

2001

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MicroGroup®

STAINLESS STEEL AND EXOTIC ALLOY PRODUCTS



STOCK TUBING



CUSTOM TUBING



CUT & DEBURRED TUBING



FITTINGS & VALVES



NEEDLES & SYRINGES



SPECIALTY TOOLS



MICRO-MACHINED PARTS



CUSTOM COMPONENTS



CUSTOM ASSEMBLIES



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FDA
Registration
#1226212



CUSTOM TUBING



MICRO-MACHINED PARTS



FITTINGS & VALVES

Only MicroGroup
Can Offer Such
Agility
Because All Our
Options Are
“Under One
Roof.”

Tubing

Abrasive Bead Blasting
Abrasive Slurry
Cut-Off & Deburr, Laser
Deburring, Electrochemical
Drawing
EDM, Ram
EDM, Wire
Electropolishing
Etching, Chemical
Grinding, Centerless
Grinding, Centerless CNC
Honing
Hydrogen Furnace
Knurling, Laser
Machining, General
Passivating
Perforating
Pipe
Polishing, Belt
Sawing, Abrasive
Sawing, Cold (Milling)
Sawing, Electrochemical
Sawing, High Speed Carbide
Straightening
Tubing, Beverage
Tubing, Cable Crimp
Tubing, Capillary
Tubing, Carbide
Tubing, Catheter
Tubing, Chromatographic
Tubing, Custom
Tubing, Cut & Deburred
Tubing, Fractional
Tubing, Hypodermic
Tubing, Layered
Tubing, Manufactured Types
Tubing, Medical
Tubing, Metric
Tubing, Multi-lumen
Tubing, Round
Tubing, Shaped
Tubing, Specifications
Tubing, Stent
Tubing, Surplus
Tubing, Telescoping
Tubing, Tolerances
Tumbling, Vibratory & Barrel
Turning, CNC
Vacuum Stress Relieving

Custom Products

Assemblies, Aircraft & Aerospace
Assemblies, Bellows
Assemblies, Carbide
Assemblies, Exotic Alloys
Assemblies, Medical & Dental
Assemblies, Stainless Steel
Assemblies, Titanium
Assemblies, Tubing
Bellows, Metal
Belts, Metal
Blades, Surgical
Blades, Tubular
Bone Screws
Catheters & Stents
Fasteners
Fittings, Miniature
Fittings, Tubular
Machined Springs
Manifolds, Miniature
Medical Devices
Needles
Perforated Tubing
Shaft Couplings
Stamping & Punching
Tubing Components
Tubing Components
Valves, Miniature
Wire Forms

Contract Services

Brazing & Soldering

Hydrogen Furnace
Induction
Micro-Torch
Vacuum Furnace

Cut-Off & Deburring

Abrasive Bead Blasting
Cut-Off & Deburr, Laser
Deburring, Abrasive Slurry
Deburring, Electrochemical
EDM, Ram
EDM, Wire
Electropolishing
Sawing, Abrasive
Sawing, Cold (Milling)
Sawing, Electrochemical
Sawing, High Speed Carbide
Tumbling, Vibratory & Barrel
Turning, CNC

Drawing & Straightening

Drawing
Bright Annealing
Straightening

Engineering & Quality

Design Review
Inspection
Project Management
Quality Control
Registrations, ISO & FDA
SPC
Testing, Metallurgy
Testing, Pressure
Testing, Tensile
Tooling

Finishing

Abrasive Bead Blasting
Cleaning, Catheter
Cleaning, Filtered Ultrasonic
Electropolishing
Etching, Chemical
Laser Engraving
Packaging
Passivating
Pyrolyzation
Tumbling, Vibratory & Barrel

Grinding & Polishing

Electropolishing
Grinding, Centerless
Grinding, Centerless CNC
Grinding, CNC
Honing
Needles
Polishing, Belt
Surgical Blades

Heat Treating

Hydrogen Furnace
Induction Heating
Vacuum Oven

Specialty Tools

Benders

Blades, Cut-Off Saw
Brushes, Deburring
Brushes, Hand, Stainless Steel
Brushes, Stem, Abrasive
Brushes, Stem, Miniature
Brushes, Stem, Stainless Steel
Brushes, Wheel, Abrasive
Brushes, Wheel, Stainless Steel
Flexhone® Flexible Honers
Lubricants
Saws, Cut-Off

Machining, CNC

EDM, CNC Ram
EDM, CNC Wire
Grinding, CNC
Laser, CNC
Milling, CNC
Prototyping, CNC
Turning, CNC

Machining, Electrochemical

Deburring, Electrochemical
EDM, Ram
EDM, Wire
Electropolishing
Grinding, Electrochemical
Sawing, Electrochemical

Machining, General

Prototype
Production

Machining, Laser

Cut-Off & Deburr, Laser
Cutting, Laser
Drilling, Laser
Knurling, Laser
Machining, Laser

Perforating, Metals

Cutting, Laser
Etching, Photo
Perforating, Tubing
Punching
Ram EDM
Stamping

Stamping & Punching

Cutting, Laser
Foil & Sheet, Perforated
Products, Foil & Sheet

Surface Abrading

Abrasive Bead Blasting
Etching, Chemical
Knurling, Laser

Tube Forming

Closures
End Forming
Flaring, Tube
Roll Forming
Swaging
Tube Bending
Tube Forming

Welding

Welding, Laser
Welding, MIG
Welding, Plasma
Welding, Resistance (Spot)
Welding, TIG

Fluid Handling

Dispensing Bottles
Dispensing Needles
Dispensing Tips
Fittings, Medical
Fittings, Miniature
Fittings, Tubular
Fittings, Tubular
Inspection Gages, Luer
Manifolds, Miniature
Pumps
Syringes, Glass
Syringes, Plastic
Valves, Miniature

General Information

Five Reasons to Buy From MicroGroup, Inc.

It's All About Speed – The MicroGroup Advantage

Speed 1. Greatest Selection

Save time by sourcing through our inventory of over 5 million feet of standard and special size tubing including many configurations of fittings and valves and unique small tools.

Speed 2. Immediate Quoting

Fast quoting over the phone or online. Quick turnaround time on quotes for customs.

Speed 3. Knowledgeable Staff/Great Service and Support

Our Account Representatives and Sales Engineers are tubing experts with years of hands-on experience. They'll be happy to assist you with your needs. Our Customer Service Representatives are always available to help you with any questions or concerns regarding your order.

Speed 4. Four Easy Ways to Pay

1. If you don't already have an account, your Sales Representative can usually qualify you within minutes to set up a N30 account.
2. Credit cards are accepted; MasterCard, VISA, Discover, American Express.
3. C.O.D.
4. Letter of Credit for our international accounts.

Speed 5. Fast Delivery

With our large inventory and manufacturing facility, MicroGroup can deliver most items promptly to help meet your needs.

Terms and Conditions

1) Payment Terms: Net 30 days. A finance charge of 1 1/2% per month (18% annum) will be charged on past due accounts. Statements will not be mailed unless an account is past due when a finance charge will apply.

2) Freight: All shipments are FOB Medway, MA. A \$5.00 handling charge will apply to all orders. Insurance will be added for all orders over \$100.00.

3) Industry Standard: It is at MicroGroup's discretion to ship +/- 10% on orders unless otherwise requested beforehand by the customer.

4) Returned Goods Policy: Returned merchandise is accepted up to 30 days only after purchase and is subject to a 25% restocking charge, plus freight costs. Returns cannot be accepted without a Return Materials Authorization number which can be obtained from your sales representative. MicroGroup reserves the right to require proof of purchase prior to authorization for returns by requesting invoice copies.

5) Specials/Customs: No customs or specials will commence work without confirming order and associated documentation. Orders for specials for customs may be subject to a non-refundable deposit or payment in advance. Orders for special items are not subject to cancellation unless we are reimbursed for costs incurred. No specials may be returned.

6) Minimum Order: A minimum order of \$100.00 net per order is required, unless order is placed by credit card, at which the minimum order is \$50.00 net per order.

7) Credit Terms: All new accounts must supply financial and credit references if an open account is desired. Other options include check in advance, C.O.D. or credit card orders.

8) Certifications of Material: Certifications are not automatically provided and orders will be shipped without certifications unless otherwise requested by the customer at the time of the order.

All orders are contingent upon availability to secure raw materials and services. No changes will be made without written confirmation and associated documentation and are subject to rescheduling. Prices and terms are subject to change without notice. An Equal Opportunity Employer.

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Stainless Steel Tubing

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Custom Small Diameter Tubing

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100% Burr-Free Cutting

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Online Pricing & Ordering



Stock Tubing



Fittings



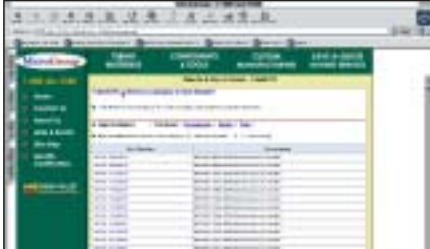
Custom Products



Valves



Prototype Tubing



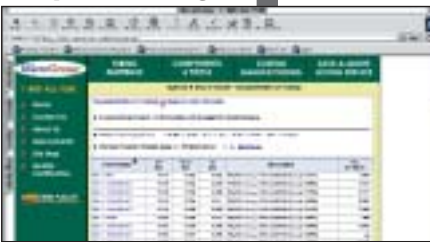
Contract Services



Syringes



Surplus Tubing

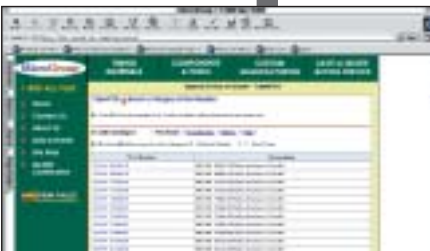


**Online Prices
Online Ordering
Online Fitting**

Needles



Custom Tubing



**Only MicroGroup
Can Offer Such
Agility
Because All Our
Options Are
“Under One
Roof”.**

Specialty Tools



Cut Tubing



SPEED – the MicroGroup® Advantage

*Most orders shipped
within 24 HOURS!*

Stainless Steel Tubing - In Stock

Fast Turnaround!

- ◀ HYPODERMIC
- ◀ FRACTIONAL
- ◀ METRIC
- ◀ MEDICAL
- ◀ PIPE
- ◀ ODD-LOT



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FDA
Registration
#1226212

About Tubing



The ITEM CODE was initially developed to enable our employees and computer systems to accurately specify and control the ALL-TUBE inventory. It has been so successful that we will use it as an outline. Please use the "Item Code" where possible.

Material:

Specifying "Material" is mandatory and can contain any number of digits (text and/or numeric) between one (1) and four (4).

Dash (-):

Dash (-) is mandatory at this position.

Category:

Specifying "Category" is mandatory and must contain one (1) text digit.

Tolerance Level:

"Tolerance Level" is optional, but can have only one (1) numeric digit.

Dash (-):

Dash (-) is mandatory at this position.

Nominal OD:

Specifying "OD" (outside diameter) is mandatory and must contain between one (1) and five (5) numeric digits and decimals if required.

By sign (x):

Inclusion of a "by sign" (x) is mandatory at this position.

Nominal Wall:

Specifying "Wall" is mandatory and must contain between one (1) and four (4) numeric digits and decimals, if required.

Dash (-):

Inclusion of a dash (-) is mandatory at this position.

Manufactured Type:

"Manufactured Type" is mandatory and can have two (2) text digits.

Dash (-):

Dash (-) is mandatory at this position.

Specification Type:

"Specification Type" is optional, but can have only one (1) numeric digit.

Dash (-):

Dash (-) is mandatory at this position.

Temper:

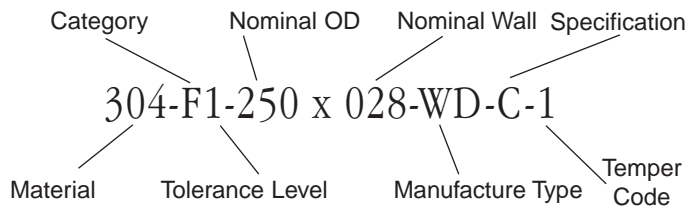
"Temper" is optional, but if used, must contain only one (1) numeric digit.

Note:

A complete explanation of these specifications and considerations not included in the ALL-TUBE Standard Item Code, are listed in our full-line catalog and at www.alltube.com.

Item Code Example

The following example is a guideline to assist you in the ordering process. Your MicroGroup representative can help you further with this process if necessary.



Tubing can be Provided in the Following Configurations

Random Lengths:

2' to 20' unless otherwise specified.

Straight Lengths:

20' straight lengths generally available, 40' maximum.

Coils:

Coils of 5,000 feet or more can be produced in welded and seamless.

Cut-Off:

Commercial practice on Cut-Off tubing does NOT include deburring.

Cut and Deburred:

Commercial practice includes burr-free ends.

* 24 hour delivery is contingent upon materials availability.

www.microgroup.com

Order Online!

The industry's best web site just got better. MicroGroup's tubing wizard is up and running and ready to accommodate your buying requirements!

www.microgroup.com

T304

T316

T321

Stock Fractional Tubing

C276, Ti

Description: "Fractional" tubing starts at 1/32" O.D. and continues in increments of 1/32" (i.e. 1/16", 3/32", 1/8", 5/32", 3/16" etc.) or 1/16" (i.e. 3/8", 7/16", 1/2", 9/16" etc.). Available in seamless or welded and drawn, fractional tubing is often used in commercial applications that require corrosion resistance and good strength. Also available in other stainless and nickel alloy grades (i.e. 321, 200, 600 etc.). Normally available in commercial specifications (i.e. ASTM-A269); Occasionally available in aircraft specs. (i.e. Mil-T-8504, AMS-5570). Primarily stocked in annealed temper.

Application: Used in many different industries ranging from medical to aircraft, fractional tubing covers small (1/32") to large (up through 3") applications. Welded and drawn can often be substituted for seamless because it usually has the same, if not better, appearance, tolerances, concentricity and specifications.

OD Nom	Wall Nom	ID Nom	Est Wt #/Ft	Item #	Type 304	Type 316	Other	
1/32"	.006	.019	.002	F1-032x006-F1-032x010-	WD SL	WD SL	200	
	.010	.011	.002		WD SL	WD SL		200,321,600
1/16" .0625 .0625	.006	.051	.004	F1-062x006-F1-062x010-	WD SL	WD SL	200,321,600	
	.010	.042	.006		WD SL	WD SL		200,276,321,400,600
	.016	.030	.008		WD SL	WD SL		200,321,600,Ti2
	.020	.022	.009		WD SL	WD SL		200,321,600
	.023	.017	.010		SL	SL		
	.026	.011	.010		SL	SL		
	.028	.007	.011		SL	SL		200,Ti2
3/32" .0938 2.38mm	.006	.082	.006	F1-093x006-F1-093x010-	WD SL	WD SL	200	
	.010	.074	.009		WD SL	WD SL		200,321,600
	.016	.062	.014		WD SL	WD SL		200,321,600,Ti2
	.020	.054	.016		WD SL	WD SL		200,321,600
	.028	.038	.020		WD SL	SL		321
	.035	.024	.023		WD SL	SL		
	.035	.024	.023		WD SL	SL		
1/8" .1250 3.17mm	.006	.113	.008	F1-125x006-F1-125x010-	WD SL	SL	200	
	.010	.105	.013		WD SL	WD SL		200,276,321,600
	.012	.101	.015		SL	SL		
	.016	.093	.019		WD SL	WD SL		200,321,400,600,Ti2
	.020	.085	.023		WD SL	WD SL		200,276,321,400,600
	.025	.075	.027		SL	SL		
	.028	.069	.030		WD SL	WD SL		200,321,400,600
	.032	.061	.033		WD SL	SL		
	.035	.055	.034		WD SL	WD SL		200,276,321,400,600
	.042	.041	.038		SL	SL		
	.049	.027	.041		SL	SL		321
5/32" .1563 3.97mm	.006	.144	.010	F1-156x006-F1-156x010-	WD SL	SL	600	
	.010	.136	.016		WD SL	SL		600
	.016	.124	.025		WD SL	WD SL		321
	.020	.116	.030		WD SL	WD SL		321
	.028	.100	.039		WD SL	WD SL		321
	.035	.086	.046		WD SL	WD SL		600
3/16" .1875 4.76mm	.006	.175	.012	F1-188x006-F1-188x010-	WD SL	SL	200,321,600	
	.010	.167	.019		WD SL	WD SL		200,321,600
	.016	.156	.030		WD SL	WD SL		200,321,600
	.020	.148	.037		WD SL	WD SL		200,321,400,600
	.028	.131	.049		WD SL	WD SL		200,321,600
	.035	.118	.058		WD SL	WD SL		200,321,400,600
7/32" .2188 5.55mm	.006	.207	.014	F1-218x006-F1-218x010-	SL	SL	321	
	.010	.199	.023		SL	SL		
	.016	.187	.035		SL	SL		
	.020	.179	.043		SL	SL		
	.028	.163	.058		SL	SL		
	.035	.149	.070		SL	SL		321
1/4" .2500 6.35mm	.006	.238	.016	F1-250x006-F1-250x010-	WD SL	SL	200,600	
	.010	.230	.026		WD SL	WD SL		
	.012	.226	.031		SL	SL		
	.016	.218	.041		WD SL	WD SL		321,200,600
	.020	.210	.050		WD SL	WD SL		321,200,400,600

OD Nom	Wall Nom	ID Nom	Est Wt #/Ft	Item #	Type 304	Type 316	Other	
1/4" cont.	.028	.194	.068	F1-250x028-F1-250x032-	WD SL	WD SL	200,321,400,600	
	.032	.186	.076		WD SL	WD SL		
	.035	.180	.082		WD SL	WD SL		200,276,321,400,600,Ti2
	.042	.166	.095		SL	SL		
	.049	.152	.108		WD SL	WD SL		200,321,400,600
	.058	.134	.122		SL	SL		321,Ti2
	.065	.120	.131		WD SL	WD SL		200,276,321,400,600
	.083	.084	.151		WD SL	WD SL		321,400
	.095	.060	.161		SL	SL		321
	.095	.060	.161		SL	SL		
	9/32" .2813 7.14mm	.006	.269		.018	F1-281x006-F1-281x010-		SL
.010		.261	.030	SL	SL			
.016		.249	.046	SL	SL			
.020		.241	.057	SL	SL			
.028		.225	.077	SL	SL			
.035		.211	.094	SL	SL			
5/16" .3125 7.93mm	.006	.301	.020	F1-312x006-F1-312x010-	SL	SL	321	
	.010	.293	.033		WD SL	SL		321
	.016	.280	.052		WD SL	SL		321
	.020	.272	.064		WD SL	WD SL		321,600
	.028	.257	.087		WD SL	WD SL		321,600
	.035	.243	.106		WD SL	WD SL		276,321,400,600,Ti2
	.049	.215	.141		WD SL	WD SL		321,600,Ti2
	.065	.183	.176		WD SL	WD SL		200,321,400,600,Ti2
	.083	.147	.208		SL	SL		321
	.095	.122	.226		SL	SL		
	11/32" .3438 8.73mm	.010	.324		.037	F1-344x010-F1-344x016-		SL
.016		.312	.057	SL	SL			
.020		.304	.071	SL	SL			
.028		.288	.097	SL	SL			
.035		.274	.118	SL	SL			
.035		.274	.118	SL	SL			
3/8" .3750 9.52mm	.006	.363	.024	F1-375x006-F1-375x010-	SL	SL	200,321,600	
	.010	.355	.040		WD SL	WD SL		200,321,600
	.016	.343	.063		WD SL	WD SL		200,321,600
	.020	.335	.078		WD SL	WD SL		200,321,600
	.028	.319	.106		WD SL	WD SL		200,321,400,600
	.035	.305	.130		WD SL	WD SL		200,276,321,400,600,Ti2
	.049	.277	.174		WD SL	WD SL		200,321,400,600,Ti2
	.065	.245	.220		WD SL	WD SL		200,276,321,400,600,Ti2
	.083	.209	.265		WD SL	WD SL		321,400,600
	.095	.185	.291		WD SL	WD SL		321
	.120	.135	.334		SL	SL		321
7/16" .4375 11.10mm	.010	.418	.047	F1-438x010-F1-438x016-	SL	SL	321	
	.016	.405	.074		WD SL	SL		
	.020	.397	.091		WD SL	SL		
	.028	.382	.125		WD SL	SL		
	.035	.368	.154		WD SL	SL		321,600
	.049	.340	.208		WD SL	SL		321
	.065	.308	.264		WD SL	SL		321
	.083	.272	.321		WD SL	SL		
	.095	.248	.355		SL	SL		
	.120	.197	.416		SL	SL		
	1/2" .5000 12.69mm	.006	.488		.032	F1-500x006-F1-500x010-		SL
.010		.480	.054	WD SL	SL		321	
.016		.468	.085	WD SL	WD SL		321,600	
.020		.460	.105	WD SL	WD SL		200,321,600	
.028		.444	.144	WD SL	WD SL		200,321,400,600,Ti2	
.035		.430	.178	WD SL	WD SL		200,276,321,400,600,Ti2	
.049		.402	.241	WD SL	WD SL		200,276,321,400,600,Ti2	
.065		.370	.309	WD SL	WD SL		200,276,321,400,600,Ti2	
.083		.334	.378	WD SL	WD SL		321,400,600	
.095		.310	.420	WD SL	WD SL		321,400	
.120		.260	.498	WD SL	WD SL		321,400,600	
1/2" cont.	.156	.188	.586	F1-500x156-F1-500x188-	SL	SL	321,400,600	
	.188	.124	.641		SL	SL		

Need Help?

Call 1-800-255-8823

All dimensions are measured in inches except where designated mm (millimeters) *Hastelloy® is a registered trademark of Haynes International, Inc. Please contact our sales office regarding availability. Some items may not be available for immediate delivery.

MicroGroup provides complete final assembly services for your tubing and miniature component requirements. From start to finish, MicroGroup is the only source you'll ever need. **FDA Registration #1226212**

T316L

Stock Medical Grade Tubing

T316L

Description: Medical-quality grade (“MQ”) tubing is 316L welded and mandrel drawn, manufactured to tight I.D. dimensions. Supplied in 1/8 hard to 1/4 hard temper, stock sizes range from 1/8" to 1" O.D.

Application: Ideal for applications requiring tighter than normal tolerances. Some temper is added for applications that require more rigidity, such as in medical instrumentation.

OD Nom	Wall Nom	ID Min/Max	OD Min/Max	Est Wt #/Ft	Item #
1/8"	.006	.1120/.1140	.1228/.1272	.008	316L-F9-125x006-MQ
.125	.010	.1040/.1060	.1220/.1280	.013	316L-F9-125x010-MQ
3.17mm	.016	.0920/.0940	.1208/.1292	.019	316L-F9-125x016-MQ
	.020	.0840/.0860	.1200/.1300	.020	316L-F9-125x020-MQ
5/32"	.006	.1433/.1453	.1541/.1585	.010	316L-F9-156x006-MQ
.156	.010	.1353/.1373	.1533/.1593	.016	316L-F9-156x010-MQ
3.97mm	.016	.1233/.1253	.1521/.1605	.025	316L-F9-156x016-MQ
	.020	.1153/.1173	.1513/.1613	.030	316L-F9-156x020-MQ
3/16"	.006	.1745/.1765	.1853/.1897	.012	316L-F9-188x006-MQ
.188	.010	.1665/.1685	.1845/.1905	.019	316L-F9-188x010-MQ
4.76mm	.016	.1545/.1565	.1833/.1917	.030	316L-F9-188x016-MQ
	.020	.1465/.1485	.1825/.1925	.037	316L-F9-188x020-MQ
1/4"	.006	.2370/.2390	.2478/.2522	.016	316L-F9-250x006-MQ
.250	.010	.2290/.2310	.2470/.2530	.026	316L-F9-250x010-MQ
6.35mm	.016	.2170/.2190	.2458/.2542	.041	316L-F9-250x016-MQ
	.020	.2090/.2110	.2450/.2550	.050	316L-F9-250x020-MQ
3/8"	.006	.3620/.3640	.3728/.3772	.026	316L-F9-375x006-MQ
.375	.010	.3540/.3560	.3720/.3780	.040	316L-F9-375x010-MQ
9.52mm	.016	.3420/.3440	.3708/.3792	.063	316L-F9-375x016-MQ
	.020	.3340/.3360	.3700/.3800	.078	316L-F9-375x020-MQ
1/2"	.006	.4865/.4895	.4973/.5027	.032	316L-F9-500x006-MQ
.500	.010	.4785/.4815	.4965/.5035	.054	316L-F9-500x010-MQ
12.69mm	.016	.4665/.4695	.4953/.5047	.085	316L-F9-500x016-MQ
	.020	.4585/.4615	.4945/.5055	.105	316L-F9-500x020-MQ
5/8"	.010	.6035/.6065	.6215/.6285	.067	316L-F9-625x010-MQ
.625	.020	.5835/.5865	.6195/.6305	.132	316L-F9-625x020-MQ
3/4"	.010	.7285/.7315	.7465/.7535	.081	316L-F9-750x010-MQ
.750	.020	.7085/.7115	.7445/.7555	.159	316L-F9-750x020-MQ
7/8"	.010	.8535/.8565	.8715/.8785	.095	316L-F9-875x010-MQ
.875	.016	.8415/.8445	.8703/.8797	.150	316L-F9-875x016-MQ
22.21mm	.020	.8335/.8365	.8695/.8805	.187	316L-F9-875x020-MQ
1"	.010	.9785/.9815	.9965/1.0035	.108	316L-i9-1000x010-MQ
1.000	.020	.9585/.9615	.9945/1.0055	.214	316L-i9-1000x020-MQ
25.38mm					



STAINLESS STEEL TUBING

T304

Pipe

T316

Description: A special range of tubing sizes designated by dimension and wall thickness. Generally available in any drawable metal or alloy, with method of manufacture (seamless or welded) dictated by material, to OD/Wall ratio and wall thickness. Standards cover actual dimensions, tolerances, chemical and physical requirements. Call for pricing and availability.

Application: Pipe is a tubular product intended primarily for such purposes as the conveying of water, fuel, gas, air, steam, etc. It has also been found to be a convenient form for use as structural members, such as columns and railings.

Nominal OD		Schedule Number (Wall Thickness Shown in table below)								
Pipe Size	Inches	Sch# 5S	Sch# 5	Sch# 10/S	Sch# 40S	Sch# 40Std	Sch# 40	Sch# 80/S	Sch# 160	Sch# XXH
1/8	0.405	.035	.035	.049	.068	.068	.068	.095	N/A	N/A
1/4	0.54	.049	.049	.065	.088	.088	.088	.119	N/A	N/A
3/8	0.675	.049	.049	.065	.091	.091	.091	.126	N/A	N/A
1/2	0.84	.065	.065	.083	.109	.109	.109	.147	.187	.294
3/4	1.05	.065	.065	.083	.113	.113	.113	.154	.218	.308
1	1.315	.065	.065	.109	.133	.133	.133	.179	.250	.358
1-1/4	1.66	.065	.065	.109	.140	.140	.140	.191	.250	.382
1-1/2	1.9	.065	.065	.109	.145	.145	.145	.200	.281	.400
2	2.375	.065	.065	.109	.154	.154	.154	.218	.343	.436
2-1/2	2.875	.083	.083	.120	.203	.203	.203	.276	.375	.552

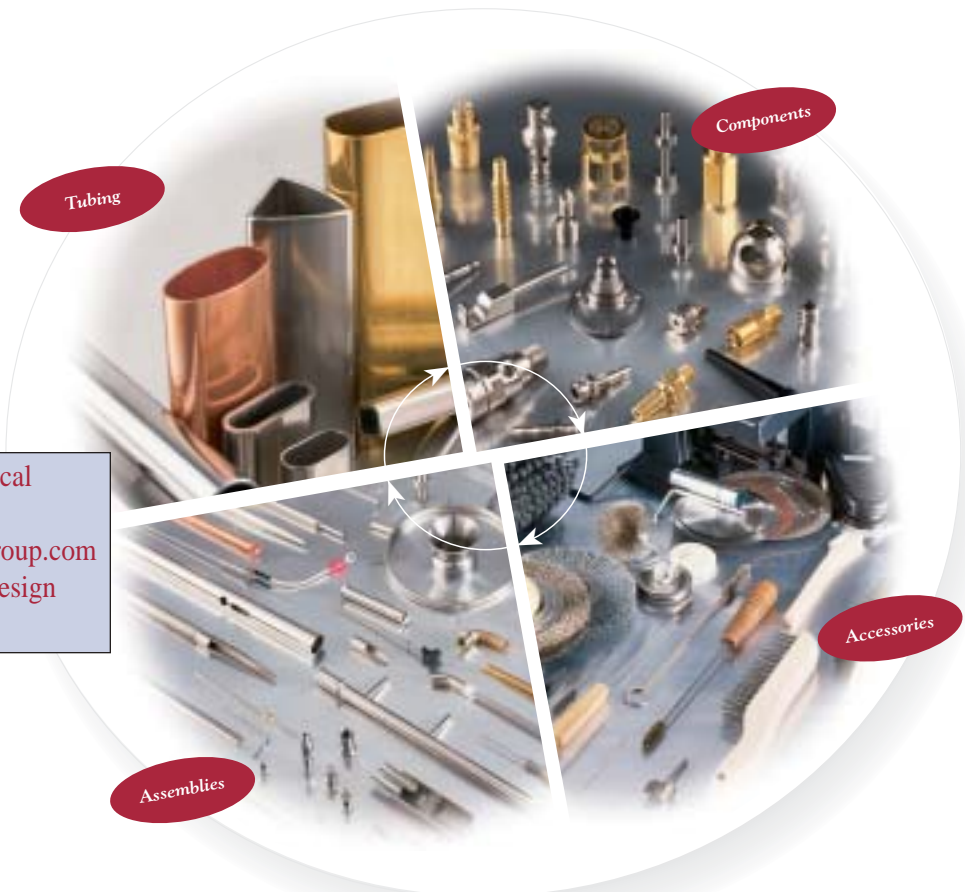
Tolerance Table: Pipe				
STAINLESS STEEL PIPE TOLERANCES (ASTM A-312)				
Nom Size	OD Tol		Wall Tol	
	+	-	+	-
1/8 to 1-1/2	1/64 (.015)	1/32 (.031)	12.5%	12.5%
1-1/2+ thru 4	1/32 (.031)	1/32 (.031)	12.5%	12.5%
4+ thru 8	1/16 (.062)	1/32 (.031)	12.5%	12.5%
8+ thru 18	3/32 (.093)	1/32 (.031)	12.5%	12.5%
18+ thru 24	1/8 (.125)	1/32 (.031)	12.5%	12.5%

All dimensions are measured in inches except where designated mm (millimeters). Please contact our sales office regarding availability. Some items may not be available for immediate delivery.

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Seamless Fractional Tubing

Description: "Fractional" refers to any tubing that is less than 3" in outside diameter and whose outside diameter is an even increment of 1/64" (.016). Fractional tubing can generally be produced by any method of manufacture and in any drawable metal. Available in random lengths and TubeKITS™. Material is manufactured to O.D. and wall dimensions.

Application: Fractional tubing is most common in T304 and T316 stainless steel for general commercial applications due to availability and relatively low cost.

Size	Wall Nom	ID Theo	T304 Item #	\$ ea	T316 Item #	\$ ea Meter	
1/16"	.010	.043	TK4FS-062x010	Call or access web for pricing	TK6FS-062x010	Call or	
3/32"	.016	.061	TK4FS-093x016		TK6FS-093x016	access	
1/8"	.016	.093	TK4FS-125x016		TK6FS-125x016	web for	
	.028	.069	TK4FS-125x028		TK6FS-125x028		
3/16"	.028	.132	TK4FS-188x028		TK6FS-188x028	pricing	
	.028	.194	TK4FS-250x028		TK6FS-250x028		
	.035	.180	TK4FS-250x035		TK6FS-250x035		
1/4"	.049	.152	TK4FS-250x049		TK6FS-250x049		
	.065	.120	TK4FS-250x065		TK6FS-250x065		
	5/16"	.028	.257		TK4FS-312x028		TK6FS-312x028
		.028	.319	TK4FS-375x028	TK6FS-375x028		
3/8"	.035	.305	TK4FS-375x035	TK6FS-375x035			
	.049	.277	TK4FS-375x049	TK6FS-375x049			
	.065	.245	TK4FS-375x065	TK6FS-375x065			
	1/2"	.028	.444	TK4FS-500x028		TK6FS-500x028	
.035		.430	TK4FS-500x035	TK6FS-500x035			
.049		.402	TK4FS-500x049	TK6FS-500x049			
.065		.370	TK4FS-500x065	TK6FS-500x065			
5/8"	.028	.569	TK4FS-625x028	TK6FS-625x028			
	.035	.555	TK4FS-625x035	TK6FS-625x035			
	.049	.527	TK4FS-625x049	TK6FS-625x049			
	.065	.495	TK4FS-625x065	TK6FS-625x065			
3/4"	.035	.680	TK4FS-750x035	TK6FS-750x035			
	.049	.652	TK4FS-750x049	TK6FS-750x049			
	.065	.620	TK4FS-750x065	TK6FS-750x065			
1"	.035	.930	TK4FS-1000x035	TK6FS-1000x035			
	.049	.920	TK4FS-1000x049	TK6FS-1000x049			
	.065	.870	TK4FS-1000x065	TK6FS-1000x065			
1-1/4"	.049	1.152	TK4FS-1250x049	TK6FS-1250x049			

Seamless Metric Tubing

Description: With its OD expressed evenly in millimeters (mm), metric tubing can generally be produced by any method of manufacture and in any drawable material. Standards cover actual dimensions and tolerances plus chemical and physical requirements. Due to its custom nature, metric tubing is sometimes limited in availability.

Application: Stocked metric tubing is most common in T304 and T316 stainless steel for general commercial applications with standard metric compression fittings.

OD Nom mm	OD Nom Inches	Wall Nom mm	Wall Nom Inches	ID Nom mm	ID Nom Inches	T304 Item #	\$ ea	T316 Item #	\$ ea Meter
1	.039	.20	.008	.60	.024	TK4mS-1x.20	Call or access web for pricing	TK6mS-1x.20	Call or
2	.079	.50	.020	1.00	.039	TK4mS-2x.50		TK6mS-2x.50	access
3	.118	.50	.020	2.00	.079	TK4mS-3x.50		TK6mS-3x.50	web for
	.158	.50	.020	3.00	.118	TK4mS-4x.50		TK6mS-4x.50	
5	.197	.50	.020	4.00	.158	TK4mS-5x.50		TK6mS-5x.50	pricing
6	.236	1.00	.039	4.00	.158	TK4mS-6x1.00		TK6mS-6x1.00	
8	.315	1.00	.039	6.00	.236	TK4mS-8x1.00		TK6mS-8x1.00	
10	.394	1.00	.039	8.00	.315	TK4mS-10x1.00		TK6mS-10x1.00	
12	.473	1.00	.039	10.00	.394	TK4mS-12x1.00		TK6mS-12x1.00	
14	.552	1.50	.059	11.00	.433	TK4mS-14x1.50		TK6mS-14x1.50	
16	.630	1.50	.059	13.00	.512	TK4mS-16x1.50	TK6mS-16x1.50		
20	.788	1.50	.059	17.00	.670	TK4mS-20x1.50	TK6mS-20x1.50		
22	.867	1.50	.059	19.00	.749	TK4mS-22x1.50	TK6mS-22x1.50		
24	.945	1.50	.059	21.00	.827	TK4mS-24x1.50	TK6mS-24x1.50		

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Hypodermic Tubing

Description: Often referred to as “seamless” because of its smooth appearance, hypo tubing is manufactured, welded and drawn to tight O.D. and I.D. tolerances. Stocked in grades 304 & 316 stainless steel in the full hard condition.

Application: Ideal for medical and industrial components that require strength, uniformity, and corrosion resistance. Not manufactured for pressure service. Wide selection, economical and quick delivery.

Gage	OD Nom	Wall Theo	ID Nom	T304 Item #	\$ ea	T316 Item #	\$ ea Meter
6RW	.2030	.015	.173"	TK4H-6RW	Call or access web for pricing	TK6H-6RW	Call or access web for pricing
7RW	.1800	.015	.150	TK4H-7RW		TK6H-7RW	
8RW	.1650	.015	.135	TK4H-8RW		TK6H-8RW	
9RW	.1480	.015	.118	TK4H-9RW		TK6H-9RW	
10RW	.1340	.014	.106	TK4H-10RW		TK6H-10RW	
11RW	.1200	.013	.094	TK4H-11RW		TK6H-11RW	
11TW	.1200	.010	.100	TK4H-11TW		TK6H-11TW	
12RW	.1090	.012	.085	TK4H-12RW		TK6H-12RW	
12TW	.1090	.009	.091	TK4H-12TW		TK6H-12TW	
13RW	.0950	.012	.071	TK4H-13RW		TK6H-13RW	
13TW	.0950	.009	.077	TK4H-13TW	TK6H-13TW		
14RW	.0830	.010	.063	TK4H-14RW	TK6H-14RW		
14TW	.0830	.006	.072	TK4H-14TW	TK6H-14TW		
15RW	.0720	.009	.054	TK4H-15RW	TK6H-15RW		
15TW	.0720	.006	.060	TK4H-15TW	TK6H-15TW		
16RW	.0650	.009	.047	TK4H-16RW	TK6H-16RW		
16TW	.0650	.006	.053	TK4H-16TW	TK6H-16TW		
17RW	.0590	.009	.041	TK4H-17RW	TK6H-17RW		
17TW	.0590	.007	.046	TK4H-17TW	TK6H-17TW		
18RW	.0500	.009	.033	TK4H-18RW	TK6H-18RW		
18TW	.0500	.004	.042	TK4H-18TW	TK6H-18TW		
19RW	.0425	.008	.028	TK4H-19RW	TK6H-19RW		
19TW	.0425	.005	.033	TK4H-19TW	TK6H-19TW		
20RW	.0355	.006	.024	TK4H-20RW	TK6H-20RW		
20TW	.0355	.005	.026	TK4H-20TW	TK6H-20TW		
21RW	.0320	.006	.020	TK4H-21RW	TK6H-21RW		
21TW	.0320	.005	.023	TK4H-21TW	TK6H-21TW		
22RW	.0280	.006	.016	TK4H-22RW	TK6H-22RW		
22TW	.0280	.004	.020	TK4H-22TW	TK6H-22TW		
23RW	.0250	.006	.013	TK4H-23RW	TK6H-23RW		
23TW	.0250	.004	.017	TK4H-23TW	TK6H-23TW		
24RW	.0220	.005	.012	TK4H-24RW	TK6H-24RW		
24TW	.0220	.004	.014	TK4H-24TW	TK6H-24TW		
25RW	.0200	.005	.010	TK4H-25RW	TK6H-25RW		
25TW	.0200	.004	.012	TK4H-25TW	TK6H-25TW		
26RW	.0180	.004	.010	TK4H-26RW	TK6H-26RW		
27RW	.0160	.004	.008	TK4H-27RW	TK6H-27RW		
28RW	.0140	.003	.007	TK4H-28RW	TK6H-28RW		
29RW	.0130	.003	.007	TK4H-29RW	TK6H-29RW		
30RW	.0120	.003	.006	TK4H-30RW	TK6H-30RW		

Convenient TubeKIT Sizes Shipped Within 24 Hours

Seamless Pipe

Description: A special range of tubing sizes designated by dimension and wall thickness. Generally available in any draw-able metal or alloy, with method of manufacture (seamless or welded) dictated by material, to OD/Wall ratio and wall thickness.

Application: Pipe is a tubular product intended primarily for such purposes as the conveying of water, fuel, gas, air, steam, etc. It has also been found to be a convenient form for use as structural members such as columns and railings.

Pipe Size	Schedule #	T304 Item #	\$/ea	T316 Item #	\$ ea Meter
1/8	10	TK4PS-125x10	21.00	TK6PS-125x10	Call or access web for pricing
1/8	40	TK4PS-125x40	18.19	TK6PS-125x40	
1/4	10	TK4PS-250x10	28.51	TK6PS-250x10	
1/4	40	TK4PS-250x40	23.15	TK6PS-250x40	
3/8	10	TK4PS-375x10	34.89	TK6PS-375x10	
3/8	40	TK4PS-375x40	29.98	TK6PS-375x40	
1/2	5	TK4PS-500x5	40.92	TK6PS-500x5	
1/2	10	TK4PS-500x10	47.26	TK6PS-500x10	
1/2	40	TK4PS-500x40	36.46	TK6PS-500x40	
3/4	5	TK4PS-750x5	49.64	TK6PS-750x5	
3/4	10	TK4PS-750x10	59.44	TK6PS-750x10	
3/4	40	TK4PS-750x40	43.73	TK6PS-750x40	
1	5	TK4PS-1000x5	72.28	TK6PS-1000x5	
1	10	TK4PS-1000x10	82.41	TK6PS-1000x10	
1	40	TK4PS-1000x40	53.42	TK6PS-1000x40	

Convenient TubeKIT Sizes Shipped Within 24 Hours

Medical Grade Tubing

Description: A medical-quality (“MQ”), T316L certified, stainless steel tubing manufactured in IDs from .020" to .500" with +/- .001" OD tolerances, or .500" to 1.000" ID with +/- .0015" ID tolerances. Available in thin wall fractional OD (Category-F).

Application: Ideal for any application requiring the highest quality tubing. Extremely close ID tolerances meet Class-9 applications. Tubing is welded and drawn to approximately 1/8-1/4 hard temper.

OD Theo	Wall Nom	ID Nom	T316 Item #	\$ ea Meter
1/8"	.006	.113	TK6MQ-125x006	Call or access web for pricing
1/8"	.010	.105	TK6MQ-125x010	
5/32"	.006	.144	TK6MQ-156x006	
5/32"	.010	.136	TK6MQ-156x010	
3/16"	.006	.176	TK6MQ-188x006	
3/16"	.010	.168	TK6MQ-188-010	
1/4"	.006	.238	TK6MQ-250x006	
1/4"	.010	.230	TK6MQ-250x010	
3/8"	.006	.363	TK6MQ-375x006	
3/8"	.010	.355	TK6MQ-375x010	
1/2"	.006	.488	TK6MQ-500x006	
1/2"	.010	.480	TK6MQ-500x010	



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Round

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Delivery of customs are set-up to meet your needs. Prompt deliveries are our goal, however, they depend on volume and availability of raw material.



Shape

Shaped tubing can be produced by different methods. Most materials that can be drawn or rolled are capable of being formed into various shapes. Examples are; squares, rectangles, ovals, keyholes, triangles and teardrops.

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Drawing & Centerless Grinding

Drawing is the process used to size tubing by reducing a larger tube to a smaller one while maintaining or reducing the wall thickness based on the specifications required.

This is accomplished by using a draw bench and dies. Pulling the material through a die and over a mandrel at the same time controls both the Outside Diameter (OD) and usually the Wall thickness, or the Inside Diameter (ID).

MicroGroup can draw most metals, although we specialize in Stainless Steel and Nickel Based Alloys.

Centerless Grinding reduces the Outside Diameter (OD) of the tubing length and cylindrical parts. Tight tolerances can be maintained. Selecting standard Inside Diameter (ID) sizes and grinding to the desired OD size can often be a cost effective approach to producing a custom sized tube. This eliminates the sometimes costly set-up charges of redrawing. See table below for other alloys.



Composite

Composite refers to any tubing that is drawn (layered) over another tube (tubes) or solid. No standards apply - please call for details. Typically used to produce extremely high pressure (heavy walls) or add a layer of corrosion resistance to a less resistant tube, most applications are extremely specialized. Delivery of composites are dependent on process required to manufacture.

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Production

Other Materials

Stainless Steels

303Se	303Se Stainless Steel
304	304 Stainless Steel
304L	304L Stainless Steel
305	305 Stainless Steel
309S	309S Stainless Steel
310S	310S Stainless Steel
316	316 Stainless Steel
316L	316L Stainless Steel
317	317 Stainless Steel
321	321 Stainless Steel
347	347 Stainless Steel
348	348 Stainless Steel
405	405 Stainless Steel
408	408 Stainless Steel
410	410 Stainless Steel
416e	416e Stainless Steel
430	430 Stainless Steel
430T	430Ti Stainless Steel
446	446 Stainless Steel
16-6	16-6 PH Stainless Steel

177	17-7 PH Stainless Steel
2169	21Cr-6Ni-9Mn Stainless Steel
A286	A-286 Stainless Steel
261	Alloy 26-1 Stainless Steel
N55	N-55 Stainless Steel
C20	Carpenter-20® (4)

Carbon and Alloy Steels

1010	1010 Steel
1012	1012 Steel
1015	1015 Steel
1018	1018 Steel
1020	1020 Steel
1021	1021 Leaded Steel

Nickel and Nickel Alloys

188	Alloy 188
200	Nickel 200 ("A" Nickel)
201	Nickel 201 (Low Carbon Nickel)
211	Nickel 211 ("D" Nickel)
270	Nickel 270
301	Duranickel Alloy 301® (1)

400	Monel Alloy 400 (Monel)® (1)
404	Monel Alloy 404
500	Monel Alloy K-500 ("K" Monel)® (1)
600	Inconel Alloy 600® (1)
601	Inconel Alloy 601® (1)
617	Inconel Alloy 617® (1)
625	Inconel Alloy 625® (1)
702	Inconel Alloy 702® (1)
718	Inconel Alloy 718® (1)
800	Inconel Alloy 800® (1)
825	Inconel Alloy 825 (Incoloy)® (1)
902	NI-SPAN ALLOY 902 (Ni-Span C)®
8020	Alloy 80-20
C276	Alloy C-276
CN30	30% Cupronickel
HX	Alloy HX®
L605	Alloy L-605
Wasp	Waspaloy® (3)
HASB	HASTELLOY alloy B® (2)

HASC	HASTELLOY alloy C® (2)
X750	Inconel Alloy X-750® (1)

Nickel-Iron Alloys

NI36	36% Nickel-Iron Alloy
NI42	42% Nickel-Iron Alloy
NI52	52% Nickel-Iron Alloy
N4	#4 Alloy
2917	Alloy 29-17 (Kovar)

Other Materials and Alloys

A-40	Unalloyed Titanium A-40
32.5	Titanium Alloy 3Al-2.5V
6-4V	Titanium Alloy 6Al-4V
Mo	Molybdenum
15-3	Titanium Alloy 15-3

* 48 hour delivery is contingent upon materials availability.

For electropolishing and other finishing services, please refer to the web.

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*Most orders shipped
within 48 HOURS!*

100% Burr-Free Cutting

Tubing • Solids

- ◀ **ELECTROCHEMICAL**
- ◀ **COLD SAWING**
- ◀ **ABRASIVE CUTTING**
- ◀ **DEBURRING**
- ◀ **PASSIVATION**
- ◀ **ELECTROPOLISHING**

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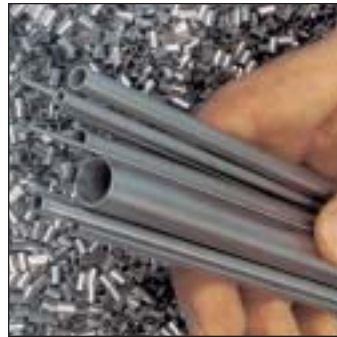


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100% Burr-Free Cuts: Tubing & Solids

MicroGroup can supply 100% burr free cuts on diameters from .004". This is the superior method for cutting small diameter thin walled tubes and shapes where edge quality is critical. Various edge conditions can be achieved from sharp to well radiused. Many catheters are cut in this manner. This process also does not change the physical characteristics of the material.

* See cutting tolerance options chart below.

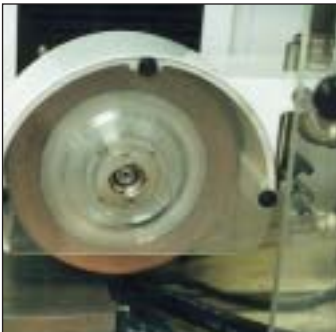
Deburring

Deburring can be accomplished from state of the art Electrochemical methods to more traditional vibratory and wire wheel, depending on the specifications. Selecting a cost effective method is based on the number of parts, size, shape and length. Electrochemical is very well suited for controlling edge breaking.



Abrasive Cutting

Abrasive Cutting can be performed on most metals. Tubing, solids and shapes can be cut using this method. Both Dry and Wet cutting is done with wet cutting minimizing burrs. Sizes range from .008" diameter and up. Fairly tight tolerances can be maintained with this process, which is dependent on diameter and lengths.



Cold Sawing

Cold sawing is primarily used for precise length cuts in heavier walled tubes and solids. Diameters range from .062" and up. Most metals can be cold sawed, and deburred at MicroGroup.



* 48 hour delivery is contingent upon materials availability.

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100% Burr-Free Cutting Tolerance Options

For cutting lengths:	Standard Tolerance "C1"	Optional Tolerance "C2"
up to 1.0"	±.010	±.005
1.01" to 6.0"	±.015	±.010
6.01" to 12.0" (1')	±.030	±.015
12.01" (1') to 72.0" (6')	±.060	±.030
72.01" (6') to 144.0" (12')	±.100	±.060
144.01" (12') to 288.0" (24')	±.250	±.100



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- ◀ **MICRO-MACHINING**
- ◀ **LASER-WELDING**
- ◀ **LASER MACHINING**
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Tube Forming



100% Burr-Free Holes & Slots

100% Burr-Free holes and slots can be achieved by the electrochemical processes referred to as ECG. ECG is well suited for slotting, applying angles, radiusing the walls on the end of tubes and finishing the ends of shaped tubes which are normally very difficult to deburr by conventional means.



Bending

MicroGroup employs compression, rotary and mandrel bending techniques to provide quality bent components in prototype to production quantities. Stock bent tubes and fittings are also available.



Flaring

MicroGroup performs flaring on stainless steel and other metals, in angles from 1 degree to 180 degrees (depending on thickness of the tube), and wall thicknesses from .003". Its many applications include stops, as a lead in or guide to aid insertion. Flaring is highly repeatable with proper preparation, cost effective and well-suited for volume applications.



Upsetting/Bulging/Bending

Cost effective hose barbs and stops for orientation or registration can be created by bulging or upsetting the tube wall, as pictured. Wall thickness and temper will affect the size and ease of the bulge. Process is best suited for precision applications in high volumes.



Swaging

Rotary Swaging is generally used to reduce the diameter of tubing and solids or to forge a tube over another tube or solid. Diameters from .020" to 1.0" in tubing and solids can be rotary swaged, overall lengths can vary from 1/4" to 20 feet or more, with a maximum tapered length of 3" in a single pass. The ideal swage angle is 15 degrees included, but angles to 90 degrees included are possible. Most metals can be rotary swaged.



Closures

Tube ends can be closed to customer specifications, with radius, flat and bullet nose tip options available. Wall thickness can be maintained throughout the end if desired. Dimensional and tolerance requirements on these features determine the manufacturing process.

MicroGroup's closures are used for a variety of products from sensor housings to inner and outer matched arthroscopic surgery cutters. Different end configurations are available.



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Computer Automated Micro-Machining

Specialists
in Stainless Steel
and Titanium



Twin Spindle CNC Machining

Almost every metal can be efficiently cut and machined using our state-of-the-art twin spindle CNC micro-machining centers. These twin spindle machines are extremely competitive – eliminating all secondary operations and handling resulting in repetitive orientation of holes, slots, etc. All machining operations are accomplished within the machine for outstanding accuracy and control – turning, milling, drilling, deburring, etc.



EDM • Electrochemical Discharge Machining

MicroGroup has CNC RAM and five axis wire capability in house. We fabricate our own electrodes which are used to create precision holes, slots, angles and skives – used primarily for precision, holding tolerances to .0001. MicroGroup can handle prototype to production quantities, is able to convert dxf files to EDM programs and can cut any conductive material as well as odd shapes like snap lock.



ECG • Electrochemical Grinding

Burr-free, tight tolerance slots, angled bevels and cut lengths are produced by MicroGroup's electrochemical grinders. Most metals can be electrochemically cut and ground in diameters from .004" to 1-1/2", in tubing and solids. Tolerances of +/- .0001" or better can be maintained using electrochemical processes. ECG can be applied to almost any part that can be fixtured on a conventional surface grinder, with results considerably beyond those provided by conventional methods.



Laser Machining

YAG laser with varying beam widths is used for a variety of applications, including slotting, cutting and creating holes. Conventional and fiber optic beam delivery are suited for unique machining applications. Its proper fixturing allows for tight tolerances to be held. Laser machining is highly repeatable, fast and efficient. Plus, MicroGroup can handle prototype to production volumes.



Punching

Shaped dies are used to pierce tubing or flat stock to create a hole of a specific size or shape, or a component from flat stock. Punching can be performed on various metals (from stainless steel to brass), is cost effective and suitable for medium and high volume applications. Thickness of material to be punched affects size and tolerance of punch. Circles are most common, however, since we make dies in-house other shapes are available. MicroGroup is ready to consult and execute your requirements that will benefit from punching services.



Prototyping/Tooling

Our engineering group designs tooling for small prototype through large production runs. We are capable of working on your projects from the design phase through production. In-house prototyping services save time and money, as well as guarantee quality and consistency from concept to completion.



MicroGroup provides complete final assembly services for your tubing and miniature component requirements. From start to finish, MicroGroup is the only source you'll ever need.

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Micro-Welding/Brazing

Short Lead Times
Tough Jobs



Laser Micro-Welding

Laser welding offers several advantages which include: minimal heat effect in the weld zone, welding of walls as thin as .002" and process repeatability in prototype through production quantities because of CNC control. Most metals can be laser beam welded. It's also ideal for welding small, thin-walled objects such as hypodermic tubing, pacemaker cases, diaphragms and bellows.



TIG Micro-Welding

MicroGroup uses TIG welding techniques suited for precision components and assemblies. MicroGroup designs fixturing in-house for each application which results in superior tolerancing and joint finishes. Walls as thin as .002" can be welded, but TIG is better suited for thicker walls. MicroGroup has also developed expertise in TIG fusion welding, which eliminates the use of unwanted filler materials.



Induction Brazing

Induction is ideally suited as a closely controlled heat source for brazing. A wide variety of materials can be brazed, including some combinations that are unweldable. Brazing can be more economical than welding smaller parts and is often preferred for joining thin sections to thick sections because reduced heat minimizes distortion. Brazing is used extensively for joining many dissimilar material combinations. Inaccessible joint areas that could not be made by gas metal arc, gas tungsten arc, and spot or seam welding can be joined by brazing.



Micro-Torch Brazing

A wide variety of materials can be brazed, including some combinations that are unweldable. Brazing can be more economical than welding smaller parts and is often preferred for joining thin sections to thick ones since reduced heat minimizes distortion. MicroGroup uses state-of-the-art equipment to join components, where other welding techniques are not applicable, such as dissimilar materials and complex joint configurations.



Fixturing

Customized to meet stringent requirements, MicroGroup performs fixturing services in-house for prototype and production quantities. We handle fixturing of both single and multiple parts. And since MicroGroup has welding experience, we understand what requirements the fixturing must meet. We also know the idiosyncrasies of tubing, enabling us to always create the proper fixtures.



MIG Welding

Used typically in thicknesses .020" and up for tubing, sheet and solids, this process uses filler metals for joining materials. Exacting assembly tolerances of +/- .001 can be maintained if specified and with proper fixturing. Most metals can be precision MIG welded. It's also perfect for producing welds that require a fillet or for building thickness. MIG is applicable for prototype to high quantity production applications.



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Finishing/Post Processing

Short Lead Times
Tough Jobs



Catheter Cleaning

MicroGroup's custom cleaning equipment is designed to perform production volume cleaning on an individual tube basis. ID and OD cleanliness problems associated with batch cleaning processes are eliminated by employing automated systems to clean, rinse, flush solvents, passivate and purge.



Electropolishing

Electropolishing is a controlled chemical process that removes a slight amount of the component or tube's surface. It helps create a clean and bright surface, enhances corrosion resistance and removes feather burrs.



Vacuum Oven

The use of high vacuum ovens enhance cleaning and stress relieving. When employed during the cleaning process drying is ensured and cleanliness is improved by the outgassing of trace elements of contaminants. Additionally, pyrogens are removed and corrosion resistance is improved. High vacuum furnaces also provide contaminant and discoloration free stress relieving.



Vibratory Polishing

Vibrating parts in a special container with media and detergent removes burrs, breaks edges, cleans and creates a nice surface finish. Metal, ceramic, plastic and other media are used, as well as different detergents. MicroGroup is also able to meet custom requests.



Pyrolyzation

In pyrolyzation, a nitrogen purged container is loaded with components and heated in an oven. The resulting pyrogen free parts are immediately packaged.



Microblasting

In microblasting, the surface of a component is roughened through blasting with abrasive media (including glass beads, Aluminum Oxide, Silicone carbide and Sodium carbonate) and air. The roughened surface allows for better adhesion of plastics to metal during injection molding. Microblasting creates a non-reflective surface and can be used to deburr and clean.



Ultrasonic with Filtration

Ultrasonic cleaning is a primary method of removing contaminants and debris from tubing that has been processed. High frequency soundwaves combine with liquid media to remove dirt, grease, oil and residual contaminants. The process is quick and involves a limited handling of parts.

MicroGroup has custom ultrasonic tanks capable of cleaning small parts of tubing up to 6 feet in length, in both single pieces and batches.



Passivation

Passivation is a chemical process used to increase the corrosion inhibiting properties of stainless steel and clean discoloration from welding and cutting. MicroGroup performs passivation to customer requirements, as well as QQP35 Type VI, Type II and A967-96.



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Assembly Services

With over 25 years of stainless steel tubing experience and support manufacturing services, MicroGroup welcomes the opportunity to produce your final product or subassembly components. Whether you acquire your raw materials from our inventory of over 5 million feet of tubing or supply your own, MicroGroup is prepared to be your one-stop source – from materials to complete product manufacturing.

The following outlines the process we've designed to both help your work teams and manage all of the details. It's a process that guarantees your quality and delivery requirements are always exceeded.



Project Review

When you work with MicroGroup, our initial step is conducting a thorough project review. This allows us to go over all of the project's specifications, ensuring that we fully understand your objectives. We'll then discuss your quality requirements, determine if prints or additional drawings are necessary and create a production schedule with milestones.



Drafting Services

MicroGroup capabilities include creating internal drawings for fixtures, as well as component and assembly drawings, if required (with AutoCAD used most often). We can e-mail drawings to you and if a complete drawing package is needed, MicroGroup can provide this service as well.



Project Engineers

The MicroGroup advantage includes an exceptional staff of the industry's finest engineers. This hard working group of highly-trained professionals will work with you from design concept through manufacturing and assembly. Our dedicated project engineers closely monitor all details – and work with you every step of the way.



Quality Assured!

Quality Control

MicroGroup's quality system has earned us ISO 9002 certification. What's more, although ISO registered, MicroGroup offers continuous employee training programs, assuring that the highest level of quality systems and products are produced.

From raw materials to manufacturing and assembly, MicroGroup is your vendor partner offering all of the services you need in one place. This means that every one of your stainless steel tubing and related manufacturing requirements can be taken care of by one supplier.

From concept through completion, you'll get the kind of control over production, delivery and product consistency you're looking for. And we're not only focused on taking care of all of the details of every project, we're also able to respond to your custom design requests and tight deadlines. Our skills are focused on creating the highest caliber products, as quickly as possible.

MicroGroup: integrated services for guaranteed results.

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within 24 HOURS!*

Stainless Steel Tube & Hose Fittings

Economical!

- ◀ 1/32" TO 1" DIAMETERS
- ◀ T316 STAINLESS STEEL
- ◀ LIGHTWEIGHT
- ◀ STOCK AND CUSTOM
- ◀ EASY TO USE
- ◀ WELD/SOLDER/EPOXY/BRAZE

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About Tube Fittings

Offering a Unique Concept...

These Stainless Steel tube fittings are fabricated from thin wall tubing in actual tube OD sizes. Braze/HozeTyte® was created to satisfy the need for a standard line of versatile fittings compatible with thin wall stainless steel tubing and suitable for reliable permanent type assemblies.

Material

Over the years, the use of the "Modern Metal" (stainless steel) has increased steadily. Its corrosion resistant qualities and high strength characteristics have inspired design engineers to specify stainless. Now with Braze/HozeTyte®, quality is available at a reasonable cost.

Application

Braze/HozeTyte® fittings lend themselves ideally to industrial applications in the beverage, chemical, food, marine, medical, photography, refrigeration industries and many other areas.

Advantages

This new line of fittings, as its name implies, is fabricated from thin wall type 316L stainless steel tubing to provide maximum corrosion resistance with minimum bulk and weight. All elbows incorporate smooth radius bends for maximum flow and minimum turbulence.

Because Braze/HozeTyte® fittings utilize thin wall tubing, they are light in weight and provide larger tube inside dimensions for increased capacity and flow. These fittings afford a substitute for the present heavy machined fittings produced from bulky expensive forgings. Braze/HozeTyte's construction facilitates the use of thin wall tubing throughout the complete system.

Installation costs are reduced, because Braze/HozeTyte fittings are easy to use. Special tools are not required and quick connections may be made utilizing standard processing.

How to Specify BrazeTyte® Tube Fittings

Nomenclature:

BrazeTyte® fitting part numbers are constructed from symbols that identify the size and style of the fitting.

The dash numbers indicate tube OD size by 1/16 inches, thus -4 means 4/16" or 1/4", -10 means 10/16" or 5/8", etc. The first series of numbers identifies the style or configuration of the fitting. The letters designate combinations of male, female and swivel ends of the part (see below).

Letter Designation		Example: 15MF-8		
FF	All Female	15	MF	-8
MM	All Male	style	male	tube OD
MF	Male and Female	TEE	and	size
SF	Swivel and Female	male run	female	1/2"
SM	Swivel and Male			

How to Specify HozeTyte® Tube Fittings

Nomenclature:

HozeTyte® fitting part numbers are constructed from symbols that identify the size and style of the fitting.

The first dash number indicates hose ID size by 1/16 inches, thus -4 means 4/16" or 1/4", -10 means 10/16" or 5/8", etc. The first series of numbers identifies the style or configuration of the fitting. The letters designate combinations of male, hose and pipe ends of the part.

Pipe ends are designated by the dash number. These are not outside diameters, but rather standard NPTF screw thread sizes.

Letter Designation		Example: 90MH-8		
HH	All Hose	90	MH	-8
MH	Male and Hose	style	male	Hose ID
PH	Pipe and Hose	90°	and	size
		elbow	hose	1/2"

Methods for Installing BrazeTyte® Fittings

The most effective means for making a stainless connection is by either soldering, brazing or welding. Such joints are strong, leak-tight, corrosion resistant, economical and have a good appearance. BrazeTyte tube fittings are designed to provide for these assembly methods.

Soldering and Brazing

Soldered or brazed joints resist most corrosive media. The very nature of the process leaves only a small seam exposed to atmosphere. It is important to choose the proper solder or brazing alloy and this is usually determined by the application and environment of the assembly being fabricated. Certain alloys are formulated with precious metals which give them corrosive resistance equal to stainless steel itself.

Soldered or brazed stainless steel connections are extremely strong in both tensile and shear strength. This high strength characteristic is based on the ability of molten brazing alloy to penetrate and fill the gap between bonding areas through "capillary action."

Welding

The other means of making a permanent joint with BrazeTyte fittings is by welding. Depending upon the configuration chosen, connections may be made by either of two basic methods, Butt or Lap welding. The technique chosen will be governed by the actual tubing application, the welding equipment available and the skill of the welding operator.

Bonding with Epoxy

BrazeTyte fittings can also be assembled using epoxy adhesives. Epoxy provides a permanent joint for low pressure assemblies and is an easy, inexpensive method to accomplish a connection. A joint may be made quickly, using unskilled labor and simple techniques.

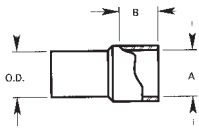
There are many types of commercial and industrial epoxy adhesives on the market. These usually are offered as two component kits, one part being the catalyst which activates the curing of the material. Curing methods of these epoxy adhesives vary. Some cure at room temperatures and in other cases curing is accelerated by the application of heat.

Properly prepared and fully cured bonds are possible that will yield tensile shear strengths of up to 3,500 psi when tested at room temperature.

Epoxy adhesive is not recommended for systems where temperatures exceed 200° or for use with certain chemicals that might tend to attack the epoxy joint. The manufacturer usually supplies this type of information in the form of chemical corrosion resistance table.

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Brazetyte® Fittings

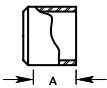


Cup Dimensions

The chart below is a reference guide to be used for your convenience listing the dimensions of each item number by size.

Item #	O.D.	Wall	A	B(Cup Depth)	
-4	1/4	.025	.254	1/4	<i>Call or access web for pricing</i>
-5	5/16	.025	.316	1/4	
-6	3/8	.028	.379	1/4	
-8	1/2	.032	.504	5/16	
-10	5/8	.035	.629	7/16	
-12	3/4	.042	.754	1/2	
-16	1	.049	1.005	3/4	
-20	1-1/4	.049	1.255	13/16	
-24	1-1/2	.049	1.505	15/16	

Tol: A = ± .005 B = ± .032

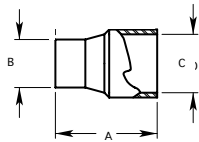


Cap

Female Closed

Used to terminate a line or fitting. Fits over male end of BrazeTyte fitting or over the O.D. of tubing.

Item #	Sizes	Wall	A	\$ ea
10F-4	1/4	.032	1/4	<i>Call or access web for pricing</i>
10F-5	5/16	.032	1/4	
10F-6	3/8	.032	1/4	
10F-8	1/2	.032	5/16	
10F-10	5/8	.032	7/16	
10F-12	3/4	.049	1/2	
10F-16	1	.049	3/4	
10F-20	1-1/4	.049	13/16	
10F-24	1-1/2	.049	15/16	

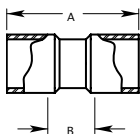


Expander

Male OD <> Female ID

Used as an adapter where an expansion from a smaller OD to a larger OD is required. Can be employed in conjunction with the 10FF union to join different OD sizes of tubing. May also be utilized with any MF, FF or SF style fitting.

Item #	Sizes	Wall	A	B	C	\$ ea
10MF-4-5	1/4 x 5/16	.025	15/16	1/4	.316	<i>Call or access web for pricing</i>
10MF-4-6	1/4 x 3/8	.025	7/8	1/4	.379	
10MF-5-6	5/16 x 3/8	.025	1-1/32	5/16	.379	
10MF-6-8	3/8 x 1/2	.032	1-9/32	3/8	.504	
10MF-8-10	1/2 x 5/8	.035	1-3/8	1/2	.629	
10MF-8-12	1/2 x 3/4	.035	1-3/8	1/2	.754	
10MF-10-12	5/8 x 3/4	.035	1-3/8	5/8	.754	
10MF-12-16	3/4 x 1	.049	2-7/16	3/4	1.005	
10MF-16-20	1" x 1-1/4	.049	2-7/16	1	1.255	
10MF-16-24	1" x 1-1/2	.049	2-1/16	1	1.505	
10MF-20-24	1-1/4 x 1-1/2	.049	2-3/8	1-1/4	1.505	

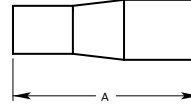


Union

Female <> Female

Used as a coupling. Both ends will accept either tube OD or male end of BrazeTyte fitting. When connecting different OD sizes, either the 5MF reducer or the 10MF expander should be employed.

Item #	Sizes	Wall	A	B	\$ ea
10FF-4	1/4	.025	15/16	11/16	<i>Call or access web for pricing</i>
10FF-5	5/16	.025	1	3/4	
10FF-6	3/8	.028	1	3/4	
10FF-8	1/2	.032	1-5/32	27/32	
10FF-10	5/8	.035	1-11/32	29/32	
10FF-12	3/4	.042	1-9/16	1-1/16	
10FF-16	1	.049	2-1/4	1-1/2	
10FF-20	1-1/4	.049	2-1/2		
10FF-24	1-1/2	.049	2-11/16		

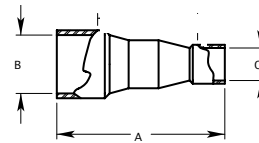


Transition

Male <> Male

Used as a reducer or expander to accomplish a change in O.D. size. Can be employed in conjunction with any MF, FF or SF style fitting to obtain a reduced or expanded male end. Also can be used as a butt weld connector when a change in O.D. is desired.

Item #	Sizes	Wall	A	\$ ea
5MM-4-5	1/4 x 5/16	.025	31/32	<i>Call or access web for pricing</i>
5MM-4-6	1/4 x 3/8	.025	15/16	
5MM-5-6	5/16 x 3/8	.025	1-1/165	
5MM-6-8	3/8 x 1/2	.032	1-5/16	
5MM-8-10	1/2 x 5/8	.035	1-7/16	
5MM-8-12	1/2 x 3/4	.035	1-7/16	
5MM-10-12	5/8 x 3/4	.035	1-7/16	
5MM-12-16	3/4 x 1	.049	2-1/2	
5MM-16-20	1 x 1-1/4	.049	2-1/2	
5MM-16-24	1 x 1-1/2	.049	2-1/8	
5MM-20-24	1-1/4 x 1-1/2	.049	2-7/16	

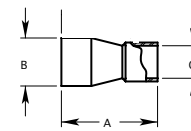


Reducing Union

Female <> Female: in tube OD sizes

Used as a coupling. Both ends will accept either tube OD or male end of BrazeTyte fitting.

Item #	Sizes	Wall	A	B	C	\$ ea
5FF-5-4	5/16 x 1/4	.025	7/8	.316	.254	<i>Call or access web for pricing</i>
5FF-6-4	3/8 x 1/4	.025	2-7/32	.379	.254	
5FF-6-5	3/8 x 5/16	.025	1	.379	.316	
5FF-8-6	1/2 x 3/8	.032	1-1/4	.504	.379	
5FF-10-8	5/8 x 1/2	.035	1-5/16	.629	.504	
5FF-12-8	3/4 x 1/2	.035	1-5/16	.754	.504	
5FF-12-10	3/4 x 5/8	.035	1-5/16	.754	.629	
5FF-16-12	1 x 3/4	.049	2-3/8	1.005	.754	
5FF-20-16	1-1/4 x 1	.049	2-3/8	1.255	1.005	
5FF-24-16	1-1/2 x 1	.049	2	1.505	1.005	
5FF-24-20	1-1/2" x 1-1/4"	.049	2-5/16	1.505	1.255	



Reducer

Male OD <> Female ID

Used as an adapter where a reduction from larger OD to a smaller OD is required. Can be employed in conjunction with any MF, FF or SF style fitting to reduce female BrazeTyte end.

Item #	Sizes	Wall	A	B	C	\$ ea
5MF-5-4	5/16 x 1/4	.025	15/16	5/16	.254	<i>Call or access web for pricing</i>
5MF-6-4	3/8 x 1/4	.025	7/8	3/8	.254	
5MF-6-5	3/8 x 5/16	.025	1-1/32	3/8	.316	
5MF-8-6	1/2 x 3/8	.032	1-9/32	1/2	.379	
5MF-10-8	5/8 x 1/2	.035	1-3/8	5/8	.504	
5MF-12-8	3/4 x 1/2	.035	1-3/8	3/4	.504	
5MF-12-10	3/4 x 5/8	.035	1-3/8	3/4	.629	
5MF-16-12	1 x 3/4	.049	2-7/16	1	.754	
5MF-20-16	1-1/4 x 1	.049	2-7/16	1-1/4	1.005	
5MF-24-16	1-1/2 x 1	.049	2-1/16	1-1/2	1.005	
5MF-24-20	1-1/2 x 1-1/4	.049	2-3/8	1-1/2	1.225	

Customs Made To Order!

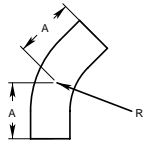


MicroGroup provides complete final assembly services for your tubing and miniature component requirements. From start to finish, MicroGroup is the only source you'll ever need.

FDA Registration #1226212

STAINLESS STEEL TUBE & HOSE FITTINGS

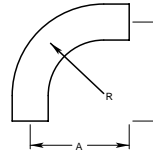
Brazetyte® Fittings



45° Elbow

Male <> Male

For direct assembly into machined ports and flanges or into female BrazeTyte expansions. can be used as a Butt-Weld fitting.



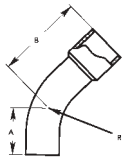
90° Elbow

Male <> Male

For direct assembly into machined ports and flanges or into female BrazeTyte expansions. Can be used as a Butt-Weld fitting.

Item #	Sizes	Wall	R	A	\$ ea
45MM-4	1/4	.025	3/8	19/32	<i>Call or access web for pricing</i>
45MM-5	5/16	.025	15/32	5/8	
45MM-6	3/8	.028	9/16	21/32	
45MM-8	1/2	.032	3/4	25/32	
45MM-10	5/8	.035	15/16	1	
45MM-12	3/4	.042	1-1/8	1-7/32	
45MM-16	1	.049	1-1/2	1-19/32	
45MM-20	1-1/4	.049	1-7/8	1-27/32	
45MM-24	1-1/2	.049	2-1/4	2-1/16	

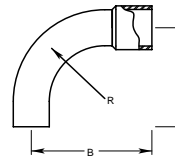
Item #	Sizes	Wall	R	A	\$ ea
90MM-4	1/4	.025	3/8	13/16	<i>Call or access web for pricing</i>
90MM-5	5/16	.025	15/32	29/32	
90MM-6	3/8	.028	9/16	1	
90MM-8	1/2	.032	3/4	1-1/4	
90MM-10	5/8	.035	15/16	1-9/16	
90MM-12	3/4	.042	1-1/8	1-7/8	
90MM-16	1	.049	1-1/2	2-15/32	
90MM-20	1-1/4	.049	1-7/8	2-15/16	
90MM-24	1-1/2	.049	2-1/4	3-13/32	



45° Elbow

Male <> Female

For direct assembly into machined ports or into female BrazeTyte expansions, female end will accept tube OD or male end of BrazeTyte fitting. When connecting different OD sizes, either the 5MF reducer or the 10MF expander can be employed.



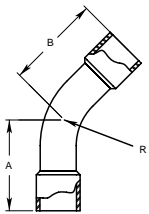
90° Elbow

Male <> Female

For direct assembly into machined ports or into female BrazeTyte expansions, female end will accept tube OD or male end of BrazeTyte fitting. When connecting different OD sizes, either the 5MF reducer or the 10MF expander can be employed.

Item #	Tube O.D.	Tube Wall	Radius R	A	B	\$ ea
45MF-4	1/4	.025	3/8	19/32	17/32	<i>Call or access web for pricing</i>
45MF-5	5/16	.025	15/32	5/8	9/16	
45MF-6	3/8	.028	9/16	21/32	19/32	
45MF-8	1/2	.032	3/4	25/32	25/32	
45MF-10	5/8	.035	15/16	1	1	
45MF-12	3/4	.042	1 1/8	1 7/32	1 7/32	
45MF-16	1	.049	1 1/2	1 19/32	1 19/32	
45MF-20	1 1/4	.049	1 7/8	1 27/32	1 27/32	
45MF-24	1 1/2	.049	2 1/4	2 1/16	2 1/16	

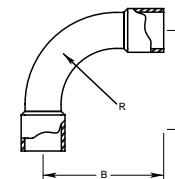
Item #	Sizes	Wall	R	A	B	\$ ea
90MF-4	1/4	.025	3/8	13/16	3/4	<i>Call or access web for pricing</i>
90MF-5	5/16	.025	15/32	29/32	27/32	
90MF-6	3/8	.028	9/16	1	15/16	
90MF-8	1/2	.032	3/4	1-1/4	1-1/4	
90MF-10	5/8	.035	15/16	1-9/16	1-9/16	
90MF-12	3/4	.042	1-1/8	1-7/8	1-7/8	
90MF-16	1	.049	1-1/2	2-15/32	2-15/32	
90MF-20	1-1/4	.049	1-7/8	2-15/16	2-15/16	
90MF-24	1-1/2	.049	2-1/4	3-13/32	3-13/32	



45° Elbow

Female <> Female

Used as a coupling. Both ends will accept either tube OD or male end of BrazeTyte fitting. When connecting different OD sizes, either the 5MF reducer or the 10MF expander should be employed.



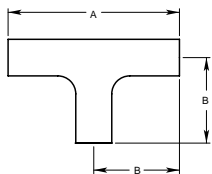
90° Elbow

Female expansions both ends

Both ends will accept either tube OD or male end of BrazeTyte fittings. When connecting different OD sizes, either the 5MF reducer or the 10MF expander should be employed.

Item #	Sizes	Wall	R	B	\$ ea
45FF-4	1/4	.025	3/8	17/32	<i>Call or access web for pricing</i>
45FF-5	5/16	.025	15/32	9/16	
45FF-6	3/8	.028	9/16	19/32	
45FF-8	1/2	.032	3/4	25/32	
45FF-10	5/8	.035	1-5/16	1	
45FF-12	3/4	.042	1-1/8	1-7/32	
45FF-16	1	.049	1-1/2	1-19/32	
45FF-20	1-1/4	.049	1-7/8	1-27/32	
45FF-24	1-1/2	.049	2-1/4	2-1/16	

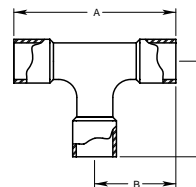
Item #	Sizes	Wall	R	B	\$ ea
90FF-4	1/4	.025	3/8	3/4	<i>Call or access web for pricing</i>
90FF-5	5/16	.025	15/32	27/32	
90FF-6	3/8	.028	9/16	15/16	
90FF-8	1/2	.032	3/4	1-1/4	
90FF-10	5/8	.035	15/16	1-9/16	
90FF-12	3/4	.042	1-1/8	1-7/8	
90FF-16	1	.049	1-1/2	2-15/32	
90FF-20	1-1/4	.049	1-7/8	2-15/16	
90FF-24	1-1/2	.049	2-1/4	3-13/32	



Tee

Male three ends

For direct assembly into machined ports and flanges or into female BrazeTyte expansions. Can be used as a Butt-Weld fitting.



Tee

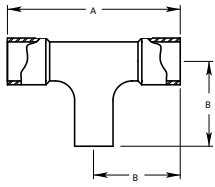
Female <> Female - Female

All ends accept either tube OD or male end of BrazeTyte fitting. When used to join different OD sizes, either the 5MF reducer or the 10MF expander can be employed.

Item #	Sizes	Wall	A	B	\$ ea
30MM-5	5/16	.025	1-3/16	19/32	<i>Call or access web for pricing</i>
30MM-6	3/8	.028	1-3/8	11/16	
30MM-8	1/2	.032	1-5/8	13/16	
30MM-10	5/8	.035	2	1	
30MM-12	3/4	.042	2-3/8	1-3/16	
30MM 16	1	.049	3-1/4	1-5/8	
30MM 20	1-1/4	.049	3-5/8	1-13/16	
30MM 24	1-1/2	.049	4-1/8	2-1/16	

Item #	Sizes	Wall	A	B	\$ ea
30FF-4	1/4	.025	1-3/16	19/32	<i>Call or access web for pricing</i>
30FF-5	5/16	.025	1-3/8	11/16	
30FF-6	3/8	.028	1-3/8	11/16	
30FF-8	1/2	.032	1-5/8	13/16	
30FF10	5/8	.035	2	1	
30FF-12	3/4	.042	2-3/8	1-3/16	
30FF-16	1	.049	3-1/4	1-5/8	
30FF-20	1-1/4	.049	3-5/8	1-13/16	
30FF-24	1-1/2	.049	4-1/8	2-1/16	

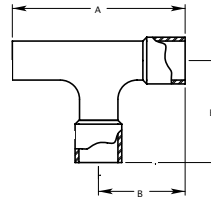
Brazetyte® Fittings



Tee

Female <> Female - Male

Male for direct assembly into machined ports or into female BrazeTyte expansions. Female ends to accept tube OD or male ends of BrazeTyte fittings. When used to join different OD sizes, either the 5MF reducer or the 10MF expander can be employed.



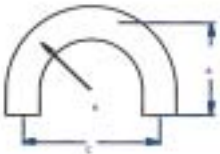
Tee

Male <> Female - Female

Male run for direct assembly into machined ports or into female BrazeTyte expansions. Female ends to accept tube OD or male ends of BrazeTyte fittings. When used to join different OD sizes, either the 5MF reducer or the 10MF expander can be employed.

Item #	Sizes	Wall	A	B	\$ ea
20MF-5	5/16	.025	1-1/16	19/32	Call or access web for pricing
20MF-6	3/8	.028	1-1/4	11/16	
20MF-8	1/2	.032	1-5/8	13/16	
20MF-10	5/8	.035	2	1	
20MF-12	3/4	.042	2-3/8	1-3/16	
20MF-16	1	.049	3-1/4	1-5/8	
20MF-20	1-1/4	.049	3-5/8	1-13/16	
20MF-24	1-1/2	.049	4-1/8	2-1/16	

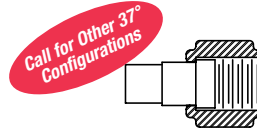
Item #	Sizes	Wall	A	B	\$ ea
15MF-5	5/16	.025	1-1/8	17/32	Call or access web for pricing
15MF-6	3/8	.028	1-5/16	5/8	
15MF-8	1/2	.032	1-5/8	13/16	
15MF-10	5/8	.035	2	1	
15MF-12	3/4	.042	2-3/8	1-3/16	
15MF-16	1	.049	3-1/4	1-5/8	
15MF-20	1-1/4	.049	3-5/8	1-13/16	
15MF-24	1-1/2	.049	4-1/8	2-1/16	



180° Return Bend

Male <> Male

For direct assembly into machined ports and flanges or into female BrazeTyte expansions. Can be used as a Butt-Weld fitting.



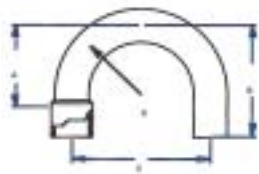
Adapter

Male <> Flare

Used to provide an easy sub-assembly disconnect. Male end assembles into machine ports or female BrazeTyte expansions. Swivel end mates with SAE 37°, JIC 37° and AN/MS 37° flare type fittings. Type 303 Nut & Sleeve

Item #	Tube O.D.	Tube Wall	Radius R	A	C	\$ ea
180MM-4	1/4	.025	3/8	13/16	3/4	Call or access web for pricing
180MM-5	5/16	.025	15/32	29/32	15/16	
180MM-6	3/8	.028	9/16	1	1 1/8	
180MM-8	1/2	.032	3/4	1 1/4	1 1/2	
180MM-10	5/8	.035	15/16	1 9/16	1 7/8	
180MM-12	3/4	.042	1 1/8	1 7/8	2 1/4	
180MM-16	1	.049	1 1/2	2 15/32	3	
180MM-20	1 1/4	.049	1 7/8	2 15/16	3 3/4	
180MM-24	1 1/2	.049	2 1/4	3 13/32	4 1/2	

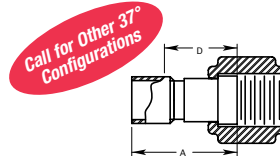
Item #	Sizes	Wall	HEX	Thread	A	\$ ea
10SM-4	1/4	.025	9/16	7/16-20	1-1/32	Call or access web for pricing
10SM-5	5/16	.025	5/8	1/2-20	1-1/8	
10SM-6	3/8	.028	11/16	9/16-18	1-1/8	
10SM-8	1/2	.032	7/8	3/4-16	1-9/32	
10SM-10	5/8	.035	1	7/8-14	1-15/32	
10SM-12	3/4	.042	1-1/4	1-1/16-12	1-29/32	
10SM-16	1	.049	1-1/2	1-5/16-12	2-9/16	
10SM-20	1-1/4	.049	2	1-5/8-12	3-1/32	
10SM-24	1-1/2	.049	2-1/4	1-7/8-12	3-7/32	



180° Return Bend

Male <> Female

For direct assembly into machined ports or into female BrazeTyte expansions, female end will accept tube OD or male end of BrazeTyte fitting. When connecting different OD sizes, either the 5MF reducer or the 10MF expander can be employed.



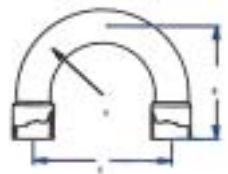
Adapter

Female <> Flare

Used to provide an easy sub-assembly disconnect. Female end to accept tube OD or male ends of BrazeTyte fittings. Swivel end mates with SAE 370, JIC 37° and AN/MS 37° flare type fittings. Type 303 Nut & Sleeve

Item #	Tube O.D.	Tube Wall	Radius R	A	B	C	\$ ea
180MF-4	1/4	.025	3/8	13/16	3/4	3/4	Call or access web for pricing
180MF-5	5/16	.025	15/32	29/32	15/16	27/32	
180MF-6	3/8	.028	9/16	1	1 1/8	15/16	
180MF-8	1/2	.032	3/4	1 1/4	1 1/2	1 1/4	
180MF-10	5/8	.035	15/16	1 9/16	1 7/8	1 9/16	
180MF-12	3/4	.042	1 1/8	1 7/8	2 1/4	1 7/8	
180MF-16	1	.049	1 1/2	2 15/32	3	2 15/32	
180MF-20	1 1/4	.049	1 7/8	2 15/16	3 3/4	2 15/16	
180MF-24	1 1/2	.049	2 1/4	3 13/32	4 1/2	2 13/32	

Item #	Sizes	Wall	HEX	Thread	A	D	\$ ea
10SF-4	1/4	.025	9/16	7/16-20	1-1/32	25/32	Call or access web for pricing
10SF-5	5/16	.025	5/8	1/2-20	1-1/8	7/8	
10SF-6	3/8	.028	11/16	9/16-18	1-1/8	7/8	
10SF-8	1/2	.032	7/8	3/4-16	1-9/32	31/32	
10SF-10	5/8	.035	1	7/8-14	1-15/32	1-1/32	
10SF-12	3/4	.042	1-1/4	1-1/16-12	1-29/32	1-13/32	
10SF-16	1	.049	1-1/2	1-5/16-12	2-9/16	1-13/16	
10SF-20	1-1/4	.049	2	1-5/8-12	3-1/32		
10SF-24	1-1/2	.049	2-1/4	1-7/8-12	3-7/32		



180° Return Bend

Female <> Female

Both ends will accept either tube OD or male end of BrazeTyte fittings. When connecting different OD sizes, either the 5MF reducer or the 10MF expander should be employed.

Item #	Tube O.D.	Tube Wall	Radius R	C	B	\$ ea
180FF-4	1/4	.025	3/8	3/4	3/4	Call or access web for pricing
180FF-5	5/16	.025	15/32	15/16	27/32	
180FF-6	3/8	.028	9/16	1 1/8	15/16	
180FF-8	1/2	.032	3/4	1 1/2	1 1/4	
180FF-10	5/8	.035	15/16	1 7/8	1 9/16	
180FF-12	3/4	.042	1 1/8	2 1/4	1 7/8	
180FF-16	1	.049	1 1/2	3	2 15/32	
180FF-20	1 1/4	.049	1 7/8	3 3/4	2 15/16	
180FF-24	1 1/2	.049	2 1/4	4 1/2	2 13/32	



MicroGroup provides complete final assembly services for your tubing and miniature component requirements. From start to finish, MicroGroup is the only source you'll ever need.

FDA Registration #1226212

All dimensions are in inches unless designated millimeters (mm).

HozeTyte® Fittings

Ideally suited for industrial applications in the following industries:

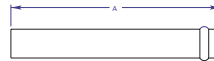
- Beverage
- Chemical
- Food
- Hydraulic
- Marine
- Medical
- Photography
- Refrigeration
- And Others

Please refer to page 24 for How to Specify HozeTyte information.

Adapter

Male Tube <-> Hose Bead

Used to connect a flexible non-metallic hose to a vessel (feed tank, reservoir, etc.). Male end can be brazed or welded.

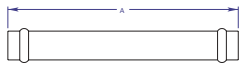


Item #	Sizes	Wall	A	\$ ea
10MH-4	1/4	.025	1-23/32	Call or access web for pricing ↓
10MH-6	3/8	.028	1-23/32	
10MH-8	1/2	.032	1-23/32	
10MH-10	5/8	.035	1-25/32	
10MH-12	3/4	.042	1-27/32	
10MH-16	1	.049	1-27/32	
10MH-20	1-1/4	.049	1-27/32	
10MH-24	1-1/2	.049	1-7/8	

Connector

Hose Bead <-> Hose Bead

Used as a connector to join flexible non-metallic hoses.

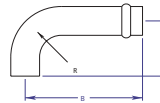


Item #	Sizes	Wall	A	\$ ea
10HH-4	1/4	.025	3	Call or access web for pricing ↓
10HH-6	3/8	.028	3	
10HH-8	1/2	.032	3	
10HH-10	5/8	.035	3	
10HH-12	3/4	.042	3	
10HH-16	1	.049	3	
10HH-20	1-1/4	.049	3	
10HH-24	1-1/4	.049	3	

90° Elbow

Male Tube <-> Hose Bead

Used to connect a flexible non-metallic hose to a vessel (feed tank, reservoir etc.) where a 90° angle is required. Male end can be brazed or welded.

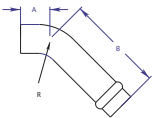


Item #	Sizes	Wall	R	A	B	\$ ea
90MH-4	1/4	.025	3/8	13/16	1-7/8	Call or access web for pricing ↓
90MH-6	3/8	.028	9/16	1	2-1/16	
90MH-8	1/2	.032	3/4	1-1/4	2-1/4	
90MH-10	5/8	.035	7/8	1-1/2	2-3/8	
90MH-12	3/4	.042	1-1/8	1-7/8	2-5/8	
90MH-16	1	.049	1-1/2	2-15/32	3	
90MH-20	1-1/4	.049	1-7/8	2-15/16	3-3/8	
90MH-24	1-1/2	.049	2-1/4	3-13/32	3-3/4	

45° Elbow

Male Tube <-> Hose Bead

Used to connect a flexible non-metallic hose to a vessel (feed tank, reservoir, etc.) where a 45° angle is required. Male end can be brazed or welded.

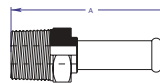


Item #	Sizes	Wall	R	A	B	\$ ea
45MH-4	1/4	.025	3/8	3/4	1-13/16	Call or access web for pricing ↓
45MH-6	3/8	.028	9/16	7/8	1-15/16	
45MH-8	1/2	.032	3/4	1-3/32	2-3/32	
45MH-10	5/8	.035	7/8	1-5/16	2-3/16	
45MH-12	3/4	.042	1-1/8	1-5/8	2-3/8	
45MH-16	1	.049	1-1/2	2-5/32	2-11/16	
45MH-20	1-1/4	.049	1-7/8	2-17/32	2-31/32	
45MH-24	1-1/2	.049	2-1/4	2-15/16	3-1/4	

Adapter

Male Pipe Thread <-> Hose Bead

Used to connect a flexible non-metallic hose to a female pipe port.

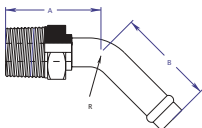


Item #	Sizes	Wall	A	HEX	NPT	\$ ea
10PH-4	1/4	.025	2-1/8	7/16	1/8	Call or access web for pricing ↓
10PH-6	3/8	.028	2-1/4	5/8	1/4	
10PH-8	1/2	.032	2-3/8	11/16	3/8	
10PH10	5/8	.035	2-1/2	7/8	1/2	
10PH-12	3/4	.042	2-9/16	1-1/16	3/4	
10PH-16	1	.049	2-11/16	1-3/8	1	
10PH-20	1-1/4	.049	2-13/16	1-3/4	1-1/4	
10PH-24	1-1/2	.049	3	2	1-1/2	

45° Elbow

Male Pipe Thread <-> Hose Bead

Used to connect a flexible non-metallic hose to a female pipe port where a 45° angle is required.

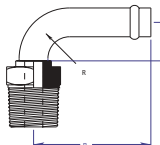


Item #	Sizes	Wall	R	A	B	HEX	NPT	\$ ea
45PH-4	1/4	.025	3/8	1-1/8	1-13/16	7/16	1/8	Call or access web for pricing ↓
45PH6	3/8	.028	9/16	1-13/32	1-15/16	5/8	1/4	
45PH-8	1/2	.032	3/4	1-3/4	2-3/32	11/16	3/8	
45PH-10	5/8	.035	7/8	21/32	2-3/16	7/8	1/2	
45PH-12	3/4	.042	1-1/8	2-11/32	2-3/8	1-1/16	3/4	
45PH16	1	.049	1-1/2	3	2-11/16	1-3/8	1	
45PH20	1-1/4	.049	1-7/8	3-19/32	2-31/32	1-3/4	1-1/4	
45PH24	1-1/2	.049	2-1/4	4-1/32	3-1/4	2	1-1/2	

90° Elbow

Male Pipe Thread <-> Hose Bead

Used to connect a flexible non-metallic hose to a pipe port where a 90° angle is required.



Item #	Sizes	Wall	R	A	B	HEX	NPT	\$ ea
90PH-4	1/4	.025	3/8	1-7/32	1-7/8	7/16	1/8	Call or access web for pricing ↓
90PH-6	3/8	.028	9/16	1-17/32	2-1/16	5/8	1/4	
90PH-8	1/2	.032	3/4	1-29/32	2-1/4	11/16	3/8	
90PH-10	5/8	.035	7/8	2-7/32	2-3/8	7/8	1/2	
90PH-12	3/4	.042	1-1/8	2-19/32	2-5/8	1-1/16	3/4	
90PH-16	1	.049	1-1/2	3-5/16	3	1-3/8	1	
90PH-20	1-1/4	.049	1-7/8	3	3-3/8	1-3/4	1-1/4	
90PH-24	1-1/2	.049	2-1/4	4-17/32	3-3/4	2	1-1/2	

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- ◀ LUER
- ◀ BARBED
- ◀ THREADED
- ◀ PIPE

MATERIALS OFFERED

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- ◀ NICKEL PLATED BRASS
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FDA
Registration
#1226212

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- Immediate Delivery
- Over 2,000 Combinations
- T316 Stainless Steel
- Nickel Plated Brass
- Delrin
- Titanium & Other Materials
- Specials Become Standard

ISO 594/1,2

All fittings are made to the **ISO 594/1-1986** and **ISO 594/2-1991** Standards which cover conical fittings with a 6% luer taper. Together, these ISO Standards replace the ISO Recommendation **R 594-1967** for conical fittings made of rigid and semi-rigid materials for use with hypodermic syringes and needles and with certain other apparatus for medical use.

Applying the most recent ISO Standards to the manufacturing processes of our LUER fittings allows us to offer our customers the most up-to-date products available on the market. If you do require LUERS made to ANSI/HIMA standards, they are still being manufactured and there are many in stock in both brass and stainless steel. Feel free to call for more information if you need a special fitting designed, or if you are unsure of the fitting to correctly suit your needs.

- Stock LUERS
- Machined Parts
- Custom
- Laser Welded Assemblies

See our extensive list of standards on the following pages. If you cannot find the one you're looking for in our standards, send us any drawings or application descriptions you have. We will be glad to work with you to get you the exact fitting you need.

The basic concept of the ModuLUER line of LUER fittings is that all standards and components are in stock. With our extensive precision welding capabilities and these stocked parts, almost any fitting configuration has a short lead time.

Your "special" is probably already sitting on our shelf.



Over 2,000 Combinations Available!

Do you have a special application that requires a unique configuration? Let MicroGroup assist you in designing a configuration from over 2,000 combinations available from ModuLUER components listed. Call now and let's work together on that new design!

ISO 594/1,-2
or
ANSI/HIMA

ModuLUER Luer Fittings, Valves & Inspection Gauges

Short Lead Times
Tough Jobs



Male LUER (ML)*



Female Straight Thread



Male LUER-Lock (MLL)*



Female Pipe Thread (FP)



Female LUER (FL)



Barb (B)



Female LUER Thread (FLT)



Caps (CAP)



Male Straight Thread (MT)



Elbows (LB)



Male Pipe Thread (MP)



Tees (T)

Standard Part Numbering

Ex.: **P/N #316 - MLL/BHB062-6H2**

Alloy - 316		Left Termination - MLL		Right Termination - BHB062		Body Diameter - 6		Body Type - H		Inside Diameter - 2	
303	303 Stainless Steel	B032	1/32" Barb	B032	1/32" Barb	1	1/16"	H	Hex Body	1	.018/.020
304	304 Stainless Steel	B062	1/16" Barb	B062	1/16" Barb	2	1/8"	K	Knurl Body	2	.060/.062
316	316 Stainless Steel	B125	1/8" Barb	B125	1/8" Barb	3	3/16"	R	Round Body	3	.093/.094
NPB	Nickel Plated Brass	B188	3/16" Barb	B188	3/16" Barb	4	1/4"	S	Square Body	B	No Bore smallest I.D.
BRS	360 Brass	B250	1/4" Barb	B250	1/4" Barb	5	5/16"				
TI	Titanium	Cap2528	1/4-28 Cap	BHB032	1/32" Bulkhead Barb	6	3/8"				
DEL	Delrin	Cap2532	1/4-32 Cap	BHB062	1/16" Bulkhead Barb	7	7/16"				
NYL	Nylon			BHB125	1/8" Bulkhead Barb						
Note: Other materials available upon request.		FL	Female Luer	FL	Female Luer	8	1/2"				
		FLT	Female Luer Thread	FLT	Female Luer Thread	9	9/16"				
		FP125	1/8" Female Pipe			10	5/8"				
		FT1032	10-32 Female Thread	FT1032	10-32 Female Thread	11	11/16"				
		FT2528	1/4-28 Female Thread	FT2528	1/4-28 Female Thread	12	3/4"				
		FT2532	1/4-32 Female Thread	FT2532	1/4-32 Female Thread						
		ML	Male Luer	Hub	Hub						
		MLL	Male Luer Lock	ML	Male Luer						
		MP062	1/16" Male Pipe	MLL	Male Luer Lock						
		MP125	1/8" Male Pipe	MP062	1/16" Male Pipe						
		MP250	1/4" Male Pipe	MP125	1/8" Male Pipe						
		MT1032	10-32 Male Thread	MP250	1/4" Male Pipe						
		MT2528	1/4-28 Male Thread	MT1032	10-32 Male Thread						
		MT2532	1/4-32 Male Thread	MT2528	1/4-28 Male Thread						
		NUT	Nut	MT2532	1/4-32 Male Thread						
		SK	Sinker								

We also custom manufacture with Tuohy Borst compression style connectors. Please refer to www.microgroup.com for additional product and pricing information.

- As an option we can add "O-Rings" to male LUERS and LUER Locks.
- Actual barb O.D.'s are manufactured oversized (refer to page 42).

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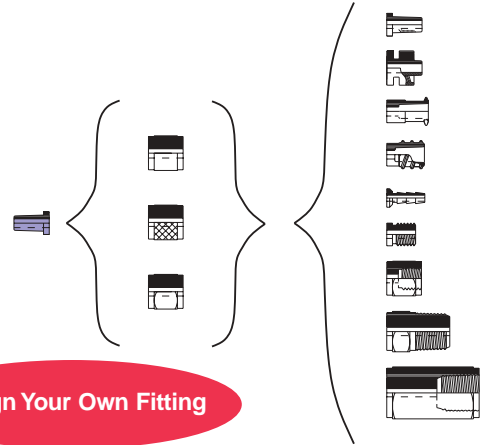
Male LUER

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Tough Jobs

Call For Quantity Discounts



Male ModuLUER fittings are manufactured to ISO 594/1,-2 and are available in several modular lengths and sections. Specials quoted on request.



24 hrs.! ▼



316-ML/-4R3
NPB-ML/-4R3



316-ML/-4RB



316-ML/-5HB
NPB-ML/-5KB



316-ML/-6H3
NPB-ML/-5K-3



316-ML/-6HB



316-ML/B062-6H2
NPB-ML/B062-5K2



316-ML/B125-6H3
NPB-ML/B125-5K3



316-ML/B188-6H3
NPB-ML/B188-6K3



316-ML/B250-6H3
NPB-ML/B250-6K3



316-ML/BH-6H3



316-ML/BHB062-6H2
NPB-ML/BHB062-6K2



316-ML/BHB125-6H3
NPB-ML/BHB125-6K3



316-ML/FL-6H3



316-ML/FLT-6H3
NPB-ML/FLT-5K3



316-ML/FP125-9H3



316-ML/FT1032-6H3
NPB-ML/FT1032-6H3



316-ML/FT2528-6H3
NPB-ML/FT2528-6H3



316-ML/FT2532-6H3
NPB-ML/FT2532-6H3



316-ML/ML-6H3
NPB-ML/ML-6K3



316-ML/MLL-6H3
NPB-ML/MLL-6K3



316-ML/MP062-6H3
NPB-ML/MP062-6H3



316-ML/MP125-7H3
NPB-ML/MP125-7H3



316-ML/MP250-9H3
NPB-ML/MP250-9H3



316-ML/MT1032-6H3
NPB-ML/MT1032-6H3



316-ML/MT2528-6H3
NPB-ML/MT2528-6H3



316-ML/MT2532-6H3
NPB-ML/MT2532-6H3

For further details – refer to
www.microgroup.com

ISO 594/1,-2
or
ANSI/HIMA

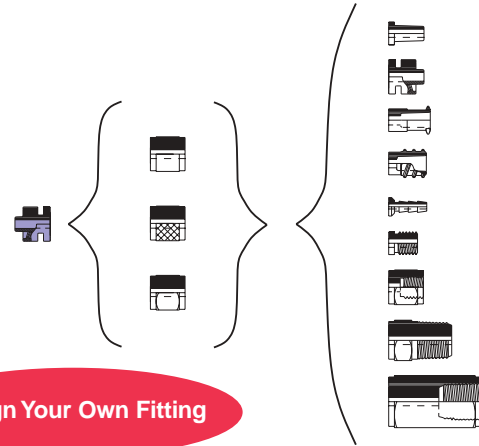
Male LUER Lock

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Tough Jobs

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Male-LUER-Lock ModuLUER fittings are manufactured to ISO 594/1,-2 and are available in several modular lengths and sections. Specials quoted on request.



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316-MLL/6H3
NPB-MLL/6K3



316-MLL/6HB
NPB-MLL/6KB



316-MLL/6R3
NPB-MLL/6RB



316-MLL/6RB



316-MLL/B032-6H1



316-MLL/B062-6H2
NPB-MLL/B062-6K2



316-MLL/B125-6H3
NPB-MLL/B125-6K3



316-MLL/B188-6H3
NPB-MLL/B188-6K3



316-MLL/B250-6H3
NPB-MLL/B250-6K3



316-MLL/BH-6H3



316-MLL/BHB032-6H1
NPB-MLL/BHB032-6K1



316-MLL/BHB062-6H2
NPB-MLL/BHB062-6K2



316-MLL/BHB125-6H3
NPB-MLL/BHB125-6K3



316-MLL/FL-6H3
NPB-MLL/FL-6K3



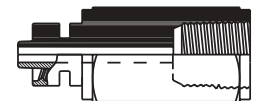
316-MLL/FLT-6H3
NPB-MLL/FLT-6K3



NPB-MLL/MLL-6R3



316-MLL/MLL-6H3



316-MLL/FP125-9H3
NPB-MLL/FP125-9H3



316-MLL/FT1032-6H3
NPB-MLL/FT1032-6H3



316-MLL/FT2528-6H3
NPB-MLL/FT2528-6H3



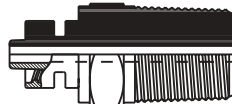
316-MLL/FT2532-6H3
NPB-MLL/FT2532-6H3



316-MLL/MP062-6H3
NPB-MLL/MP062-6H3



316-MLL/MP125-7H3
NPB-MLL/MP125-7H3



316-MLL/MP250-9H3
NPB-MLL/MP250-9H3



316-MLL/MT1032-6H3
NPB-MLL/MT1032-6H3



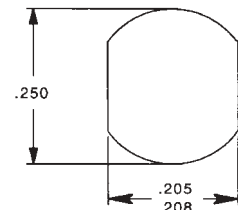
316-MLL/MT2528-6H3
NPB-MLL/MT2528-6H3



316-MLL/MT2532-6H3
NPB-MLL/MT2532-6H3

Bulkhead Specifications

Bulkhead fittings come equipped with panel nuts and lock washers. The 1/4"-32 thread is finished with flats on either side to prevent turning. The recommended panel hole size is shown below.



MINIATURE LUER FITTINGS

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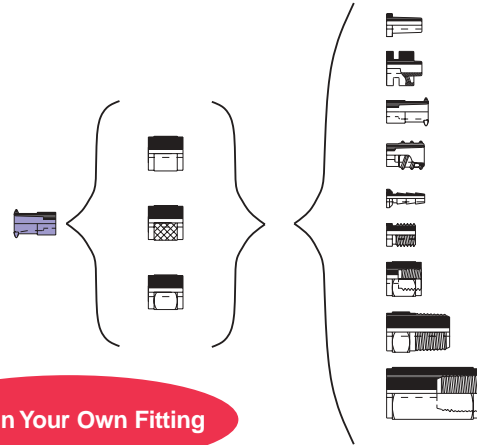
ISO 594/1,-2
or
ANSI/HIMA

Female LUER

Short Lead Times
Tough Jobs



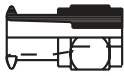
Female ModuLUER fittings are manufactured to ISO 594/1,-2 and are available in several modular lengths and sections. Specials quoted on request.



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316-FL-4R3



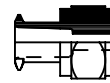
316-FL-5H3



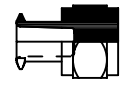
316-FL-5HB
NPB-FL-5KB



316-FL/HUB-5HB
NPB-FL/HUB-5KB



316-FL-6H3



316-FL/6HB



316-FL/B032-5H1



316-FL/B062-5H2
NPB-FL/B062-5K2



316-FL/B125-5H3
NPB-FL/B125-5K3



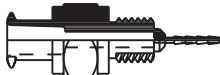
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NPB-FL/B188-6K3



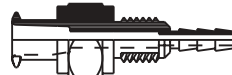
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NPB-FL/B250-6K3



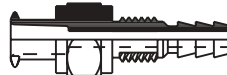
316-FL/BH-6H3



316-FL/BHB032-6H1



316-FL/BHB062-6H2



316-FL/BHB125-6H3
NPB-FL/BHB125-6K3



316-FL/FL-5H3
NPB-FL/FL-5K3



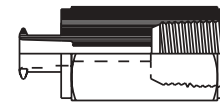
316-FL/FT1032-6H3
NPB-FL/FT1032-6H3



316-FL/FT2528-6H3
NPB-FL/FT2528-6H3



316-FL/FT2532-6H3
NPB-FL/FT2532-6H3



316-FL/FP-125-9H3
NPB-FL/FP-125-9H3



316-FL/MT1032-5H3
NPB-FL/MT1032-5H3



316-FL/MT2528-5H3
NPB-FL/MT2528-5H3



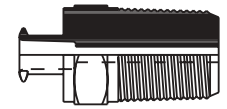
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NPB-FL/MT2532-5H3



316-FL/MP062-6H3



316-FL/MP125-7H3
NPB-FL/MP125-7H3



316-FL/MP250-9H3

For further details – refer to
www.microgroup.com

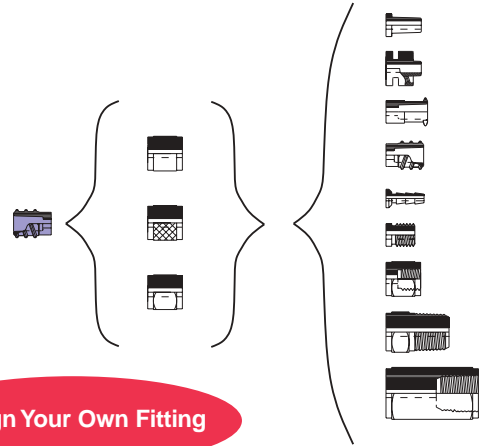
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or
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Female LUER Thread

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Tough Jobs

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Female LUER Threads ModuLUER fittings are manufactured to ISO 594-1,-2 and are available in several modular lengths and sections. Specials quoted on request.



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316-FLT/-4R3



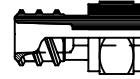
316-FLT/-5H3
NPB-FLT/-5K3



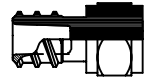
316-FLT/-5HB
NPB-FLT/-5KB



316-FLT/HUB-5HB
NPB-FLT/HUB-5KB



316-FLT/-6H3
NPB-FLT/6K3



316-FLT/-6HB
NPB-FLT/6KB



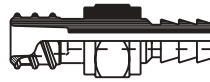
316-FLT/B032-5H1
NPB-FLT/B032-5K1



316-FLT/B062-5H2
NPB-FLT/B062-5K2



316-FLT/B125-5H3
NPB-FLT/B125-5K3



316-FLT/B188-6H3
NPB-FLT/B188-6K3



316-FLT/B250-6H3
NPB-FLT/B250-6K3



316-FLT/BH-6H3



316-FLT/BHB032-6H1



316-FLT/BHB062-6H2
NPB-FLT/BHB062-6K2



316-FLT/BHB125-6H3
NPB-FLT/BHB125-6K3



316-FLT/FLT-5H3
NPB-FLT/FLT-5K3



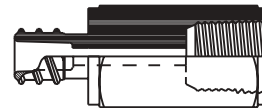
316-FLT/FT1032-6H3
NPB-FLT/FT1032-6H3



316-FLT/FT2528-6H3
NPB-FLT/FT2528-6H3



316-FLT/FT2532-6H3
NPB-FLT/FT2532-6H3



316-FLT/FP125-9H3



316-FLT/MT1032-5H3
NPB-FLT/MT1032-5H3



316-FLT/MT2528-5H3
NPB-FLT/MT2528-5H3



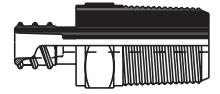
316-FLT/MT2532-5H3
NPB-FLT/MT2532-5H3



316-FLT/MP062-6H3



316-FLT/MP125-7H3
NPB-FLT/MP125-7H3



316-FLT/MP250-9H3

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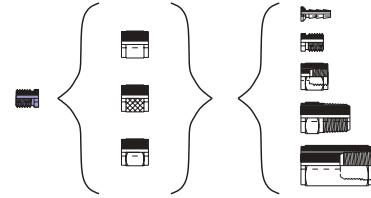
Call For Quantity Discounts



ISO 594/1,-2

Male Straight Thread

ModuLUER straight thread fittings are manufactured to applicable standards in 10-32, 1/4-28, and 1/4-32.

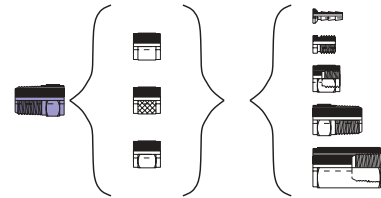


ANSI/HIMA

Male Pipe Thread (NPT)

Tough Jobs

Pipe fittings are manufactured to applicable standards in 1/16 NPT (spl order), 1/8 NPT, and 1/4 NPT. Specials quoted on request.



24 hrs.! ▼

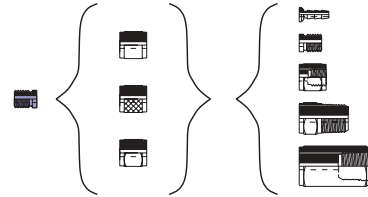
 316-MT1032-4R3	 316-MT2528-4R3	 316-MT2532-4R3	 316-MT1032-5H3 NPB-MT1032-6H3	 316-MT2528-5H3	 316-MT2532-5H3
 316-MT1032-6H3	 316-MT2528-6H3 NPB-MT2528-6H3	 316-MT2532-6H3 NPB-MT2532-6H3	 316-MP062-6HB 316-MP062-6H3 NPB-MP062-6HB	 316-MP125-7HB 316-MP125-7H3 NPB-MP125-7HB	 316-MP250-9HB 316-MP250-9H3 NPB-MP250-9HB
 316-MT1032/B032-5H1	 316-MT2528/B032-5H1 NPB-MT2528/B032-5H1	 316-MT2532/B032-5H1	 316-MP062/B032-6H1	 316-MP125/B032-7H1	 316-MP250/B032-9H1
 316-MT1032/B062-5H2	 316-MT2528/B062-5H2 NPB-MT2528/B062-5H2	 316-MT2532/B062-5H2 NPB-MT2532/B062-5H2	 316-MP062/B062-6H2 NPB-MP062/B062-6H2	 316-MP125/B062-7H2 NPB-MP125/B062-7H2	 316-MP250/B062-9H2 NPB-MP250/B062-9H2
 316-MT1032/B125-5H3 NPB-MT1032/B125-5H3	 316-MT2528/B125-5H3 NPB-MT2528/B125-5H3	 316-MT2532/B125-5H3 NPB-MT2532/B125-5H3	 316-MP062/B125-6H3	 316-MP125/B125-7H3 NPB-MP125/B125-7H3	 316-MP250/B125-9H3 NPB-MP250/B125-9H3
 316-MT1032/B188-6H3 NPB-MT1032/B188-6H3	 316-MT2528/B188-6H3	 316-MT2532/B188-6H3	 316-MP062/B188-6H3	 316-MP125/B188-7H3 NPB-MP125/B188-7H3	 316-MP250/B188-9H3 NPB-MP250/B188-9H3
 316-MT1032/B250-6H3	 316-MT2528/B250-6H3 NPB-MT2528/B250-6H3	 316-MT2532/B250-6H3 NPB-MT2532/B250-6H3	 316-MP062/B250-6H3	 316-MP125/B250-7H3	 316-MP250/B250-9H3

Call For Quantity Discounts



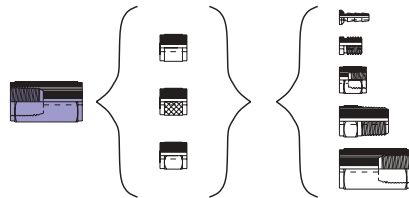
ISO 594/1,-2 Female Straight Thread **Short Lead Times**

ModuLUER straight thread fittings are manufactured to applicable standards in 10-32, 1/4-28, and 1/4-32.



ANSI/HIMA Female Pipe Thread (NPT) **Tough Jobs**

Pipe fittings are manufactured to applicable standards in 1/16 NPT (spl order), 1/8 NPT, and 1/4 NPT. Specials quoted on request.



24 hrs.! ▼

316-FT1032-6H3 NPB-FT1032-6H3	316-FT2528-6H3	316-FT2532-6H3	316-FP125-9H3
316-FT1032/B032-6H1 NPB-FT1032/B032-6H1	316-FT2528/B032-6H1 NPB-FT2528/B032-6H1	316-FT2532/B032-6H1	316-FP125/B032-9H1
316-FT1032/B062-6H2 NPB-FT1032/B062-6H2	316-FT2528/B062-6H2 NPB-FT2528/B062-6H2	316-FT2532/B062-6H2 NPB-FT2532/B062-6H2	316-FP125/B062-9H2
316-FT1032/B125-6H3 NPB-FT1032/B125-6H3	316-FT2528/B125-6H3 NPB-FT2528/B125-6H3	316-FT2532/B125-6H3	316-FP125/B125-9H3
316-FT1032/B188-6H3 NPB-FT1032/B188-6H3	316-FT2528/B188-6H3	316-FT2532/B188-6H3	316-FP125/B188-9H3
316-FT1032/B250-6H3 NPB-FT1032/B250-6H3	316-FT2528/B250-6H3 NPB-FT2528/B250-6H3	316-FT2532/B250-6H3 NPB-FT2532/B250-6H3	316-FP125/B250-9H3

MINIATURE LUER FITTINGS

Contact us for expert and courteous service at

1 · 800 · 255 · 8823

ISO
594/1,-2
or ANSI/HIMA

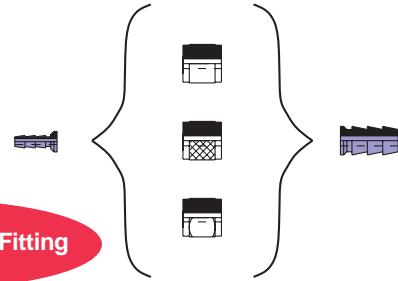
Barb

Short Lead Times
Tough Jobs

24 hrs.!

Barb fittings are used to connect rubber and/or plastic tubing (1/32 - 1/4 ID) to ModuLUER assemblies. Specials quoted on request.

Design Your Own Fitting



Actual Barb Diameter

barb O.D.=.046

barb O.D.=.120

barb O.D.=.200

barb O.D.=.240

barb O.D.=.280



316-B032/-2R1



316-B062/-4R2



316-B125/-4R3



316-B188/-4R3



316-B250/4R3



316-B032/B032-5H1



316-B062/B062-6H2



316-B032/B062-6H1
NPB-B032/B062-6K1



316-B062/B125-6H2



316-B125/B125-6H3



316-B032/B125-6H1



316-B062/B188-6H2



316-B125/B188-6H3



316-B032/B188-6H1



316-B062/B250-6H2



316-B125/B250-6H3



316-B032/B250-6H1



316-B188-B188-6H3



316-B188-B250-6H3



316-B250/B250-6H3
NPB-250/B250-6K3

For further details – refer to
www.microgroup.com

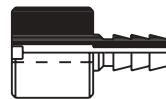
Sinkers

24 hrs.!

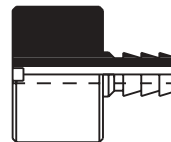
Sinkers are used to terminate plastic and/or rubber tubing when the application requires the end to be submerged.



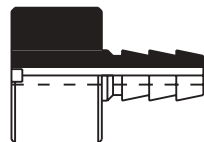
316-SK50/B032-1



316-SK100/B125-3



316-SK200/B188-3
NPB-SK200/B188-3



NPB-SK200/B250-3

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Caps

Caps are used to provide a leak tight, metal-to-metal closure on 1/4-28 male thread ModuLuer fittings.

316-CAP2528-6HB



Tees

Tees are readily available as special order items, usually fabricated from 1/4", 3/8", or 1/2" solid stock.



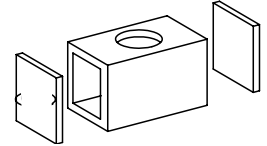
Elbows

Elbows are readily available as special order items, usually fabricated from 1/4", 3/8", or 1/2" solid stock.



Manifolds

Manifolds are readily available as special order items, usually fabricated from 3/8" O.D. x .065" Wall square tubing.



ISO
594/1,-2
or ANSI/HIMA

Luer Taper Gauges

Short Lead Times
Tough Jobs



A full line of Luer Standards Documentation and Taper Gauges are available for either the ANSI/HIMA MD70. 1-1983 or the newer ISO 594/1,2 1986-1991 Standards. All Gauges are hardened and ground. Each gauge is available with written certification at an additional charge. When inquiring, please specify the type of material from which the Luers to be checked are made, since differences occur between rigid and non-rigid materials.

ISO 594/1,2

Item #	Description	\$ ea.	
ISO 594/1-86 E Paragraph 5.1 Gage Testing			
LTG-3A	Female stepped cone ring gage for testing dimensional characteristics and taper size of <u>rigid male luer fittings</u> .	Call for pricing ↓	
LTG-3B	Female stepped cone ring gage for testing dimensional characteristics and taper size of <u>semi-rigid male luer fittings</u> .		
LTG-3C	Male stepped cone plug gage for testing dimensional characteristics and taper size of <u>female luer fittings</u> in all materials.		
ISO 594/1-86 E Paragraph 5.2 Liquid Leakage			
LTG-4	Female conical fitting for leak testing <u>male luer fittings</u> . <i>Requires application of water at 300 kpa, not for use with lock nut in place.</i>	Call for pricing ↓	
LTG-5M	Male conical fitting for leak testing <u>female luer fittings</u> . <i>Requires application of water at 300 kpa.</i>		
ISO 594/2-91 E Paragraph 5.2 Leak Testing			
LTG-5F	Female conical fitting with lugs for leak testing <u>male luer fittings</u> with lock nut in place. <i>Requires application of water at 300 kpa.</i>		
LTG-7	Male conical fitting with lock nut in place for leak testing <u>female luer fittings</u> with lugs. <i>Requires application of water at 300 kpa.</i>		
ISO 594/2-91 E Paragraph 5.4 Separation Force			
LTG-6	Female conical fitting with lugs for separation force testing <u>male luer fittings</u> with lock nut in place.		
LTG-8	Male conical fitting with lock nut for separation force testing <u>female luer fittings</u> with lugs in place.		


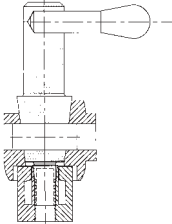
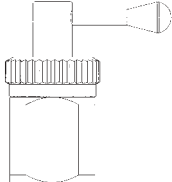
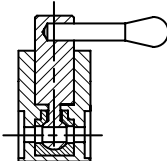
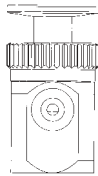







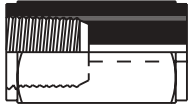

ANSI/HIMA

Item #	Description	\$ ea.	
ANSI/HIMA MD70.1-83 Paragraph 4.2 Gage Testing			
LTG-4-AH	Female stepped cone ring gage for testing dimensional characteristics and taper size of <u>rigid and nonrigid male luer fittings</u> .	Call for pricing ↓	
LTG-5-AH	Male stepped cone plug gage for testing dimensional characteristics and taper size of <u>rigid and nonrigid female luer fittings</u> .		
ANSI/HIMA MD70.1-83 Paragraph 5.2.1 Liquid Leakage			
LTG-6A-AH	Female conical fitting for leak testing <u>male luer fittings</u> . <i>Requires application of water at 310 kpa, not for use with lock nut in place.</i>	Call for pricing ↓	
LTG-6B-AH	Male conical fitting for leak testing <u>female luer fittings</u> . <i>Requires application of water at 310 kpa.</i>		
ANSI/HIMA MD70.1-83 Paragraph 8.2.1 Leak Testing			
LTG-8-AH	Female conical fitting with lugs place for leak testing <u>male luer fittings</u> with lock nut in place. <i>Requires application of water at 310 kpa.</i>		
LTG-9-AH	Male conical fitting with lock nut in place for leak testing <u>female luer fittings</u> with lugs. <i>Requires application of water at 310 kpa.</i>		

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MINIATURE LUER FITTINGS

✓ Check Here	LEFT TERMINATION	VALVE BODY	RIGHT TERMINATION	Check Here ✓
<input type="radio"/> Male LUER (ML)		PLUG (Special)  or SPINDLE (Stock)  1/8" or BALL (Special) 25 Dia. Thru  1/8" Ball .062" Dia. Thru or TRUMPET (Stock)  .059" Dia. Thru		<input type="radio"/> Male LUER (ML)
<input type="radio"/> Male LUER-Lock (MLL)			<input type="radio"/> Male LUER-Lock (MLL)	
<input type="radio"/> Female LUER (FL)			<input type="radio"/> Female LUER (FL)	
<input type="radio"/> Female LUER-Thread (FLT)			<input type="radio"/> Female LUER-Thread (FLT)	
<input type="radio"/> Male Thread (MT) MT1032 MT2528 MT2532			<input type="radio"/> Male Thread (MT)	
<input type="radio"/> Female Thread (FT) FT1032 FT2528 FT2532			<input type="radio"/> Female Thread (FT)	
<input type="radio"/> Barb (B) For Tube I.D. Actual Barb O.D. 1/32" (B032) .046 1/16" (B062) .120 1/8" (B125) .200 3/16" (B188) .240 1/4" (B250) .280			<input type="radio"/> Barb (B) For Tube I.D. Actual Barb O.D. 1/32" (B032) .046 1/16" (B062) .120 1/8" (B125) .200 3/16" (B188) .240 1/4" (B250) .280	
<input type="radio"/> Female Pipe Thread (FP) 1/8" NPT (FP125)			<input type="radio"/> Female Pipe Thread (FP)	
<input type="radio"/> Male Pipe Thread (MP) 1/16" NPT (MP062) 1/8" NPT (MP125) 1/4" NPT (MP250)			<input type="radio"/> Male Pipe Thread (MP)	
<input type="radio"/> Specials (SPL) _____	SPECIALS		<input type="radio"/> Specials (SPL) _____	

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- ◀ BALL
- ◀ PLUG

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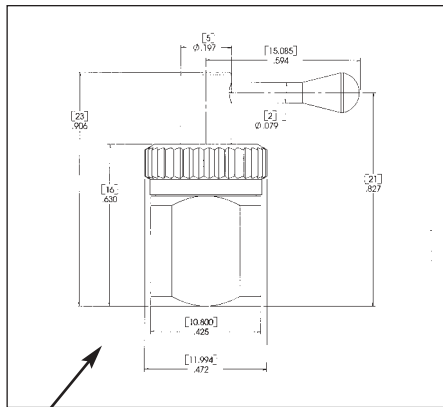
**FDA
Registration
#1226212**

Miniature Spindle and Trumpet Valves

Spindle Valves

A breakthrough in miniature valve construction, MicroGroup's Spindle Valve is the preferred choice for your medical, lab and analytical device designs. Constructed of 316 stainless steel, the Spindle Valve is sturdier and more reliable than plastic or nickel plated brass valves.

What's more, these replaceable viton o-rings and seal, combined with a stainless steel body help ensure consistent performance and long life.



Detailed schematic drawing of Spindle Valve

Stocked with:

- MaleLUER-Lock (MLL) and FemaleLUER (FL)
- 10-32F x 10-32F

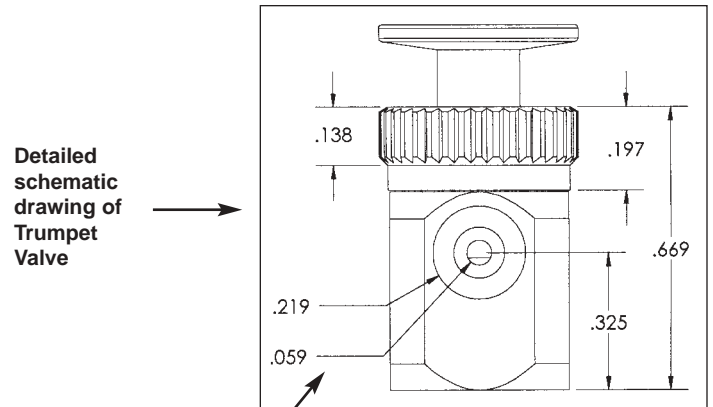
Features:

- Up to 130 PSI liquid and 75 PSI air with proper fittings
- Patent pending design that requires no lubrication
- .125" straight-thru bore
- Vary bore I.D. with fittings
- Replaceable seal and o-rings available in silicone and other custom materials upon request
- Body components available in titanium and other custom materials upon request

Trumpet Valves

MicroGroup's new Trumpet Valve was developed for a wide variety of applications. Featuring stainless steel construction, the Trumpet Valve can be custom made in less than 5 days. Consult your MicroGroup representative for a complete listing of stock fittings.

If custom materials are your preference, this innovative new product can be produced in titanium and other hard-to-find materials.



Detailed schematic drawing of Trumpet Valve

Stocked with:

- MaleLUER-Lock (MLL) and FemaleLUER (FL)

Features:

- Durable 316 stainless steel body construction
- Viton o-rings, other o-ring materials available upon request
- Up to 150 PSI liquid and gas with proper fittings
- .059 orifice
- Lubricant used to minimize friction
- Wide range of fittings for right and left terminations

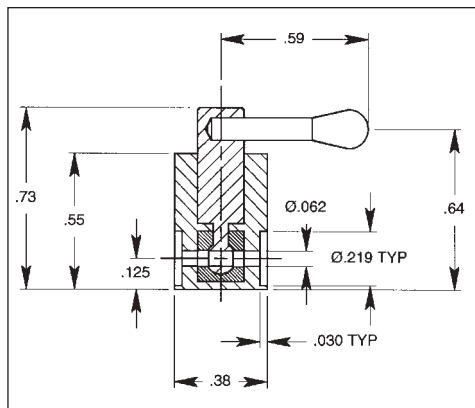
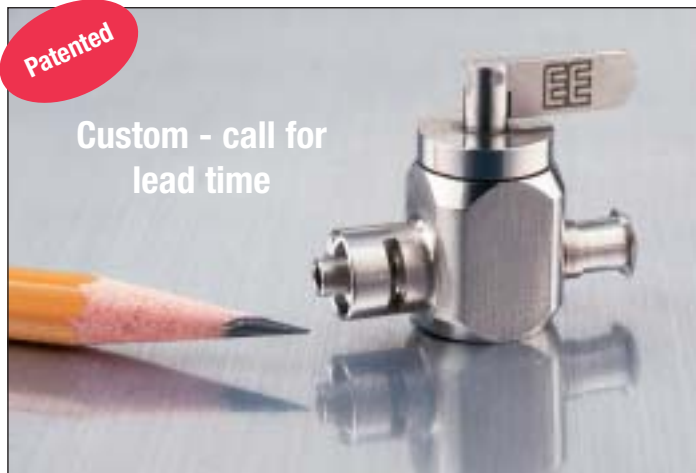
* Please call to discuss in-stock designs and applications

Miniature Ball and Plug Valves

Ball Valves

These custom designed 2-way valves feature a unique seal design, which allows liquid ratings up to 100 PSI and helps eliminate galling of metal-to-metal contact points. Their miniature size and the availability of custom configurations from stock – including ModuLUER fittings – allow maximum flexibility in making connections to standard, small diameter components. A variety of inlet and outlet configurations may be specified.

Our patented design requires no lubrication, features low and constant torque, the ability to interchange parts for additional applications, and low cost replaceable seals to ensure long life.



Detailed schematic drawing of Ball Valve

Customs only with stock design!

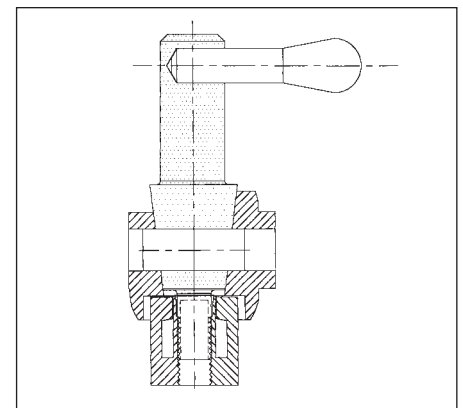
Features:

- Durable 316 stainless steel body construction. Also available in titanium, brass and other custom materials
- Seal is made of Buna-N
- Interchangeable parts
- Long life (replaceable seals)
- Smooth, low torque operation
- Straight-thru bore (low loss)

Plug Valves

Customized to your requirements, these 2-way tapered Plug Valves can be used to serve a wide variety of low pressure applications. Featuring stainless steel and brass construction with lubricated metal-to-metal contacts, these valves utilize the same ModuLUER connections as the Ball Valves, enhancing the flexibility of their use.

Other features include low torque operation, straight-thru bore and a variety of fittings to select from. The valves are also fully autoclavable and easily disassembled for cleaning. Custom Miniature Plug Valves are manufactured in accordance with our high quality standards.



Detailed schematic drawing of Plug Valve

Customs only with stock design!

Features:

- Durable 316 stainless steel and brass body construction. Also available in titanium, brass and other custom materials
- Autoclavable
- Straight-thru bore (low loss)
- Wide range of fittings for right and left terminations
- Easily disassembled for cleaning

** Please call to discuss custom designs and applications*


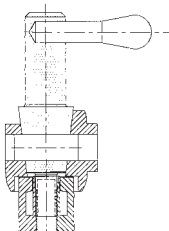
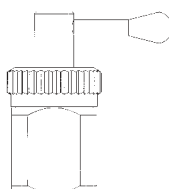
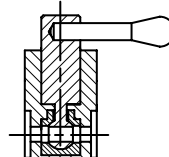
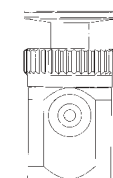













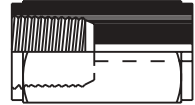
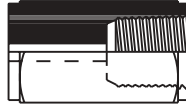




✓ Check Here

LEFT TERMINATION

VALVE BODY

RIGHT TERMINATION

Check Here ✓

<input type="radio"/> Male LUER (ML)		<p>PLUG (Special)</p>  <p>or</p> <p>SPINDLE (Stock)</p>  <p>1/8"</p> <p>or</p> <p>BALL (Special) 25 Dia. Thru</p>  <p>1/8" Ball .062" Dia. Thru</p> <p>or</p> <p>TRUMPET (Stock)</p>  <p>.059" Dia. Thru</p>		<input type="radio"/> Male LUER (ML)												
<input type="radio"/> Male LUER-Lock (MLL)				<input type="radio"/> Male LUER-Lock (MLL)												
<input type="radio"/> Female LUER (FL)				<input type="radio"/> Female LUER (FL)												
<input type="radio"/> Female LUER-Thread (FLT)				<input type="radio"/> Female LUER-Thread (FLT)												
<input type="radio"/> Male Thread (MT) MT1032 MT2528 MT2532				<input type="radio"/> Male Thread (MT)												
<input type="radio"/> Female Thread (FT) FT1032 FT2528 FT2532				<input type="radio"/> Female Thread (FT)												
<input type="radio"/> Barb (B) <table border="0"> <thead> <tr> <th>For Tube I.D.</th> <th>Actual Barb O.D.</th> </tr> </thead> <tbody> <tr> <td>1/32" (B032)</td> <td>.046</td> </tr> <tr> <td>1/16" (B062)</td> <td>.120</td> </tr> <tr> <td>1/8" (B125)</td> <td>.200</td> </tr> <tr> <td>3/16" (B188)</td> <td>.240</td> </tr> <tr> <td>1/4" (B250)</td> <td>.280</td> </tr> </tbody> </table>	For Tube I.D.		Actual Barb O.D.	1/32" (B032)	.046	1/16" (B062)	.120	1/8" (B125)	.200	3/16" (B188)	.240	1/4" (B250)	.280			<input type="radio"/> Barb (B)
For Tube I.D.	Actual Barb O.D.															
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1/16" (B062)	.120															
1/8" (B125)	.200															
3/16" (B188)	.240															
1/4" (B250)	.280															
<input type="radio"/> Female Pipe Thread (FP) 1/8" NPT (FP125)			<input type="radio"/> Female Pipe Thread (FP)													
<input type="radio"/> Male Pipe Thread (MP) 1/16" NPT (MP062) 1/8" NPT (MP125) 1/4" NPT (MP250)			<input type="radio"/> Male Pipe Thread (MP)													
<input type="radio"/> Specials (SPL)			<input type="radio"/> Specials (SPL)													

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- Stainless Blunt Tips are standard for epoxies, glues, solvents, grease, sealants, etc...
- Flexible Poly Tips prevent surface scratching – use for all basic applications, including CA's.
- Tapered Max Flow Tips are Ideal for highly filled compounds such as solder pastes.

EA Series Stainless Blunt Needles

Item #	OD	ID	Std. Length	Hub	\$ ea.
EEA-30S-5/16	.012" (.30mm)	.006" (.15mm)	.312" (8mm)	Female Luer	Call or access web for pricing
EEA-27S-5/16	.016" (.41mm)	.008" (.20mm)	.312" (8mm)	Female Luer	
EEA-26S-1/2	.018" (.46mm)	.009" (.23mm)	.500" (13mm)	Female Luer	
EEA-25S-1/2	.020" (.51mm)	.010" (.25mm)	.500" (13mm)	Female Luer	
EEA-23S-1/2	.025" (.63mm)	.013" (.33mm)	.500" (13mm)	Female Luer	
EEA-23S-1	.025" (.63mm)	.013" (.33mm)	1.000" (25mm)	Female Luer	
EEA-22S-1	.028" (.71mm)	.016" (.41mm)	1.000" (25mm)	Female Luer	
EEA-22S-1/2	.028" (.71mm)	.016" (.41mm)	.500" (13mm)	Female Luer	
EEA-21S-1	.032" (.81mm)	.020" (.51mm)	1.000" (25mm)	Female Luer	
EEA-21S-1/2	.032" (.81mm)	.020" (.51mm)	.500" (13mm)	Female Luer	
EEA-20S-1/2	.035" (.89mm)	.023" (.58mm)	1.000" (25mm)	Female Luer	
EEA-20S-1	.035" (.89mm)	.023" (.58mm)	1.000" (25mm)	Female Luer	
EEA-19S-1/2	.042" (1.07mm)	.027" (.69mm)	.500" (13mm)	Female Luer	
EEA-19S-1	.042" (1.07mm)	.027" (.69mm)	1.000" (25mm)	Female Luer	
EEA-18S-1/2	.049" (1.24mm)	.033" (.84mm)	.500" (13mm)	Female Luer	
EEA-18S-1	.049" (1.24mm)	.033" (.84mm)	1.000" (25mm)	Female Luer	
EEA-15S-1/2	.072" (1.83mm)	.054" (1.37mm)	.500" (13mm)	Female Luer	
EEA-15S-1	.072" (1.83mm)	.054" (1.37mm)	1.000" (25mm)	Female Luer	
EEA-15S-1-1/2	.072" (1.83mm)	.054" (1.37mm)	1.500" (38mm)	Female Luer	
EEA-14S-1/2	.083" (2.11mm)	.063" (1.60mm)	.500" (13mm)	Female Luer	
EEA-14S-1	.083" (2.11mm)	.063" (1.60mm)	1.000" (25mm)	Female Luer	
EEA-14S-2	.083" (2.11mm)	.063" (1.60mm)	2.000" (51mm)	Female Luer	

P Series Flexible Poly Tips

Item #	OD	ID	Std. Length	Hub	\$ ea.
EEA-25P-1-1/2	.029" (.74mm)	.013" (.33mm)	1.500" (38mm)	Female Luer	Call or access web for pricing
EEA-22P-1-1/2	.032" (.81mm)	.015" (.38mm)	1.500" (38mm)	Female Luer	
EEA-20P-1-1/2	.039" (.99mm)	.024" (.61mm)	1.500" (38mm)	Female Luer	
EEA-18P-1-1/2	.053" (1.35mm)	.032" (.81mm)	1.500" (38mm)	Female Luer	
EEA-14T-1-1/4	.062" (1.57mm)	.024" (.61mm)	1.500" (38mm)	Female Luer	
EEA-16P-1-1/2	.067" (1.70mm)	.047" (1.19mm)	1.500" (38mm)	Female Luer	
EEA-15P-1-1/2	.072" (1.83mm)	.024" (.61mm)	1.500" (38mm)	Female Luer	

Poly Tapered Rigid Tips

Item #	ID	Lgth.	Hub	\$ ea.
EEA-22T-1-1/4	.015" (.38mm)	1.250" (32mm)	Female Luer	Call or access web for pricing
EEA-22GT-1-1/4	.015" (.38mm)	1.250" (32mm)	Female Luer	
EEA-20GT-1-1/4	.024" (.61mm)	1.250" (32mm)	Female Luer	
EEA-20T-1-1/4	.024" (.61mm)	1.250" (32mm)	Female Luer	
EEA-18T-1-1/4	.032" (.81mm)	1.250" (32mm)	Female Luer	
EEA-18GT-1-1/4	.032" (.81mm)	1.250" (32mm)	Female Luer	
EEA-16T-1-1/4	.047" (1.19mm)	1.250" (32mm)	Female Luer	
EEA-14GT-1-1/4	.062" (1.57mm)	1.250" (32mm)	Female Luer	
EEA-16GT-1-1/4	.062" (1.57mm)	1.250" (32mm)	Female Luer	

Dispensing Poly Bottles

Squeez-Drop • No drip!

- Designed to apply accurate drops of epoxies, fluxes, Cyanoacrylate, Anaerobics and solvent adhesives.
- Use with any flowable liquid.
- Variety of "locking" needles (tips) available, see above.
- Economy of bulk and transfer to these low cost dispensers saves money.



Item #	Description	\$ ea.
EEA-S50-7	.5 oz. Dispensing Bottle Male Luer	Call or access web for pricing
EEA-S50-5	.75 oz. Dispensing Bottle Male Luer	
EEA-S70-3	2 oz. Dispensing Bottle Male Luer	
EEA-S90-2	4 oz. Dispensing Bottle Male Luer	

LUER CONNECTIONS

Johnson Pump

Hand-Held!

850 P.S.I.!

Features:

- Self priming, will siphon
- Pumps wide range of viscosities
- Adapts to standard luer fittings, accepts syringes on input side for prepackaged dispensing of fluids, adhesives, etc.

Material: Polycarbonate
 Length: 6"
 Width: 3"
 Cross Section: 3/4"
 Pressure: Up to 850 PSI
 Capacity/STK: 1/4 cc
 Fittings: Male Luer Outlet
 Female Luer Inlet



Item #	Description	\$ ea.
J-800	Johnson Pump	Call or access web for pricing

Call Your Sales Representative for Quantity Discounts Pricing Information

NEED HELP?
 CALL 1-800-882-3797

Company History



1971 MicroGroup® was founded in 1971 as MicroWELD, Inc. by William Hulbig and a partner, both former employees of Metal Bellows, Inc. MicroWELD initially began business as a micro-welding job shop, which performed intricate and complex TIG welding of small diameter precision tubing primarily for medical devices. The company quickly gained a reputation for extremely high quality work and the ability to solve complex welding problems involving stainless steel and exotic alloys. MicroGroup was first in national direct marketing high technology contract manufacturing services.

1978 As the company continued to grow during the late 1970's, it recognized a substantial opportunity in stocking and producing small diameter tubing to expand its device fabrication sales while providing a more predictable source of revenue. Tubing uniquely enabled the company to provide additional value to its customers while enhancing and stabilizing its revenues. With this addition, customers could procure tubing and have it fabricated at one location with exceptionally short lead times. The concept of continually looking to expand the breadth of products and services to its customers has been and continues to be the central focus of MicroGroup's "Diversity By Design" strategy. Hulbig purchased his partner's interest in the company.

During the 1980's, the Company broadened its scope of in-house processes and services and added tools to enable customers to do some of their own prototyping – technologically advanced cutting methods, laser welding, and superior finishing and cleaning methods. In addition, it began distributing third party valves and fittings. Customers could combine these components with the company's tubing products to create finished products. MicroGroup was first to use informational tabular ads in Thomas Register.

1983 The company purchased a 37,000 SF facility in Medway, MA.

1985 MicroGroup became the first Thomas Register super-advertiser.

Hulbig bought the Macintosh Division of Desktop Software to provide state-of-the-art information systems mandatory to grow MicroGroup. Incorporated as 1stDESK® Systems, Inc., and it operates as independent corporation.

1990 MicroGroup concluded that the tubing market was declining at such an accelerated pace it would be unable to grow sufficiently without becoming a production manufacturer – verses historically being a low volume specialty job shop.

1992 Hulbig founded EngineersEXPRESS® to sell products other than tubing to MicroGroup's customer base and to diversify into other markets. Products included the MINITUL® small tool line previously sold by MicroGroup, shaft couplings, and miniature valves and fittings. It was a visionary idea, but ahead of its time due to a lack of marketing technology (e.g. Internet/e-commerce) which resulted primarily in expanding MicroGroup's customer base and securing itself as the dominate supplier of luer fittings.

1993 1stDESK was commissioned to create a next generation real-time database for MicroGroup.

1996 MicroGroup received ISO 9002 registration.

1998 A "Build It And They Will Come" philosophy resulted in a significant expansion into CNC micro-machining, a 42,000 SF plant expansion, and \$6,000,000 in capital expenses. MicroGroup could exponentially slash lead times compared to all other suppliers and competitors – from months to weeks, weeks to days, days to hours, providing it with a substantial competitive advantage. The new facility would allow the company to focus on high volume production work for the first time.

1999 MicroGroup is swamped with first-time jobs for preferred accounts, considers future growth through acquisitions, became FDA registered, continues to enhance its quality, image, and dominance within the medical industry.

2000 MicroGroup seeks ISO-EN-46002 (medical device specific) registration continuing to enhance its quality and image within the medical industry.

Manufacturing bookings show an exciting transition from "Our Work" based on exotic technology with a high capital costs needed to purchase expensive equipment, to generating vertical business within "Our Customer," thereby offering more services to satisfy the customers' needs, both exotic and traditional. Most new business is being generated for long term production components and assemblies where it has truly "partnered" with the customer. The new state-of-the-art micro-machining capability dramatically expanded MicroGroup's unmatched breadth of products and services and expected to contribute substantially to the company's growth.



Glass Borosilicate Syringes

- Made of durable borosilicate glass.
- Precision ground

Item #	Size	Graduation	Hub	\$ ea
GL 1	1 ml	.01 ml	Ni-Plated Brass Male Luer-Lock	Call or access web for pricing ↓
GT 2	2 ml	.10 ml	Glass Male Luer-Slip	
GL 2	2 ml	.10 ml	Ni-Plated Brass Male Luer-Lock	
GM 2	2 ml	.10 ml	Ni-Plated Brass Male Luer-Slip	
GT 5	5 ml	.20 ml	Glass Male Luer-Slip	
GL 5	5 ml	.20 ml	Ni-Plated Brass Male Luer-Lock	
GM 5	5 ml	.20 ml	Ni-Plated Brass Male Luer-Slip	
GT 10	10 ml	1 ml	Glass Male Luer-Slip	
GL 10	10 ml	1 ml	Ni-Plated Brass Male Luer-Lock	
GM 10	10 ml	1 ml	Ni-Plated Brass Male Luer-Slip	
GT 20	20 ml	1 ml	Glass Male Luer-Slip	
GL 20	20 ml	1 ml	Ni-Plated Brass Male Luer-Lock	
GM 20	20 ml	1 ml	Ni-Plated Brass Male Luer-Slip	
GT 30	30 ml	1 ml	Glass Male Luer-Slip	
GL 30	30 ml	1 ml	Ni-Plated Brass Male Luer-Lock	
GM 30	30 ml	1 ml	Ni-Plated Brass Male Luer-Slip	
GT 50	50 ml	1 ml	Glass Male Luer-Slip	
GL 50	50 ml	1 ml	Ni-Plated Brass Male Luer-Lock	
GM 50	50 ml	1 ml	Ni-Plated Brass Male Luer-Slip	
GT 100	100 ml	5 ml	Glass Male Luer-Slip	
GL 100	100 ml	5 ml	Ni-Plated Brass Male Luer-Lock	
GM 100	100 ml	5 ml	Ni-Plated Brass Male Luer-Slip	

Disposable Poly Plastic Syringes

- Disposable for ease-of-use.
- Economical
- Non-toxic pyrogenic plastic
- Laboratory
- Industrial
- Scientific

Call for box quantity pricing

Item #	Size	Graduation	Type	\$ ea
5001-DV	1 ml	.10 ml	Male Luer-Slip	Call or access web for pricing ↓
5002-DV	2 ml	.20 ml	Male Luer-Slip	
5005-DV	5 ml	.10 ml	Male Luer-Slip	
5010-DV	10 ml	.20 ml	Male Luer-Slip	
5020-DV	20 ml	.20 ml	Male Luer-Slip	



CUSTOM TUBING



MICRO-MACHINED PARTS



FITTINGS & VALVES

**Only MicroGroup
Can Offer Such
Agility
Because All Our
Options Are
“Under One
Roof.”**

Tubing

- Abrasive Bead Blasting
- Abrasive Slurry
- Cut-Off & Deburr, Laser
- Deburring, Electrochemical
- Drawing
- EDM, Ram
- EDM, Wire
- Electropolishing
- Etching, Chemical
- Grinding, Centerless
- Grinding, Centerless CNC
- Honing
- Hydrogen Furnace
- Knurling, Laser
- Machining, General
- Passivating
- Perforating
- Pipe
- Polishing, Belt
- Sawing, Abrasive
- Sawing, Cold (Milling)
- Sawing, Electrochemical
- Sawing, High Speed Carbide
- Straightening
- Tubing, Beverage
- Tubing, Cable Crimp
- Tubing, Capillary
- Tubing, Carbide
- Tubing, Catheter
- Tubing, Chromatographic
- Tubing, Custom
- Tubing, Cut & Deburred
- Tubing, Fractional
- Tubing, Hypodermic
- Tubing, Layered
- Tubing, Manufactured Types
- Tubing, Medical
- Tubing, Metric
- Tubing, Multi-lumen
- Tubing, Round
- Tubing, Shaped
- Tubing, Specifications
- Tubing, Stent
- Tubing, Surplus
- Tubing, Telescoping
- Tubing, Tolerances
- Tumbling, Vibratory & Barrel
- Turning, CNC
- Vacuum Stress Relieving

Custom Products

- Assemblies, Aircraft & Aerospace
- Assemblies, Bellows
- Assemblies, Carbide
- Assemblies, Exotic Alloys
- Assemblies, Medical & Dental
- Assemblies, Stainless Steel
- Assemblies, Titanium
- Assemblies, Tubing
- Bellows, Metal
- Belts, Metal
- Blades, Surgical
- Blades, Tubular
- Bone Screws
- Catheters & Stents
- Fasteners
- Fittings, Miniature
- Fittings, Tubular
- Machined Springs
- Manifolds, Miniature
- Medical Devices
- Needles
- Perforated Tubing
- Shaft Couplings
- Stamping & Punching
- Tubing Components
- Tubing Components
- Valves, Miniature
- Wire Forms

Contract Services

Brazing & Soldering

- Hydrogen Furnace
- Induction
- Micro-Torch
- Vacuum Furnace

Cut-Off & Deburring

- Abrasive Bead Blasting
- Cut-Off & Deburr, Laser
- Deburring, Abrasive Slurry
- Deburring, Electrochemical
- EDM, Ram
- EDM, Wire
- Electropolishing
- Sawing, Abrasive
- Sawing, Cold (Milling)
- Sawing, Electrochemical
- Sawing, High Speed Carbide
- Tumbling, Vibratory & Barrel
- Turning, CNC

Drawing & Straightening

- Drawing
- Bright Annealing
- Straightening

Engineering & Quality

- Design Review
- Inspection
- Project Management
- Quality Control
- Registrations, ISO & FDA
- SPC
- Testing, Metallurgy
- Testing, Pressure
- Testing, Tensile
- Tooling

Finishing

- Abrasive Bead Blasting
- Cleaning, Catheter
- Cleaning, Filtered Ultrasonic
- Electropolishing
- Etching, Chemical
- Laser Engraving
- Packaging
- Passivating
- Pyrolyzation
- Tumbling, Vibratory & Barrel

Grinding & Polishing

- Electropolishing
- Grinding, Centerless
- Grinding, Centerless CNC
- Grinding, CNC
- Honing
- Needles
- Polishing, Belt
- Surgical Blades

Heat Treating

- Hydrogen Furnace
- Induction Heating
- Vacuum Oven

Specialty Tools

Benders

- Blades, Cut-Off Saw
- Brushes, Deburring
- Brushes, Hand, Stainless Steel
- Brushes, Stem, Abrasive
- Brushes, Stem, Miniature
- Brushes, Stem, Stainless Steel
- Brushes, Wheel, Abrasive
- Brushes, Wheel, Stainless Steel
- Flexhone® Flexible Hones
- Lubricants
- Saws, Cut-Off

Machining, CNC

- EDM, CNC Ram
- EDM, CNC Wire
- Grinding, CNC
- Laser, CNC
- Milling, CNC
- Prototyping, CNC
- Turning, CNC

Machining, Electrochemical

- Deburring, Electrochemical
- EDM, Ram
- EDM, Wire
- Electropolishing
- Grinding, Electrochemical
- Sawing, Electrochemical

Machining, General

- Prototype
- Production

Machining, Laser

- Cut-Off & Deburr, Laser
- Cutting, Laser
- Drilling, Laser
- Knurling, Laser
- Machining, Laser

Perforating, Metals

- Cutting, Laser
- Etching, Photo
- Perforating, Tubing
- Punching
- Ram EDM
- Stamping

Stamping & Punching

- Cutting, Laser
- Foil & Sheet, Perforated
- Products, Foil & Sheet

Surface Abrading

- Abrasive Bead Blasting
- Etching, Chemical
- Knurling, Laser

Tube Forming

- Closures
- End Forming
- Flaring, Tube
- Roll Forming
- Swaging
- Tube Bending
- Tube Forming

Welding

- Welding, Laser
- Welding, MIG
- Welding, Plasma
- Welding, Resistance (Spot)
- Welding, TIG

Fluid Handling

- Dispensing Bottles
- Dispensing Needles
- Dispensing Tips
- Fittings, Medical
- Fittings, Miniature
- Fittings, Tubular
- Fittings, Tubular
- Inspection Gages, Luer
- Manifolds, Miniature
- Pumps
- Syringes, Glass
- Syringes, Plastic
- Valves, Miniature

SPEED – the MicroGroup® Advantage

Most orders shipped
within 24 HOURS!

Specialty Small Tools

Fast Turnaround!

- ◀ SAWS
- ◀ BLADES
- ◀ BENDERS
- ◀ FLEXHONE
- ◀ BRUSHES



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- Ordering
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FDA
Registration
#1226212

MINITUL® Model - 500 Small Diameter Cut-Off Saw

2 Free Blades
with Purchase!
(5-080-030A)

90 Day
Warranty

The easy-to-use MINITUL® Model-500 Cut-Off Saw is a portable tool for small diameter cutting requirements. This solidly built saw comes assembled and is ready to perform efficiently on a variety of materials from aluminum to stainless steel. **90 Day Warranty**

Features

- Cuts lengths from 1/16"
- Cuts with Minimal Burr
- Mitres to 30°
- Easy Blade Changes
- Portable 115v AC
- Cuts to 1/2" Cross Section
- Double-Acting Vise
- Cut to +/- .005" Tol.
- Positive Drive Belt
- Economical
- 2 Free BLADES (5-080-030A)

Applications

- Aluminum
- Brass
- Copper
- Glass
- Plastic
- Stainless Steel
- Most Materials
- Composites
- Braided Cables
- Coax
- Armored Cable



Item #	Description	\$ ea.
Mod500	Model 500 Miniature Cut Off Saw	Call or access web for pricing

Tube Cutter

Applications:

- Stainless steel
- Monel
- Copper
- Titanium
- Other tubing applications
- Brass



Item #	Description	\$ ea.
RR274	Tube Cutter for 1/8" to 1 1/8" OD Tubing	Call or access web for pricing
RR105	Optional - Tube Cutter with SKH Cutting Wheel	↓
RR374	Tube Constrictor and Cutter Combo for 1/8" to 1 1/8" OD	↓

* Prices subject to change without notice.



Stock Tubing - 24 Hours

Over 5 Million Feet in Stock Including Specials

Hypodermic
Medical Grade
Pipe
Fractional
Metric

Need quality small diameter stainless steel tubing, fast?

Call the industry leaders for over 25 years –



Custom Tubing - 5 Days

Short Lead Time Mini-mill Small Quantities Welcome

Round
Shaped
Composites
Drawing
Grinding

MicroGroup
1-800-ALL-TUBE

Model - 500 Saw & Other Abrasive Cut-Off Blades



EngineersEXPRESS sells a wide variety of saw blades for most applications and requirements. The following is a comprehensive listing of our stocked blades. However, if you don't see what you need listed, please call and we'll find it.

A = Aluminum Oxide S = Silicon Carbide HS = High Speed Steel HG = Hollow Ground High Speed Steel
● = Dry Cut ○ = Use Boelube

Custom Blades Available

Item #	General Purpose Saw Blades	Dia.	Grit /# Teeth	Thickness	Type	Arbor Size	Alum < 1/4"	Alum > 1/4"	Brass < 1/4"	Brass > 1/4"	Copper < 1/8"	Copper > 1/8"	Glass	Plastics < 1/8"	Plastics > 1/8"	Steel Stainless	Steel	Wood	\$ ea
4-240-013A	Non-Reinforced Rubber Abrasive Blade with Special Mixed Abrasive Sizes for minimum burr. Most commonly used for cutting any steels up to 1/2" diameter.	4	240	013	A	1/2			●	●						●	●		Call or access web for pricing
4-120-016A		4	120	016	A	1/2			●	●						●	●		
5-120-015A	Non-Reinforced Rubber Abrasive Blade. Recommended for cutting metals when #5-80-030 causes motor to labor excessively or when burrs are unacceptable. The blade is somewhat fragile and used for very light wall to 1/2" diameter.	5	120	015	A	1/2										●	●		
4-90-025A	Non-Reinforced Rubber Abrasive Blade. Rugged blade cuts metals, reduces motor load. Best blade if used only occasionally, due to rugged construction, to be used on most stock over 3/8" dia.	4	90	025	A	1/2			●	●						●	●		
4-060-030AR	Heavy Duty Reinforced Resin Abrasive Blade Can be used for cutting Titanium	4	60	030	A	1/2										●	●		
5-060-030AR		5	60	030	A	1/2										●	●		
5-080-030A	Heavy Duty Non-Reinforced Rubber Abrasive Blade. Similar to 4-90-025A The best all purpose blade. For heavy cuts.	5	80	030	A	1/2			●	●						●	●		
6-080-030A		6	80	030	A	1/2;5/8			●	●						●	●		
7-080-030A		7	80	030	A	1/2;5/8			●	●						●	●		
5-080-060A	For extra-heavy cuts.	5	80	060	A	1/2			●	●						●	●		
5-046-060AR	Heavy Duty Reinforced Resin Abrasive Blade. Similar to 4-90-025A For heavy cuts.	5	46	060	A	1/2			●	●						●	●		
4-SPL-009S	Non-Reinforced Rubber/Silicon Carbide Blade. Silicon abrasive allows this blade to cut through very small diameter hypodermic tubing, drill blanks and glass; However, this blade requires extreme care in handling to prevent breakage since it is only .009" thick. Use with a Boelube®.	4	---	009	S	1/2							○						
4-120-025S	Non-Reinforced Rubber/Silicon Carbide Heavy Duty Blade for cutting glass, ceramics, and thermocouple cable. Should be used with Boelube®.	4	120	025	S	1/2							○						
5-150-015S	Non-Reinforced Rubber/Silicon Carbide Heavy Duty Blade for cutting glass, ceramics, and thermocouple cable. Should be used with Boelube®.	5	150	015	S	1/2							○						
4-028-024HS	High-Speed Steel Blade.Used for plastics and wood without lubricant. Excellent for cutting copper, aluminum and brass. Use with a Boelube®. except on brass (cut dry).	4	28	024	HS	1/2	○	○	●		○	○							
5-028-024HS		5	28	024	HS	1/2	○	○	●		○	○							
4-010-030HG	Hollow-Ground High-Speed Steel Blade. Used on larger sections of soft metals and wood due to hollow ground side which prevents jamming in cut. Excellent for cutting copper, aluminum and brass. Should be used with Boelube®, except on brass (cut dry).	4	10	030	HG	1/2	○	○	●		○	○				●	●		
5-010-030HG		5	10	030	HG	1/2	○	○	●		○	○				●	●		
7-600-015A	Non-Reinforced Rubber Abrasive Blade with Fine Abrasive Sizes for Minimum Burr. Most commonly used for cutting any steels up to 1/2" diameter.	7	600	015	A	22mm										●	●		
7-600-020A		7	600	020	A	22mm										●	●		
7-220-030A		7	220	030	A	5/8										●	●		
7-240-015A		7	240	015	A	5/8										●	●		
7-320-020A		7	320	020	A	5/8										●	●		
MK-200	Premium MK-200 Wet Cutting Blades (for cutting tile, limestone, marble, glass and blocks.)	7	---	---	D	5/8							○						

*Italicized part numbers are for Model 660 not Model 500 Saw. Customs Available!

We also carry other size blades up to 12" diameter, call for availability.

* Prices subject to change without notice.

DUO-MITE Industrial Bending Kit

Hand Bender



DUO-MITE Kits

Item #	Description	\$ ea
50000	Duo-Mite® Hand Bender Kit Gauge and Pin 3/16" Diameter Pin 1/4" Diameter Pin 1/2" Diameter Pin 1" Diameter Circle Sharp Angle Die Form Pin Follower	Call or access web for pricing
54000	Jewelry Kit Pivot Lock Handle Delrin Follower Pin Bend Stop Pin Allen Wrench Narrow Jaw Faces (2) Jaw Face Pad 3/8" Diameter Pin 1/4" Diameter Pin Ring Shank Dies (4) Sharp Angle Die Steel Dies (2) Delrin Dies (2) Gauge 1/2" Pin (2) Form-Matic Handle Tapered Jaw Face	↓
55000	Best Value Same as #50000 Except Includes Vari-Vise and Pivot Lock For Production Jobs and Small Parts	

DUO-MITE Accessories

Circle Pins

Item #	Description	\$ ea
51002	1/8" Diameter Pin	Call or access web for pricing
51003	3/16" Diameter Pin	
51004	1/4" Diameter Pin	
51006	3/8" Diameter Pin	
51352	1/2" Diameter Pin	

Handles

Item #	Description	\$ ea
53100	Form-Matic Handle	Call or access web for pricing
53115	Delrin Follower	
54500	YR Handle	
54501	YRT Handle - Optional	

Circle Dies (1/2" ID)

Item #	Description	\$ ea
51012	3/4" Diameter Circle	Call or access web for pricing
51014	7/8" Diameter Circle	
51016	1" Diameter Circle	
51018	1 1/4" Diameter Circle (Steel)	
51019	1 1/4" Diameter Circle (Delrin)	
51020	2" Diameter Circle	
51022	2 1/4" Diameter Circle	
51025	2 1/2" Diameter Circle (Steel)	
51026	2 1/2" Diameter Circle (Delrin)	
51028	2 3/4" Diameter Circle	
51030	3" Diameter Circle	
51040	4" Diameter Circle	

Miscellaneous

Item #	Description	\$ ea
52000	Edgebending Kit	Call or access web for pricing
53008	Bench Bracket	
53110	Small Bracelet Die (Child's) 5"-5 1/2"	
53120	Medium Bracelet Die (Lady's) 5 3/4"	
53125	Large Bracelet Die (Men's) 6"-6 1/2"	
60100	Tube Bending with YRT Tooling, 1/16, 1/8, 3/16, 1/4" tool set consisting of 4 groove jaw and follower roll. 3/4" centerline radius. Tube Bending with YRT Tooling, 3/32, 5/16, 3/8 tool set consisting of 3 groove jaw and follower roll - 3/4" centerline radius.	↓
60200		

Circle Loops (for hand forming)

Item #	Description	\$ ea
51050	5" Diameter Circle	Call or access web for pricing
51060	6" Diameter Circle	
51070	7" Diameter Circle	
51080	8" Diameter Circle	

Close Follower (for best results use with #53100 handle)

Item #	Description	\$ ea
51200	Close Follower (for bending small wire forms)	Call or access web for pricing

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Red Goo #2

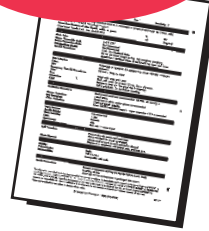
Red Goo #2 is an incredible oil lubricant developed when MicroGroup was researching new tube drawing compounds. Red Goo #2 multiplies tool life by significantly reducing heat on all metals. Red Goo #2 as the name implies is a heavy, sticky lubricant usually applied directly to a tool.

Applications:

- Spinning
- Machining
- Swaging
- Coining
- Punching
- Grinding
- Drawing

Please call and let us fax the updated Material Safety Data Sheet for Red Goo #2 to you.

Item #	Description	\$ ea.
RED - 1/2	1/2 oz.	<i>Call or access web for pricing</i> ↓
RED - 4	4 oz.	
RED - 32	1 qt.	
RED - 64	1/2 gal.	
RED - 128	1 gal.	



SPECIALTY SMALL TOOLS



(Boelube® is a Reg. TM Boeing Co.)

Boelube® Stick Lubricant

GRINDING: Reduces burning by its unique ability to load the grinding wheel as a wax and changing to a liquid at 400°F, purging the wheel and cooling the work. Excellent for sharpening tools.

MACHINING: Significantly reduces heat on all metals, increasing tool life and decreasing burr on small parts in particular.

APPLICATION: Wax stick is used to directly press the tool while turning.

70200-13

Refer to price list

Water soluble & Non-toxic



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Pipe
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The Use of Industrial Brushes

Wheel Brush

The most widely used is called the standard wheel brush and the most popular diameters are 6 and 8 inch, although they are made anywhere from 3 to 15 inch. MicroGroup carries a wide assortment of sizes to select from. They come in many wire sizes depending on the work piece and the type of finish that you want. The wire fill is invariably CRIMPED. Crimping is done for mainly two purposes. The first is to make the wires stand apart from each other, and the second is to absorb the flexing and the vibrations as well as to help prevent wire fatigue and wire breakage. Be sure to investigate all of the elements that you need before ordering a very inexpensive brush.

When ordering brushes you should always pay attention to the length of trim, which is the length of the wire from the hub, and also the running face width. The running face width is the width of the brush when it is in operation and normally is a different dimension than when you get it out of the box. It is very important to reverse the brush from time to time so that the brush is then running in the opposite direction. This will extend the life of the brush and improve its cutting action. They may also be dressed in the same manner as a grinding wheel. For maximum performance a wheel brush should be operated at the highest possible safe speed within its quoted safe speed limits and the lightest possible pressure being applied by the work piece to the brush face. Your best performance should be with a soft brush. But if the cutting action required is severe or if the brush is not cutting fast enough, then you must switch to a coarser wire or to a shorter trim. Wheel diameters are important because of surface speeds. With a 3,450 RPM motor, a 4" diameter brush has a speed of 3,600 linear feet per minute (LFM). A 6" brush 5,400 LFM, a 8" diam. LFM, a 10" diam. 9,000 LFM, a 12" diam. 11,000 LFM and a 15" diam. brush 13,500 linear feet per minute. MicroGroup's wide assortment of wheel brushes assures the right tool for any job.

Narrow Face Wheel Brush

The narrow face wheel brush is normally one with a much longer trim which is used against an irregular surface enabling the wire to get down into the crevices. The longer trim is also used quite often for polishing because of the softer brushing action. As with all wheel brushes, you should use the largest diameter spindle possible because with a large wheel brush at the proper RPM, a great deal of force is exerted at its periphery.

Tampico Wheels

Tampico used to be the standard in the polishing trade. A fibre from a cactus type plant that grows in northern Mexico, it is tough as well as resistant to oils and heat. Treated tampico (the wheel is coated with a sticky type of varnish that will hold dry abrasives) also polishes such items as chromed parts, eye-glass frames, etc.

Abrasive Impregnated Nylon Wheels, etc.

Nylon mixed with abrasive and then extruded gives a filament that also polishes well. At the present there are ten sizes of filaments extruded, with fine grit in the small diameters (500 grit in .018 nylon), and coarse grit in the large diameter filaments (80 grit in .040 nylon). These are available in silicon carbide or aluminum oxide. Maximum safe free running speeds are about 3600 surface feet per minute. It's important to remember that the bristle tips are set hot, the nylon will melt and you may also have some nylon contamination on the part.

Copper Center Wheel Brushes

Copper centers are small wheel brushes from 1" to 4" in diameter. They usually have copper centers and are normally available from 1/4" to 5/8" arbor holes, depending upon the diameter. One of our major customers uses 1" to 1 3/4" copper centers with three or four of them stacked together on a speed controlled air drill for cleaning oil well tool bits prior to rewelding the hard facing. Small diameters in this type of work do have the advantage of being much easier to control by the operator, as the rotary motion does not have the same tendency to push itself away from the work area as larger diameters. These also make excellent tube brushes and can be stacked together or spaced apart by putting washers in between the brushes in order to reach an area in which dirt, scale, and other things can accumulate. These copper centers come in higher tempered carbon wire, stainless steel, nylon, tampico, and silicon carbide or aluminum oxide impregnated nylon.

Hand Scratch Brushes

These are available in many variations, which include normal long curved handle or shoe handle, in three or four row widths, 19 row lengths and variable trim lengths. They are available in bronze for non-sparking operations, and in nylon. One of our most popular is a small toothbrush-type with a stainless steel handle and fill wire, which is very useful in stainless steel welding, cleaning of threads, and a variety of other applications. Increasingly, plastic handles are used as a cost-efficient alternative to wood.

Tube Brushes

As the name implies, these are for tubes or cylinders and are not what some engineers like to call a bottle brush. These are cleaning tools and are available in almost any size of wire in carbon steel, stainless steel or nylon, etc. They come in almost any length of handle, with ring handles or loop handles, whichever fits your particular operation and is easier for your operator to use. It is easy to engineer this brush type to your particular job, saving you time and labor. One of the greatest fallacies is that you need one that is grossly oversized, or it is not going to clean well. Remember that the tips of the brush are the cutting tools even in a tube brush. Another great fallacy is the preference of a very long brush part. We list them in the catalog as balanced brush, because usually only the first third or half of the brush does the cleaning. A long brush part will only give you a tool which creates a lot of friction and, therefore, is very difficult to use. In this particular area brush terminology is very simple. Everybody in the world knows what a 2 x 4 is and to order, specify a 2 x 4 eight feet long in fir, for example.

The standard brush terminology in the tube brush field is the diameter by the length of the brush part by the length overall. Therefore, a 2 x 4 x 8 will mean a brush 2" in diameter, 4" of brush part and 8" overall. Also specify what type of fill you want, whether it is carbon steel, stainless steel or nylon, or natural bristle or abrasive impregnated nylon. Next, pick out a the size of filament that is going to do the job you need, whether it is cleaning, deburring, or finishing. Finally, order it by its correct size. These tube brushes come in all varieties, from miniatures on up. As for the wires in the brush itself, the tips of the stainless have a tendency to work harden. The stainless stem, in being twisted, work hardens very quickly, and so you will have a stem wire which is extremely hard and relatively flexible. The majority are made with galvanized stem wire with a high tensile strength. but with a nylon tube brush there is a tendency for the ends to become sharp after much use, reducing its cleaning power. Nylon can be used in almost all cleaning solvents and mild acids without damage. For very fine and delicate work, natural bristle and pig bristle is important because it won't scratch, and the ends of the bristle will split or flag and are excellent in picking up and removing small particles of dust. The natural bristles will not pick up and carry static electricity as the nylon brush is apt to do. MicroGroup's wide assortment of these brushed ensures you will find one that is the perfect match for your job.

Four Common Factors Governing the Horsepower Necessary to Drive a Power Brush

1. Brushing pressure required.
2. Resistance between work surface and brush (trim length).
3. Speed of the brush.
4. Brush face width.

For exact specifications, please refer to www.microgroup.com or call your MicroGroup representative.

For further information on industrial brushes - refer to www.microgroup.com

Flexhone® Flexible Honers & Accessories



The FLEX-HONE®, a resilient, flexible honing tool with a soft-cutting action produces a controlled surface condition unobtainable by any other method. A construction which includes abrasive (points) globules independently suspended, assures the FLEX-HONE® to be self-centering and self-aligning to the bore, as well as self-compensating for wear.

The particular type of Flex-Hone crosshatch is extremely efficient in providing a multiplicity of oil grooves or valleys for oil retention, as opposed to the often unidirectional or uneven valleys common to the conventional type of rigid hone. A crosshatch that usually remains as the cylinder wall has been wear-reduced by the Flex-Hone. This hone will deburr a peaked finish very rapidly without the danger of much metal removal, and will aid in rapid ring seating, oil control, seepage in hydraulics, longer ring or seal life. It has also been approved by more major original equipment manufacturers than probably any other single tool of its kind.

The Flex-Hone® tool might effectively deburr your cross holes, put a radius on those ports and finish your cylinder in the one operation. It is self-centering, self-aligning, self-compensating for wear – and does not require elaborate set-up and may be used by a novice worker giving you the same consistent finish. Depending upon your particular job, it might give you 150 cylinders per hone or as high as 2,200.

Item #	Dia"	Dia.(mm)	OAL	120SC	180SC	240SC	320SC
BC 4mm	.157	4.0	6.0	Call or access	Call or access	Call or access	Call or access
BC 4.5mm	.177	4.5	6.0	web for pricing	web for pricing	web for pricing	web for pricing
BC 3/16"	.188	4.8	6.0				
BC 5mm	.197	5.0	8.0				
BC 5.5mm	.216	5.5	8.0				
BC 6.4m	.250	6.4	8.0				
BC 7mm	.276	7.0	8.0				
BC 8mm	.315	8.0	8.0				
BC 9mm	.355	9.0	8.0				
BC 9.5mm	.375	9.5	8.0				
BC 10mm	.394	10.0	8.0				
BC 11mm	.433	11.0	8.0				
BC 12mm	.472	12.0	8.0				
BC 1/2"	.500	12.7	8.0				
BC 14mm	.552	14.0	8.0				
BC 5/8"	.625	15.9	8.0				
BC 18mm	.709	18.0	8.0				
BC 3/4"	.750	19.0	8.0				
BC 20mm	.788	20.0	8.0				
BC 7/8"	.875	22.2	8.0				
BC 1"	1.000	25.4	8.0				
BC 1-1/8"	1.125	28.6	8.0				
GB 1-1/4"	1.250	31.7	8.0				
BC 1-3/8"	1.375	34.9	8.0				
DBC 1-1/2"	1.500	38.1	5.0				
BC 1-1/2"	1.500	38.1	8.0				
BC 1-5/8"	1.625	41.2	8.0				
DBC 1-3/4"	1.750	44.4	5.0				
BC 1-3/4"	1.750	44.4	8.0				
BC 1-7/8"	1.875	48.0	8.0				
BC 2"	2.000	50.8	8.0				
GB 2"	2.000	50.8	8.0				
BC 2-1/8"	2.125	54.0	8.0				
DBC 2-1/8"	2.125	53.9	5.0				
BC 2-1/4"	2.250	57.1	8.0				
BC 2-3/8"	2.375	60.0	8.0				
DBC 2-1/2"	2.500	63.5	5.0				
BC 2-1/2"	2.500	63.5	8.0				
BC 2-5/8"	2.625	67.0	8.0				
DBC 2-3/4"	2.750	69.8	5.0				
BC 2-3/4"	2.750	69.8	8.0				
BC 2-7/8"	2.875	73.0	8.0				
BC 3"	3.000	76.1	8.0				
GBD 3"	3.000	76.1	8.0				
DBC 3-1/8"	3.125	79.3	5.0				
GB-3 1/4"	3.250	82.5	13.5				
GBD 3-1/4"	3.250	82.5	13.5				
GB 3-1/2"	3.500	88.8	13.5				
GBD 3-1/2"	3.500	88.8	13.5				
GB-3 3/4"	3.750	95.2	13.5				
GBD 3-3/4"	3.750	95.2	13.5				
GBD 4"	4.000	101.5	13.5				
GB 4-1/8"	4.125	104.7	13.5				
GBD 4-1/4"	4.250	107.9	13.5				
GBD 4-1/2"	4.500	114.2	13.5				
GB 4-5/8"	4.625	117.4	17.50				
GBD 5"	5.000	126.9	17.50				
GBD 5-1/2"	5.500	139.6	17.50				
GBD 6"	6.000	152.3	17.50				
GBD 6-1/2"	6.500	165.0	17.50				
GBD 7"	7.000	177.7	17.50				
GBD 7-1/2"	7.500	190.4	17.50				
GBD 8"	8.000	203.0	17.50				
GBDH 8"	8.000	203.0	17.50				
GBD 8-1/2"	8.500	215.7	17.50				

All dimensions are measured in inches unless designated millimeters.
Flexhone® is a trade mark of Brush Research.

Item #	Dia"	Dia.(mm)	OAL	120SC	180SC	240SC	320SC
GBD 9"	9.000	228.4	17.50	Call or access	Call or access	Call or access	Call or access
GBD 9-1/2"	9.500	241.1	17.50	web for pricing	web for pricing	web for pricing	web for pricing
GBD 10"	10.000	253.8	17.50				
GBD 10-1/2"	10.500	266.5	17.50				
GBD 11"	11.000	279.2	17.50				
GBD 11-1/2"	11.500	291.9	17.50				
GBD 12"	12.000	304.6	17.50				
GBD 12-1/2"	12.500	317.3	17.50				
GBD 13"	13.000	329.9	17.50				
GBD 13 1/2"	13.500	342.6	17.50				
GBD 14"	14.000	355.3	17.50				
GBD 15"	15.000	380.7	17.50				
GBD 16"	16.000	406.1	17.50				
GBD 17"	17.000	431.5	17.50				
GBD 18"	18.000	456.9	17.50				
GBDX 19"	19.000	482.2	34.00				
GBDX 20"	20.000	507.6	34.00				
GBDX 21"	21.000	533.0	34.00				
GBDX 22"	22.000	558.4	34.00				
GBDX 23"	23.000	583.8	34.00				
GBDX 24"	24.000	609.1	34.00				
GBDX 25"	25.000	634.5	34.00				
GBDX 26"	26.000	659.9	34.00				
GBDX 27"	27.000	685.3	34.00				
GBDX 28"	28.000	710.7	34.00				
GBDX 29"	29.000	736.0	34.00				
GBDX 30"	30.000	761.4	34.00				
GBDX 31"	31.000	786.8	34.00				
GBDX 32"	32.000	812.2	34.00				
GBDX 33"	33.000	837.6	34.00				
GBDX 34"	34.000	862.9	34.00				
GBDX 35"	35.000	888.3	34.00				
GBDX 36"	36.000	913.7	34.00				

Grit Types	Grit Sizes										
	Specials				Standard				Special		
	20	40	60	80	120	180	240	320	400	600	800
SC = Silicon Carbide	X	X	X	X	X	X	X	X	X	X	X
AO = Aluminum Oxide	X	X	X	X	X	X	X	X	X	X	X
BC = Boron Carbide	X	X	X	X	X	X	X	X	X	X	X
WC = Tungsten Carbide (either 100% or 50/50)	X	X	X	X	X	X	X	X			
Z Grain = Alumina Zirconia			X	X	X	X	X	X		X	
No. 1525 (25% Zirconia/75% Alumina)											
Levigated Alumina	Available in extra fine grit only										
Diamond	220/240 mesh available for experimental honing										
CBN	140/170 mesh available for experimental honing										

Specials Available

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Stock Stainless Steel Brushes

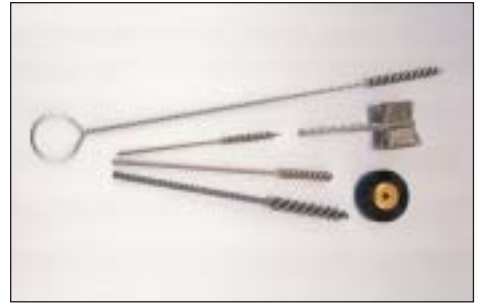
Crimped Wire Wheel Brushes



Copper Center Wheel Brushes



Thread Cleaning Brushes



Multi-Duty Narrow-Face

Item #	Brush Dia	Wire Size	Arbor Hole	Trim Lgth	Face Width	Max RPM	\$ ea.
BDM-3S	3	.006	3/8, 1/2	1/2	3/8	6000	Call or access web for pricing
	3	.0118	3/8, 1/2	1/2	3/8	6000	
BDM-4S	4	.006	3/8, 1/2	7/8	3/8	6000	Call or access web for pricing
	4	.008	3/8, 1/2	7/8	3/8	6000	
	4	.0104	3/8, 1/2	7/8	3/8	6000	
	4	.0118	3/8, 1/2	7/8	3/8	6000	
BDM-6S	6	.006	2	1-1/8	1/2	4500	Call or access web for pricing
	6	.008	2	1-1/8	1/2	4500	
	6	.0104	2	1-1/8	1/2	4500	
	6	.0118	2	1-1/8	1/2	4500	
BDM-8S	8	.006	2	1-1/2	1/2	4500	Call or access web for pricing
	8	.0104	2	1-1/2	1/2	4500	
	8	.014	2	1-1/2	1/2	4500	
	8	.0118	2	1-1/2	1/2	4500	
BDM-10S	10	.0118	2	2-3/4	5/8	3600	Call or access web for pricing
BDM-12S	12	.0104	2	3	11/16	3000	

Standard Duty Medium-Face

BDA-4S	4	.014	2	5/8	7/8	6000	Call or access web for pricing
BDA-6S	6	.006	2	1-1/8	7/8	4500	
BDA-7S	6	.008	2	1-1/8	7/8	4500	
	6	.0118	2	1-1/8	7/8	4500	
	6	.014	2	1-1/8	7/8	4500	
BDA-8S	8	.006	2	1-1/2	7/8	4500	
	8	.0104	2	1-1/2	7/8	4500	
	8	.0118	2	1-1/2	7/8	4500	
	8	.014	2	1-1/2	7/8	4500	
BDA-10S	10	.006	2	2-1/8	1-3/8	3600	
	10	.014	2	2-1/8	1-3/8	3600	

Heavy-Duty Wide-Face

BDH-4S	4	.014	2	5/8	1-3/8	6000	Call or access web for pricing
BDH-6S	6	.006	2	1-1/8	1-3/8	4500	
BDH-7S	7	.0118	2	1-1/8	1-3/8	4500	
	7	.014	2	1-1/8	1-3/8	4500	
BDH-8S	8	.006	2	1-1/2	1-3/8	4500	
	8	.014	2	1-1/2	1-3/8	4500	

Wheel

Item #	Brush Dia	Arbor Hole	Wire Size	Max RPM	\$ ea.
C-1	1	3/8	.006	20000	Call or access web for pricing
C-1-1/4	1-1/4	3/8	.006	20000	
C-1-3/8	1-3/8	3/8	.008	20000	
C-1-1/2	1-1/2	3/8	.006	20000	
C-1-5/8	1-5/8	3/8	.008	20000	
C-2	2	1/2	.006	20000	
C-2	2	1/2	.008	20000	
C-2	2	1/2	.0104	20000	
C-2	2	1/2	.0118	20000	
C-2	2	1/2	.014	20000	
C-2-1/2	2-1/2	1/2	.006	20000	
C-2-1/2	2-1/2	1/2	.0104	20000	
C-2-1/2	2-1/2	1/2	.0118	20000	
C-2-1/2	2-1/2	1/2	.014	20000	
C-2-1/2	2-1/2	5/8	.006	20000	
C-2-1/2	2-1/2	5/8	.0104	20000	
C-2-1/2	2-1/2	5/8	.0118	20000	
C-2-1/2	2-1/2	5/8	.014	20000	
C-3	3	1/2	.006	20000	
C-3	3	1/2	.008	20000	
C-3	3	1/2	.0118	20000	
C-3	3	1/2	.014	20000	
C-3	3	5/8	.006	20000	
C-3	3	5/8	.008	20000	
C-3	3	5/8	.0118	20000	
C-3	3	5/8	.014	20000	
C-3-1/2	3-1/2	1/2	.006	20000	
C-3-1/2	3-1/2	1/2	.008	20000	
C-3-1/2	3-1/2	1/2	.0104	20000	
C-3-1/2	3-1/2	1/2	.0118	20000	
C-3-1/2	3-1/2	1/2	.014	20000	
C-4	4	1/2	.006	20000	
C-4	4	1/2	.008	20000	
C-4	4	1/2	.0104	20000	
C-4	4	1/2	.0118	20000	
C-4	4	1/2	.014	20000	
C-4	4	5/8	.006	20000	
C-4	4	5/8	.008	20000	
C-4	4	5/8	.0104	20000	
C-4	4	5/8	.0118	20000	
C-4	4	5/8	.014	20000	

Butterfly Brush - Wire Fill

Item #	Brush Dia	Wire Size	Brush Part	Stem Dia	\$ ea.
BS-1/4	1/4	.005	9/16	3/32	Call or access web for pricing
BS-5/16	5/16	.005	9/16	3/32	
BS-3/8	3/8	.005	9/16	3/32	
BS-7/16	7/16	.005	9/16	3/32	
BS-1/2	1/2	.005	9/16	3/32	
BS-9/16	9/16	.005	5/8	1/8	
BS-5/8	5/8	.005	5/8	1/8	
BS-3/4	3/4	.005	5/8	1/8	
BS-7/8	7/8	.005	5/8	1/8	
BS-1	1	.005	5/8	1/8	
BS-1-1/4	1-1/4	.005	5/8	1/8	

Stem Brush - Series #83

Item #	Brush Dia	Wire Size	Brush Part	OAL	\$ ea.
83-S250	1/4	.004	1-1/2	41/2	Call or access web for pricing
83-S312	5/16	.004	1-1/2	41/2	
83-S375	3/8	.005	1-1/2	41/2	
83-S437	7/16	.005	1-1/2	5	
83-S500	1/2	.006	1-1/2	5	
83-S562	9/16	.006	1-1/2	5	
83-S625	5/8	.008	1-3/4	5	
83-S750	3/4	.008	1-3/4	5	
83-S875	7/8	.008	2	6	
83-S1000	1	.008	2	6	
83-S1250	1-1/4	.010	2-1/2	6	
83-S1500	1-1/2	.010	2-1/2	6	
83-S1750	1-3/4	.010	3	7	
83-S2000	2	.012	3	7	

Hand Scratch Brushes



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Hand Brushes

Item #	No of Rows	Handle Width	OAL	Handle	\$ ea.
B-39S	3x19	1-1/8	14	Curved Handle	Call or access web for pricing
B-49S	4x19	1-1/8	14	Curved Handle	
B-740	3x19	1-1/8	14	Curved Handle	
B-741	4x18	1-1/8	14	Curved Handle	
B-744	4x16	1-1/8	10"	Shoe Handle	
93A-S250	1/4	7-1/4		Lam. Wood	
93A-S375	3/8	7-1/4		Lam. Wood	
93A-S500	1/2	7-1/4		Lam. Wood	
93-AP		7-1/4		Poly Handle	
93-AW		7-1/4		Wood Handle	
1685SS		7-1/4		Galvanized	

Stock Stainless Steel Brushes

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Tube Brushes

Brush Accessories



Cross Hole Deburring - Series #81

Item #	Wire Size	Brush Part	Stem Dia.	OAL	\$ ea.
81-A-.024	.003	1/4	.015	3	Call or access web for pricing
81-A-.032	.002	5/8	.016	3	
81-A-.047	.003	3/4	.026	3	
81-A-.054	.003	3/4	.026	3	
81-A-.063	.003	3/4	.026	3	
81-A-.079	.003	3/4	.034	3	
81-A-.094	.003	3/4	.043	3	
81-A-.109	.003	3/4	.055	3	
81-A-.125	.003	1	.055	3	
81-A-.142	.003	1	.055	3	
81-A-.156	.003	1	.072	3	
81-A-.172	.003	1	.072	3	
81-A-.189	.003	1	.072	3	
81-B-7/32	.003	1-1/2	.072	3	
81-B-1/4	.003	1-1/2	.110	3	
81-B-5/16	.004	1-1/2	.125	3	
81-B-3/8	.004	1-1/2	.160	3	
81-B-7/16	.004	1-1/2	.160	3	
81-B-1/2	.005	1-1/2	.160	3	
81-A-1mm	.002	5/8	.016	3	
81-A-1.5mm	.003	5/8	.026	3	
81-A-2mm	.003	3/4	.026	3	
81-A-2.5mm	.003	3/4	.043	3	
81-A-3mm	.003	1	.055	3	
81-A-3.5mm	.003	1	.055	3	
81-A-4mm	.003	1	.055	3	
81-A-4.5mm	.003	1	.072	3	
81-A-5mm	.003	1	.072	3	
81-A-5.5mm	.003	1	.110	3	
81-A-6mm	.003	1	.110	3	
81-A-6.5mm	.003	1	.110	3	

Thru-Hole Stem Brush - Series #84

Item #	Brush Dia	Wire Size	Brush LSD	OAL	\$ ea.
84-S125	1/8	.002	11/4	8	Call or access web for pricing
84-S187	3/16	.003	11/2	8	
84-S250	1/4	.004	2	8	
84-S312	5/16	.004	2	8	
84-S375	3/8	.004	2	8	
84-S437	7/16	.004	21/2	10	
84-S500	1/2	.005	21/2	10	
84-S562	9/16	.006	21/2	10	
84-S625	5/8	.008	21/2	10	
84-S750	3/4	.008	21/2	10	
84-S875	7/8	.010	3	12	
84-S1000	1	.010	3	12	
84-S1125	1-1/8	.010	3	12	
84-S1250	1-1/4	.010	3	12	
84-S1375	1-3/8	.010	3	12	
84-S1500	1-1/2	.010	3	12	
84-S1625	1-5/8	.010	31/2	18	
84-S1750	1-3/4	.012	31/2	18	
84-S2000	2	.012	31/2	18	
84-S2250	2-1/4	.012	4	18	
84-S2500	2-1/2	.012	4	18	
84-S2750	2-3/4	.012	4	18	
84-S3000	3	.012	4	18	

Closed Hole Stem Brushes - Series #85

Item #	Brush Dia	Wire Size	Brush LSD	OAL	\$ ea.
85-S2-125	1/8	.002	1	4	Call or access web for pricing
85-S3-125	1/8	.003	1	4	
85-S156	5/32	.003	1	4	
85-S187	3/16	.003	1	4	
85-S219	7/32	.003	1	4	
85-S250	1/4	.004	1-1/4	4-1/2	
85-S281	9/32	.004	1-1/4	4-1/2	
85-S312	5/16	.004	1-1/4	4-1/2	
85-S344	11/32	.004	1-1/4	4-1/2	
85-S375	3/8	.004	1-1/4	4-1/2	
85-S406	13/32	.004	1-1/4	4-1/2	
85-S437	7/16	.004	1-1/4	4-1/2	
85-S469	15/32	.005	1-1/4	4-1/2	
85-S500	1/2	.005	1-1/2	5	
85-S562	9/16	.006	1-1/2	5	
85-S625	5/8	.008	1-1/2	5	
85-S687	11/16	.008	1-1/2	5	
85-S750	3/4	.008	1-1/2	5	
85-S812	13/16	.010	1-1/2	6	
85-S875	7/8	.010	1-1/2	6	
85-S937	1-5/16	.010	1-1/2	6	
85-S1000	1	.010	2	6	
85-S1250	1-1/4	.010	2-1/2	6-1/2	
85-S1500	1-1/2	.010	2-1/2	6-1/2	
85-S1750	1-3/4	.012	3	7	
85-S2000	2	.012	3	8	
85-S2500	2-1/2	.012	3-1/2	9	
85-S3000	3	.012	4	10	

Condenser - Series #89

Item #	Brush Dia	Wire Size	Brush LSD	OAL	\$ ea.
89-S500	1/2	.008	4	7	Call or access web for pricing
89-S625	5/8	.008	4	7	
89-S750	3/4	.010	4-1/2	7-1/2	
89-S875	7/8	.010	4-1/2	7-1/2	
89-S1000	1	.012	4-1/2	7-1/2	
89-S1250	1 1/4	.012	4-1/2	7-1/2	
89-S1500	1 1/2	.012	4-1/2	7-1/2	
89-S1750	1 3/4	.012	4-1/2	7-1/2	
89-S2000	2	.012	4-1/2	7-1/2	
89-S2500	2 1/2	.012	4-1/2	7-1/2	
89-S3000	3	.014	4-1/2	7-1/2	
89-S3500	3 1/2	.014	4-1/2	7-1/2	
89-S4000	4	.016	4-1/2	7-1/2	

Threaded Adapters

Item #	Arbor Dia	Stem Dia	Max Brush Dia	\$ ea.
AT1	1/2	1/4	4	Call or access web for pricing
UA1	1/2	1/4	4	
UA4	3/8	1/4	4	
UA2	3/8	1/4	4	
UA3	1/4	1/4	2	
1300	1/2	1/4	4	

Cardboard Adapters

Item #	Fits Inside	Stk Arbor Hole	Max Arbor	\$ ea.
AF3	3-1/4	5/8	2	Call or access web for pricing
AF4	4-1/4	5/8	2	
AF5	5-1/4	5/8	3-1/2	

Metal Adapters

Item #	Fits Inside	Arbor Hole	\$ ea.
(AL Type For Use With BDH, BDA, TW, and NY Styles)			Call or access web for pricing
AL3/8	2	3/8	
AL1/2	2	1/2	
AL5/8	2	5/8	
AL5/8-1/2	2	5/8-1/2	
AL3/4	2	3/4	
AL7/8	2	7/8	
AL1	2	1	
AL1-1/8	2	1-1/8	
AL1-1/4	2	1-1/4	
AL1-3/8	2	1-3/8	
AL1-1/2	2	1-1/2	
AL1-5/8	2	1-5/8	
AL1-3/4	2	1-3/4	
(MA Type For Use With Nylon Abrasive and Tampico Styles)			Call or access web for pricing
MA3	3-1/4	5/8 (2 Max.)	
MA4	4-1/4	5/8 (2 Max.)	
MA5	5-1/4	5/8 (2 Max.)	

Snap-Out Adapters

Item #	Fits Inside	Arbor Hole	\$ ea.
SA-1214	1/2	1/4	Call or access web for pricing
SA-1238	1/2	3/8	
SA-5812	5/8	1/2	

Mandrel Mounted

Mandrel Mounted - Series #82

Item #	Dia.	Fill	Shank	Thickness	\$ ea.
82C-427	3/4"	.005 cr. Stainless	1/8"	single	Call or access web for pricing
82C-428	1"	.005 cr. Stainless	1/8"	double	

Mandrel Mounted Copper Center

Item #	Brush Diam.	Wire Size	Face Width	Max RPM	\$ ea.
BMC-16	1-3/4	.006	5/16	25000	Call or access web for pricing
BMC-16	1-3/4	.008	5/16	25000	
BMC-16	1-3/4	.0118	5/16	25000	
BMC-20	2	.006	5/16	25000	
BMC-20	2	.008	5/16	25000	
BMC-20	2	.0104	5/16	25000	

Mounted Flared Wheel

Item #	Brush Dia	Wire Size	Face Width	Max RPM	\$ ea.
BMF-14	1-1/2	.006		25000	Call or access web for pricing
BMF-14	1-1/2	.008		25000	
BMF-14	1-1/2	.0104		25000	
BMF-16	1-3/4	.006		25000	
BMF-16	1-3/4	.008		25000	
BMF-16	1-3/4	.0118		25000	
BMF-20	2	.006		25000	
BMF-20	2	.008		25000	
BMF-20	2	.0104		25000	

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