item No.							
GAR-56166	GAR-89166	1/16	.0625	3/4	1 1/2	1	GAR-56526	GAR-89526	1 5/64	.2344	2	3 1/4	1				
GAR-56171	GAR-89171	#52	.0635	3/4	1 1/2	1	GAR-56531	GAR-89531	6	.2362	50	82	1				
GAR-56176	GAR-89176	#51	.0670	3/4	1 1/2	1	GAR-56536	GAR-89536	B	.2380	2	3 1/4	1				
GAR-56181	GAR-89181	#50	.0700	7/8	1 1/16	1	GAR-56541	GAR-89541	C	.2420	2	3 1/4	1				
GAR-56186	GAR-89186	#49	.0730	7/8	1 1/16	1	GAR-56546	GAR-89546	D	.2460	2	3 1/4	1				
GAR-56191	GAR-89191	#48	.0760	7/8	1 1/16	1	GAR-56551	GAR-89551	1/4(E)	.2500	2	3 1/4	1				
GAR-56196	GAR-89196	5/64	.0781	7/8	1 1/4	1	GAR-56556	GAR-89556	6.5	.2559	50	82	1				
GAR-56201	GAR-89201	#47	.0785	7/8	1 1/4	1	GAR-56561	GAR-89561	F	.2570	2	3 1/4	1				
GAR-56206	GAR-89206	2	.0787	22	44	1	GAR-56566	GAR-89566	G	.2610	2 1/2	3 1/2	1				
GAR-56211	GAR-89211	#46	.0810	7/8	1 1/4	1	GAR-56571	GAR-89571	1 1/64	.2656	2 1/2	3 1/2	1				
GAR-56216	GAR-89216	#45	.0820	7/8	1 1/4	1	GAR-56576	GAR-89576	H	.2660	2 1/2	3 1/2	1				
GAR-56221	GAR-89221	#44	.0860	1	2	1	GAR-56581	GAR-89581	I	.2720	2 1/2	3 1/2	1				
GAR-56226	GAR-89226	#43	.0890	1	2	1	GAR-56586	GAR-89586	7	.2756	54	88	1				
GAR-56231	GAR-89231	#42	.0935	1	2	1	GAR-56591	GAR-89591	J	.2770	2 1/2	3 1/2	1				
GAR-56236	GAR-89236	3/32	.0938	1	2	1	GAR-56596	GAR-89596	K	.2810	2 1/2	3 1/2	1				
GAR-56241	GAR-89241	#41	.0960	1	2	1	GAR-56601	GAR-89601	3/32	.2812	2 1/2	3 1/2	1				
GAR-56246	GAR-89246	#40	.0980	1	2	1	GAR-56606	GAR-89606	L	.2900	2 1/2	3 1/2	1				
GAR-56251	GAR-89251	2.5	.0984	32	57	1	GAR-56611	GAR-89611	M	.2950	2 1/2	3 1/2	1				
GAR-56256	GAR-89256	#39	.0995	1 1/4	2 1/4	1	GAR-56616	GAR-89616	7.5	.2953	60	95	1				
GAR-56261	GAR-89261	#38	.1015	1 1/4	2 1/4	1	GAR-56621	GAR-89621	1 5/64	.2969	2 1/2	3 1/2	1				
GAR-56266	GAR-89266	#37	.1040	1 1/4	2 1/4	1	GAR-56626	GAR-89626	N	.3020	2 1/2	3 1/2	1				
GAR-56271	GAR-89271	#36	.1065	1 1/4	2 1/4	1	GAR-56631	GAR-89631	5/16	.3125	2 1/2	3 1/2	1				
GAR-56276	GAR-89276	3/64	.1094	1 1/4	2 1/4	1	GAR-56636	GAR-89636	8	.3150	60	95	1				
GAR-56281	GAR-89281	#35	.1100	1 1/4	2 1/4	1	GAR-56641	GAR-89641	O	.3160	2 1/2	3 1/2	1				
GAR-56286	GAR-89286	#34	.1110	1 1/4	2 1/4	1	GAR-56646	GAR-89646	P	.3230	2 1/2	3 1/2	1				
GAR-56291	GAR-89291	#33	.1130	1 1/4	2 1/4	1	GAR-56651	GAR-89651	2 1/64	.3281	2 1/2	4	1				
GAR-56296	GAR-89296	#32	.1160	1 1/4	2 1/4	1	GAR-56656	GAR-89656	Q	.3320	2 1/2	4	1				
GAR-56301	GAR-89301	3	.1181	32	57	1	GAR-56661	GAR-89661	8.5	.3346	63	101	1				
GAR-56306	GAR-89306	#31	.1200	1 1/4	2 1/4	1	GAR-56666	GAR-89666	R	.3390	2 1/2	4	1				
GAR-56311	GAR-89311	1/8	.1250	1 1/4	2 1/4	1	GAR-56671	GAR-89671	1 1/2	.3438	2 1/2	4	1				
GAR-56316	GAR-89316	#30	.1285	1 1/4	2 1/4	1	GAR-56676	GAR-89676	S	.3480	2 1/2	4	1				
GAR-56321	GAR-89321	#29	.1360	1 1/2	2 1/2	1	GAR-56681	GAR-89681	9	.3543	63	101	1				
GAR-56326	GAR-89326	3.5	.1378	35	63	1	GAR-56686	GAR-89686	T	.3580	2 1/2	4 1/2	1				
GAR-56331	GAR-89331	#28	.1405	1 1/2	2 1/2	1	GAR-56691	GAR-89691	2 3/64	.3594	2 1/2	4 1/2	1				
GAR-56336	GAR-89336	3/64	.1406	1 1/2	2 1/2	1	GAR-56696	GAR-89696	U	.3680	2 1/2	4 1/2	1				
GAR-56341	GAR-89341	#27	.1440	1 1/2	2 1/2	1	GAR-56701	GAR-89701	9.5	.3740	70	107	1				
GAR-56346	GAR-89346	#26	.1470	1 1/2	2 1/2	1	GAR-56706	GAR-89706	3/8	.3750	2 1/2	4 1/2	1				
GAR-56351	GAR-89351	#25	.1495	1 1/2	2 1/2	1	GAR-56711	GAR-89711	V	.3770	2 1/2	4 1/2	1				
GAR-56356	GAR-89356	#24	.1520	1 1/2	2 1/2	1	GAR-56716	GAR-89716	W	.3860	2 1/2	4 1/2	1				
GAR-56361	GAR-89361	#23	.1540	1 1/2	2 1/2	1	GAR-56721	GAR-89721	2 5/64	.3906	2 1/2	4 1/2	1				
GAR-56366	GAR-89366	5/32	.1562	1 1/2	2 1/2	1	GAR-56726	GAR-89726	10	.3937	73	114	1				
GAR-56371	GAR-89371	#22	.1570	1 1/2	2 1/2	1	GAR-56731	GAR-89731	X	.3970	2 1/2	4 1/2	1				
GAR-56376	GAR-89376	4	.1575	35	63	1	GAR-56736	GAR-89736	Y	.4040	2 1/2	4 1/2	1				
GAR-56381	GAR-89381	#21	.1590	1 1/2	2 1/2	1	GAR-56741	GAR-89741	1 1/32	.4062	2 1/2	4 1/2	1				
GAR-56386	GAR-89386	#20	.1610	1 1/2	2 1/2	1	GAR-56746	GAR-89746	Z	.4130	2 1/2	4 1/2	1				
GAR-56391	GAR-89391	#19	.1660	1 1/2	2 1/2	1	GAR-56751	GAR-89751	10.5	.4134	73	114	1				
GAR-56396	GAR-89396	#18	.1695	1 1/2	2 1/2	1	GAR-56756	GAR-89756	2 1/64	.4219	2 1/2	4 1/2	1				
GAR-56401	GAR-89401	1 1/64	.1719	1 1/2	2 1/2	1	GAR-56761	GAR-89761	11	.4331	73	114	1				
GAR-56406	GAR-89406	#17	.1730	1 1/2	2 1/2	1	GAR-56766	GAR-89766	7/16	.4375	2 1/2	4 1/2	1				
GAR-56411	GAR-89411	#16	.1770	1 1/2	2 1/2	1	GAR-56771	GAR-89771	11.5	.4528	76	120	1				
GAR-56416	GAR-89416	4.5	.1772	41	70	1	GAR-56776	GAR-89776	2 3/64	.4531	3	4 1/2	1				
GAR-56421	GAR-89421	#15	.1800	1 1/2	2 1/2	1	GAR-56781	GAR-89781	1 1/32	.4688	3	4 1/2	1				
GAR-56426	GAR-89426	#14	.1820	1 1/2	2 1/2	1	GAR-56786	GAR-89786	12	.4724	76	120	1				
GAR-56431	GAR-89431	#13	.1850	1 1/2	2 1/2	1	GAR-56791	GAR-89791	3 1/64	.4844	3	4 1/2	1				
GAR-56436	GAR-89436	3/16	.1875	1 1/2	2 1/2	1	GAR-56796	GAR-89796	12.5	.4921	76	120	1				
GAR-56441	GAR-89441	#12	.1890	1 1/2	2 1/2	1	GAR-56801	GAR-89801	1 1/2	.5000	3	4 1/2	1				
GAR-56446	GAR-89446	#11	.1910	1 1/2	2 1/2	1	---	GAR-89806	13	.5118	83	127	1				
GAR-56451	GAR-89451	#10	.1935	1 1/2	2 1/2	1	---	GAR-89811	3 3/64	.5156	3 1/4	5	1				
GAR-56456	GAR-89456	#9	.1960	1 1/2	3	1	---	GAR-89816	1 1/32	.5312	3 1/4	5	1				
GAR-56461	GAR-89461	5	.1969	44	76	1	---	GAR-89821	13.5	.5315	83	127	1				
GAR-56466	GAR-89466	#8	.1990	1 1/4	3	1	---	GAR-89826	3 5/64	.5469	3 1/4	5	1				
GAR-56471	GAR-89471	#7	.2010	1 1/4	3	1	---	GAR-89831	14	.5512	83	127	1				
GAR-56476	GAR-89476	1 3/64	.2031	1 1/4	3	1	---	GAR-89836	9/16	.5625	3 1/4	5	1				
GAR-56481	GAR-89481	#6	.2040	1 1/4	3	1	---	GAR-89841	14.5	.5709	83	127	1				
GAR-56486	GAR-89486	#5	.2055	1 1/4	3	1	---	GAR-89846	3 7/64	.5781	3 1/2	5 1/4	1				
GAR-56491	GAR-89491	#4	.2090	1 1/4	3	1	---	GAR-89851	15	.5906	89	133	1				
GAR-56496	GAR-89496	#3	.2130	1 1/4	3	1	---	GAR-89856	1 1/32	.5938	3 1/2	5 1/4	1				
GAR-56501	GAR-89501	5.5	.2165	44	76	1	---	GAR-89861	3 3/64	.6094	3 1/2	5 1/4	1				
GAR-56506	GAR-89506	7/32	.2188	1 1/4	3	1	---	GAR-89866	15.5	.6102	89	133	1				
GAR-56511	GAR-89511	#2	.2210	1 1/4	3	1	---	GAR-89871	5/8	.6250	3 1/2	5 1/4	1				
GAR-56516	GAR-89516	#1	.2280	1 1/4	3	1	---	GAR-89876	16	.6299	89	133	1				
GAR-56521	GAR-89521	A	.2340	2	3 1/4	1											



High performance, high penetration. Coolant through capabilities for high pressure coolant systems. Minimum 500 psi of coolant recommended for proper usage. Up to 70% faster than standard carbide drills. 30° helix for better chip evacuation. Honed cutting edge.

Balinit® HELICA Coated  
7xD 2 Flute

## 140 Degree High Performance Drill Point

GARR TOOL®



Item No.	+ .0000/- .0005 Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
GAR-26571	7/32	.2188	2	4	1
GAR-26576	#2	.2210	4	1	1
GAR-26581	#1	.2280	2 1/2	4 1/2	1
GAR-26586	A	.2340	2 1/2	4 1/2	1
GAR-26591	1 5/64	.2344	2 1/2	4 1/2	1
GAR-26596	6	.2362	55	105	1
GAR-26601	B	.2380	2 1/2	4 1/2	1
GAR-26606	C	.2420	2 1/2	4 1/2	1
GAR-26611	D	.2460	2 1/2	4 1/2	1
GAR-26616	1 1/4(E)	.2500	2 1/2	4 1/2	1
GAR-26621	6.5	.2559	58	108	1
GAR-26626	F	.2570	2 3/4	4 3/4	1
GAR-26631	G	.2610	2 3/4	4 3/4	1
GAR-26636	1 7/64	.2656	2 3/4	4 3/4	1
GAR-26641	H	.2660	2 3/4	4 3/4	1
GAR-26646	I	.2720	2 3/4	4 3/4	1
GAR-26651	J	.2756	61	111	1
GAR-26656	J	.2770	2 3/4	4 3/4	1
GAR-26661	K	.2810	2 7/16	4 7/16	1
GAR-26666	9/32	.2812	2 7/16	4 7/16	1
GAR-26671	L	.2900	2 7/16	4 7/16	1
GAR-26676	M	.2950	2 7/16	4 7/16	1
GAR-26681	7.5	.2953	66	116	1
GAR-26686	1 9/64	.2969	2 3/4	4 3/4	1
GAR-26691	N	.3020	2 3/4	4 3/4	1
GAR-26696	5/16	.3125	2 3/4	4 3/4	1
GAR-26701	8	.3150	69	119	1
GAR-26706	O	.3160	2 11/16	4 11/16	1
GAR-26711	P	.3230	2 11/16	4 11/16	1
GAR-26716	2 1/64	.3281	2 11/16	4 11/16	1
GAR-26721	Q	.3320	2 11/16	4 11/16	1
GAR-26726	8.5	.3346	75	125	1
GAR-26731	R	.3390	2 11/16	4 11/16	1
GAR-26736	1 1/32	.3438	2 11/16	4 11/16	1
GAR-26741	S	.3480	3	5	1
GAR-26746	9	.3543	77	127	1
GAR-26751	T	.3580	3	5	1
GAR-26756	2 3/64	.3594	3	5	1
GAR-26761	U	.3680	3	5	1
GAR-26766	9.5	.3740	80	130	1
GAR-26771	3/8	.3750	3 1/2	5 1/2	1
GAR-26776	V	.3770	3 1/2	5 1/2	1
GAR-26781	W	.3860	3 1/2	5 1/2	1
GAR-26786	2 5/64	.3906	3 1/2	5 1/2	1
GAR-26791	10	.3937	83	133	1
GAR-26796	X	.3970	3 1/4	5 1/4	1
GAR-26801	Y	.4040	3 3/4	5 3/4	1
GAR-26806	1 3/32	.4062	3 3/4	5 3/4	1
GAR-26811	Z	.4130	3 3/4	5 3/4	1
GAR-26816	10.5	.4134	86	137	1
GAR-26821	2 7/64	.4219	3 7/16	5 7/16	1
GAR-26826	11	.4331	88	138	1
GAR-26831	7/16	.4375	3 7/16	5 7/16	1
GAR-26836	11.5	.4528	91	141	1
GAR-26841	2 9/64	.4531	3 13/16	5 9/16	1
GAR-26846	1 5/32	.4688	3 13/16	5 9/16	1
GAR-26851	12	.4724	98	141	1
GAR-26856	3 1/64	.4844	3 13/16	5 9/16	1
GAR-26861	12.5	.4921	102	152	1
GAR-26866	1/2	.5000	4	6	1
GAR-26871	13	.5118	102	152	1
GAR-26876	3 3/64	.5156	4	6	1
GAR-26881	1 7/32	.5312	4 1/2	6 1/2	1
GAR-26886	13.5	.5315	105	156	1
GAR-26891	3 5/64	.5469	4 1/2	6 1/2	1
GAR-26896	14	.5512	105	156	1
GAR-26901	9/16	.5625	4 3/4	6 3/4	1
GAR-26906	14.5	.5709	109	159	1
GAR-26911	3 7/64	.5781	4 3/4	6 3/4	1
GAR-26916	15	.5906	112	162	1
GAR-26921	1 9/32	.5938	4 3/4	6 3/4	1
GAR-26926	3 9/64	.6094	4 7/16	6 7/16	1
GAR-26931	15.5	.6102	113	164	1
GAR-26936	3/8	.6250	4 3/4	6 3/4	1
GAR-26941	16	.6299	117	167	1

Balinit® HELICA Coated  
5xD 2 Flute

## 140 Degree High Performance Drill Point

GARR TOOL®



Item No.	+ .0000/- .0005 Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
GAR-25571	7/32	.2188	1 1/2	3	1
GAR-25576	#2	.2210	1 1/2	3	1
GAR-25581	#1	.2280	1 1/2	3	1
GAR-25586	A	.2340	1 1/2	3 1/4	1
GAR-25591	1 5/64	.2344	1 1/2	3 1/4	1
GAR-25596	6	.2362	38	82.5	1
GAR-25601	B	.2380	1 1/2	3 1/4	1
GAR-25606	C	.2420	1 1/2	3 1/4	1
GAR-25611	D	.2460	1 1/2	3 1/4	1
GAR-25616	1 1/4(E)	.2500	1 1/2	3 1/4	1
GAR-25621	6.5	.2559	41	82.5	1
GAR-25626	F	.2570	1 11/16	3 1/4	1
GAR-25631	G	.2610	1 11/16	3 1/2	1
GAR-25636	1 7/64	.2656	1 11/16	3 1/2	1
GAR-25641	H	.2660	1 11/16	3 1/2	1
GAR-25646	I	.2720	1 11/16	3 1/2	1
GAR-25651	J	.2756	43	89	1
GAR-25656	J	.2770	1 11/16	3 1/2	1
GAR-25661	K	.2810	1 1/4	3 1/2	1
GAR-25666	9/32	.2812	1 1/4	3 1/2	1
GAR-25671	L	.2900	1 1/4	3 1/2	1
GAR-25676	M	.2950	1 1/4	3 1/2	1
GAR-25681	7.5	.2953	44	95	1
GAR-25686	1 9/64	.2969	1 1/4	3 1/2	1
GAR-25691	N	.3020	1 1/4	3 1/2	1
GAR-25696	5/16	.3125	1 1/4	3 1/2	1
GAR-25701	8	.3150	48	95	1
GAR-25706	O	.3160	1 1/4	3 1/2	1
GAR-25711	P	.3230	2 3/32	3 3/4	1
GAR-25716	2 1/64	.3281	2 3/32	4	1
GAR-25721	Q	.3320	2 3/32	4	1
GAR-25726	8.5	.3346	53	101.6	1
GAR-25731	R	.3390	2 3/32	4	1
GAR-25736	1 1/32	.3438	2 3/16	4	1
GAR-25741	S	.3480	2 3/16	4	1
GAR-25746	9	.3543	55.5	101.6	1
GAR-25751	T	.3580	2 3/32	4 1/4	1
GAR-25756	2 3/64	.3594	2 3/32	4 1/4	1
GAR-25761	U	.3680	2 3/32	4 1/4	1
GAR-25766	9.5	.3740	58	108	1
GAR-25771	3/8	.3750	2 3/8	4 1/4	1
GAR-25776	V	.3770	2 3/8	4 1/4	1
GAR-25781	W	.3860	2 3/8	4 1/2	1
GAR-25786	2 5/64	.3906	2 3/8	4 1/2	1
GAR-25791	10	.3937	60	114	1
GAR-25796	X	.3970	2 1/2	4 1/2	1
GAR-25801	Y	.4040	2 1/2	4 1/2	1
GAR-25806	1 3/32	.4062	2 1/2	4 1/2	1
GAR-25811	Z	.4130	2 1/2	4 1/2	1
GAR-25816	10.5	.4134	67	114	1
GAR-25821	2 7/64	.4219	2 11/16	4 1/2	1
GAR-25826	11	.4331	68	114	1
GAR-25831	7/16	.4375	2 11/16	4 3/4	1
GAR-25836	11.5	.4528	71	121	1
GAR-25841	2 9/64	.4531	2 7/8	4 3/4	1
GAR-25846	1 5/32	.4688	2 7/8	4 3/4	1
GAR-25851	12	.4724	73	121	1
GAR-25856	3 1/64	.4844	3	5 9/16	1
GAR-25861	12.5	.4921	76	135	1
GAR-25866	1/2	.5000	3 1/8	5 1/2	1
GAR-25871	13	.5118	78	136.5	1
GAR-25876	3 3/64	.5156	3 1/8	5 1/2	1
GAR-25881	1 7/32	.5312	3 1/8	5 11/16	1
GAR-25886	13.5	.5315	84	144	1
GAR-25891	3 5/64	.5469	3 3/8	5 13/16	1
GAR-25896	14	.5512	86	148	1
GAR-25901	9/16	.5625	3 1/2	5 13/16	1
GAR-25906	14.5	.5709	89	151	1
GAR-25911	3 7/64	.5781	3 1/2	6	1
GAR-25916	15	.5906	90	152.4	1
GAR-25921	1 9/32	.5938	3 1/2	6	1
GAR-25926	3 9/64	.6094	3 11/16	6 1/2	1
GAR-25931	15.5	.6102	94	157	1
GAR-25936	3/8	.6250	3 3/4	6 1/2	1
GAR-25941	16	.6299	95	160	1

Solid Submicron Grain Carbide Drill  
2 Flute  
118 Degree Drill PointGeneral purpose 25 degree helix rhs/rhc.  
Diameter tolerance is +.000/- .0005.

GARR TOOL®

Item No.	+ .0000/- .0005 Dia.	Dec. Equiv.	Lgth. of Cut	OAL	Pack Qty.
GAR-56165	1/16	.0625	3/4	1 1/2	1
GAR-56235	9/32	.0938	1	2	1
GAR-56275	7/64	.1094	1 1/4	2 1/4	1
GAR-56310	3/8	.1250	1 1/4	2 1/4	1
GAR-56335	9/64	.1406	1 1/2	2 1/2	1
GAR-56365	5/32	.1562	1 1/2	2 1/2	1
GAR-56400	1 1/64	.1719	1 1/2	2 1/4	1
GAR-56435	3/16	.1875	1 1/2	2 3/4	1
GAR-56475	1 3/64	.2031	1 3/4	3	1
GAR-56505	7/32	.2188	1 3/4	3	1
GAR-56525	1 5/64	.2344	2	3 1/4	1
GAR-56550	3/4	.2500	2	3 3/4	1
GAR-56600	9/32	.2812	2 1/2	3 1/2	1
GAR-56620	1 9/64	.2969	2 3/4	3 3/4	1

Item No.	+ .0000/- .0005 Dia.	Dec. Equiv.	Lgth. of Cut	OAL	Pack Qty.
GAR-56630	5/16	.3125	2 3/4	3 3/4	1
GAR-56650	2 1/64	.3281	2 1/2	4	1
GAR-56670	1 1/32	.3438	2 1/2	4	1
GAR-56690	2 3/64	.3594	2 3/4	4 1/2	1
GAR-56705	3/8	.3750	2 3/4	4 1/2	1
GAR-56720	2 5/64	.3906	2 3/4	4 1/2	1
GAR-56740	1 9/32	.4062	2 3/4	4 1/2	1
GAR-56755	2 7/64	.4219	2 3/4	4 1/2	1
GAR-56765	7/16	.4375	2 3/4	4 1/2	1
GAR-56775	1 5/64	.4531	3	4 3/4	1
GAR-56780	1 9/32	.5688	3	4 3/4	1
GAR-56790	3 1/64	.4844	3	4 3/4	1
GAR-56800	1/2	.5000	3	4 3/4	1



**Solid Submicron Grain Carbide Drill  
 3 Flute  
 150 Degree Self-Centering Point**

**GARR TOOL®**



Increased feed rates and tighter tolerance holes. Improved roundness and straightness. Diameter tolerance is .000/-0.005.

Item No.	+0.000/-0.005 Dia.	Dec. Equiv.	Lgth. of Cut	OAL	Pack Qty.
GAR-90310	1/8	.125	1 1/4	2 1/4	1
GAR-90705	3/8	.375	2 3/4	4 1/4	1
GAR-90800	1/2	.500	3	4 3/4	1

**Solid Submicron Grain Carbide Drill  
 Combination Drill and Countersink  
 118 Degree Drill Point**

**GARR TOOL®**



For center drilling applications 60 degree included countersink angle. Drill diameter tolerance is +.003/-0.000.

Item No.	+0.003/-0.000 Dia.	Size	Shank Dia.	OAL	Pack Qty.
GAR-58030	3/64	1	1/8	1 1/2	1
GAR-58040	5/64	2	3/16	2	1
GAR-58050	7/64	3	1/4	2	1
GAR-58060	9/64	4	5/16	2 1/8	1
GAR-58070	11/64	5	3/16	2 3/4	1
GAR-58080	13/64	6	1/2	3	1

Designed for use in all types of machine tools. Ground with a 45 degree chamfer. Made in the U.S.A. Diameter tolerance: through 1/2" = +.0002/-0.0000, above 1/2" through 5/8" = +.0003/-0.0000, dowel pin = +.0000/-0.0002.

**Chucking Reamer Set  
 High Speed Steel - Straight Shank - Straight Flute**



Item No.	Description	Pack Qty.
MRS-1	14 pc. Over and Under Size Set (.1240 - .5010)	1

**Chucking Reamers  
 High Speed Steel - Straight Shank - Straight Flute  
 Over and Under Sizes**



Item No.	Dia.	Flute Lgth.	OAL	Pack Qty.
MR-1	.1240	7/8	3 1/2	1
MR-2	.1260	7/8	3 1/2	1
MR-3	.1865	1 1/8	4 1/2	1
MR-4	.1885	1 1/8	4 1/2	1
MR-5	.2490	1 1/2	6	1
MR-6	.2510	1 1/2	6	1
MR-7	.3115	1 1/2	6	1
MR-8	.3135	1 1/2	6	1
MR-9	.3740	1 3/4	7	1
MR-10	.3760	1 3/4	7	1
MR-11	.4365	1 3/4	7	1
MR-13	.4990	2	8	1
MR-14	.5010	2	8	1

**Chucking Reamers  
 High Speed Steel - Straight Shank - Straight Flute  
 Dowel Pin Sizes**



Item No.	Dia.	Flute Lgth.	OAL	Pack Qty.
MR-16	.1247	7/8	3 1/2	1
MR-17	.1855	1 1/8	4 1/2	1
MR-18	.1870	1 1/8	4 1/2	1
MR-19	.2480	1 1/2	6	1
MR-20	.2495	1 1/2	6	1
MR-24	.3745	1 3/4	7	1
MR-28	.4995	2	8	1

**Solid Submicron Grain Carbide Drill  
 Spade Drill  
 118 Degree Drill Point**

**GARR TOOL®**



For shallow hole drilling and burnishing to a depth of 1 to 1 1/2 times the diameter. Diameter tolerance is +.0000/-0.0005.

Item No.	+0.0000/-0.0005 Dia	Web Thickness	OAL	Pack Qty.
GAR-57050	3/32	.015	1 1/2	1
GAR-57070	1/8	.015	1 1/2	1
GAR-57080	9/32	.020	1 1/2	1
GAR-57090	3/16	.020	2	1
GAR-57110	1/4	.025	2	1

**Solid Submicron Grain Carbide Drill  
 Straight Flute  
 135 Degree Notched Drill Point**

**GARR TOOL®**



For precision drilling of tight tolerance holes, and materials 40 Rockwell or higher. Diameter tolerance is +.000/-0.0005.

Item No.	+0.000/-0.0005 Dia.	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
GAR-59310	1/8	.1250	5/8	2	1
GAR-59365	5/32	.1562	3/4	2 1/2	1
GAR-59435	3/16	.1875	3/4	2 1/2	1
GAR-59550	1/4	.2500	1	2 1/2	1
GAR-59630	5/16	.3125	1 1/4	2 1/2	1
GAR-59705	3/8	.3750	1 1/4	3	1
GAR-59800	1/2	.5000	1 1/4	3	1

**Chucking Reamers  
 High Speed Steel - Straight Shank - Straight Flute  
 Metric Sizes**



Item No.	Dia.	Flute Lgth.	OAL	Pack Qty.
MCR-1	6	1 1/2	6	1
MCR-2	7	1 1/2	6	1
MCR-3	8	1 1/2	6	1
MCR-4	9	1 3/4	7	1
MCR-5	10	1 3/4	7	1
MCR-7	12	2	8	1
MCR-8	13	2	8	1
MCR-9	14	2	8	1
MCR-10	15	2	8	1
MCR-11	16	2 1/4	9	1
MCR-13	18	2 1/4	9	1

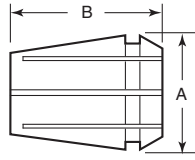
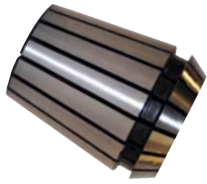
**Chucking Reamers  
 High Speed Steel - Straight Shank - Straight Flute  
 Individual Reamers**



Item No.	Size	Dec. Equiv.	Flute Lgth.	OAL	Pack Qty.
MR-256	#31	.1200	7/8	3 1/2	1
MR-259	1/8	.1250	7/8	3 1/2	1
MR-265	#29	.1360	1	4	1
MR-298	#20	.1610	1 1/8	4 1/2	1
MR-325	5/16	.1875	1 1/8	4 1/2	1
MR-346	15/64	.2031	1 1/4	5	1
MR-352	#5	.2055	1 1/4	5	1
MR-367	#1	.2280	1 1/2	6	1
MR-373	15/64	.2344	1 1/2	6	1
MR-385	1/4 (E)	.2500	1 1/2	6	1
MR-388	F	.2570	1 1/2	6	1
MR-391	G	.2610	1 1/2	6	1
MR-412	L	.2900	1 1/2	6	1
MR-427	O	.3160	1 1/2	6	1
MR-430	P	.3230	1 1/2	6	1
MR-457	3/8	.3750	1 3/4	7	1
MR-460	V	.3770	1 3/4	7	1
MR-469	X	.3970	1 3/4	7	1
MR-475	19/32	.4062	1 3/4	7	1
MR-484	1/16	.4375	1 3/4	7	1
MR-496	1/2	.5000	2	8	1



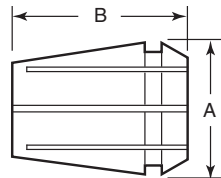
**Ultra Precision ER**



A wide clamping range offers fewer tool changes based on collet ID ranges and a low cost per set that covers a wide array of sizes. Can be used on drilling, milling, tapping, and reaming applications and are interchangeable with all brands of ER and ESX type collets. These long life collets are made of high grade spring steel, hardened and precision ground.

Item No.	Briney	Collet Series	O.D. A	Lgth. B	I.D.	I.D. Range	Pack Qty.	Item No.	Briney	Collet Series	O.D. A	Lgth. B	I.D.	I.D. Range	Pack Qty.
BRIN-5	BR11-1/16	ER11	.453	.709	1/16	.062 - .043	1	BRIN-265	BR25-5/8	ER25	1.024	1.378	5/8	.625 - .586	1
BRIN-10	BR11-3/32	ER11	.453	.709	3/32	.093 - .054	1	BRIN-270	BR32-3/32	ER32	1.299	1.575	7/32	.093 - .054	1
BRIN-15	BR11-1/8	ER11	.453	.709	1/8	.125 - .086	1	BRIN-275	BR32-1/8	ER32	1.299	1.575	1/8	.125 - .086	1
BRIN-20	BR11-5/32	ER11	.453	.709	5/32	.156 - .117	1	BRIN-280	BR32-5/32	ER32	1.299	1.575	5/32	.156 - .117	1
BRIN-25	BR11-3/16	ER11	.453	.709	3/16	.187 - .148	1	BRIN-285	BR32-3/16	ER32	1.299	1.575	3/16	.187 - .148	1
BRIN-30	BR11-7/32	ER11	.453	.709	7/32	.218 - .179	1	BRIN-290	BR32-7/32	ER32	1.299	1.575	7/32	.218 - .179	1
BRIN-35	BR11-1/4	ER11	.453	.709	1/4	.250 - .211	1	BRIN-295	BR32-1/4	ER32	1.299	1.575	1/4	.250 - .211	1
BRIN-40	BR16-1/16	ER16	.669	1.063	1/16	.062 - .043	1	BRIN-300	BR32-9/32	ER32	1.299	1.575	9/32	.281 - .242	1
BRIN-45	BR16-3/32	ER16	.669	1.063	3/32	.093 - .054	1	BRIN-305	BR32-5/16	ER32	1.299	1.575	5/16	.312 - .273	1
BRIN-50	BR16-1/8	ER16	.669	1.063	1/8	.125 - .086	1	BRIN-310	BR32-11/32	ER32	1.299	1.575	11/32	.343 - .304	1
BRIN-55	BR16-5/32	ER16	.669	1.063	5/32	.156 - .117	1	BRIN-315	BR32-3/8	ER32	1.299	1.575	3/8	.375 - .336	1
BRIN-60	BR16-3/16	ER16	.669	1.063	3/16	.187 - .148	1	BRIN-320	BR32-13/32	ER32	1.299	1.575	13/32	.406 - .367	1
BRIN-65	BR16-7/32	ER16	.669	1.063	7/32	.218 - .179	1	BRIN-325	BR32-7/16	ER32	1.299	1.575	7/16	.437 - .398	1
BRIN-70	BR16-1/4	ER16	.669	1.063	1/4	.250 - .211	1	BRIN-330	BR32-15/32	ER32	1.299	1.575	15/32	.468 - .429	1
BRIN-75	BR16-9/32	ER16	.669	1.063	9/32	.281 - .242	1	BRIN-335	BR32-1/2	ER32	1.299	1.575	1/2	.500 - .461	1
BRIN-80	BR16-5/16	ER16	.669	1.063	5/16	.312 - .273	1	BRIN-340	BR32-17/32	ER32	1.299	1.575	17/32	.531 - .492	1
BRIN-85	BR16-11/32	ER16	.669	1.063	11/32	.343 - .304	1	BRIN-345	BR32-9/16	ER32	1.299	1.575	9/16	.562 - .523	1
BRIN-90	BR16-3/8	ER16	.669	1.063	3/8	.375 - .336	1	BRIN-350	BR32-19/32	ER32	1.299	1.575	19/32	.593 - .554	1
BRIN-95	BR16-13/32	ER16	.669	1.063	13/32	.406 - .367	1	BRIN-355	BR32-5/8	ER32	1.299	1.575	5/8	.625 - .586	1
BRIN-100	BR20-1/16	ER20	.827	1.220	1/16	.062 - .043	1	BRIN-360	BR32-21/32	ER32	1.299	1.575	21/32	.656 - .617	1
BRIN-105	BR20-3/32	ER20	.827	1.220	3/32	.093 - .054	1	BRIN-365	BR32-11/16	ER32	1.299	1.575	11/16	.687 - .648	1
BRIN-110	BR20-1/8	ER20	.827	1.220	1/8	.125 - .086	1	BRIN-370	BR32-23/32	ER32	1.299	1.575	23/32	.718 - .679	1
BRIN-115	BR20-5/32	ER20	.827	1.220	5/32	.156 - .117	1	BRIN-375	BR32-3/4	ER32	1.299	1.575	3/4	.750 - .711	1
BRIN-120	BR20-3/16	ER20	.827	1.220	3/16	.187 - .148	1	BRIN-380	BR40-1/8	ER40	1.614	1.811	1/8	.125 - .086	1
BRIN-125	BR20-7/32	ER20	.827	1.220	7/32	.218 - .179	1	BRIN-385	BR40-5/32	ER40	1.614	1.811	5/32	.156 - .117	1
BRIN-130	BR20-1/4	ER20	.827	1.220	1/4	.250 - .211	1	BRIN-390	BR40-3/16	ER40	1.614	1.811	3/16	.187 - .148	1
BRIN-135	BR20-9/32	ER20	.827	1.220	9/32	.281 - .242	1	BRIN-395	BR40-7/32	ER40	1.614	1.811	7/32	.218 - .179	1
BRIN-140	BR20-5/16	ER20	.827	1.220	5/16	.312 - .273	1	BRIN-400	BR40-1/4	ER40	1.614	1.811	1/4	.250 - .211	1
BRIN-145	BR20-11/32	ER20	.827	1.220	11/32	.343 - .304	1	BRIN-405	BR40-9/32	ER40	1.614	1.811	9/32	.281 - .242	1
BRIN-150	BR20-3/8	ER20	.827	1.220	3/8	.375 - .336	1	BRIN-410	BR40-5/16	ER40	1.614	1.811	5/16	.312 - .273	1
BRIN-155	BR20-13/32	ER20	.827	1.220	13/32	.406 - .367	1	BRIN-415	BR40-11/32	ER40	1.614	1.811	11/32	.343 - .304	1
BRIN-160	BR20-7/16	ER20	.827	1.220	7/16	.437 - .398	1	BRIN-420	BR40-3/8	ER40	1.614	1.811	3/8	.375 - .336	1
BRIN-165	BR20-15/32	ER20	.827	1.220	15/32	.468 - .429	1	BRIN-425	BR40-13/32	ER40	1.614	1.811	13/32	.406 - .367	1
BRIN-170	BR20-1/2	ER20	.827	1.220	1/2	.500 - .461	1	BRIN-430	BR40-7/16	ER40	1.614	1.811	7/16	.437 - .398	1
BRIN-175	BR25-1/16	ER25	1.024	1.378	1/16	.062 - .043	1	BRIN-435	BR40-15/32	ER40	1.614	1.811	15/32	.468 - .429	1
BRIN-180	BR25-3/32	ER25	1.024	1.378	3/32	.093 - .054	1	BRIN-440	BR40-1/2	ER40	1.614	1.811	1/2	.500 - .461	1
BRIN-185	BR25-1/8	ER25	1.024	1.378	1/8	.125 - .086	1	BRIN-445	BR40-17/32	ER40	1.614	1.811	17/32	.531 - .492	1
BRIN-190	BR25-5/32	ER25	1.024	1.378	5/32	.156 - .117	1	BRIN-450	BR40-9/16	ER40	1.614	1.811	9/16	.562 - .523	1
BRIN-195	BR25-3/16	ER25	1.024	1.378	3/16	.187 - .148	1	BRIN-455	BR40-19/32	ER40	1.614	1.811	19/32	.593 - .554	1
BRIN-200	BR25-7/32	ER25	1.024	1.378	7/32	.218 - .179	1	BRIN-460	BR40-5/8	ER40	1.614	1.811	5/8	.625 - .586	1
BRIN-205	BR25-1/4	ER25	1.024	1.378	1/4	.250 - .211	1	BRIN-465	BR40-21/32	ER40	1.614	1.811	21/32	.656 - .617	1
BRIN-210	BR25-9/32	ER25	1.024	1.378	9/32	.281 - .242	1	BRIN-470	BR40-11/16	ER40	1.614	1.811	11/16	.687 - .648	1
BRIN-215	BR25-5/16	ER25	1.024	1.378	5/16	.312 - .273	1	BRIN-475	BR40-23/32	ER40	1.614	1.811	23/32	.718 - .679	1
BRIN-220	BR25-11/32	ER25	1.024	1.378	11/32	.343 - .304	1	BRIN-480	BR40-3/4	ER40	1.614	1.811	3/4	.750 - .711	1
BRIN-225	BR25-3/8	ER25	1.024	1.378	3/8	.375 - .336	1	BRIN-485	BR40-25/32	ER40	1.614	1.811	25/32	.748 - .787	1
BRIN-230	BR25-13/32	ER25	1.024	1.378	13/32	.406 - .367	1	BRIN-490	BR40-13/16	ER40	1.614	1.811	13/16	.787 - .826	1
BRIN-235	BR25-7/16	ER25	1.024	1.378	7/16	.437 - .398	1	BRIN-495	BR40-27/32	ER40	1.614	1.811	27/32	.826 - .866	1
BRIN-240	BR25-15/32	ER25	1.024	1.378	15/32	.468 - .429	1	BRIN-500	BR40-7/8	ER40	1.614	1.811	7/8	.866 - .905	1
BRIN-245	BR25-1/2	ER25	1.024	1.378	1/2	.500 - .461	1	BRIN-505	BR40-29/32	ER40	1.614	1.811	29/32	.906 - .945	1
BRIN-250	BR25-17/32	ER25	1.024	1.378	17/32	.531 - .492	1	BRIN-510	BR40-15/16	ER40	1.614	1.811	15/16	.905 - .944	1
BRIN-255	BR25-9/16	ER25	1.024	1.378	9/16	.562 - .523	1	BRIN-515	BR40-31/32	ER40	1.614	1.811	31/32	.944 - .984	1
BRIN-260	BR25-19/32	ER25	1.024	1.378	19/32	.593 - .554	1	BRIN-520	BR40-1	ER40	1.614	1.811	1	.984 - 1.02	1

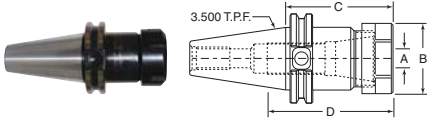
**Ultra Precision ER Collet Sets**



Item No.	Briney	Collect Series	O.D. A	Lgth. B	I.D. Range	Pieces Per Set	Range of Collet Set	Pack Qty.
BRIN-525	BR11-00	ER11	.453	.709	.044 - .250	7	1/16 - 1/4 x 1/32	1
BRIN-530	BR16-00	ER16	.669	1.063	.044 - .402	12	1/16 - 19/32 x 1/32	1
BRIN-535	BR20-00	ER20	.827	1.220	.044 - .500	15	1/16 - 1/2 x 1/32	1
BRIN-540	BR25-00	ER25	1.024	1.378	.044 - .625	19	1/16 - 5/8 x 1/32	1
BRIN-545	BR32-00	ER32	1.299	1.575	.075 - .750	22	3/32 - 3/4 x 1/32	1
BRIN-550	BR40-00	ER40	1.614	1.811	.125 - 1.00	29	1/8 - 1 x 1/32	1



Collet Chucks  
Ultra Precision CAT 40 V-Flange



Ground taper shanks that are guaranteed to meet AT3 specifications. Made from premium 8620 alloy and carbon hardened to Rc 58-62 with .06" case depth per side. All feature ends which are ground while tool is in simulated machine spindle fixture. This process yields .0002" TIR from taper shank to collet chuck ID bore end. Ground v-grooves and head diameters help prevent tools from sticking in automatic tool changers. Ground collet threads ensure best fit of collet nut.

Item No.	Briney	Collet Series	Collet Range A	Body Dia. B	Gauge Lgth. C	Cavity Depth D	Collet Nut	Stop Screw	Stop Screw Max. Range	Collet Nut Wrench	Pack Qty.
BRIN-555	V40BR-11-300	ER11	.019 - .276	.63	3.00	4	BRIN-815	BRIN-845	0 - 2.20	BRIN-765	1
BRIN-560	V40BR-16-250	ER16	.019 - .393	1.10	2.50	3	BRIN-820	BRIN-850	0 - 1.84	BRIN-780	1
BRIN-565	V40BR-16-500	ER16	.019 - .393	1.10	5.00	3	BRIN-820	BRIN-850	0 - 2.10	BRIN-780	1
BRIN-570	V40BR-20-275	ER20	.039 - .512	1.34	2.75	3	BRIN-825	BRIN-855	0 - 1.45	BRIN-790	1
BRIN-575	V40BR-20-400	ER20	.039 - .512	1.34	4.00	3	BRIN-825	BRIN-855	0 - 1.45	BRIN-790	1
BRIN-580	V40BR-20-525	ER20	.039 - .512	1.34	5.25	3	BRIN-825	BRIN-855	0 - 2.70	BRIN-790	1
BRIN-585	V40BR-25-250	ER25	.039 - .630	1.65	2.50	3	BRIN-830	BRIN-860	0 - 1.30	BRIN-795	1
BRIN-590	V40BR-25-400	ER25	.039 - .630	1.65	4.00	3	BRIN-830	BRIN-860	0 - 2.10	BRIN-795	1
BRIN-595	V40BR-25-600	ER25	.039 - .630	1.65	6.00	3	BRIN-830	BRIN-860	0 - 2.35	BRIN-795	1
BRIN-600	V40BR-32-238	ER32	.078 - .787	1.97	2.38	3	BRIN-835	BRIN-865	0 - .585	BRIN-800	1
BRIN-605	V40BR-32-300	ER32	.078 - .787	1.97	3.00	3	BRIN-835	BRIN-865	0 - 1.21	BRIN-800	1
BRIN-610	V40BR-32-400	ER32	.078 - .787	1.97	4.00	3	BRIN-835	BRIN-865	0 - 2.21	BRIN-800	1
BRIN-615	V40BR-32-600	ER32	.078 - .787	1.97	6.00	3	BRIN-835	BRIN-865	0 - 2.21	BRIN-800	1
BRIN-620	V40BR-40-315	ER40	.394 - 1.339	3.07	3.15	5	BRIN-840	BRIN-870	0 - 1.055	BRIN-805	1

Adapters  
End Mill CAT 40 V-Flange

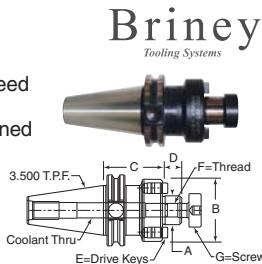


Eccentric bore will reduce tool run-out to as little as .0002" TIR at 4X's length to diameter ratio. Ground taper shanks that are guaranteed to meet AT3 specifications. Made from premium 8620 alloy and carbon hardened to Rc 58-62 with .06" case depth per side. All feature ends which are ground while tool is in simulated machine spindle fixture. Ground v-grooves and head diameters help prevent tools from sticking in automatic tool changers.

Item No.	Briney	Bore (In.) A	OD Dia. B	Gauge Lgth. C	Cavity Depth D	Set Screw Location E	Distance Between Set Screws F	Set Screw	End Mill Type	Pack Qty.
<b>Stub Length</b>										
BRIN-625	V40E-050-175	.500	1.75	1.75	—	.88	—	BRIN-875	Single	1
BRIN-630	V40E-062-175	.625	1.75	1.75	2.38	.94	—	BRIN-880	Single	1
BRIN-635	V40E-075-175	.750	1.75	1.75	2.25	1.00	—	BRIN-885	Single	1
BRIN-640	V40E-100-175	1.000	1.75	1.75	2.50	1.12	—	BRIN-890	Single	1
BRIN-645	V40E-125-200	1.250	2.25	2.00	2.35	1.12	—	BRIN-890	Single	1
<b>Standard Length</b>										
BRIN-650	V40E-012-250	.125	.68	2.50	—	.31	—	BRIN-895	Single or Double	1
BRIN-655	V40E-018-250	.1875	.68	2.50	—	.44	—	BRIN-900	Single or Double	1
BRIN-660	V40E-025-250	.250	.88	2.50	—	.44	—	BRIN-900	Single or Double	1
BRIN-665	V40E-031-250	.3125	1.00	2.50	—	.44	—	BRIN-905	Single or Double	1
BRIN-670	V40E-038-250	.375	1.00	2.50	—	.74	—	BRIN-910	Single or Double	1
BRIN-675	V40E-044-250	.4375	1.25	2.50	—	.74	—	BRIN-910	Single or Double	1
BRIN-680	V40E-050-262	.500	1.25	2.62	—	.88	—	BRIN-875	Single or Double	1
BRIN-685	V40E-062-375	.625	1.50	3.75	3.62	.94	—	BRIN-880	Single or Double	1
BRIN-690	V40E-075-375	.750	1.75	3.75	4.00	1.00	—	BRIN-885	Single or Double	1
BRIN-695	V40E-088-400	.875	2.00	4.00	4.00	1.00	.81	BRIN-885	Single or Double	1
BRIN-700	V40E-100-300	1.000	2.00	3.00	4.00	1.12	—	BRIN-890	Single	1
BRIN-705	V40E-100-400	1.000	2.00	4.00	4.50	1.12	1.00	BRIN-890	Double	1
BRIN-710	V40E-125-425	1.250	2.50	4.25	2.50	1.12	1.00	BRIN-890	Single	1
BRIN-715	V40E-150-462	1.500	2.75	4.62	2.75	1.12	1.00	BRIN-890	Single	1
<b>Intermediate Length</b>										
BRIN-720	V40E-025-450	.250	.88	4.50	—	.44	—	BRIN-900	Single or Double	1
BRIN-725	V40E-038-450	.375	1.00	4.50	—	.74	—	BRIN-910	Single or Double	1
BRIN-730	V40E-050-450	.500	1.25	4.50	—	.88	—	BRIN-875	Single or Double	1
BRIN-735	V40E-062-475	.625	1.50	4.75	3.62	.94	—	BRIN-880	Single or Double	1
BRIN-740	V40E-075-475	.750	1.75	4.75	1.00	1.00	—	BRIN-885	Single or Double	1

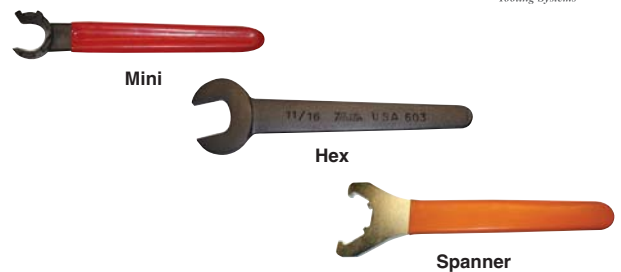
Adapters  
Shell Mill CAT 40 V-Flange

Ground taper shanks that are guaranteed to meet AT3 specifications. Made from premium 8620 alloy and carbon hardened to Rc 58-62 with .06" case depth per side. All feature ends which are ground while tool is in simulated machine spindle fixture. This process yields .0002" TIR from taper shank to shell mill OD boss end. Ground v-grooves and head diameters help prevent tools from sticking in automatic tool changers. Pressed in drive keys and custom made shell screws included with each holder.



Item No.	Briney	Arbor Dia. (In.) A	OD Dia. B	Gage Lgth. C	Length of Pilot D	Key E	Thread F	Screw G	Pack Qty.
BRIN-745	V40SM-075-138	.750	1.75	1.375	.68	.31	3/8-24	BRIN-915	1
BRIN-750	V40SM-100-206	1.000	2.19	2.062	.68	.38	1/2-20	BRIN-920	1
BRIN-755	V40SM-125-212	1.250	2.88	2.125	.68	.50	5/8-18	BRIN-925	1
BRIN-760	V40SM-150-240	1.500	3.81	2.406	.94	.62	3/4-16	BRIN-930	1

Collet Wrenches  
Mini, Hex and Spanner



Item No.	Briney	Opening	Style	Collet Nut	Pack Qty.
BRIN-765	BR11MW	.630	Mini	BRIN-815	1
BRIN-780	BR16HW	1.00	Hex	BRIN-820	1
BRIN-790	BR20HW	1.18	Hex	BRIN-825	1
BRIN-795	BR25SW	1.65	Spanner	BRIN-830	1
BRIN-800	BR32SW	1.97	Spanner	BRIN-835	1
BRIN-805	BR40SW	2.46	Spanner	BRIN-840	1



**Arbors**  
Morse Taper to Jacobs Taper



Item No.	Description	OAL	Pack Qty.
JA-04817	#2 Morse x 2JT	4.16	1
JA-04818	#2 Morse x 3JT	4.50	1
JA-04819	#2 Morse x 4JT	4.94	1
JA-04823	#2 Morse x 33JT	4.28	1
JA-04826	#3 Morse x 2JT	4.94	1
JA-04827	#3 Morse x 3JT	5.27	1
JA-04828	#3 Morse x 4JT	5.70	1
JA-04829	#3 Morse x 5JT	5.94	1
JA-04836	#4 Morse x 3JT	6.25	1
JA-04837	#4 Morse x 4JT	6.69	1
JA-04838	#4 Morse x 5JT	6.91	1
JA-04848	#5 Morse x 5JT	8.16	1

**Arbors**  
Straight Shank to Jacobs Taper



Item No.	Description	Straight Shank	OAL	Pack Qty.
JA-04881	1/2 x 1JT	2.5	3.312	1
JA-04882	1/2 x 2JT	2.5	3.531	1
JA-04883	1/2 x 3JT	2.5	3.875	1
JA-04886	1/2 x 33JT	2.5	3.656	1
JA-04894	3/8 x 6JT	2.5	3.656	1
JA-04901	3/4 x 3JT	3.0	4.375	1

**Arbors**  
Bridgeport Taper to Jacobs Taper



Item No.	Description	OAL	Lgth.	Dia.	Pack Qty.
JA-04876	R-8 Bridgeport x 3JT	5.53 - 5.55	1.25 - 1.27	.75	1

**Jacobs® Ball Bearing Super Chucks**  
Chuck Keys



Designed for extra heavy duty drilling applications on production drilling machines, jig borers, milling machines, lathes and radials. Ideal for close tolerance drilling. The ball thrust bearing reduces friction in the chuck closing mechanism, so the operator can apply more gripping power on the twist drill shank. Sleeve is fluted. Key included with each chuck, however, individual keys also available separately for replacement.

Item No.	Chuck Model	Capacity Inch	Capacity mm	Tapered Mount	Pack Qty.
JA-03001	8-1/2N	0 - 1/4	0 - 6.4	2JT	1
JA-03002	11N	0 - 3/8	0 - 10	2JT	1
JA-03003	14N	0 - 1/2	0 - 13	3JT	1
JA-03004	16N	1/8 - 3/4	3 - 16	3JT	1
JA-03005	18N	1/8 - 3/4	3 - 19	4JT	1
JA-03006	20N	3/8 - 1	10 - 25	5JT	1

**Chuck Keys**



Item No.	Key No.	Pilot Size	Pack Qty.	Item No.	Key No.	Pilot Size	Pack Qty.
JA-03505	K0	1/8	1	JA-03516	K5	7/16	1
JA-03506	K1	9/32	1	JA-03510	K7	7/32	1
JA-03507	K2	1/4	1	JA-03512	K30	15/64	1
JA-03508	K3	5/16	1	JA-03513	K32	1/4	1
JA-03515	K4	3/8	1				

**Taper Mounted Chucks**



Item No.	Chuck Model	Capacity		Mount Jacobs	Pack Qty.
		Min.	Max.		
<b>Medium Duty</b>					
JA-02009	1A	.040	.250	1JT	1
JA-02035	2A	.040	.375	2JT	1
<b>Heavy Duty</b>					
JA-02075	34-06	.040	.500	6JT	1
JA-14445	34-33	.040	.500	33JT	1
JA-02086	3A	.125	.625	3JT	1

**Jaw and Nut Replacement Unit**  
for Chuck Series 34



Item No.	Chuck Model	Description	Pack Qty.
JA-02521	U34	Jaw and Nut Replacement	1

**Ball Bearing Chuck**  
Replacement Parts  
Jaw and Nut Replacement Unit for Older Models



Item No.	Jacobs	Chuck Model Series	Pack Qty.
JA-03262	U14N	14N	1
JA-03264	U18N	18N	1

**Thread Mounted Chucks**



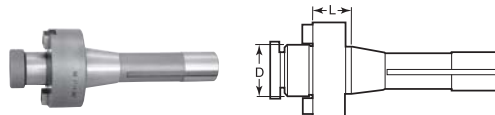
Item No.	Chuck Model	Capacity		Mount Jacobs	Pack Qty.
		Min.	Max.		
<b>Medium</b>					
JA-6287	33BA	.080	.500	1/2-20	1
<b>Heavy</b>					
JA-8859	32BA	.000	.375	1/2-20	1

**Key Leash Chuck Accessory**



Item No.	Jacobs	Key No.	Pack Qty.
JA-03532	Model B	K30, K32, K2, KK	1

**Shell Mill Holder R-8**



Item No.	D	L	Square Key Size	Arbor Thread	Draw Bar	Pack Qty.
SO-410-515N	1	1	3/8	1/2-20	7/16-20	1



Industrial Keyless Chucks



Applications

- Portable drilling machines and with taper fittings for stationary drilling machines

Features and Benefits

- Self-tightening feature automatically increases gripping force proportional to increased torque to prevent tool shank slippage in a clockwise rotation
- Drill chucks for industrial use (medium drill) available with screw fittings for professional portable drilling machines and with taper fittings for stationary drilling machines
- Automatic fitting for efficient, fast change of tools
- Fits tools up to 20mm in diameter
- Machine fitting via DIN0238 of Jacobs tapers and UNF thread fittings

Item No.	Capacity		Jacobs Mount	Closed Length		Dimension Open Length		Sleeve Diameter		Pack Qty.
	Inch	mm		Inch	mm	Inch	mm	Inch	mm	
JA-33357	0-.315	0-8	1JT	2.68	68	2.40	61	1.34	34	1
JA-33358	0-.315	0-8	2JT	2.68	68	2.40	61	1.34	34	1
JA-33360	0-.394	0-10	1/2-20	3.15	80	2.87	73	1.54	39	1
JA-33361	0-.394	0-10	2JT	3.15	80	2.87	73	1.54	39	1
JA-33362	.039-.512	1-13	3/8-24	3.74	95	3.39	86	1.73	44	1
JA-33363	.039-.512	1-13	1/2-20	3.74	95	3.39	86	1.73	44	1
JA-33364	.039-.512	1-13	3/32JT	3.74	95	3.39	86	1.73	44	1
JA-33365	.039-.512	1-13	2JT	3.74	95	3.39	86	1.73	44	1
JA-33366	.039-.512	1-13	6JT	3.74	95	3.39	86	1.73	44	1
JA-33367	.118-.630	3-16	1/2-20	4.53	115	4.02	102	2.01	51	1
JA-33368	.118-.630	3-16	3/8-16	4.53	115	4.02	102	2.01	51	1
JA-33369	.118-.630	3-16	3/32JT	4.53	115	4.02	102	2.01	51	1
JA-33370	.118-.630	3-16	6JT	4.53	115	4.02	102	2.01	51	1
JA-33371	.197-.787	5-20	3JT	5.51	140	4.02	102	2.52	64	1

Keyless Chucks



The Albrecht chuck assures high accuracy and maximum grip. Precision ground and lapped surfaces on all major components. All parts except jaw guides and collar are hardened. Smaller sizes are dynamically balanced for high RPM use. Self-tightening as more torque is applied, yet easily opened by hand.

Item No.	Chuck Mount	Capacity (Inch)	Capacity (mm)	Pack Qty.
AC-70050	J1	0-1/4	0-6.5	1
AC-70080	J2	0-3/8	0-10	1
AC-70090	J33	1/32-1-2	1-13	1
AC-70100	J2	1/32-1/2	1-13	1

Keyless Drill Chucks with Integral Shank



Integral shank design is more compact and often less expensive than a combined drill chuck and arbor. Eliminates the possibility of a chuck slipping on its arbor. Self-tightening as more torque is applied, yet easily opened by hand. Balanced. R8 shank type.

Item No.	Capacity Inch	Capacity mm	Max. RPM	Pack Qty.
AC-73040	1/32-1/2	1-13	7,000	1
AC-73090	1/8-3/8	3-16	4,000	1

Master Chuck Keys



Steel



Stainless Steel

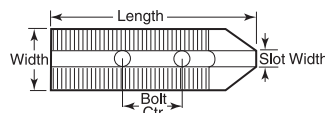
These master chuck keys fit over 200 sizes of popular chucks including Jacobs, Albrecht, Rohm, etc. One key fits many sizes, eliminating the need to keep several individual keys on hand. Saves wear on the chuck by always having the proper key size on hand. Steel are heat treated, black oxide finish. Stainless are polished, rust resistant.

**SMK-13** opens chucks from 1/4" to 1/2" on most cordless drills and lighter power tools.

**SMK-12** opens heavy duty chucks from 3/8" to 3/4" on most drill presses, shop equipment and heavy duty power tools.

Item No.	Description	Pack Qty.
SMK-13	1/4 to 1/2 Master Chuck - Steel	1
SMK-13SS	1/4 to 1/2 Master Chuck - Stainless Steel	1
SMK-12	3/8 to 3/4 Master Chuck - Steel	1
SMK-12SS	3/8 to 3/4 Master Chuck - Stainless Steel	1

Aluminum Chuck Jaws



For Kitagawa and other Japanese chucks with 1.5mm serrations x 60 degree.

Item No.	Chuck Size	Material	Height	Lgth.	Width	Slot Width	Bolt Size (mm)	Bolt Ctr. Dist.	Pack Qty.
ACJ-3	6	6061-T6	2.00	3.00	1.50	.473	10	.787	1
ACJ-5	8	7075-T6	1.50	4.30	1.50	.551	12	.984	1
ACJ-10	10	7075-T6	1.50	4.60	1.50	.630	12	1.181	1
ACJ-13	10	6061-T6	3.00	4.60	1.50	.630	12	1.181	1

Note: Three pieces per set

WE ARE HERE TO HELP!



Our Customer Service team is friendly, knowledgeable, and ready to help you find the right product for your application.

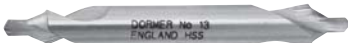


**Cutting Tools**  
Counterbores - Straight Shank



Item No.	Pilot Dia.	Mill Dia.	For U.S.S. Cap Screw	Shank Dia.	OAL	Pack Qty.
<b>1936 Series</b>						
BT-CS-10	.187	.316	#10	5/16	3 1/2	1
BT-CS-11	.204	.328	#10	5/16	3 1/2	1
BT-CS-16	1/4	3/8	1/4	3/8	5 3/4	1
BT-CS-18	5/32	13/32	1/4	3/8	5 3/4	1
BT-CS-22	11/32	19/32	5/16	7/16	6	1
BT-CS-24	3/8	9/16	3/8	1/2	6 1/2	1
BT-CS-26	13/32	19/32	3/8	1/2	6 1/2	1
BT-CS-34	17/32	25/32	1/2	1/2	7 1/4	1
BT-CS-36	9/16	13/16	5/16	3/4	7 1/2	1
<b>1960 Series</b>						
BT-CS-22-60	11/32	1/2	5/16	7/16	6	1
BT-CS-42-60	21/32	31/32	3/4	3/4	8 1/4	1
BT-CS-44-60	11/16	1	3/8	3/4	8 1/4	1

**HSS Combined Drills and Countersinks - Bell Type**  
118 Degree w/ 60 Degree Protected Form



Item No.	Size	Body Dia.	Drill Dia.	Bell Dia.	Drill Lgth.	OAL	Pack Qty.
DOR-A222-13	13	1/4	3/32	.20	3/32	2	1
DOR-A222-16	16	1/2	3/16	.40	3/16	3	1

**Cutting Tools**  
Sleeves for Taper Shank Drills  
Oil Toughened



Item No.	Inside Morse Taper	Outside Morse Taper	Pack Qty.
DOR-M150-2-3	2	3	1
DOR-M150-2-4	2	4	1
DOR-M150-3-4	3	4	1
DOR-M150-4-5	4	5	1

**Cutting Tools**  
Ejecting Drifts - Center Keys



Used to eject Morse Taper shank tools from sleeves, sockets and machine spindles.

Item No.	Size	Ejecting MT Number	Pack Qty.
DOR-M152-1	1	1 & 2	1
DOR-M152-2	2	3 & 4	1
DOR-M152-3	3	4 & 5	1

**Econo-Sink**  
90 Degree Drill Point Countersinks



Item No.	Severance	C'sink Dia.	Drill Type	Shank Dia.	OAL	Shank Lgth.	Pack Qty.
SEV-01501	ESD-3/8	3/8	.125	1/4	1 1/4	7/8	1
SEV-01502	ESD-1/2	1/2	.167	3/8	2 1/8	1 1/8	1
SEV-01507	ESD-3/4	3/4	.250	1/2	2 11/16	1 11/16	1

**Combined Drills and Countersinks**  
High Speed Steel - Bright Finish



Plain type, 60 degree included angle.

Item No.	Dia.	Body Dia.	Drill Dia.	Drill Lgth.	OAL	Pack Qty.
PTD-97604	4	5/16	1/8	1/8	2 1/8	1

**Cutting Tools**  
Combined Drills and Countersinks Long Series



Long series combined drills and countersinks are used for producing center holes in components or workpieces with the extra length, allowing access to hard to reach areas. These have an angle of 60 degree.

Item No.	Size	Body Dia.	Point Dia.	Point Lgth.	OAL	Pack Qty.
KEO-21030	1	1/8	3/64	3/64	3	1
KEO-21040	1	1/8	3/64	3/64	4	1
KEO-22040	2	3/16	3/64	3/64	4	1
KEO-22050	2	3/16	3/64	3/64	5	1
KEO-23040	3	1/4	7/64	7/64	4	1
KEO-23050	3	1/4	7/64	7/64	5	1
KEO-23060	3	1/4	7/64	7/64	6	1
KEO-24040	4	5/16	1/8	1/8	4	1
KEO-24050	4	5/16	1/8	1/8	5	1
KEO-24060	4	5/16	1/8	1/8	6	1
KEO-25050	5	7/16	3/16	3/16	5	1
KEO-25060	5	7/16	3/16	3/16	6	1
KEO-26060	6	1/2	7/32	7/32	6	1

**Cutting Tools**  
Single Flute Countersinks



Single flute countersinks are ideal for chamfering, deburring and countersinking. The large positive rake and single flute construction provide a smooth surface finish on a variety of materials. A versatile tool on all general purpose applications.

Item No.	Body Dia.	Shank Lgth.	OAL	Shank Dia.	Angle Degrees	Pack Qty.
KEO-53128	1/2	1	2	1/4	82	1
KEO-53148	3/4	3/4	1 1/2	1/4	82	1
KEO-53108	1	1 1/4	2 3/4	1/2	82	1
KEO-53348	3/4	1 1/4	2 3/8	1/2	82	1
KEO-53388	5/8	7/8	1 3/4	1/4	82	1
KEO-53588	5/8	1	2 1/4	3/8	82	1

**Cutting Tools**  
NC Spotting Drills



Designed with a narrow chisel edge for quick starting and a constant web to allow for resharpening without the need for web thinning.

Item No.	Dia.	Cut	OAL	Point Angle	Flute Lgth.	Pack Qty.
SD-110	1/4	RH	4	90	3/4	1
SD-130	3/8	RH	5	90	1 1/8	1
SD-140	3/8	RH	5	120	1 1/8	1
SD-150	1/2	RH	6	90	1 3/8	1
SD-170	5/8	RH	7	90	1 3/8	1



**4 Flute - Regular Length  
Center Cutting - Double End**



Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	Pack Qty.
WEL-AAC16-3	1/2	1/2	1	4 1/2	1

**4 Flute - Regular Length  
Center Cutting - Single End**



Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	Pack Qty.
WEL-AC16-3	1/2	1/2	1 1/4	3 1/4	1
WEL-AC24-5	3/4	3/4	1 1/2	3 3/8	1

**4 Flute - Long Length  
Center Cutting - Single End**



Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	Pack Qty.
WEL-AC24-5A	3/4	3/4	3	4 1/4	1
WEL-AC28-6A	7/8	7/8	3 1/2	5 1/4	1
WEL-AC32-7A	1	1	4	6 1/2	1

**4 Flute - Extra Long Length  
Center Cutting - Single End**



Item No.	Cutting Dia.	Shank Dia.	Lgth. of Cut	OAL	Pack Qty.
WEL-AC16-3B	1/2	1/2	3	5	1
WEL-AC20-4B	5/8	5/8	4	6 1/2	1
WEL-AC24-5B	3/4	3/4	5	6 3/4	1

**2 Flute - Regular Length  
Right Hand Cut - Ball Style - Single End**



Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	Pack Qty.
WEL-COR6-2	3/16	3/8	1/2	2 3/8	1
WEL-COR10-2	3/16	3/8	3/4	2 1/2	1
WEL-R16-3	1/2	1/2	1	3	1
WEL-R32-7	1	1	2 1/4	4 3/4	1

**Cut-Ease Stick Lubricant**



- Extends tool life
- Cleaner, faster cut
- Reduces loading
- Stops binding
- Prevents burring

In cardboard tube with push bottom. Approximately 2" x 10" and weight: 1 lb. For high speed sawing and cutting where circulating lubricants are not used. Provides smooth, cool cutting for non-ferrous metals and plastics - won't stain aluminum.

Item No.	Description	Pack Qty.
CE-16	CUT-EASE Stick Lubricant	1

**MOLD COMPONENTS**

Core Pins  
Ejector Pins  
Oversized Step Pins

Pages 450 - 454



Premium Solid Carbide End Mills  
4 Flute  
Regular Length  
Made in U.S.A.



Square End



Square End with ALTiN Coated



Ball Nose



Ball Nose ALTiN Coated

		ALTiN Coated		Size	Flute Lgth.	OAL	Pack Qty.
Square End	Ball Nose	Square End	Ball Nose				
Item No.	Item No.	Item No.	Item No.				
TU-130722	TU-132790	TU-166340	TU-133197	1/32	5/64	1 1/2	1
TU-130744	TU-132812	TU-166362	TU-133219	1/16	3/16	1 1/2	1
TU-130766	TU-132834	TU-166384	TU-133241	3/32	3/8	1 1/2	1
TU-130777	TU-132845	TU-166395	TU-133252	7/64	3/8	1 1/2	1
TU-130788	TU-132856	TU-166406	TU-133263	1/8	1/2	1 1/2	1
TU-130799	TU-132867	TU-166417	TU-133274	9/64	9/16	2	1
TU-130810	TU-132878	TU-166428	TU-133285	5/32	9/16	2	1
TU-130832	TU-132900	TU-166450	TU-133307	3/16	3/8	2	1
TU-130854	TU-132922	TU-166472	TU-133329	7/32	3/8	2 1/2	1
TU-130876	TU-132944	TU-166494	TU-133351	1/4	3/8	2 1/2	1
TU-130887	TU-132955	TU-166505	TU-133362	17/64	3/4	2 1/2	1
TU-130898	TU-132966	TU-166516	TU-133373	9/32	3/4	2 1/2	1
TU-130909	TU-132977	TU-166527	TU-133384	19/64	13/16	2 1/2	1
TU-130920	TU-132988	TU-166538	TU-133395	5/16	19/32	2 1/2	1
TU-130942	TU-133010	TU-166560	TU-133417	11/32	7/8	2 1/2	1
TU-130964	TU-133032	TU-166582	TU-133439	3/8	7/8	2 1/2	1
TU-130986	TU-133054	TU-166604	TU-133461	13/32	7/8	2 1/2	1
TU-131008	TU-133076	TU-166626	TU-133483	7/16	7/8	2 1/2	1
TU-131030	TU-133098	TU-166648	TU-133505	15/32	1	3	1
TU-131052	TU-133120	TU-166670	TU-133527	1/2	1	3	1
TU-131074	TU-133131	TU-166692	TU-133538	9/16	1 1/4	3	1
TU-131085	TU-133142	TU-166703	TU-133549	5/8	1 1/4	3 1/2	1
TU-131096	TU-133153	TU-166714	TU-133560	3/4	1 1/2	4	1
TU-131107	TU-133164	TU-166725	TU-133571	7/8	1 1/2	4	1
TU-131118	TU-133175	TU-166736	TU-133582	1	1 1/2	4	1

Premium Solid Carbide End Mills  
4 Flute  
Long Length  
Made in U.S.A.



Square End



Square End ALTiN Coated



Ball Nose



Ball Nose ALTiN Coated

		ALTiN Coated		Size	Flute Lgth.	OAL	Pack Qty.
Square End	Ball Nose	Square End	Ball Nose				
Item No.	Item No.	Item No.	Item No.				
TU-136442	TU-137058	TU-136596	TU-137212	1/8	3/4	2 1/4	1
TU-136453	TU-137069	TU-136607	TU-137223	3/16	3/4	2 1/2	1
TU-136464	TU-137080	TU-136618	TU-137234	1/4	1	3	1
TU-136475	TU-137091	TU-136629	TU-137245	1/4	1	4	1
TU-136486	TU-137102	TU-136640	TU-137256	5/16	1 1/8	3	1
TU-136497	TU-137113	TU-136651	TU-137267	3/8	1 1/8	3	1
TU-136508	TU-137124	TU-136662	TU-137278	3/8	1	4	1
TU-136519	TU-137135	TU-136673	TU-137289	7/16	2	4	1
TU-136530	TU-137146	TU-136684	TU-137300	1/2	1	4	1
TU-136541	TU-137157	TU-136695	TU-137311	1/2	2	4	1
TU-136552	TU-137168	TU-136706	TU-137322	5/8	2 1/4	5	1
TU-136563	TU-137179	TU-136717	TU-137333	3/4	2 1/4	5	1
TU-136574	TU-137190	TU-136728	TU-137344	7/8	2 1/4	5	1
TU-136585	TU-137201	TU-136739	TU-137355	1	2 1/4	5	1

Premium Solid Carbide End Mills  
4 Flute  
Extra Long Length  
Made in U.S.A.



Square End



Square End ALTiN Coated



Ball Nose



Ball Nose ALTiN Coated

		ALTiN Coated		Size	Flute Lgth.	OAL	Pack Qty.
Square End	Ball Nose	Square End	Ball Nose				
Item No.	Item No.	Item No.	Item No.				
TU-137674	TU-138334	TU-137850	TU-138510	1/8	1	3	1
TU-137685	TU-138345	TU-137861	TU-138521	3/16	1 1/8	3	1
TU-137696	TU-138356	TU-137872	TU-138532	1/4	1 1/2	4	1
TU-137707	TU-138367	TU-137883	TU-138543	1/4	1 1/2	6	1
TU-137718	TU-138378	TU-137894	TU-138554	5/16	1 1/8	4	1
TU-137729	TU-138389	TU-137905	TU-138565	3/8	1 3/4	4	1
TU-137740	TU-138400	TU-137916	TU-138576	3/8	1 1/2	6	1
TU-137751	TU-138411	TU-137927	TU-138587	7/16	3	6	1
TU-137762	TU-138422	TU-137938	TU-138598	1/2	1 1/2	6	1
TU-137773	TU-138433	TU-137949	TU-138609	1/2	3	6	1
TU-137784	TU-138444	TU-137960	TU-138620	5/8	3	6	1
TU-137795	TU-138455	TU-137971	TU-138631	3/4	3	6	1
TU-137817	TU-138477	TU-137993	TU-138653	7/8	3	6	1
TU-137828	TU-138488	TU-138004	TU-138664	1	3	6	1



**END MILLS**

Buy One or Buy Bulk & SAVE



Premium Solid Carbide End Mills  
2 Flute  
Regular Length  
Made in U.S.A.



Square End



Square End ALTiN Coated



Ball Nose



Ball Nose ALTiN Coated

Square End		Ball Nose		ALTiN Coated				Pack Qty.
Item No.	Item No.	Item No.	Item No.	Size	Flute Lgth.	OAL		
TU-129677	TU-131745	TU-130084	TU-132152	1/64	5/8	2	1	
TU-129578	TU-131646	TU-129985	TU-132053	1/32	5/64	1 1/2	1	
TU-129600	TU-131668	TU-130007	TU-132075	1/16	3/16	1 1/2	1	
TU-129622	TU-131690	TU-130029	TU-132097	3/32	3/8	1 1/2	1	
TU-129644	TU-131712	TU-130051	TU-132119	1/8	1/2	1 1/2	1	
TU-129666	TU-131734	TU-130073	TU-132141	5/32	9/16	2	1	
TU-129688	TU-131756	TU-130095	TU-132163	3/16	5/8	2	1	
TU-129710	TU-131778	TU-130117	TU-132185	7/32	5/8	2 1/2	1	
TU-129732	TU-131800	TU-130139	TU-132207	1/4	3/4	2 1/2	1	
TU-129754	TU-131822	TU-130161	TU-132229	9/32	3/4	2 1/2	1	
TU-129776	TU-131844	TU-130183	TU-132251	5/16	13/16	2 1/2	1	
TU-129798	TU-131866	TU-130205	TU-132273	11/32	7/8	2 1/2	1	
TU-129820	TU-131888	TU-130227	TU-132295	3/8	7/8	2 1/2	1	
TU-129842	TU-131910	TU-130249	TU-132317	13/32	7/8	2 1/2	1	
TU-129864	TU-131932	TU-130271	TU-132339	7/16	7/8	2 1/2	1	
TU-129886	TU-131954	TU-130293	TU-132361	15/32	1	3	1	
TU-129908	TU-131976	TU-130315	TU-132383	1/2	1	3	1	
TU-129919	TU-131987	TU-130326	TU-132394	9/16	1 1/4	3	1	
TU-129930	TU-131998	TU-130337	TU-132405	5/8	1 1/4	3 1/2	1	
TU-129941	TU-132009	TU-130348	TU-132416	3/4	1 1/2	4	1	
TU-129952	TU-132020	TU-130359	TU-132427	7/8	1 1/2	4	1	
TU-129963	TU-132031	TU-130370	TU-132438	1	1 1/2	4	1	

Premium Solid Carbide End Mills  
2 Flute  
Long Length  
Made in U.S.A.



Square End



Square End ALTiN Coated



Ball Nose



Ball Nose ALTiN Coated

Square End		Ball Nose		ALTiN Coated				Pack Qty.
Item No.	Item No.	Item No.	Item No.	Size	Flute Lgth.	OAL		
TU-136134	TU-136750	TU-136288	TU-136904	1/8	3/4	2 1/4	1	
TU-136145	TU-136761	TU-136299	TU-136915	3/16	3/4	2 1/2	1	
TU-136156	TU-136772	TU-136310	TU-136926	1/4	1 1/8	3	1	
TU-136167	TU-136783	TU-136321	TU-136937	1/4	1	4	1	
TU-136178	TU-136794	TU-136332	TU-136948	5/16	1 1/8	3	1	
TU-136189	TU-136805	TU-136343	TU-136959	3/8	1 1/8	3	1	
TU-136200	TU-136816	TU-136354	TU-136970	3/8	1	4	1	
TU-136211	TU-136827	TU-136365	TU-136981	7/16	2	4	1	
TU-136222	TU-136838	TU-136376	TU-136992	1/2	1	4	1	
TU-136233	TU-136849	TU-136387	TU-137003	1/2	2	4	1	
TU-136244	TU-136860	TU-136398	TU-137014	5/8	2 1/4	5	1	
TU-136255	TU-136871	TU-136409	TU-137025	3/4	2 1/4	5	1	
TU-136266	TU-136882	TU-136420	TU-137036	7/8	2 1/4	5	1	
TU-136277	TU-136893	TU-136431	TU-137047	1	2 1/4	5	1	

Premium Solid Carbide End Mills  
2 Flute  
Extra Long Length  
Made in U.S.A.



Square End



Square End ALTiN Coated



Ball Nose



Ball Nose ALTiN Coated

Square End		Ball Nose		ALTiN Coated				Pack Qty.
Item No.	Item No.	Item No.	Item No.	Size	Flute Lgth.	OAL		
TU-137366	TU-138026	TU-137520	TU-138180	1/8	1	3	1	
TU-137377	TU-138037	TU-137531	TU-138191	3/16	1 1/8	3	1	
TU-137388	TU-138048	TU-137542	TU-138202	1/4	1 1/2	4	1	
TU-137399	TU-138059	TU-137553	TU-138213	1/4	1 1/2	6	1	
TU-137410	TU-138070	TU-137564	TU-138224	3/16	1 3/4	4	1	
TU-137421	TU-138081	TU-137575	TU-138235	3/8	1 3/4	4	1	
TU-137432	TU-138092	TU-137586	TU-138246	3/8	1 1/2	6	1	
TU-137443	TU-138103	TU-137597	TU-138257	7/16	3	6	1	
TU-137454	TU-138114	TU-137608	TU-138268	1/2	1 1/2	6	1	
TU-137465	TU-138125	TU-137619	TU-138279	1/2	3	6	1	
TU-137476	TU-138136	TU-137630	TU-138290	5/8	3	6	1	
TU-137487	TU-138147	TU-137641	TU-138301	3/4	3	6	1	
TU-137498	TU-138158	TU-137652	TU-138312	7/8	3	6	1	
TU-137509	TU-138169	TU-137663	TU-138323	1	3	6	1	



TiCN Coated Roughing End Mills  
Regular Length - Square End  
Coarse Profile  
Center Cutting

HANITA



Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	No. of Flutes	Pack Qty.
HA-TC6208-10004	3/8	3/8	3/4	2 1/2	4	1
HA-TC6208-11005	7/16	1/2	1 1/4	3 3/4	4	1

Roughing End Mills  
Long Length - Square End  
Coarse Profile  
Non-Center Cutting

HANITA



Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	No. of Flutes	Pack Qty.
HA-6217-16006	5/8	5/8	2 1/2	4 5/8	4	1

TiCN Coated End Mills  
2 Flute - Regular Length  
Center Cutting

HANITA



Premium steel - M42 (8%) Cobalt

Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	Pack Qty.
HA-TC1202-10004	3/8	3/8	3/8	2 5/8	1
HA-TC1202-11005	7/16	1/2	1	3	1
HA-TC1202-16006	5/8	5/8	1 5/8	3 1/8	1

4 Flute - Regular Length Carbide  
TiCN Coated  
Center Cutting

HANITA



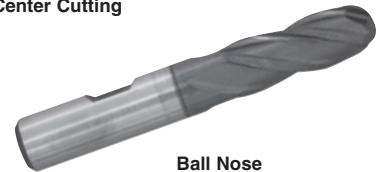
Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	Pack Qty.
HA-TC4S0R-10004	3/8	3/8	7/8	2 1/2	1
HA-TC4S0R-13005	1/2	1/2	1	3	1

TiCN Coated End Mills  
4 Flute - Regular Length  
Center Cutting or Ball Nose

HANITA



Center Cutting



Ball Nose

Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	Pack Qty.
<b>Center Cutting</b>					
HA-TC1205-08004	5/16	3/8	3/4	2 1/2	1
HA-TC1205-22003	7/8	7/8	1 7/8	4 1/8	1
<b>Ball Nose</b>					
HA-TC1200-13005	1/2	1/2	1 1/4	3 3/4	1

End Mills  
2 Flute - Regular Length  
Single Ball End

BRUBAKER TOOL



Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	Pack Qty.
BT-ER8-1	1/4	3/8	5/8	2 7/16	1
BT-ER16-2	1/2	1/2	1	3	1

4 Flute  
Regular Length  
Single End

BRUBAKER TOOL



Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	Pack Qty.
BT-G8-1	1/4	3/8	5/8	2 7/16	1
BT-G10-1	5/16	3/8	3/4	2 1/2	1
BT-G14-1	7/16	3/8	1	2 11/16	1
BT-G20-3	5/8	5/8	1 5/8	3 3/4	1

4 Flute  
Long Length  
Single End

BRUBAKER TOOL



Item No.	Cut Dia.	Shank Dia.	Lgth. of Cut	OAL	Pack Qty.
BT-GL8-1	1/4	3/8	1 1/4	3 1/8	1
BT-GL10-1	5/16	3/8	1 3/8	3 3/8	1
BT-GL12-1	3/8	3/8	1 1/2	3 1/4	1





**2 and 4 Flute - Corner Radius Center Cutting**

**GARR TOOL®**



2 Flute



4 Flute

For stronger corners and part radii. Diameter tolerance is  $\pm .000/- .002$ ". Corner radius tolerance is  $\pm .001$ ".

2 Flute		4 Flute					
Item No.	Item No.	Flute Dia.	Corner Radius	Flute Lgth.	Shank Dia.	OAL	Pack Qty.
GAR-79010	GAR-80010	1/8	.015	1/2	1/8	1 1/2	1
GAR-79020	GAR-80020	3/16	.020	1/2	3/16	1 1/2	1
GAR-79050	GAR-80050	3/16	.015	3/4	3/16	2	1
GAR-79060	GAR-80060	3/16	.020	3/4	3/16	2	1
GAR-79070	GAR-80070	3/16	.030	3/4	3/16	2	1
GAR-79100	GAR-80100	1/4	.015	3/4	1/4	2 1/2	1
GAR-79110	GAR-80110	1/4	.020	3/4	1/4	2 1/2	1
GAR-79120	GAR-80120	1/4	.030	3/4	1/4	2 1/2	1
GAR-79130	GAR-80130	1/4	.045	3/4	1/4	2 1/2	1
GAR-79160	GAR-80160	3/16	.015	7/8	3/16	2 1/2	1
GAR-79180	GAR-80180	3/16	.030	7/8	3/16	2 1/2	1
GAR-79190	GAR-80190	3/16	.045	7/8	3/16	2 1/2	1
---	GAR-80170	3/16	.020	7/8	3/16	2 1/2	1
GAR-79240	GAR-80240	3/8	.020	3/4	3/8	2 1/2	1
GAR-79250	GAR-80250	3/8	.030	3/4	3/8	2 1/2	1
GAR-79260	GAR-80260	3/8	.045	3/4	3/8	2 1/2	1
GAR-79230	---	3/8	.015	7/8	3/8	2 1/2	1
GAR-79320	GAR-80320	1/2	.030	1	1/2	3	1
GAR-79330	GAR-80330	1/2	.045	1	1/2	3	1
GAR-79340	GAR-80340	1/2	.060	1	1/2	3	1
GAR-79300	GAR-80300	1/2	.015	1	1/2	3	1
---	GAR-80310	1/2	.020	1	1/2	3	1

**2 and 4 Flute - Standard Length Ball End and Square Double End Center Cutting**

**GARR TOOL®**



4 Flute Square End



4 Flute Ball End

Used for general purpose. Diameter tolerance is  $\pm .000/- .002$ ".

2 Flute		4 Flute					
Item No.	Item No.	Flute Dia.	Flute Lgth.	Shank Dia.	OAL	Pack Qty.	
<b>Square End</b>							
GAR-29030	---	1/16	3/16	1/8	2	1	
---	GAR-30040	3/32	1/4	1/8	2	1	
---	GAR-30050	1/8	3/8	1/8	2	1	
GAR-29070	GAR-30070	3/16	1/2	3/16	2 1/2	1	
---	GAR-30090	1/4	5/8	1/4	2 1/2	1	
---	GAR-30100	3/16	3/4	5/16	3 1/2	1	
---	GAR-30110	3/8	3/4	3/8	3 1/2	1	
---	GAR-30130	1/2	1	1/2	4	1	
<b>Ball End</b>							
GAR-31030	---	1/16	3/16	1/8	2	1	
GAR-31090	---	1/4	3/8	1/4	2 1/2	1	

**4 Flute - N/C Tolerance Center Cutting - Ball End**

**GARR TOOL®**



Hold tight tolerances when precision machining. Use when matching tools are necessary. Shank dia. tolerance is  $\pm .0001/- .0004$ ". Center cutting, ball end.

Item No.	Flute Dia.	Flute Lgth.	Shank Dia.	OAL	Pack Qty.
GAR-28030	1/8	1/2	1/8	1 1/2	1
GAR-28050	1/4	3/4	1/4	2 1/2	1
GAR-28090	1/2	1	1/2	3	1

**2 Flute - Straight Square End and Ball End Center Cutting**

**GARR TOOL®**



Square End



Ball End

For cutting high Rockwell materials. Helps to hold perpendicularity. Diameter tolerance is  $\pm .000/- .002$ ".

Item No.	Flute Dia.	Flute Lgth.	OAL	Shank Dia.	Pack Qty.	Item No.	Flute Dia.	Flute Lgth.	OAL	Shank Dia.	Pack Qty.
<b>Square End</b>						<b>Ball End</b>					
GAR-81070	1/8	1/2	1 1/2	1/8	1	GAR-83070	1/8	1/2	1 1/2	1/8	1
GAR-81110	3/16	3/8	2	3/16	1	GAR-83110	3/16	3/8	2	3/16	1
GAR-81150	1/4	3/4	2 1/2	1/4	1	GAR-83230	3/16	7/8	2 1/2	3/8	1
GAR-81190	5/16	7/8	2 1/2	5/16	1						
GAR-81230	3/8	7/8	2 1/2	3/8	1						
GAR-81310	1/2	1	3	1/2	1						

**2 and 4 Flute - Standard Length Center Cutting - 30 Degree Helix Square End and Ball End**

**GARR TOOL®**



2 Flute Square End



2 Flute Ball End



4 Flute Ball End

Used for general purposes. Diameter tolerance is  $\pm .000/- .002$ ", 30 degree helix rhs/rhc.

2 Flute		4 Flute					
Item No.	Item No.	Flute Dia.	Flute Lgth.	Shank Dia.	OAL	Pack Qty.	
<b>Square End</b>							
GAR-11010	GAR-13010	1/32	3/32	1/8	1 1/2	1	
---	GAR-13020	3/64	3/8	1/8	1 1/2	1	
GAR-11030	GAR-13030	1/16	1/4	1/8	1 1/2	1	
GAR-11040	GAR-13040	5/64	3/4	1/8	1 1/2	1	
GAR-11050	GAR-13050	3/32	3/8	1/8	1 1/2	1	
GAR-11070	GAR-13070	1/8	1/2	3/16	1 1/2	1	
GAR-11090	GAR-13090	5/32	3/4	3/16	2	1	
GAR-11110	GAR-13110	3/16	3/4	3/16	2	1	
GAR-11150	GAR-13150	1/4	3/4	1/4	2 1/2	1	
---	GAR-13170	9/32	7/8	3/16	2 1/2	1	
GAR-11190	GAR-13190	5/16	7/8	3/16	2 1/2	1	
GAR-11230	GAR-13230	3/8	1	3/8	2 1/2	1	
GAR-11270	GAR-13270	7/16	1	7/16	2 1/2	1	
GAR-11310	GAR-13310	1/2	1	1/2	3	1	
---	GAR-13320	9/16	1 1/4	3/8	3 1/2	1	
GAR-11330	GAR-13330	5/8	1 1/4	3/8	3 1/2	1	
GAR-11350	GAR-13350	3/4	1 1/2	3/4	4	1	
GAR-11360	GAR-13360	7/8	1 1/2	7/8	4	1	
GAR-11370	---	1	1	1	4	1	
---	GAR-13370	1	1 1/2	1	4	1	
<b>Ball End</b>							
GAR-16010	GAR-18010	1/32	3/32	1/8	1 1/2	1	
GAR-16020	GAR-18020	3/64	1/8	1/8	1 1/2	1	
GAR-16030	GAR-18030	1/16	1/4	1/8	1 1/2	1	
GAR-16040	---	5/64	1/4	1/8	1 1/2	1	
GAR-16050	GAR-18050	3/32	3/8	1/8	1 1/2	1	
GAR-16070	GAR-18070	1/8	1/2	1/8	1 1/2	1	
GAR-16090	GAR-18090	5/32	3/4	3/16	2	1	
GAR-16110	GAR-18110	3/16	3/4	3/16	2	1	
GAR-16150	GAR-18150	1/4	3/4	1/4	2 1/2	1	
GAR-16190	GAR-18190	5/16	7/8	5/16	2 1/2	1	
GAR-16230	GAR-18230	3/8	7/8	3/8	2 1/2	1	
GAR-16310	GAR-18310	1/2	1	1/2	3	1	
---	GAR-18320	9/16	1 1/4	3/8	3 1/2	1	
GAR-16330	GAR-18330	5/8	1 1/4	5/8	3 1/2	1	
GAR-16350	GAR-18350	3/4	1 1/2	3/4	4	1	
GAR-16370	---	1	1 1/2	1	4	1	

**2 Flute Center Cutting - 45 Degree Helix Square End**

**GARR TOOL®**



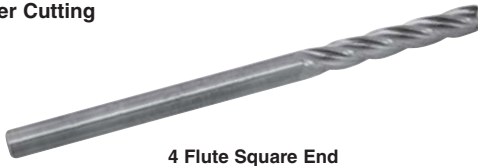
High performance machining of aluminum and titanium. Rigid work holding, machine stability and part integrity are critical. Excellent choice for slotting. Can be modified with a corner radius.

Item No.	Flute Dia.	Dec. Equiv.	Flute Lgth.	Shank Dia.	OAL	Pack Qty.
<b>Inch</b>						
GAR-85200	1/4	.2500	1/2	1/4	2	1
GAR-85220	1/4	.2500	1	1/4	2 1/2	1
GAR-85240	1/4	.2500	2	1/4	4	1
GAR-85300	5/16	.3125	1 1/8	5/16	3	1
GAR-85400	3/8	.3750	5/8	3/8	2	1
GAR-85420	3/8	.3750	1	3/8	2 1/2	1
GAR-85440	3/8	.3750	2	3/8	4	1
GAR-85500	1/2	.5000	3/4	1/2	2 1/2	1
GAR-85520	1/2	.5000	1 1/4	1/2	3	1
GAR-85540	1/2	.5000	2	1/2	4	1
GAR-85600	5/8	.6250	1 3/8	5/8	3 1/2	1
GAR-85620	5/8	.6250	3	5/8	6	1
GAR-85700	3/4	.7500	1 3/4	3/4	4	1
GAR-85720	3/4	.7500	3	3/4	6	1
GAR-85800	1	1.000	1 3/4	1	4	1
GAR-85820	1	1.000	3	1	6	1
<b>Metric</b>						
GAR-09010	6	.2362	12	6	50	1
GAR-09020	6	.2362	25	6	63	1
GAR-09030	6	.2362	50	6	101	1
GAR-09240	8	.3150	20	8	63	1
GAR-09040	8	.3150	30	8	76	1
GAR-09050	8	.3150	50	8	101	1
GAR-09060	10	.3937	16	10	50	1
GAR-09070	10	.3937	25	10	63	1
GAR-09080	10	.3937	50	10	101	1
GAR-09090	12	.4724	20	12	63	1
GAR-09100	12	.4724	32	12	76	1
GAR-09110	12	.4724	50	12	101	1
GAR-09120	16	.6299	41	16	88	1
GAR-09130	16	.6299	76	16	152	1
GAR-09140	18	.7087	44	18	101	1
GAR-09350	20	.7874	38	20	101	1
GAR-09150	20	.7874	76	20	152	1
GAR-09160	25	.9843	44	25	101	1
GAR-09170	25	.9843	76	25	152	1

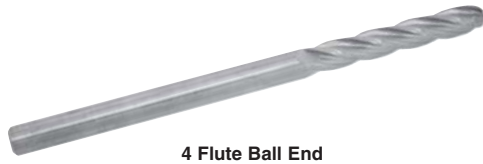


**Solid Submicron Grain Carbide End Mills**  
**2 and 4 Flute - Extra Length**  
**Square End and Ball End**  
**Center Cutting**

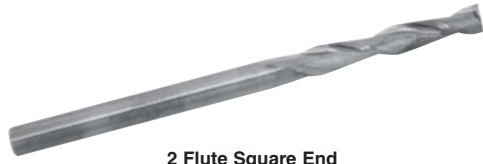
**GARR TOOL®**



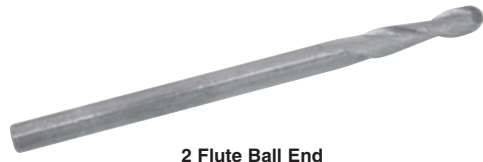
**4 Flute Square End**



**4 Flute Ball End**



**2 Flute Square End**



**2 Flute Ball End**

Extended reach and extended lengths of cut, for deep pocket milling. Diameter tolerance is  $+.000/-0.002$ .

2 Flute		4 Flute		Shank Dia.	OAL	Pack Qty.
Item No.	Item No.	Flute Dia.	Flute Lgth.			
<b>Square End</b>						
—	GAR-42010	1/8	5/8	1/8	3	1
GAR-41020	GAR-42020	1/8	3/4	1/8	3	1
GAR-41030	GAR-42030	1/8	1	1/8	3	1
—	GAR-42040	3/16	1	3/16	3	1
—	GAR-42050	3/16	1	3/16	3	1
GAR-41060	GAR-42060	3/16	1	3/16	4	1
—	GAR-42070	1/4	1	1/4	4	1
GAR-41080	GAR-42080	1/4	1	1/4	4	1
GAR-41090	GAR-42090	1/4	1 1/2	1/4	4	1
GAR-41100	GAR-42100	1/4	1 1/2	1/4	6	1
GAR-41120	GAR-42120	5/16	1	5/16	4	1
—	GAR-42130	5/16	1 1/8	5/16	4	1
GAR-41140	GAR-42140	5/16	1 1/2	5/16	6	1
GAR-41160	GAR-42160	3/8	1	3/8	4	1
GAR-41170	GAR-42170	3/8	2	3/8	4	1
GAR-41180	GAR-42180	3/8	1 1/2	3/8	6	1
—	GAR-42190	3/8	3	3/8	6	1
GAR-41250	GAR-42250	1/2	1	1/2	2	1
GAR-41240	GAR-42240	1/2	1	1/2	4	1
GAR-41260	GAR-42260	1/2	1 1/2	1/2	6	1
GAR-41270	GAR-42270	1/2	3	1/2	6	1
GAR-41300	GAR-42300	5/8	2	5/8	6	1
—	GAR-42310	5/8	3	5/8	6	1
GAR-41320	GAR-42320	3/4	2	3/4	6	1
—	GAR-42330	3/4	3	3/4	6	1
—	GAR-42340	1	2	1	6	1
—	GAR-42350	1	3	1	6	1
—	GAR-42360	1	4	1	6	1
<b>Ball End</b>						
GAR-43010	GAR-44010	1/8	5/8	1/8	2	1
GAR-43020	GAR-44020	1/8	3/4	1/8	3	1
GAR-43030	GAR-44030	1/8	1	1/8	3	1
—	GAR-44050	3/16	1	3/16	3	1
—	GAR-44040	3/16	1 1/8	3/16	3	1
GAR-43060	GAR-44060	3/16	1	3/16	4	1
GAR-43070	—	1/4	2	1/4	3	1
GAR-43080	GAR-44080	1/4	1	1/4	4	1
GAR-43090	GAR-44090	1/4	1 1/2	1/4	4	1
GAR-43100	GAR-44100	1/4	1 1/2	1/4	6	1
GAR-43120	GAR-44120	5/16	1	5/16	4	1
GAR-43140	GAR-44140	5/16	1 1/2	5/16	6	1
GAR-43160	GAR-44160	3/8	1	3/8	4	1
GAR-43170	GAR-44170	3/8	2	3/8	4	1
GAR-43180	GAR-44180	3/8	1 1/2	3/8	6	1
GAR-43190	GAR-44190	3/8	3	3/8	6	1
GAR-43240	GAR-44240	1/2	1	1/2	4	1
GAR-43250	GAR-44250	1/2	2	1/2	4	1
GAR-43260	GAR-44260	1/2	1 1/2	1/2	6	1
GAR-43270	GAR-44270	1/2	3	1/2	6	1
GAR-43300	GAR-44300	5/8	2	5/8	6	1
GAR-43320	GAR-44320	3/4	2	3/4	6	1
GAR-43330	GAR-44330	3/4	3	3/4	6	1
—	GAR-44340	1	2	1	6	1
GAR-43350	—	1	3	1	6	1

**TiN and TiCN Coated End Mills**  
**2 and 4 Flute - Standard Length**  
**Center Cutting**

**GARR TOOL®**

General purpose 30 degree helix -rhs/rhc. Made from submicron grain carbide. Coated TiN or TiCN for improved lubricity and abrasion resistance. TiCN works for applications in steel, and high temperature alloys. Diameter tolerance is  $+.000/-0.002$ .



**2 Flute Square End TiCN Coated**



**4 Flute Square End TiN Coated**



**4 Flute Square End TiCN Coated**

Square End		Ball End		Flute Dia.	Flute Lgth.	Shank Dia.	OAL	No. of Flutes	Pack Qty.	
Item No.	Item No.	Item No.	Item No.							
<b>TiN</b>										
GAR-13073	GAR-18073			1/8	1/2	1/8	1 1/2	4	1	
GAR-13113	GAR-18113			3/16	3/8	3/16	2	4	1	
GAR-13153	GAR-18153			1/4	3/4	1/4	2 1/2	4	1	
GAR-13193	GAR-18193			3/16	7/8	3/16	2 1/2	4	1	
GAR-13233	GAR-18233			3/8	7/8	3/8	2 1/2	4	1	
GAR-13313	GAR-18313			1/2	1	1/2	3	4	1	
<b>TiCN</b>										
—	GAR-16034			1/16	1/4	1/16	1 1/2	2	1	
GAR-13074	—			1/8	1/2	1/8	1 1/2	4	1	
—	GAR-16074			1/8	1/2	1/8	1 1/2	2	1	
—	GAR-16114			3/16	5/8	3/16	2	2	1	
—	GAR-16154			1/4	3/4	1/4	2 1/2	2	1	
—	GAR-18154			1/4	3/4	1/4	2 1/2	4	1	
GAR-13234	GAR-18234			3/8	7/8	3/8	2 1/2	4	1	
GAR-13314	—			1/2	1	1/2	3	4	1	

**TiAlN Coated End Mills**  
**4 Flute - Extra Length**

**GARR TOOL®**



Made from submicron grain carbide. Center cutting.

Item No.	Flute Dia.	Flute Lgth.	Shank Dia.	OAL	No. of Flutes	Pack Qty.
GAR-42247	1/2	1	1/2	4	4	1
GAR-42257	1/2	2	1/2	4	4	1
GAR-42267	1/2	1 1/2	1/2	6	4	1

**2 and 4 Flute - Stub Length**  
**Square End and Ball End**

**GARR TOOL®**



**4 Flute Square End**



**4 Flute Ball End**



**2 Flute Square End**



**2 Flute Ball End**

Short flute length for rigidity. 30 degree helix rhs/rhc. Center cutting. Diameter tolerance is  $+.000/-0.002$ .

2 Flute		4 Flute		Shank Dia.	OAL	Pack Qty.
Item No.	Item No.	+0.000/0.002 Flute Dia.	Flute Lgth.			
<b>Square End</b>						
—	GAR-02010	1/32	1/16	1/8	1 1/2	1
GAR-01030	GAR-02030	1/16	1/8	1/8	1 1/2	1
GAR-01040	—	3/32	3/16	1/8	1 1/2	1
GAR-01050	GAR-02050	1/8	1/4	1/8	1 1/2	1
GAR-01060	—	5/32	5/16	3/16	2	1
GAR-01070	GAR-02070	3/16	3/8	3/16	2	1
GAR-01090	GAR-02090	1/4	1/2	1/4	2	1
GAR-01100	—	3/16	1/2	5/16	2	1
GAR-01110	—	3/8	5/8	3/8	2	1
—	GAR-02130	1/2	5/8	1/2	2 1/2	1
<b>Ball End</b>						
GAR-03010	GAR-04010	1/32	1/16	1/8	1 1/2	1
—	GAR-04030	1/16	1/8	1/8	1 1/2	1
GAR-03040	—	3/32	3/16	1/8	1 1/2	1
GAR-03070	—	3/16	3/8	3/16	2	1

**Short Flute - Stub Length**  
**Double Square End**  
**Center Cutting**

**GARR TOOL®**



Square end and short flute length for rigidity. 30 degree helix rhs/rhc. Diameter tolerance is  $+.000/-0.002$ .

Item No.	+0.000/-0.002 Flute Dia.	Flute Lgth.	Shank Dia.	OAL	Pack Qty.
GAR-06040	3/32	3/16	1/8	1 1/2	1
GAR-06050	1/8	1/4	1/8	1 1/2	1
GAR-06090	1/4	1/2	1/4	2 1/2	1
GAR-06110	3/8	1/2	3/8	2 1/2	1



AlumaStar® coating (Titanium Diboride - TiB2) has a low affinity to aluminum and high hardness, making it integral to the productive machining of aluminum alloys. The thickness is kept intentionally lower in order to maintain sharp cutting edges needed for the machining of softer materials like magnesium, and various copper and titanium alloys.

Specific coating engineered to repel aluminum. Engineered to run at 750-2500 SFM. High velocity- high metal removal rate. Use properly balanced holders. Holds perpendicularity.

2 and 3 Flute HSAL Square End - AlumaStar® Coated



2 Flute

3 Flute

Table with columns: Item No., Item No., Flute Dia., Dec. Equiv., Flute Lgth., Shank Dia., OAL, Pack Qty. for 2 Flute and 3 Flute end mills.

2 Flute HSAL Ball End - AlumaStar® Coated



Table with columns: Item No., Flute Dia., Dec. Equiv., Flute Lgth., Shank Dia., OAL, Pack Qty. for 2 Flute HSAL Ball End end mills.

3 Flute HSAL Corner Radius - AlumaStar® Coated



Table with columns: Item No., Flute Dia., Dec Equiv., Corner Radius, Flute Lgth., Shank Dia., OAL, Pack Qty. for 3 Flute HSAL Corner Radius end mills.

Cutting Fluids Tap Free Excel



A high performance cutting oil that produces tight tolerances, provides longer tool life and gives a better finish on all metals. Especially effective on hard to cut metals.

Table with columns: Item No., Container, Pack Qty. for Tap Free Excel.

Cutting Fluids Tap Free 2



An environmentally safe, aqueous-based fluid that provides superior performance on most metals from aluminum to stainless steel. Easy clean up.

Table with columns: Item No., Container, Pack Qty. for Tap Free 2.

**High Performance Balinit® X-Treme Coated End Mills**  
2 Flute  
Die Mold Cutters**GARR TOOL®**

Tapered

Straight

High performance machining in the die mold industry. Rigid work holdings, machining stability and part integrity are critical. Carbide tested and selected for specific application. High Rc materials.

Item No.	Flute Dia.	Dec. Equiv	Flute Lgth.	Shank Dia.	OAL	Pack Qty.
<b>Tapered - Inch</b>						
GAR-14210	1/32	.0312	1/32	1/4	3	1
GAR-14220	1/16	.0625	1/16	1/4	3	1
GAR-14230	3/32	.0938	3/32	1/4	3	1
GAR-14240	1/8	.1250	1/8	1/4	3	1
GAR-14250	3/16	.1875	3/16	1/4	3	1
<b>Tapered - Metric</b>						
GAR-15210	1	.0394	1	6	75	1
GAR-15220	1.5	.0591	1.5	6	75	1
GAR-15230	2	.0787	2	6	75	1
GAR-15240	3	.1181	3	6	75	1
GAR-15250	4	.1575	4	6	75	1
GAR-15260	5	.1969	5	6	75	1
<b>Straight - Inch</b>						
GAR-14260	1/4	.2500	1/4	1/2	4	1
GAR-14270	3/16	.3125	3/16	1/2	4	1
GAR-14280	3/8	.3750	3/8	1/2	4	1
GAR-14290	1/2	.5000	1/2	1	4	1
<b>Straight - Metric</b>						
GAR-15270	6	.2362	6	6	75	1
GAR-15280	8	.3150	8	8	101	1
GAR-15290	10	.3937	10	10	101	1
GAR-15300	12	.4724	12	12	101	1

**High Performance End Mills**  
4 Flute  
Square End - TiALN Coated**GARR TOOL®**

State-of-the-art solid carbide rougher using VRX technology. Reduces tool pressure for more aggressive machining. Recommended for stainless steel, inconel, PH materials, cold rolled steel, titanium, cast iron and tool steels. Furnished with a standard 45 degree lead chamfer.

Item No.	Flute Dia.	Dec Equiv.	Chamfer Lgth.	Flute Lgth.	Shank Dia.	OAL	Pack Qty.
<b>Inch</b>							
GAR-49520	1/4	.2500	.020	3/8	1/4	2	1
GAR-49540	1/4	.2500	.020	3/4	1/4	2 1/2	1
GAR-49570	3/32	.2812	.020	7/16	5/16	2	1
GAR-49575	3/32	.2812	.020	13/16	5/16	2 1/2	1
GAR-49580	5/16	.3125	.020	7/16	5/16	2	1
GAR-49600	5/16	.3125	.020	13/16	5/16	2 1/2	1
GAR-49625	1/32	.3438	.025	7/8	3/8	2	1
GAR-49630	1/32	.3438	.025	7/8	3/8	2 1/2	1
GAR-49640	3/8	.3750	.025	1/2	3/8	2	1
GAR-49660	3/8	.3750	.025	7/8	3/8	2 1/2	1
GAR-49690	7/16	.4375	.025	3/8	7/16	2 1/2	1
GAR-49700	7/16	.4375	.025	1	7/16	2 3/4	1
GAR-49740	1/2	.5000	.030	3/8	1/2	2 1/2	1
GAR-49760	1/2	.5000	.030	1 1/4	1/2	3	1
GAR-49780	3/8	.6250	.035	3/4	5/8	3	1
GAR-49800	3/8	.6250	.035	1 1/4	5/8	3 1/2	1
GAR-49820	3/8	.6250	.035	1 3/4	5/8	4	1
GAR-49860	3/4	.7500	.040	7/8	3/4	3	1
GAR-49880	3/4	.7500	.040	1 3/4	3/4	4	1
GAR-49925	1	1.000	.040	1	1	4	1
GAR-49930	1	1.000	.040	1 1/2	1	4	1
GAR-49940	1	1.000	.040	2	1	5	1
<b>Metric</b>							
GAR-49490	6	.2362	.51	12	6	50	1
GAR-49500	6	.2362	.51	19	6	63	1
GAR-49550	7	.2756	.51	12	8	50	1
GAR-49555	7	.2756	.51	22	8	63	1
GAR-49610	8	.3150	.51	12	8	50	1
GAR-49620	8	.3150	.51	22	8	63	1
GAR-49635	9	.3543	.63	14	10	50	1
GAR-49637	9	.3543	.63	22	10	63	1
GAR-49670	10	.3937	.63	16	10	50	1
GAR-49680	10	.3937	.63	22	10	63	1
GAR-49710	12	.4724	.76	19	12	63	1
GAR-49720	12	.4724	.76	32	12	76	1
GAR-49765	14	.5512	.76	19	14	76	1
GAR-49770	14	.5512	.76	32	14	88	1
GAR-49830	16	.6299	.89	19	16	76	1
GAR-49840	16	.6299	.89	32	16	88	1
GAR-49845	18	.7087	.89	22	18	76	1
GAR-49850	18	.7087	.89	38	18	101	1
GAR-49890	20	.7874	1.01	22	20	76	1
GAR-49900	20	.7874	1.01	41	20	101	1
GAR-49905	22	.8661	1.01	22	22	101	1
GAR-49910	22	.8661	1.01	41	22	101	1
GAR-49915	25	.9843	1.01	25	25	101	1
GAR-49920	25	.9843	1.01	41	25	101	1

Note: Furnished with a standard 45° lead chamfer.

**High Performance TiALN Coated End Mills**  
5 Flute  
45 Degree Helix**GARR TOOL®**

High performance milling in steels, stainless steel and exotics. Rigid work holding, machine stability and part integrity are critical. Dry or semi-dry machining. Up to 40% faster than uncoated. Improved finishes in titanium. Heavy core. Sharp corners.

Item No.	Flute Dia.	Dec. Equiv	Flute Lgth.	Shank Dia.	OAL	Pack Qty.
GAR-52107	3/16	.1875	5/16	3/16	2	1
GAR-52127	3/16	.1875	9/16	3/16	2	1
GAR-52207	1/4	.2500	3/4	1/4	2	1
GAR-52227	1/4	.2500	3/4	1/4	2 1/2	1
GAR-52247	1/4	.2500	1 1/4	1/4	4	1
GAR-52307	5/16	.3125	7/16	5/16	2	1
GAR-52327	5/16	.3125	13/16	5/16	2 1/2	1
GAR-52347	5/16	.3125	1 1/4	5/16	4	1
GAR-52407	3/8	.3750	1/2	3/8	2	1
GAR-52427	3/8	.3750	7/8	3/8	2 1/2	1
GAR-52447	3/8	.3750	1 1/2	3/8	3 1/2	1
GAR-52507	7/16	.4375	9/16	7/16	2 1/2	1
GAR-52527	7/16	.4375	1	7/16	2 3/4	1
GAR-52547	7/16	.4375	2	7/16	4	1
GAR-52607	1/2	.5000	5/8	1/2	2 1/2	1
GAR-52627	1/2	.5000	1 1/4	1/2	3	1
GAR-52647	1/2	.5000	2	1/2	4	1
GAR-52707	3/8	.6250	3/4	5/8	3	1
GAR-52727	3/8	.6250	13/16	5/8	3 1/2	1
GAR-52747	3/8	.6250	2 1/2	5/8	6	1
GAR-52807	3/4	.7500	7/8	3/4	3	1
GAR-52827	3/4	.7500	1 3/4	3/4	4	1
GAR-52847	3/4	.7500	3 1/4	3/4	6	1
GAR-52927	1	1.000	2	1	4	1
GAR-52947	1	1.000	3 1/4	1	6	1

**High Performance TiALN Coated End Mills**  
3 Flute  
50 Degree Helix**GARR TOOL®**

High performance machining of stainless steel. Rigid work holding, machine stability and part integrity are critical. Up to 40% faster than uncoated. Sharp corners.

Item No.	Flute Dia.	Dec. Equiv	Flute Lgth.	Shank Dia.	OAL	Pack Qty.
GAR-86157	3/16	.1875	5/16	3/16	2	1
GAR-86167	3/16	.1875	9/16	3/16	2	1
GAR-86187	3/16	.1875	1	3/16	3	1
GAR-86207	1/4	.2500	1/2	1/4	2	1
GAR-86227	1/4	.2500	3/4	1/4	2 1/2	1
GAR-86247	1/4	.2500	1 1/4	1/4	3	1
GAR-86257	5/16	.3125	7/16	5/16	2	1
GAR-86277	5/16	.3125	13/16	5/16	2 1/2	1
GAR-86287	5/16	.3125	1 1/4	5/16	4	1
GAR-86307	3/8	.3750	1/2	3/8	2	1
GAR-86327	3/8	.3750	1	3/8	2 1/2	1
GAR-86347	3/8	.3750	1 1/2	3/8	3 1/2	1
GAR-86367	7/16	.4375	9/16	7/16	2 1/2	1
GAR-86377	7/16	.4375	1	7/16	2 3/4	1
GAR-86387	7/16	.4375	2	7/16	4	1
GAR-86407	1/2	.5000	5/8	1/2	2 1/2	1
GAR-86427	1/2	.5000	1	1/2	3	1
GAR-86447	1/2	.5000	2	1/2	4	1
GAR-86467	9/16	.5625	7/8	9/16	3	1
GAR-86477	9/16	.5625	1 1/4	9/16	3 1/2	1
GAR-86487	9/16	.5625	2 1/2	9/16	6	1
GAR-86507	3/8	.6250	7/8	3/8	3	1
GAR-86527	3/8	.6250	1 1/4	3/8	3 1/2	1
GAR-86547	3/8	.6250	2 1/2	3/8	6	1
GAR-86607	3/4	.7500	1	3/4	3 1/2	1
GAR-86627	3/4	.7500	1 1/2	3/4	4	1
GAR-86647	3/4	.7500	3	3/4	6	1
GAR-86707	1	1.000	1 3/4	1	3	1
GAR-86727	1	1.000	2	1	4	1
GAR-86747	1	1.000	3 1/4	1	6	1

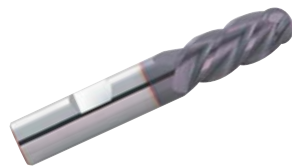


HIGH PERFORMANCE END MILLS

Buy One or Buy Bulk & SAVE

High Performance End Mills
4 Flute - Ball End
Balinit® X.CEED Coated

GARR TOOL®



State-of-the-art solid carbide rougher finisher using VRX technology. Reduces vibration for more aggressive machining resulting in less cycle times and greater productivity...

Table with columns: Plain/Weldon Flats, Item No., Flute Dia., Dec. Equiv., Flute Lgth., Shank Dia., OAL, Pack Qty. Includes sub-sections for Inch and Metric.

High Performance End Mills
Extra Length - Corner Radius
Balinit® X.CEED Coated



Table with columns: Plain/Weldon, Item No., Flute Dia., Dec. Equiv., Corner Radius, Flute Lgth., Shank Dia., OAL, Pack Qty. Includes sub-sections for Inch and Metric.

High Performance End Mills
4 Flute - Corner Radius
Balinit® X.CEED Coated

GARR TOOL®



State-of-the-art solid carbide rougher finisher using VRX technology. Reduces vibration for more aggressive machining resulting in less cycle times and greater productivity...

Table with columns: Plain/Weldon Flats, Item No., Flute Dia., Dec. Equiv., Corner Radius, Flute Lgth., Shank Dia., OAL, Pack Qty. Includes sub-sections for Inch and Metric.

GARR TOOL®

# KEYS, CUTTERS, BROACHES & CUTTING FLUID



## Cutters High Speed Steel



These cutters have straight flutes and 1/2" straight shanks. There is 2" under the head with right hand cutters.

Item No.	Old Std.	ASME Std.	Width/Dia.	Pack Qty.
WKC-1	1	204	1/16 x 1/2	1
WKC-3	3	404	1/8 x 1/2	1
WKC-4	5	405	1/8 x 5/8	1
WKC-5	7	406	1/8 x 3/4	1
WKC-7	8	506	5/32 x 3/4	1
WKC-9	9	606	3/16 x 3/4	1
WKC-19	91	806	1/4 x 3/4	1
WKC-10	11	607	3/16 x 1/2	1
WKC-13	15	808	1/4 x 1	1
WKC-15	B	1008	5/16 x 1	1

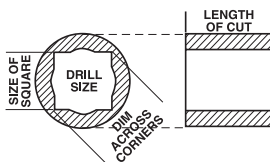
## Slotting Cutters High Speed Steel - Narrow Widths - Woodruff Style



Narrow width slotting cutters can be used for a multitude of narrow slotting or slitting operations. Wherever shank type slotting cutters can be used there is a considerable savings in setup time over arbor type saws. In some cases, the shank type are the only kind that can be used. Made of high speed steel - properly hardened. Hollow ground for free cutting action. Width tolerance is ± .0005". OD tolerance on the 1/2", 5/8" and 3/4" is +.010"/+.015". OD tolerance on the 1" and 1 1/8" is +.012"/+.017". OD tolerance on the 1 1/4", 1 3/8" and 1 1/2" is +.015"/+.020". Right hand cut. Shanks are 1/2" diameter - 2" long.

Item No.	Head Dia.	Head Width	Pack Qty.	Item No.	Head Dia.	Head Width	Pack Qty.
NW-1	1/2	.020	1	NW-18	1	3/32	1
NW-2	1/2	1/32	1	NW-20	1	1/8	1
NW-5	5/8	1/32	1	NW-22	1	5/32	1
NW-7	5/8	1/16	1	NW-34	1 1/4	3/32	1
NW-15	1	3/64	1	NW-39	1 3/8	1/16	1
NW-16	1	1/16	1	NW-48	1 1/2	1/8	1

## Square Hole Broaches



High speed steel, push type, for use with arbor or hydraulic press, to finish in one pass in cast or drilled bore.

Item No.	Size Square	Limits	Broach Lgth.	Pilot Dia.	Drill Size	Dimensions Across Corners	Tooth Pitch		Lgth. of Cut		Pack Qty.
							Min.	Max.	Min.	Max.	
SHB-3	3/16	.1880 - .1890	5 9/16	.1935	#10	.2620 - .2640	5/32	1/4	5/8	1	
SHB-4	1/32	.2190 - .2200	6 3/8	.2280	#1	.3060 - .3080	3/16	1/4	3/4	1	
SHB-5	1/4	.2505 - .2515	6 1/2	.2656	17/64	.3510 - .3530	3/16	1/4	3/4	1	
SHB-7	5/16	.3130 - .3140	7 7/8	.3281	21/64	.4370 - .4390	7/32	3/8	1	1	
SHB-8	11/32	.3440 - .3450	9 3/8	.3594	23/64	.4830 - .4850	1/4	3/8	1 1/4	1	
SHB-9	3/8	.3755 - .3765	9 3/8	.3906	25/64	.5240 - .5260	1/4	3/8	1 1/4	1	
SHB-13	1/2	.5005 - .5015	12	.5312	17/32	.6990 - .7010	5/16	1/2	1 3/8	1	

Note: Length of Cut is based on mild steel.

## Woodruff Keys



These carbon steel keys are made from SAE 1035 steel and are not heat treated. Burr-free and polished to hold work firmly with a rockwell hardness of 90-100 B Scale.

Item No.	Old Std.	ASME Std.	Width x Dia.	Pack Qty.
WK-1	1	204	1/16 x 1/2	1
WK-2	2	304	3/32 x 1/2	1
WK-17	4	305	3/32 x 5/8	1
WK-3	3	404	1/8 x 1/2	1
WK-4	5	405	1/8 x 5/8	1
WK-5	7	406	1/8 x 3/4	1
WK-10	11	607	3/16 x 1/2	1
WK-11	13	608	3/16 x 1	1
WK-12	A	807	1/4 x 1	1
WK-13	15	808	1/4 x 1	1
WK-14	18	809	1/4 x 1 1/8	1
WK-15	B	1008	5/16 x 1	1
WK-16	C	1009	5/16 x 1 1/8	1

## Woodruff Keys



For locating and locking wheels, pulleys, etc. on shafts and similar assemblies. Plain finish carbon steel.

Item No.	Size	Lgth.	Pack Qty.
ROC-X8081-471	1/8	1/2	25
ROC-X8081-472	1/8	5/8	25
ROC-X8081-473	1/8	3/4	25
ROC-X8081-487	5/32	3/4	25
ROC-X8081-508	3/16	3/4	20
ROC-X8081-510	3/16	1	20
ROC-X8081-541	1/4	7/8	10
ROC-X8081-542	1/4	1	10
ROC-X8081-543	1/4	1 1/8	10
ROC-X8081-544	1/4	1 1/4	10
ROC-X8081-583	5/16	1	10

## Cutting and Tapping Fluid



Both products are extremely effective on most metals including aluminum and stainless steel. Does not contain trichloroethane or any ozone depleting substances. Cool Tool II is also free of methylene chloride, chlorine and sulfur. It may be used alone or as an additive to enhance less expensive cutting oils.

Item No.	Container	Pack Qty.
Cool Tool		
MC-101	1 Pint Can	1
MC-103	1 Gal. Can	1
Cool Tool II		
MC-110	16 oz. Aerosol Can	1
MC-111	1 Pint Can	1
MC-2G	1 Gal. Can	1

**Keyway Broaches**  
High Speed Steel

All furnished with the necessary shims.

Item No.	Size	Keyway Width	Broach Dia.	No. Shims Required	Pack Qty.	Item No.	Size	Keyway Width	Broach Dia.	No. Shims Required	Pack Qty.
KW-2	A	3/32	1/8 x 5	0	1	KW-7	B	3/16	3/16 x 6 3/4	1	1
KW-3	A	1/8	1/8 x 5	1	1	KW-9	C	1/4	3/8 x 11 3/4	1	1
KW-5	B	1/8	3/16 x 6 3/4	1	1	KW-10	C	5/16	3/8 x 11 3/4	2	1
KW-6	B	3/32	3/16 x 6 3/4	1	1						

**Collared Keyway Bushings**

"A" bushings used with "A" broaches, "B" bushings with "B" broaches, etc.

Item No.	Bushing	Dia.	Pack Qty.
KBC-3	A	3/8	1
KBC-4	A	7/16	1
KBC-5	A	1/2	1
KBC-8	B	5/8	1
KBC-10	B	3/4	1
KBC-17	C	1	1

**Square Steel Keystock**

Material is high quality, cold drawn steel, C1020 to C1045. All sizes meet ISO R773, and BS 4235. Most sizes meet DIN 6880.

Meter Lgth.	12" Lgth.		Pack Qty.
Item No.	Item No.	Size (mm)	Pack Qty.
MKS-01*	MKS-21*	3 x 3	1
MKS-02	MKS-22	4 x 4	1
MKS-03	MKS-23	5 x 5	1
MKS-04	MKS-24	6 x 6	1
—	MKS-25	8 x 8	1
MKS-06	MKS-26	10 x 10	1
—	MKS-27	12 x 12	1
—	MKS-28	14 x 14	1

\* Plain Finish

**Square Key Stock**  
Zinc Plated Steel  
Individual Sizes

- Made of mild steel, electro-zinc plated
- Size is clearly marked on each bar
- 12" lengths

Item No.	Fractional Size	Millimeter Size	Tolerance	Pack Qty.
KS-1412	3/32	2.3810	+ .003 / - .0	1
KS-1415	1/8	3.1750	+ .003 / - .0	1
KS-1417	5/32	3.9690	+ .003 / - .0	1
KS-1420	3/16	4.7630	+ .003 / - .0	1
KS-1425	1/4	6.3500	+ .003 / - .0	1
KS-1430	5/16	7.9375	+ .003 / - .0	1
KS-1432	3/8	9.5250	+ .003 / - .0	1
KS-1435	7/16	11.1125	+ .003 / - .0	1
KS-1437	1/2	12.7000	+ .003 / - .0	1
KS-1442	5/8	15.8750	+ .003 / - .0	1
KS-1445	3/4	19.0500	+ .003 / - .0	1
KS-1450	1	25.4000	+ .004 / - .0	1

**Square Key Stock**  
Stainless Steel  
Individual Sizes

- Made of Type 303/304 Stainless Steel
- Size is clearly marked on each bar
- 12" lengths

Item No.	Fractional Size	Millimeter Size	Tolerance	Pack Qty.
KS-57501	1/8	3.1750	+/- .003	1
KS-57502	3/16	4.7630	+/- .003	1
KS-57503	1/4	6.3500	+0 / - .002	1
KS-57504	5/16	7.9375	+0 / - .003	1
KS-57505	3/8	9.5250	+0 / - .003	1
KS-57507	1/2	12.7000	+0 / - .004	1
KS-57508	5/8	15.8750	+0 / - .004	1

**Broach & Bushing Sets**  
Inch and Metric

High speed steel. All necessary shims provided with each broach set. Packaged in hardwood, varnished box.

Item No.	Description	Pack Qty.
<b>Inch</b>		
KBS-3C	Consists of: four broaches, two "B" size, one each for 1/8" and 3/16" wide keyways; and two "C" size, one each for 1/4" and 3/8" wide keyways. Four "B" bushing bores 1/2", 5/8", 3/4" and 7/8". Five "C" bushings for bores 1", 1 1/8", 1 1/4", 1 3/8" and 1 1/2". Collar type bushings. Cuts 18 different keyways.	1
<b>Metric</b>		
MBS-60	Consists of: two "A" size broaches, one each for 2mm and 3mm wide keyways. Three collared bushings, one each for 6mm, 8mm and 10mm bores. Cuts 6 different keyways.	1

# SQUARE, HEX & SLOTTED SLEEVES

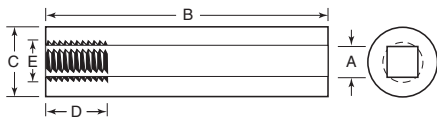


## Square, Hex & Slotted Sleeves Square-Holed Mild or Pre-Hardened



With Thread

Without Thread



Square-holed sleeves are ideal for making boring bars, milling cutters, tool holders and any other use where an accurate square hole is required. Square and concentric to .003" T.I.R. Two styles available in 11L17 or equivalent. One with a tapped hole at one end, to receive backup screw, which we supply. The other has an accurate square hole end to end without thread or backup screw. SHSG part numbers are supplied with .015" grinding stock on the O.D. Pre-hardened steel type is 1144 class, to Rockwell 23-30C and is only available without thread.

w/ Thread	w/o Thread			+ .0005/- .0000	+ .0005/- .0000	+ .0005/- .0000		Pack Qty.
Item No.	Item No.	Tool Bit Size	A	B	C	D	E	
SHS-12	—	1/8	.1280	3/4	7/32	1/4	10-32	1
—	SHS-P12	1/8	.1280	3/4	7/32	1/4	—	1
—	SHSG-P12	1/8	.1280	3/4	.2337	1/4	—	1
SHS-18	—	3/16	.1915	1 1/2	5/16	7/16	1/4-28	1
—	SHS-P18	3/16	.1915	1 1/2	5/16	7/16	—	1
—	SHSG-P18	3/16	.1915	1 1/2	.3275	7/16	—	1
SHS-25	—	1/4	.2550	2	7/16	1/2	5/16-24	1
—	SHS-P25	1/4	.2550	2	7/16	1/2	—	1
SHSG-25	—	1/4	.2550	2	.4525	7/16	5/16-24	1
—	SHSG-P25	1/4	.2550	2	.4525	7/16	—	1
SHS-31	—	5/16	.3175	2 1/4	1/2	9/16	3/8-24	1
—	SHS-P31	5/16	.3175	2 1/4	1/2	9/16	—	1
—	SHSG-P31	5/16	.3175	2 1/4	.5150	9/16	—	1
SHS-37	—	3/8	.3800	2 1/2	19/32	5/8	1/2-20	1
—	SHS-P37	3/8	.3800	2 1/2	19/32	5/8	—	1
SHSG-37	—	3/8	.3800	2 1/2	.6087	5/8	1/2-20	1
—	SHSG-P37	3/8	.3800	2 1/2	.6087	5/8	—	1
SHS-43	—	7/16	.4425	2 5/8	11/16	5/8	1/2-20	1
—	SHS-P43	7/16	.4425	2 5/8	11/16	5/8	—	1
—	SHSG-P43	7/16	.4425	2 5/8	.7025	5/8	—	1
SHS-50	—	1/2	.5050	2 3/4	25/32	5/8	5/8-18	1
—	SHS-P50	1/2	.5050	2 3/4	25/32	5/8	—	1
SHSG-50	—	1/2	.5050	2 3/4	.7962	5/8	5/8-18	1
—	SHSG-P50	1/2	.5050	2 3/4	.7962	5/8	—	1
SHS-62	—	5/8	.6300	3 1/4	15/16	1	3/4-16	1
—	SHS-P62	5/8	.6300	3 1/4	15/16	1	—	1
SHSG-62	—	5/8	.6300	3 1/4	.9525	1	3/4-16	1
—	SHSG-P62	5/8	.6300	3 1/4	.9525	1	—	1
SHS-75	—	3/4	.7550	4	1 1/8	1	1-14	1
—	SHS-P75	3/4	.7550	4	1 1/8	1	—	1
SHSG-75	—	3/4	.7550	4	1.1400	1 1/4	1-14	1
—	SHSG-P75	3/4	.7550	4	1.1400	1 1/4	—	1
—	SHS-P87	7/8	.8800	4	1 5/16	1 1/4	—	1
—	SHSG-P87	7/8	.8800	4	1.3275	1	—	1
SHS-100	—	1	1.008	5	1 1/2	1 1/2	1 1/8-12	1
—	SHS-P100	1	1.008	5	1 1/2	1 1/2	—	1
—	SHSG-P100	1	1.008	5	1.5150	1 1/2	—	1
—	SHS-P125	1 1/4	1.260	5	2	1 1/2	—	1
—	SHSG-P125	1 1/4	1.260	5	2.0150	1 1/2	—	1

### Pre-Hardened Steel

Item No.	A	B	C	+ .005/- .000	Pack Qty.
SHS-250	.255	2	5/16	1	1
SHS-310	.317	2 1/4	5/8	1	1
SHS-370	.380	2 1/2	11/16	1	1
SHS-430	.441	2 5/8	13/16	1	1
SHS-500	.505	2 3/4	7/8	1	1
SHS-620	.630	3 1/4	1 1/8	1	1
SHS-750	.755	4	1 1/2	1	1
SHS-870	.880	4	1 1/2	1	1
SHS-1000	1.008	5	1 1/2	1	1
SHS-1250	1.260	5	2 1/4	1	1

## Hexagon-Holed Mild or Pre-Hardened Steel

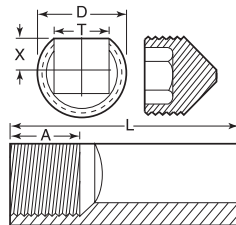


These versatile sleeves are ideal for couplings, extensions, sockets or drivers. Round O.D. with a uniform hexagon hole broached from one end to the other. Available in mild steel or pre-hardened steel, 1144 class, to Rockwell 23-30C. The pre-hardened sleeve is carefully turned to provide .003" concentricity ID to OD.

Item No.	Hex Size	Lgth.	O.D.	Pack Qty.
<b>Mild Steel</b>				
HHS-2	.128	3/4	1/4	1
HHS-4	.190	1 1/2	3/8	1
HHS-6	.253	2	1/2	1
HHS-8	.315	2 1/4	5/8	1
HHS-10	.378	2 1/2	3/4	1
HHS-12	.440	2 5/8	3/4	1
HHS-14	.503	2 3/4	13/16	1
HHS-16	.628	3 1/4	1	1
HHS-18	.753	4	1 1/16	1
HHS-20	.878	4	1 1/8	1
HHS-22	1.004	5	1 1/2	1
HHS-24	1.255	5	2 1/16	1
<b>Pre-Hardened Steel</b>				
HHS-106	.253	2	3/16	1
HHS-108	.315	2 1/4	5/8	1
HHS-110	.378	2 1/2	1 1/16	1
HHS-112	.440	2 5/8	13/16	1
HHS-114	.503	2 3/4	7/8	1
HHS-116	.628	3 1/4	1 1/8	1
HHS-118	.753	4	1 1/16	1
HHS-120	.878	4	1 1/2	1
HHS-122	1.004	5	1 3/4	1
HHS-124	1.255	5	2 1/4	1

Note: OD tolerance on pre-hardened is +.005/- .000

## Square, Hex & Slotted Sleeves Square Slotted



The use of square slotted sleeves provides a simple, quick and inexpensive method of installing tool bits in boring bars, tool holders and cutter heads. The sleeves are tapped at one end and furnished with back-up screws. Saves many hours over machining square holes in boring bars, tool holders and cutter heads. Instructions included with shipment.

Item No.	+ .005/- .000 T	L	+ .000/- .0005 D	Thread A	X	Pack Qty.
AT-1	3/16	1 1/2	.3125	1/4-28 x 3/16	.112	1
AT-2	1/4	2	.4375	5/16-24 x 3/8	.167	1
AT-3	5/16	2 1/4	.5000	3/8-24 x 3/4	.174	1
AT-4	3/8	2 1/2	.5937	1/2-20 x 7/8	.225	1

Note: X (Flat End Width) is location to bore hole for sleeve to locate top of tool bit on center line of bar.



"Spotter" Punch Assortments



25 or 28 Pc. Assortment



33 Pc. Assortment

Used to transfer to location of tapped, drilled or reamed holes. Place the part with the holes to be transferred. Select the correct size "Spotter" and insert it in the hole, tap lightly with a hammer. A heavier punch is used to make a crater for the drill. All "Spotter" punches are made of tool steel and properly hardened and tempered for long life. Black penetrate finish. Punches are undersized as follows:  $\frac{3}{32}$ ", 1mm - 2mm = .002";  $\frac{7}{64}$ " -  $\frac{1}{32}$ ", 2.5mm - 13mm, letter sizes F,I,Q wire sizes 3 - 40 = .0025",  $\frac{9}{16}$ " - 2", 14mm - 25mm = .003", tolerance plus or minus .0005". All are  $\frac{4}{8}$ " long.

Item No.	Description	Pack Qty.	Item No.	Description	Pack Qty.
PS-28	Consists of 28 punches ranging in size from $\frac{3}{32}$ " to $\frac{1}{2}$ " by 64ths plus handy $\frac{17}{32}$ " size in indexed stand.	1	PS-25	Consists of 25 punches ranging in sizes from 1mm through 13mm by .5mm. in indexed stand.	1
PS-33	Consists of 33 punches ranging in sizes from $\frac{1}{2}$ " through 1" by 64ths in heavy-duty indexed stand.	1			

Spellmaco Spotters & Punches  
Individual "Spotter" or Transfer Punches  
Fractional Sizes

Item No.	Dia.	Pack Qty.	Item No.	Dia.	Pack Qty.	Item No.	Dia.	Pack Qty.	Item No.	Dia.	Pack Qty.
PT-1	$\frac{3}{32}$	1	PT-12	$\frac{17}{64}$	1	PT-23	$\frac{7}{16}$	1	PT-34	$\frac{11}{16}$	1
PT-2	$\frac{7}{64}$	1	PT-13	$\frac{9}{32}$	1	PT-24	$\frac{29}{64}$	1	PT-35	$\frac{3}{4}$	1
PT-3	$\frac{1}{8}$	1	PT-14	$\frac{19}{64}$	1	PT-25	$\frac{15}{32}$	1	PT-36	$\frac{49}{64}$	1
PT-4	$\frac{9}{64}$	1	PT-15	$\frac{5}{16}$	1	PT-26	$\frac{31}{64}$	1	PT-37	$\frac{25}{32}$	1
PT-5	$\frac{5}{32}$	1	PT-16	$\frac{21}{64}$	1	PT-27	$\frac{1}{2}$	1	PT-38	$\frac{19}{16}$	1
PT-6	$\frac{11}{64}$	1	PT-17	$\frac{11}{32}$	1	PT-28	$\frac{33}{64}$	1	PT-39	$\frac{7}{8}$	1
PT-7	$\frac{3}{16}$	1	PT-18	$\frac{23}{64}$	1	PT-29	$\frac{17}{32}$	1	PT-40	$\frac{15}{16}$	1
PT-8	$\frac{13}{64}$	1	PT-19	$\frac{3}{8}$	1	PT-30	$\frac{9}{16}$	1	PT-41	1	1
PT-9	$\frac{7}{32}$	1	PT-20	$\frac{25}{64}$	1	PT-31	$\frac{5}{8}$	1	PT-50	$\frac{1}{16}$	1
PT-10	$\frac{15}{64}$	1	PT-21	$\frac{13}{32}$	1	PT-32	$\frac{41}{64}$	1			
PT-11	$\frac{1}{4}$	1	PT-22	$\frac{27}{64}$	1	PT-33	$\frac{21}{32}$	1			

Fast, easy way to locate opposite centers. When holes do not extend through material, such as holes for dowel pins, perforating punches, etc. Can be used in threaded, drilled or reamed holes. Packaged six of one size in plastic tube or in the handy sets as listed below.

Blind Hole "Spotter" Assortment



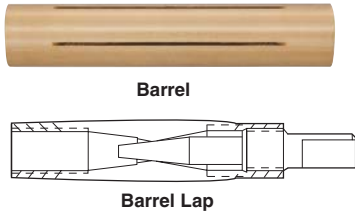
Item No.	Description	Pack Qty.
BH-18S	A Complete 108-piece set of 18 popular sizes of blind hole "Spotters" in a sturdy steel storage case. Six of each size packed in a plastic tube, $\frac{1}{8}$ " through $\frac{21}{32}$ " by 32nds.	1

Individual Blind Hole "Spotters"  
Fractional Sizes



Item No.	Dia.	Pack Qty.	Item No.	Dia.	Pack Qty.
BHS-1	$\frac{1}{8}$	6	BHS-15	$\frac{11}{32}$	6
BHS-3	$\frac{5}{32}$	6	BHS-17	$\frac{3}{8}$	6
BHS-5	$\frac{3}{16}$	6	BHS-21	$\frac{7}{16}$	6
BHS-7	$\frac{7}{32}$	6	BHS-25	$\frac{1}{2}$	6
BHS-9	$\frac{1}{4}$	6	BHS-27	$\frac{17}{32}$	6
BHS-13	$\frac{5}{16}$	6	BHS-31	$\frac{5}{8}$	6

# FLEXOLAPS & LAPPING COMPOUND



Barrel

Barrel Lap

Enables you to lap rounder and straighter holes and saves you time. Flexolaps are instantly and accurately adjustable for fast cutting and polishing. The brass cylinder is made with a series of longitudinal slots, milled off-center, to permit sensitive expansion up to 15 percent by simply turning the adjusting screw. Charge with lapping compound in the same manner as when using conventional solid laps.

### Flexolap Sets

Sets contain complete flexolaps with stand. The FLS-1 includes one additional barrel for each size.

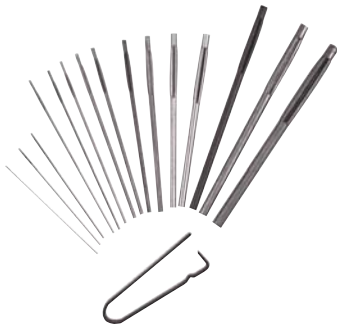
Item No.	Size	Type	Pack Qty.
FLS-1	3/16, 1/4, 5/16, 3/8, 7/16, 1/2	Barrel	6
FLS-7	3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 7/8, 9/16, 1	Barrel	13

### Flexolaps

#### Individual Laps

Complete Flexolap		Brass Barrels Only		Complete Flexolap		Brass Barrels Only	
Item No.	Item No.	Size Range	Pack Qty.	Item No.	Item No.	Size Range	Pack Qty.
FL-1	FB-1	3/16 - 7/32	1	FL-10	FB-10	15/32 - 1/2	1
FL-2	FB-2	7/32 - 1/4	1	FL-11	FB-11	1/2 - 9/16	1
FL-3	FB-3	1/4 - 9/32	1	FL-12	—	9/16 - 5/8	1
FL-4	FB-4	9/32 - 5/16	1	FL-13	FB-13	5/8 - 11/16	1
FL-5	FB-5	5/16 - 11/32	1	FL-15	FB-15	3/4 - 7/8	1
FL-6	FB-6	11/32 - 3/8	1	FL-16	—	7/8 - 15/16	1
FL-7	FB-7	3/8 - 13/32	1	FL-17	—	15/16 - 1	1
FL-8	FB-8	13/32 - 7/16	1	FL-18	FB-18	1 - 1 1/16	1
FL-9	FB-9	7/16 - 15/32	1				

### Midget Laps for Small Hole Lapping Lap Set



Each size expands to the next larger size. The midget lap has a slit-like the eye of a needle. By inserting the lap expander, any desired degree of expansion is quickly and easily obtained. They can be easily charged with any regular lapping compound. Extreme accuracy and excellent finish are obtainable.

Item No.	Description	Pack Qty.
LA-1	Assortment contains 17 pcs. ranging from .032 through .281. Complete with lap expander.	1

### Midget Laps for Small Lapping Individual Laps

Item No.	Range	Pack Qty.	Item No.	Range	Pack Qty.
ML-2	.036 - .040	1	ML-10	.104 - .120	1
ML-3	.040 - .046	1	ML-11	.120 - .135	1
ML-4	.046 - .054	1	ML-12	.135 - .155	1
ML-6	.062 - .070	1	ML-13	.155 - .170	1
ML-7	.070 - .079	1	ML-14	.170 - .187	1
ML-8	.079 - .090	1	ML-15	.187 - .218	1
ML-9	.090 - .104	1	ML-17	.250 - .281	1

Note: Expander included with each package of ten.

### Clover® Lapping Compound Greased Based – Silicon Carbide



Extremely sharp, hard and uniform. Produces a smooth flat surface. Grease base retains its texture and lubrication during extended lapping and leaves a rust preventing film. One pound can.

Item No.	Grit	Grade	Pack Qty.	Item No.	Grit	Grade	Pack Qty.
J-1	100	F	1	J-6	240	B	1
J-2	120	E	1	J-7	280	A	1
J-4	180	D	1	J-8	320	1-A	1
J-5	220	C	1	J-14	1,200	7-A	1

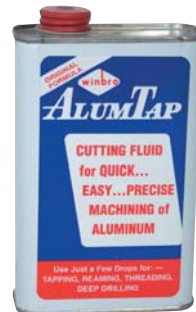
### Stainless Steel Tool Wraps



Protects the surface of air hardening tool steels from scale and oxide buildup during heat treating in atmospheric furnaces. Made of type 321 high titanium stainless steel. Highly resistant to scaling and chromium carbide precipitation. Can be folded and crease sealed easily. .002" thick.

Item No.	Description	Pack Qty.
TW-3	50 ft Tool Wrap - 12" Wide	1
TW-1	50 ft Tool Wrap - 24" Wide	1
TW-5	100 ft Tool Wrap - 12" Wide	1
TW-4	100 ft Tool Wrap - 24" Wide	1

### Cutting Fluid AlumTap



A special compound that enables speedy and precise machining of aluminum and other soft metals. Primarily for aluminum, but can be used on other metals.

Item No.	Container	Pack Qty.
WB-111	8 oz. Can	1
WB-112	16 oz. Can	1
WB-115	1 Gal. Can	1



**BRITE-MARK® H20**



- Vibrant colors
- Excellent opacity
- Not a xylene based formula
- Low odor
- Low VOC
- High flash point (over 212 degree Fahrenheit)



BRITE-MARK® H20 is a general purpose water-based marker ideal for making clear, bold markings on almost any surface in environments where VOC issues and Xylene use is a concern. BRITE-MARK® H20 can be used to permanently identify inventory, assemblies, tools, finished products or work-in-progress while resisting most work related abuses or compounds.

Item No.	Color	Pack Qty.
DX-91425	White	1
DX-91426	Black	1
DX-91427	Yellow	1
DX-91428	Red	1
DX-91602	Green	1
DX-91603	Blue	1
DX-91604	Orange	1

**SUDZ OFF®**



- Ideal for quality control
- Interchangeable and replaceable tips make the pen more practical and long lasting
- No "ghosting" occurs when removed with detergent
- Drying Time: 15-20 seconds

SUDZ OFF® markers are perfect for temporary writing on non-treated, non-painted metal surfaces which require ink that is water resistant. Marks can be removed with detergents with a pH of 10 or height.

Item No.	Color	Pack Qty.
DX-91146	White	1
DX-91371	Green	1
DX-91694	Yellow	1
DX-91938	Blue	1
DX-91939	Red	1
DX-91985	Black	1

**TUFF GUY™**



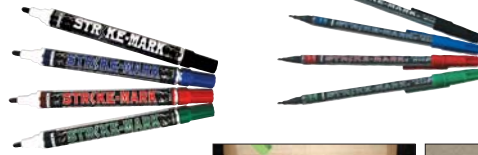
- Resistant to most coolants and cutting fluids
- Excellent for marking plastics
- Permanent ink writes on smooth surfaces such as metal, aluminum, steel plastics, cardboard, and more
- Marks withstand dirt, oil, grease, extreme weather conditions and even degreasing solvents
- Drying Time: 25-35 seconds



TUFF GUY™ is a heavy-duty, truly permanent ink marker which features a non-xylene based formula. This valve-action marker is ideal for permanent identification of parts and accessories. The clear, crisp marks resist fading even when subjected to varying, extreme climates. TUFF GUY™ won't rub off slick surfaces like plastics and shrink wrap.

Item No.	Color	Pack Qty.
DX-44179	Blue	1
DX-44175	White	1
DX-44203	Black	1
DX-44177	Green	1
DX-44819	Red	1

**STRIKE-MARK™**



- Fast drying
- Resists fading
- Industrial strength ink

STRIKE-MARK™ is an ink based permanent marker. This valve action maker features a fiber tip and an industrial strength ink ideal for permanent identification of parts or accessories. The clear, crisp marks resist fading even when subjected to varying extreme climates and dries in seconds.

Item No.	Color	Pack Qty.
<b>Medium Tip</b>		
DX-91731	Blue	1
DX-91734	Green	1
DX-91682	Black	1
<b>Fine Tip</b>		
DX-33682	Black	1
DX-33731	Blue	1
DX-33734	Green	1

**RINZ OFF®**



- Ideal for quality control
- Interchangeable and replaceable tips make the pen more practical and long lasting
- No "ghosting" occurs when removed marks are painted over
- Drying Time: 25-35 seconds

RINZ OFF® markers are perfect for temporary writing on non-treated, non-painted metal surfaces which require ink that can be removed with water.

Item No.	Color	Pack Qty.
DX-91105	Blue	1
DX-91106	Red	1
DX-91108	Green	1
DX-91109	Black	1
DX-91709	White	1
DX-91757	Yellow	1

**UV-Marker**

- Marks on plastic, glass and nonporous surfaces
- Excellent for security applications
- Detectable by UV light
- Drying time: 45 seconds to 1 minute



UV marker goes on invisible but illuminates blue under a black light. The fiber tipped marker writes on virtually any nonporous surface including plastic, glass, metal and more. Great for quality control processes, tamper checks, tagging, ownership, anti-counterfeiting and much more.

Item No.	Color	Pack Qty.
DX-91195	Clear	1



The **TEXPEN®** Marker



- Available in three tip sizes
- Write sharp, defined, bright marks on any surface including metal, plastic, glass, concrete, rubber and more
- Ergonomically correct marker enables you to mark at all angles, even upside down
- Marker retains its shape unlike tube-style markers
- Paint flow is controlled by the pressure bulb at the end of the barrel
- Drying Time: 25-35 minutes

The **TEXPEN®** stands out for its distinctive fine, medium and broad oil based paint markings. Its stainless steel-ball valve action tip writes through oil, grease and underwater without losing legibility or brightness even in extreme conditions.

Item No.	Color	Pack Qty.
<b>Broad Tip</b>		
DX-16034	Black	1
DX-16104	Orange	1
DX-16024	Red	1
DX-16084	White	1
DX-16064	Yellow	1
DX-16044	Green	1
DX-16014	Blue	1
<b>Medium Tip</b>		
DX-16063	Yellow	1
DX-16023	Red	1
DX-16083	White	1
DX-16103	Orange	1
DX-16013	Blue	1
DX-16033	Black	1
DX-16043	Green	1
<b>Fine Tip</b>		
DX-16020	Red	1
DX-16040	Green	1
DX-16010	Blue	1
DX-16060	Yellow	1
DX-16100	Orange	1
DX-16080	White	1
DX-16030	Black	1

Layout Fluids



Layout fluids are ideal for laying out dies, templates, jig and fixture parts and any other metal parts where layout is required.

Blue Item No.	Red Item No.	Description	Pack Qty.
DX-100-4	DX-296-4	4 oz. Can - brush in cap	1
DX-100-8	DX-296-8	8 oz. Can - brush in cap	1
DY-SP-1100	DY-SP-1196	16 oz. Spray	1

\*These items can not be shipped via air freight

Hi-Spot Blue



Dykem hi-spot blue is a non-drying paste, used for locating high spots when scraping bearing surfaces, machine ways, surface plates, etc., and in making close fits.

Item No.	Size	Pack Qty.
HC-107	3/4" x 4" Tube - .55 oz.	1

General Purpose and Fine Line



Non-skip and fast-drying, these markers work on virtually any surface, including metal, plastic, glass, etc. Yet the marks can be removed with layout stain remover. Fine line marking pens for use on small objects such as electronic components.

Item No.	Color	Pack Qty.	Item No.	Color	Pack Qty.
<b>General Purpose Pens</b>			<b>Fine Line Marking Pens</b>		
DX-84001	Blue	1	DX-84235	Blue	1
DX-84002	Black	1	DX-84231	Black	1
DX-84003	White	1	DX-84232	White	1
DX-84004	Yellow	1	DX-84233	Yellow	1
DX-84005	Orange	1	DX-84236	Orange	1
DX-84006	Red	1	DX-84234	Red	1
DX-84007	Green	1	DX-84237	Green	1

High Temp 44



- Medium tip
- Ideal for marking on glass, metal and ceramic
- Each color represents a temperature range

High temp markers are specifically formulated for marking surfaces that are exposed to extreme high temperature environments. Marks should be made at room temperature and can be applied to almost any non-porous surface such as metal, glass, and ceramic. When marking on ceramics, the marks will become permanently fused to the surface after heat is applied. Certain colors can withstand temperature up to 2000 degree Fahrenheit.

Item No.	Color	Pack Qty.
DX-44219	White	1
DX-44250	Black	1
DX-44424	Yellow	1
DX-44094	Blue	1

Ball Point Metal Markers



This unique ball-point metal marker lets you make fast and permanent marks on any materials. The special, fast drying ink won't chip, peel, fade or rub off - even in adverse conditions. The non-clogging ball point lets you write on metal, wood, plastic and glass in any position. Smooth, rough, wet oily surfaces won't affect it. Comes in a handy 6" tube with 1/8" ball point in 3 bright, highly visible colors.

Item No.	Description	Pack Qty.
BPM-W	Ball Point Marker - White Ink	1
BPM-Y	Ball Point Marker - Yellow Ink	1
BPM-B	Ball Point Marker - Black Ink	1