

HANNA RUBBER COMPANY PRODUCT CATEGORIES



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| Pipe Size | 1/16 | 1/8 | 1/4 | 3/8 | 1/2 | 3/4 | 1 |
|---------------------|---------|--------|--------|--------|--------|--------|----------|
| Thread Size | 1/16-27 | 1/8-27 | 1/4-18 | 3/8-18 | 1/2-14 | 3/4-14 | 1-1111/2 |
| Working Pressure | 1200 | 1200 | 1200 | 1200 | 1200 | 1000 | 1000 |
| Thread OD | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1-1/4 |

Typical Application

Grease, fuels, LP and Natural gas (available on special order), refrigeration, instrumentation and hydraulic systems.

•Pressure

Operating pressure up to 1200 PSI.

•Vibration

Fair resistance.

•Temperature Range

 -65° F to $+250^{\circ}$ F (-53° C to $+121^{\circ}$ C).

Used With

Brass, bronze, copper, steel, aluminum and iron pipe.

Tolerance

+/- .02 on all dimensions. Dimension Data can change without notice. Please call us when dimensions are critical.

Conformance

Meets specifications and standards of ASA, ASME and SAE

• Not lead free

• "L" at the end of a Part# means Light Pattern

- these fittings are completely interchangeable with full pattern fittings, but have been modified in some way. This modification is usually in the length of the pipe threads. Used in plumbing and light industrial applications.

Assembly Instructions

- 1- Tighten approximately 2-1/2 turns past hand tight.
- 2- Fittings with Everseal tighten two turns past hand tight. Brittle materials require special cautions.

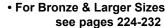


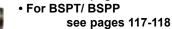
• see page 310-312 for plastic pipe fittings.



Lead Free Fittings

see pages 162-164







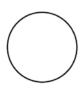


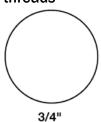
1/8"

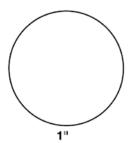
1/4"



3/8"







Actual Male Thread Profiles

1/2"

HOSE BARB FITTINGS



• Temperature and Working Pressure Ranges From -40°F to + 160°F at 150 PSI maximum.

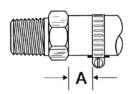
Tolerance

+/- .02 on all dimensions. Dimension Data can change without notice. Please call us when dimensions are critical.

Note: These fittings are intended for use with hose clamp, similar type clamp or a crimped ferrule.

Assembly Instructions

- 1- Cut hose cleanly and squarely to length.
- 2- Slide clamp on hose.
- **3-** Lubricate hose. Push hose on fitting until hose bottoms against stop ring or hex.
- **4-** Position hose clamp as shown below and secure with a screwdriver or wrench. Maintain "A" dimension noted below for proper clamp positioning.





• For Lead Free AB1953 Compliant Fittings see pages 157-158

Other Barbs available



See page 292-295 for plastic hose barb fittings



See page 27-28 for stainless steel hose barbs



See page 307 for King Nipples

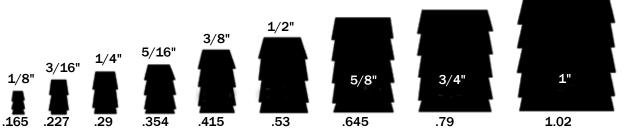


Stainless Steel hose barbs for beverage service available -

See beverage fitting section, pg. 28

| Hose Size | A |
|--------------|------|
| 3/16" | 1/4" |
| 1/4" | 1/4" |
| 5/16" | 1/4" |
| 3/8" | 1/8" |
| 1/2" | 1/8" |
| 5/8" | 1/8" |
| 3/4" | 1/8" |

Actual Profile of Hose Barbs



PUSH ON BARB FITTINGS



Typical Application: Low Pressure Air, Fuel, Lube, and Oil Lines

• Pressure determined by tube material and hardness. Our Parts have been tested to max 150 PSI.

Advantages: Easy assembly. No clamps needed!!

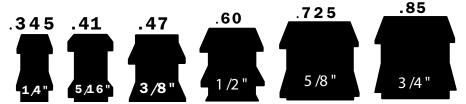
- Assembly Instructions
 - 1- Lubricate insert.
 - 2- Hold hose at angle as shown & push on and up over first barb
 - **3-** Continue to push straight on until hose is seated under protective plastic cap. Keep hands back from hose end area so that hose can expand.

• Disassembling Instructions

- **1-** Split hose. Do not cut completely through hose. Sealing edge of barb could be damaged.
- 2- Bend hose and remove with a quick pull.

See lead free section for lead free push-on barb fittings. Stainless steel available at the end of this section.

Actual Profile of Push On Barbs



GARDEN HOSE FITTINGS



• Temperature and Working Pressure Ranges

From +35°F to +100°F at 75 PSI maximum or the recommended working pressure of the garden hose. (Not to exceed 150 PSI.)

Note: All female connector ends should have a rubber washer inserted prior to usage.

FGH = Female Garden Hose threads **MGH** = Male Garden Hose threads Male garden hose threads are all 3/4" with an outside diameter of 1.0625 and 11-1/2" threads per inch.



Male Garden Hose Profile



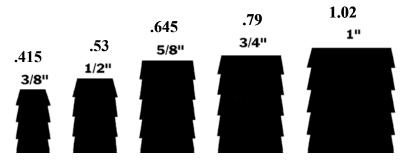
See Plastic section for Plastic Garden Hose Fittings



See page 158 for lead free Garden Hose

Washers included are #30150B black rubber washers.

Actual Profile of Garden Hose Barbs



SAE 45° FLARE



| Tube O.D. | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 |
|------------------|---------|--------|---------|--------|--------|----------|--------|--------|-----------|
| Thread Size-B | 5/16-24 | 3/8-24 | 7/16-20 | 1/2-20 | 5/8-18 | 11/16-16 | 3/4-16 | 7/8-14 | 1-1/16-14 |

Typical Application

LP and natural gas, flammable liquids, instrumentation, refrigeration, power steering, hydraulic and pneumatic systems.

•Working Pressure Ranges

Temperature and type of tubing used are important factors. However, the following table is a good guide for proper selection. Temperature 73°F with copper tubing:

| PSI | Tube O.D. (in.) | Tube Wall (in.) |
|------|-----------------|-----------------|
| 2800 | 1/8 | .030 |
| 1900 | 3/16 | .030 |
| 1400 | 1/4 | .030 |
| 1200 | 5/16 | .032 |
| 1000 | 3/8 | .032 |
| 750 | 1/2 | .032 |
| 650 | 5/8 | .035 |
| 550 | 3/4 | .035 |
| 450 | 7/8 | .035 |
| | | |

•Vibration

Good resistance - use long nut when greater vibration resistance is required.

•Temperature Range

 -65° F to $+250^{\circ}$ F (-53° C to $+121^{\circ}$ C) range at maximum operating pressures.

•Used With

Copper, brass, aluminum and steel hydraulic tubing that can be flared.

Actual O.D. of Flare Fittings

• Tolerance

+/- .03 on all dimensions. Dimension data can change without notice. Please call us when dimensions are critical.

•Conformance

Meets specifications and standards of ASA, ASME, SAE and MS (Military standards).

Assembly Instructions

- 1- Cut tubing to desired length. Make sure all burrs are removed and ends are cut square.
- 2- Slide nut on tube. Threaded end "A" of nut must face out.
- **3-** Flare end of tube with a 45⁰ flaring tool.
 - a-Measure flare diameter.
 - **b-** Examine flare for excessive thin out.
- **4-** Lubricate threads and assemble to fitting body. Nut should be turned hand tight.
- **5-** Tighten assembly with wrench until a solid feeling is encountered. From that point, apply a one-sixth turn

Note: Do not over-torque as it may damage the fitting or split the tubing at the flare.



See Lead Free Flare Fittings page 159





















INVERTED FLARE



| Tube O.D. | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | 7/8 | 1 |
|------------------------------|---------|--------|---------|--------|--------|----------|--------|--------|-----------|-----------|-----------|
| Thread O.D. threads per inch | 5/16-28 | 3/8-24 | 7/16-24 | 1/2-20 | 5/8-18 | 11/16-18 | 3/4-18 | 7/8-18 | 1-1/16-16 | 1-3/16-16 | 1-5/16-16 |

•Typical Application

Hydraulic brake, power steering, fuel lines and transmission cooler lines, LP and natural gas.

•Working Pressure Ranges

Temperature and type of tubing used are important factors. However, the following table is a good guide for proper selection. Temperature 73°F with copper tubing:

| Tube O.D. (in.) | Tube Wall (in.) |
|-----------------|--|
| 1/8 | .030 |
| 3/16 | .030 |
| 1/4 | .030 |
| 5/16 | .032 |
| 3/8 | .032 |
| 1/2 | .032 |
| 5/8 | .035 |
| 3/4 | .035 |
| | 3/16 1/4 5/16 3/8 1/2 5/8 |

•Vibration

Excellent resistance.

•Temperature Range

-65°F to +250°F (-53°C to +121°C) range at maximum operating pressures.

•Used With

Copper, brass, aluminum and steel hydraulic tubing that can be flared.

Advantages

Very low cost and reusable. Seats and threads are internal and protected. Compact, excellent vibration life. Short nut affords very close tube bends. Steel or brass tube nut.

Tolerance

+/- .03 on all dimensions.

•Conformance

Meets specifications and standards of ASA, ASME, SAE and MS (Military Standards).

•Assembly Instructions

1-Cut tubing to desired length. Make sure all burrs are removed and the ends are cut square.

- 2- Slide nut on tube. Threaded end "A" of nut must face out.
- 3- Flare end of tube with a 45^o flaring tool.
 - a- Measure flare diameter.
 - b- Examine flare for excessive thin out.
 - c- On thin wall, welded or brazed tubing, use double flare to prevent pinch-off and cracked flares.
- **4-** Lubricate threads and assemble to fitting body. Nut should be turned hand tight.
- **5-** Tighten assembly with wrench until a solid feeling is encountered. From that point, apply a one-sixth turn.

Note: Do not over-torque as it may damage the fitting or split the tubing at the flare.

STANDARD METRIC THREADS

| Description Tube Size | Thread O.D. | Crest (Pitch) | Thread Description |
|--------------------------|-------------|------------------|-----------------------|
| Japanese 3/16" | 10mm | 1.0mm | M10 x 1.0 |
| European 3/16" | 10mm | 1.0mm | M10 x 1.0 |
| GM 6mm | 12mm | 1.0mm | M12 x 1.0 |
| Fuel 5/16" | 14mm | 1.5mm | M14 x 1.5 |
| Fuel 3/8? | 16mm | 1.5mm | M16 x 1.5 |

Measuring Metric Threads: Measure the O.D. of the threads and the crest to crest distance (pitch) in millimeters between threads.

Actual O.D. of male inverted flare threads

5/16"-28 3/8"-24 7/16"-24 1/2"-20 5/8"-18 3/4"-18 7/8"-18 1-1/16"-16 2800 PSI 1900 PSI 1400 PSI 1200 PSI 1000 PSI 750 PSI 650 PSI 550 PSI

3/16" 1/4" 5/16" 3/8" 1/2" 5/8" 3/4"

COMPRESSION FITTINGS



These are NOT Lead Free

See pages 160-164 for Lead Free products

| Tube O.D. | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 | 5/8 | 3/4 | 7/8 |
|-------------------------|---------|--------|---------|--------|---------|--------|----------|----------|------|----------|
| Thread Size-B | 5/16-24 | 3/8-24 | 7/16-24 | 1/2-24 | 9/16-24 | 5/8-24 | 11/16-20 | 13/16-18 | 1-18 | 1-1/8-18 |
| Working Pressure | 400 | 400 | 300 | 300 | 200 | 200 | 200 | 150 | 100 | 75 |

• Typical Application

Use with copper, aluminum and thermoplastic tubing. Not recommended for steel tubing. Manufactured for low and medium pressure tubing connection work where excessive vibration or tube movement is not involved. Not recommended for application using gaseous media.

•Pressure

See table above for working pressures at 73°F.

Vibration

Fair resistance - use long nut when greater vibration resistance is needed.

•Temperature Range

-65°F to +250°F (-53°C to +121°C) range at maximum operating pressures. (Refer to tubing temperature range.)

•Used With

Aluminum, copper, brass and plastic tubing. Plastic tubing requires insert. Not recommended for steel tubing.

Tolerance

+/- .02 on all dimensions. Dimension data can change without notice. Please call us when dimensions are critical.

5/16"

Conformance

Meets specifications and standards of ASA, ASME and SAE.

Assembly Instructions

- 1- Cut tubing to desired length.
- 2- Slide nut and then sleeve on tube. Threaded end "A" of nut must face toward fitting.
- 3- Insert tubing into fitting body. Be sure tubing is bottomed on fitting shoulder.
- 4- Lubricate threads and assemble nut to fitting body.
- 5- Tighten nut hand tight. From that point, tighten with a wrench the number of turns indicated in the chart below.

| Tube Size | Additional Turns from |
|----------------|-----------------------|
| | Hand Tight |
| 1/8" thru 1/4" | 1-1/4" |
| 5/16" | 1-3/4" |
| 3/8" thru 1" | 2-1/4" |

• "L" at the end of a Part# means Light Pattern - These fittings are completely interchangeable with full pattern fittings, but have been modified in some way. This modification is usually in the length of the pipe threads. Used in plumbing and light industrial applications.

3/4"

7/8"

Actual Profile of Compression Threads

5/16"-24 3/8"-24 7/16"-24 1/2"-24 9/16"-24 11/16"-20 13/16"-18 1"-18 1-1/8"-18 75 PSI

/8" 1/2" 5/8"

Flareless

Flareless Brass Tube Fittings are Interchangeable with Poly-Flo®, Poly-Tite® and Poly-Line® and Poly-Fit®



Built-in SS Tube Support

| Tube O.D. | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 1/2 |
|---------------|---------|--------|--------|---------|--------|----------|
| Thread Size-B | 5/16-24 | 3/8-24 | 3/8-24 | 7/16-24 | 1/2-24 | 11/16-20 |

•Typical Application

Pneumatic instrumentation circuits, lubricant and cooling lines.

•Working Pressure and Temperature Ranges

Up to 150 PSI from 0°F to + 150°F with thermoplastic tubing. Up to 300 PSI from 0°F to + 175°F with soft metal tubing.

•Maximum allowable metal tube wall thickness for use with Poly-Tite fittings:

1/8", 3/16" O.D. --no limitation, 1/4" O.D.--.035 5/16", 3/8",1/2" O.D.--.049

•Vibration

Excellent Resistance.

•Temperature Range

Depends on tubing used. $-65^{\circ}F$ to $+250^{\circ}F$ ($-53^{\circ}C$ to $+121^{\circ}C$) with brass sleeve, $-40^{\circ}F$ to $+150^{\circ}F$ ($-40^{\circ}C$ to $+66^{\circ}C$) with plastic sleeve. (Refer to tubing temperature range.)

•Used With

Aluminum & copper tubing. Hard plastic tubing requires brass sleeve. Not recommended for steel tubing.

• Tolerance

+/- .02 on all dimensions. Dimension data can change without notice. Please call us when dimensions are critical.

Advantages

No flaring of tubing required. Easy installation, captive sleeve, pre-assembled for installation and can be reassembled. Nuts rotate around the sleeve during tightening, preventing twisting of tubing.

Assembly Instructions

- **1-** Cut tubing to desired length.
- **2-** Slide nut/sleeve assembly on tube. Threaded end "A" of nut must face toward fitting.
- **3-** Bottom tubing into fitting.
- **4-** Plastic sleeve Tighten nut hand tight. Brass Sleeve - Tighten nut hand tight, then an additional 3/4 turn.

* Note: 1/8 and 3/16 sizes have brass sleeves

NICKEL PLATED BRASS PUSH-IN

PAGE 100-104

PUSH-IN/ PUSH-TO-CONNECT FITTINGS

BRASS PUSH-IN

PAGE 95-99



BALL VALVES FOR N/P PUSH-IN



COMPOSITE BODY PUSH-IN

PAGE 109-113

PAGE 105



METRIC N/P BRASS PUSH-IN

COMPOSITE BODY METRIC PUSH-IN PAGE 114-116



PLASTIC PUSH-IN

PAGE 298-299



DOT BRASS PUSH-IN

PAGE 117-123



DOT COMPOSITE PUSH-IN

PAGE 124-128



BRASS PUSH-IN FITTINGS

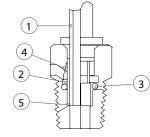


ENGINEERING AND DESIGN

- QUICK CONNECT, simply push tubing in, no tools. Saves up to 75% of assembly time of standard compression fittings.
- QUICK DISCONNECT, hold two fingers on insert and pull tubing out, no tools required.
- REUSEABLE, connect and disconnect numerous times.
- FULL FLOW DESIGN, provides up to 60% more flow area than conventional fittings with internal tube supports.
- POSITIVE SEAL, no leaks. After tubing is inserted, seal is made.
- VERSATILE, BunaN "O" rings standard. Other materials of "O" rings available.
- **SECURE TUBE RETENTION**, pulling on tubing only serves to tighten the connection.
- SELF CONTAINED ASSEMBLY, no loose parts, brass body and invert
- BRASS CONSTRUCTION, elbows and tees are forged brass.
- CHOICE of convenient swivel of economical stationary elbows and tees.
- STRAIGHT CONNECTORS have interior hex for Allen key tightening where space is limited...no need to use a wrench.
- PRE-APPLIED TEFLON ® based pipe sealant on all male pipe threads, saving customer additional labor.
- METRIC SIZES AVAILABLE: Metric tube sizes from 2mm through 12mm in both standard NPT and metric pipe sizes are available on a special order basis.
- WORKING PRESSURE:

The fitting is suitable for use up to the maximum working pressure of the plastic tubing used.

- WORKING TEMPERATURE:
- -10°F to 200°F (other ranges available on request).
- PIPE THREAD: NPTF with Teflon ® based sealant pre-applied.



When tubing (1) is inserted into the fitting, it first passes through the gripping teeth (2). Just beyond the gripping teeth is the o-ring (3) which provides the leak proof seal against the OD of the tube. The gripping teeth grab the tube, which

expands the insert. Pulling back on the tube only tightens the grip as the insert moves onto the camming surface (4). Pressure through the tube also serves to tighten the grip. The tube bottoms against a positive tube stop (5) in a cavity providing tube support to prevent leakage.

Tolerance

+/- .02 on all dimensions. Dimension data can change without notice. Please call us when dimensions are critical

NICKEL PLATED PUSH-IN FITTINGS with GLOBAL THREAD

NPTF • BSPP • BSPT • ISO 7 • ISO 228 • G THREAD • J THREAD



- Saves time and money
- No stripped threads
- No stripped parts
- Reduce inventory

- Completely reusable
- Quick installation
- No pitch identification

| Component Parts and Materials | | | | | |
|-------------------------------|------------------------------------|--|--|--|--|
| Body | Brass - Nickel Plated | | | | |
| Thrust Ring | Acetalic Resin/ Glass filled Nylon | | | | |
| Sleeve | Brass - Nickel Plated | | | | |
| Gripper Collet | Stainless Steel | | | | |
| Safety Ring | PA66 | | | | |
| Lip Seal (1/8 O-Ring Seal) | NBR 70 | | | | |
| Thread Seal | NBR 70 | | | | |

Max Operating Pressure: 0-250 psi (17 bar) Vacuum service.

Min Temperature: 0°F (-18°C) Max Temperature: 160°F (+70°C)

Tubing: Nylon, Polyethylene, Polyurethane.

- For best results use 95 Durometer Media: Compressed air, water.

• Tolerance

+/- .02 on all dimensions. Dimension data can change without notice. Please call us when dimensions are critical.

GLOBAL THREAD

Works With Inch or Metric Threads



"Global Thread" fittings can be assembled with female threads produced to the following stan-

dards: Tapered NPTF

Parrallel (BSPP, BSP, ISO 7)
Tapered (BSPT, PT, ISO 7, ISO 228)

Composite Body Push-In Fittings





• For Food Grade, see page 298-299

Specifications

| Fluid admitted | Air |
|---------------------------|-------------------|
| Working pressure range | 0-150 PSI (10BAR) |
| Min. Burst pressure | 340PSI (23BAR) |
| Working Temperature range | -104°F ~180°F |

Materials of Construction:

| 1 | Body | Composite Polyacetal (hemopolymer,copolymer) |
|---|--------------|--|
| 2 | Body | Brass |
| 3 | Tube Release | Acetal Resin |
| 4 | Retainer | Brass |
| 5 | Gripper Ring | Stainless Steel |
| 6 | Spacer | Brass |
| 7 | O-Ring | NBR 70 |
| 8 | Threads | Brass w/ white sealant |

The latest generation of composite material is used in the body construction in addition to brass on threaded components and stainless steel on the tube gripper.

• Tolerance

+/- .02 on all dimensions. Dimension data can change without notice. Please call us when dimensions are critical.

D.O.T. PUSH-IN TUBE FITTINGS



Meets D.O.T. FMVSS 571.106 SAE J1131 Air Brake System Requirements

Benefits for Cost Savings & Engineering Project

- **Fast assembly:** No tools required. Simply push tubing in. Saves up to 75% of assembly time compared to standard air compression fittings. No loose parts to handle.
- Fast disconnect: Hold the collet collar with two fingers and pull out tube. No tools required.
- Reusable: Can be connected and disconnected several times.
- **Reliable sealing:** Using recommended tubing, full sealing is guaranteed.
- **Versatility:** Buna N O'ring standard. Viton and others available per request. Secure tube retention. Pulling on tubing only serves to tighten the connection.
- Pre-Applied Teflon® based pipe sealant on all male pipe threads, saving customer additional labor.
- Full Flow Design, provides more flow area than conventional fittings with internal tube supports even in the swivels.

DOT Fittings are constructed with an all brass captive eyelet which allows for maximum flow. The brass captive eyelet with extended length is floating and has a machined top end radius for easy installation of tubing. All male threads have a pre-applied Teflon® based pipe sealant to provide for easy assembly and leak proof seal.

• Materials:

Brass

"O" Ring: Buna - Nitrile (90 Durometer) EP (Ethylene Propylene)

• Working Pressures & Temperature Ranges

Vacuum to 150 PSI

 -40° F to 200° F (-40° C to $+93^{\circ}$ C)

COMPOSITE BODY DOT AIRBRAKE FITTINGS

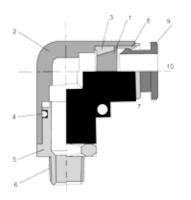




- One touch connection reduces installation time and cost.
- Rugged ultraviolet and vibration resistant composite body.
- Various shapes and configurations to meet vehicle applications and make installations easier.

Specifications for FMVSS (D.O.T.) and SAE Compliant Fittings

| Operating Fluid | Air | | | | | | |
|---|---|---------|----------------|-----------------|--------------|---------|--------|
| Max. Operating Pressure | 145psi (1.0MPa) | | | | | | |
| | Size | 5/32" | 1/4" | 3/8" | 1/2" | 5/8" | 3/4" |
| Proof Pressure | At 75°F (24°C) | 1200psi | 1200psi | 1400psi | 950psi | 900psi | 800psi |
| Proof Pressure | At 200 °F (93°C) | | | 450psi (| 3.1MPa) | | |
| Recommended Fluid and Ambient Temperature* | -40°F to 140°F (-40°C to 60°C) | | | | | | |
| Leak Rate at -40°F (-40°C) | 7 Ncm³/min. or less | | | | | | |
| Thread | Thread Portion | | ANS | I/ASME B1. | 20.1, 1983 R | 11992 | |
| | Nut | | JIS B 02 | 208 (Unified | fine thread) | ISO 263 | |
| Thread Sealant | | | Fluor | rine/ Acrylic | | | |
| Applicable Standards | D.O.T. FMVSS 49 CFR 571.106, SAE J2494-3 | | | | | | |
| Applicable Tubing | Tubing conforming to both SAE J844 and D.O.T. FMVSS 49 CFR 571.106. Material: Nylon12 | | | | | | |
| Tube O.D. | | : | 5/32", 1/4", 3 | 5/8", 1/2", 5/8 | 3", 3/4" | | |



| 1. Chuck | Stainless steel or Brass |
|------------------------|---|
| 2. Body | Polybutylene Terephthalate (PBT), Brass |
| 3/4. Tube seal, O-Ring | Buna-N, Nitrile Rubber |
| 5. Stud | Brass |
| 6. Sealant | Flourine/ Acrylic |
| 7. Guide | Stainless Steel or Polyacetal (Acetal) |
| 8. Stabilization Ring | Stainless Steel |
| 9. Release Button | Polyacetal, POM (Acetal) |
| 10. Tube support | Stainless Steel/ Brass |

D.O.T. AIR BRAKE - NYLON TUBING



| Tube O.D | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 |
|------------------|---------|----------|----------|----------|------|
| Thread Size-B | 7/16-24 | 17/32-24 | 11/16-20 | 13/16-18 | 1-18 |

•Typical Application

Air brake systems except where temperatures exceed +200°F or where battery acid can drip on tubing.

•Pressure

Maximum operating pressure of 150 PSI.

•Vibration

Fair resistance.

•Temperature Range

 -40° F to $+200^{\circ}$ F (-40° C to $+93^{\circ}$ C).

•Material

Brass

•Used With

NT Nylon Tubing - SAE J844 Type A and B.

• Tolerance

+/- .02 on all dimensions. Dimension data can change without notice. Please call us when dimensions are critical

Advantages

Easy to assemble (no tube preparation or flaring required.) Built in tube support. Fittings utilize a ribbed sleeve for compression and positive grip. May be used with copper tubing by replacing nut, sleeve and insert with long nut and spherical sleeve. Insert should be removed for copper tubing use.

•Conformance

Meets specifications and standards of SAE and DOT FMVSS 571,106.

Assembly Instructions

- 1- Cut tubing to desired length.
- **2-**Slide nut and then sleeve on tubing. Threaded end of nut "A" must face toward fitting body.
- **3-**Insert tubing into the preassembled fitting. Be sure tubing is bottomed in fitting.
- **4-** Tighten nut to required torque as indicated on chart.

Disassembling: Remove nut and pull tubing out of fitting body. Insert will remain in tubing.

Reassembly: Push tubing and insert into fitting body until it bottoms. Thread nut onto fitting body and torque as in step 4.

| Tube Size | Additional Number of Turns from Hand-Tight |
|--------------|---|
| 1/4 | 3 |
| 3/8, 1/2 | 4 |
| 5/8, 3/4 | 3-1/2 |

D.O.T. AIR BRAKE REUSABLE HOSE/ FITTINGS



•Typical Application
Air Brake hose connections.
Meets SAE & DOT specifications
(FMVCS 10 GAL)

•Pressure

Determined by maximum working pressure for hose size. Up to 125 psi

Temperature: -40° F to $+120^{\circ}$ F (-40° C to $+48^{\circ}$ C)

Advantages

Can be used for nearly any brake line. Easy to assemble with a good selection of hose end configurations. Brass material offers excellent resistance against corrosion.

• Tolerance

+/- .02 on all dimensions. Dimension data can change without notice. Please call us when dimensions are critical.

Assembly Instructions

- 1- Slide nut and sleeve onto hose. Make sure bevel edge of sleeve faces out toward fitting.
- **2-** Push hose into fitting until it bottoms.
- **3-** Screw nut until contact is made with body hex.

NOTE: When reassembling fitting, body and nut should be inspected. Only reuse if in proper condition. Sleeves should never be reused.

SLEEVE FERRULE



| Part # | Hose I.D. Size | Approx. Wt. Lbs. | List Price |
|--------|-------------------|---------------------|------------|
| 38-300 | 3/8" | 0.02 | |
| 38-301 | 1/2" | 0.02 | |

#60HC 3380-A 0903610 367 60RB

NUT



| Part # | Hose I.D. Size | Approx. Wt. Lbs. | List Price |
|--------|-------------------|---------------------|------------|
| 38-306 | 3/8" | 0.04 | |
| 38-307 | 1/2" | 0.06 | |

61RB #61HC 369 3380-B 0903624

NUT FOR USE WITH SPRING



| Part # | Hose I.D. Size | Thread | Approx. Wt. Lbs. | List Price |
|--------|-------------------|-----------|---------------------|------------|
| 38-312 | 3/8" | 31/32-20 | 0.04 | |
| 38-313 | 1/2" | 1-3/32-20 | 0.06 | |

SPECIALTY VALVES AND COCKS





DRAIN COCKS PAGE 144-145



AIR COCKS



3, 4 AND 6 WAY PAGE 150



NEEDLE PAGE 147-148



MARINE & ANTI-SIPHON PAGE 151



PANEL MOUNT BALL VALVES
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TRUCK PAGE 149



USA MINI PAGE 152



SOLID BOTTOM SHUT-OFF PAGE 149



CHECK PAGE 153



SPRING BOTTOM SHUT-OFF PAGE 146

BRASS FITTINGS LEAD FREE

LEAD FREE



What is the new lead-free requirement?

In 2011, the Reduction of Lead in Drinking Water Act was signed into law. The Act has reduced the lead content allowed in drinking water system and plumbing materials by changing the definition of "lead-free" in Section 1417of the Safe Drinking Water Act.

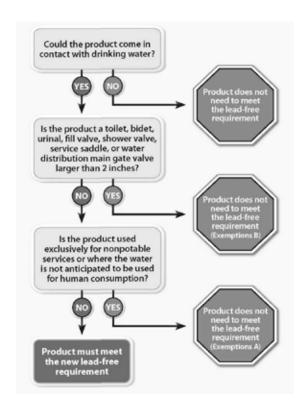
The term "lead-free" has been updated from notmore that 8% lead content to mean "not more than a weighted average of 0.25% lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings and fixtures."

How do I know which products must meet the new lead-free requirement?

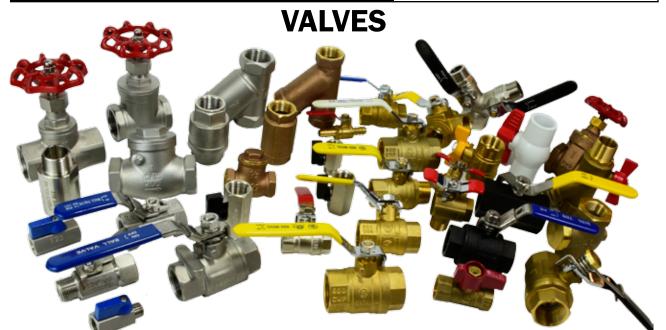
The prohibitions on use and introduction into commerce apply to all pipe, pipe fittings, plumbing fittings, and fixtures (henceforth reffered to as "products"), including stocked inventories that have not been installed. This includes coated or uncoated brass or bronze materials. By using the flow-chart below as a guide, you can determine if a product must meet the new lead-free requirement:

Lead-Free Requirement Exemptions

- (A) The new requirement does not apply to pipes, pipe fittings, plumbing fittings, or fixtures, including backflow preventers, that are used exclusively for nonpotable service such as manufacturing, industrial processing, irrigation, outdoor watering or any other uses where the water is not anticipated to be used for human consumption.
- (B) The new requirement does not apply to toilets, bidets, urinals, fill valves, flushometer valves, tub fillers, shower valves, service saddles or water distribution main gate valves 2 inches in diameter or larger.



VALVES



| 7 | Ī | n |
|---|---|---|
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VALVES

STAINLESS STEEL VALVES

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NIPPLES & FITTINGS



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We hereby certify that to the best of our knowledge and belief the CDA 230 alloy seamless Red Brass Pipe from which our nipples are produced meet the requirements of ASTM Specifications B43 and is free of mercury contamination. The chemical analysis is 85% copper, 15% Zinc and conforms to federal Specifications WWN-351. Our brass nipples meet ANSI/ASTM B687-96 and MS51846 for standard brass nipples, and MS51872 for extra heavy brass nipples.

Threads: Nipples are threaded with American Standard taper pipe threads (NPT) in accordance with screw-thread standard for Federal Services Handbook H-58. ANSI B1.20.1

This product is certified by NSF to NSF/ANSI 61 for use in drinking water supplies of pH 6.5 and above.

- ASTM B43
- ANSI B1.20.1, WW-N-351
- ANSI/ ASTM B687-96
- NSF-61 Approved
- MS51846 STD Brass Nipples
- RoHS compliant

STANDARD RED BRASS 85% PIPE WITH THREADED ENDS SPECIFICATIONS:

| THE WITH THREADED ENDS SI EC | | | |
|------------------------------|---------------------|-------|-------------------|
| Pipe Size | Dimension in Inches | | |
| in Inches | 0.D. | I.D. | Wall Thickness |
| 1/8" | .405 | .281 | .062 |
| 1/4" | .540 | .376 | .082 |
| 3/8" | .675 | .495 | .090 |
| 1/2" | .840 | .626 | .107 |
| 3/4" | 1.050 | .822 | .114 |
| 1" | 1.315 | 1.063 | .126 |
| 1-1/4" | 1.660 | 1.368 | .146 |
| 1-1/2" | 1.900 | 1.600 | .150 |
| 2" | 2.375 | 2.063 | .156 |
| 2-1/2" | 2.875 | 2.501 | .187 |
| 3" | 3.500 | 3.062 | .219 |
| 3-1/2" | 4.000 | 3.500 | .250 |
| 4" | 4.500 | 4.000 | .250 |
| 4-1/2" | 5.000 | 4.500 | .250 |
| 5" | 5.563 | 5.063 | .250 |
| 6" | 6.625 | 6.125 | .250 |

| Allowable Pressure POUNDS PER SQUARE INCH | | | | | | |
|---|--------|--------|--------|--------|--|--|
| Standard | | | | | | |
| Size (Inches) | 100° F | 200° F | 300° F | 400° F | | |
| 1/8" | 370 | 370 | 320 | 140 | | |
| 1/4" | 870 | 870 | 760 | 330 | | |
| 3/8" | 890 | 890 | 780 | 340 | | |
| 1/2" | 900 | 900 | 790 | 340 | | |
| 3/4" | 810 | 810 | 710 | 310 | | |
| 1" | 630 | 630 | 560 | 240 | | |
| 1-1/4" | 690 | 690 | 610 | 260 | | |
| 1-1/2" | 630 | 630 | 560 | 240 | | |
| 2" | 540 | 540 | 480 | 210 | | |
| 2-1/2" | 450 | 450 | 390 | 170 | | |
| 3" | 510 | 510 | 450 | 190 | | |
| 3-1/2" | 570 | 570 | 500 | 220 | | |
| 4" | 510 | 510 | 440 | 190 | | |
| 5" | 410 | 410 | 360 | 160 | | |
| 6" | 340 | 340 | 300 | 130 | | |

No-Lead 125LB seamless Threaded Red Brass Nipples - 2200





BRONZE FITTINGS





Class 125 (150) For steam, water, gas, oil and air service

Standard specifications

- UL/FM Approved
- 1S0 9001:2000
- Not Lead Free
- RoHS Compliant

Materials - ASTM B62-93 (85,5,5,5) C83600 Dimensions - ANSI B 16.15

Threads - ANSI B2.1 or BA 21 and Fed. WW-P-460C, MSS-SP-106, ANSI/ASME B1.20.1

Bronze threaded fittings are manufactured from smooth-cored castings, designed to provide full flow with minimum restriction. All threads are accurately machined and gauged to ensure a perfect fit with the pipe. All fittings are individually tested under water to ensure quality. Bronze provides a tighter seal and is easier to install than other metals. Can be used for water, plumbing, heating, pneumatic and marine applications, able to resist the harmful effects of corrosion when coming into contact with salt water or fresh water polluted with mineral acids or peaty soils.

LEAD FREE BRASS FITTINGS



- Approved to ANSI/NSF 61-4 California AB 1953
- Meets Federal State Drinking Water Act, Lead Free Requirement
- Brass fittings conform to AWWA C800
- Brass castings conform to ASTM B584, UNS Alloy C8933
- Brass fittings dimensions conform to ASME B16.15
- •NPT threads on all fittings conform to ASME B1.20.1
- Brass unions conform to specification A-A-59617
- Manufacturing facilities are ISO 9001:2008

STAINLESS STEEL NIPPLES



SCHEDULE 40 WELDED

Stainless steel pipe nipples are manufactured from stainless steel pipe that conforms to specification ASTM A312/SA312.

All stainless steel nipples conform to specification ASTM A733. Threads conform to the requirements of ANSI B1.20.1.

304

The basic alloy. Type 304 (18-8) is an austenitic steel possessing a minimum of 18% chromium and 8% nickel, combined with a maximum of 0.08% carbon. It is a nonmagnetic steel which cannot be hardened by heat treatment, but instead. must be cold worked to obtain higher tensile strengths.

Because of its ability to withstand the corrosive action of various acids found in fruits, meats, milk, and vegetables, Type 304 is especially suited for all types of dairy equipment piping and valves, the brewing industry, the citrus and fruit juice industry, and in food processing applications. Also used for the dye tanks, pipelines buckets, dippers, etc. that come in contact with the lormic, acetic, and other organic acids used in the dyeing industry.

In the marine environment, because of it slightly higher strength and wear resistance than type 316 it is also used for nuts, bolts, screws, and other fasteners. It is also used for springs, cogs, and other components where both wear and corrosion resistance is needed.

Both #304 and #316 nipples are NSF/ANSI 372 and NSF/ANSI 61 compliant.



SCHEDULE 80 SEAMLESS

- SEAMLESS FOR UNRESTRICTED FLOW
- USE WITH AIR, WATER, OIL, NATURAL GAS, STEAM
- FITTINGS: USE THREADED CLASS 3000 HIGH-PRESSURE STAINLESS STEEL.
- ASTM A733
 ASTM A312
 ANSI/ ASME B1.20.1
- PSI 3000

316

For severe environments. Of course, there are many industrial processes that require a higher level of resistance to corrosion than Type 304 can offer. For these applications, Type 316 is the answer.

In type 316, the nickel content is increased slightly. What distinguishes Type 316 from Type 304 is the addition of molybdenum up to a maximum of 3%.

Molybdenum increases the corrosion resistance of this chromium-nickel alloy to withstand attack by many industrial chemicals and solvents, and, in particular, inhibits pitting caused by chlorides. As such, molybdenum is one of the single most useful alloying additives in the fight against corrosion.

Type 316 can withstand corrosive attack by sodium and calcium brines, hypochlorite solutions, phosphoric acid; and the sulfite liquors and sulfurous acids used in the paper pulp industry. This alloy, therefore, is specified for industrial equipment that handles the corrosive process chemicals used to produce inks, rayons, photographic chemicals, paper, textiles, bleaches, and rubber. Type 316 is also used extensively for surgical implants within the hostile environment of the body.

Type 316 is the main stainless used in the marine environment, with the exception of fasteners and other items where strength and wear resistance are needed, then Type 304 (18-8) is typically used.



150# 304 & 316 Stainless Steel Fittings

Our high quality standard pattern 150lb rated stainless steel threaded fittings are manufactured to the highest standards. All stainless steel fittings are monitored by our quality control personnel for strict compliance with applicable standards and specifications.

These stainless steel pipe fittings are excellent for uses that involve chemicals or liquids that may be corrosive. Along with fighting corrosion, a stainless steel pipe fitting will prevent contamination making it useful to many professionals.

- Use with air, water, oil, natural gas, steam
- NPT and FNPT threads conform to ASME B1.20.1
- Maximum Pressure: 300 psi @ 72 F;150 psi @ 366 F for steam
- Maximum Steam Pressure: 150 psi
- Material Conforms to ASTM A-351. Class 150 Pressure Ratings
- Manufacturing facility is ISO 9001:2008
- 304 Stainless Steel is economically priced, chromium-nickel material that offers very good corrosion resistance. 316 Stainless Steel has higher nickel content and contains molybdenum for even better corrosion resistance.

HIGH PRESSURE 1000# BARSTOCK



1000#

- Stainless bar stock dimensions conform to MSS SP-114
- NPT threads conform to ASME B1.20.1
- Manufacturing facility is ISO 9001:2008
- Fittings meet applicable chemical & physical properties

HIGH PRESSURE 3000# FORGED

A182 and ANSI/ASME B16.11.



3000#

- Use with air, water, oil, natural gas, steam
- Maximum Pressure:

Type 304 SS: 2,570 psi @ 72°F;

1,965 psi @ 350°F for steam

Type 316 SS: 3,000 psi @ 72°F

2810 psi @ 350°F for steam

• Pipe Nipples and Pipe: Use threaded Schedule 80 thickwall stainless steel



BLACK AND GALVANIZED STEEL NIPPLES

Product Specifications

Welded steel pipe nipples both galvanized and black in diameters ranging from 1/8" up to 4" in lengths from close to 12" and cut-pipe up to 120". -200°-150° Temp Rating.

Technical Specifications

Standards: Product complies with ASTM A-53, A-733 and ANSI B1.20.1 for threading, dimensions and pipe specifications.

Pipe: Complies with ASTM A-53 mill tested schedule 40 and 80 for both Welded & Seamless Meets ANSI B36.1. All pipe is hydrostatic tested.

Galvanized: Zinc coating applied by hot dipped. Galvanized complying with ASTM A-123, NSF approved, RoHS compliant. **Black:** Protected against oxidation with varnish coating.

Cutting Procedure: All pipe is roller cut. A visual inspection of seams, excessive galvanizing, mid-welds, poor galvanizing, bends, roundness, under and over weight of the pipe is made at the time it is cut. This is done for every length of pipe. Pipe lengths are cut to a tolerance of + or -1/16° of the actual length.

Threading Procedure:

All pipe is chaser thread cut to American Standard Tapered Pipe Thread standards. This is 3/4" taper per foot. Pipe is visually inspected for roundness of threads and other visual faults as it is removed from the threading machine.

SCHEDULE 80 SEAMLESS



ASTM A106 Grade B Seamless Pipe

- ASTM A 53
- WWN 351
- Standard NPT Tapered Pipe Threads as per ANSI B 1.20.1 Specification

XXS SEAMLESS



MALLEABLE FITTINGS



ISO 9002 - CERTIFICATE OF QUALITY - UL/FM LISTED

Our quality fittings are made with care and attention to detail. With better molds we can reduce parting lines and rough edges resulting in better fluid flow. By using a low temperature galvanizing process the coating is more durable which means a longer lasting fitting. All Fittings are 100% Pressure Tested to 300# Class.

(Every fitting is subjected to an underwater fitness test to ensure the highest quality)

SPECIFICATIONS

- MATERIAL: ASTM A 197 Cuppla Malleable Iron, ASTM A 153 Hot dipped galvanizing
 Coating ASTM A164 LS
- DIMENSIONS: ANSI B 16.3 Malleable Iron threaded fittings, ANSI B 16.14 st Ferrous Pipe Plugs, Bushings etc..., ANSI B 16.39 - Malleable Iron threaded pipe unions.
- THREADS: ANSI B 2.1 or BS 21 ASME B1.20.1 RoHS Compliant Tapered Threads

MALLEABLE IRON - ANSI B 16.3

| F° | Class | Sizes | Sizes | Sizes |
|----------|-------|-------|---------|---------|
| | 150 | 1/4-1 | 1 1/4-2 | 2 1/4-3 |
| | PSIG | | | |
| -200-150 | 300 | 2000 | 1500 | 1000 |
| 200 | 265 | 1785 | 1350 | 910 |
| 250 | 225 | 1575 | 1200 | 825 |
| 300 | 185 | 1360 | 1050 | 735 |
| 366* | 150 | 1150 | 900 | 650 |
| | | | | |

*Permissible for service temperature up to 366°F, reflecting the temperature of saturated steam at 150 psig.

STEEL FITTINGS



- 1010 Carbon Steel, 3/4 taper threads (see hydraulic section for 7/8 taper threads.)
- Finish or coating Black Dipped in rust resistant
- · Galvanized, Zinc Plated (Inside and Out)

BULL PLUGS AND SWAGES



300lb MALLEABLE FITTINGS



Max. pressure: 300 psi WOG @ 72°F; 150 psi WOG saturated steam

- Meet ANSI/ ASME B1.20.1 standards
- Black meet ASTM 197 standards

FLANGES



1-1/4"

COPPER FITTINGS



SYMBOL OF JOINT ENDS

 \mathbf{C} Solder joint fitting end made to receive copper tube diameter

Ftg. Solder joint fitting end made to copper tube diameter

Internal ANSI Standard Taper Pipe Thread-Female

M External ANSI Standard Taper Pipe Thread-Male

Threaded ends ANSI/ ASME B1. Solder ends ASTM B88

• Temp range 32° to 200°F

• Pressure @100° - 1/8-1 : 500 PSI

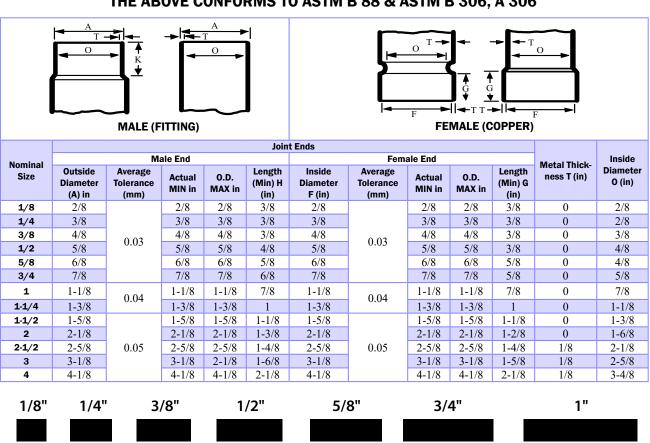
2"

- 1-1/4-2 : 400 PSI

- 2-1/2 - 3: 300 PSI

NSF - 61 CERTIFIED ALLOY C12200

THE ABOVE CONFORMS TO ASTM B 88 & ASTM B 306, A 306



1-1/2"

PLASTIC FITTINGS



SCH 80 PVC NIPPLES



Machined Schedule 80 PVC nipples comply fully with ASTM D2464, threads conform to ASTM F1498, and the pipe is extruded from PVC 1120-1220 meeting ASTM D1784 and meets ASTM D1785, products standard 21-70

SCH 40 PVC FITTINGS



- NSF 61 certified for use with drinking (potable) water
- Max Temperature: 140°F
- Max Pressure: Not Rated Resistant to corrosion, strong and rigid - commonly used in low pressure plumbing applications. ASTM D1784 and D2466.

SCH 80 PVC FITTINGS



PVC Material is Type 1 according to the American Society for Testing Materials (ASTM) D-1784. Fittings conform to ASTM D-2464 & ASTM D-2467. Temperature rating is 140°F. PSI is based on water at 73°F. Derate 50% at 110°F and 78% at 140°F. Not recommended for use in compressed air or gas systems.

PIPE FITTINGS



- Nylon
- Polyethylene
- Polypropylene

HOSE BARB FITTINGS



- Nylon
- Polyethylene
- Polypropylene

GARDEN HOSE FITTINGS



• Nylon

NYLON & POLYPROPYLENE COMPRESSION FITTINGS



Machined Schedule 80 PVC nipples comply fully with ASTM D2464,

POLYPROPYLENE PUSH-IN TUBE FITTINGS AND VALVES



• NSF 61 certified for use with drinking (potable) water

Max Temperature: 140°F
Max Pressure: Not Rated

HOSE ACCESSORIES



CAM AND GROOVE



ALUMINIUM



POLYPROPLYENE



STAINLESS STEEL



BRASS

COMBINATION HOSE NIPPLES



FIRE HOSE FITTINGS



UNIVERSAL/ GROUND JOINT COUPLINGS



HOSE CLAMPS





WORM GEAR PAGE 312-315



QUICK RELEASE PAGE 316



T-BOLT PAGE 317



SPRING LOADED T-BOLT PAGE 318



CONSTANT TORQUE PAGE 319



V-BAND PAGE 319



MUFFLER PAGE 320



EXHAUST PAGE 321



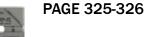
1 EAR, 2 EAR, GAPLESS PAGE 322-323



PRE-FORMED PAGE 324-325



TOOLS & STRAPPING





NON-PERFORATED OR LINED BAND PAGE 327



RUBBER LINED PAGE 328



HOSE FERRULES PAGE 329

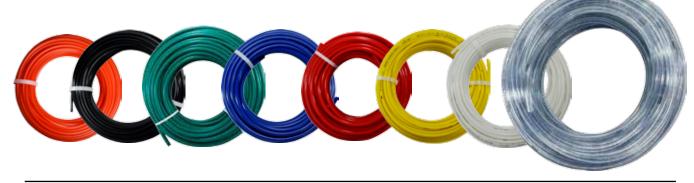
TUBING

TUBING









POLYURETHANE



NYLON

Sold individually boxed







PVC

Sold individually boxed

• Clear















COPPER AND ALUMINUM













ALUMINUM



HIGH PRESSURE SPRAYERS







FITTINGS AND SWIVELS







SPRAY GUNS AND WANDS



PNEUMATICS PNEUMATICS

PNEUMATICS



QUICK DISCONNECTS



- ARO 210
- Lincoln
- Industrial
- Automotive
- ST Series High Flow

BREATHER VENTS, MUFFLERS



PNEUMATIC ACCESSORIES



- Kits NEW
- Tire gauge
- Tank and vent valves
- Blow guns
- Air chucks
- Inflators

GAUGES



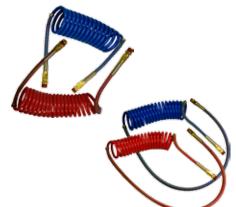
• Control valves

• Manifolds

- Lower mount & center mount
- Water test
- Syphons

TRUCK AND TRAILER





INDUSTRY GRADE NYLON AIR COIL ASSEMBLY - SET

- Each kit contains one Emergency (Red) and one service (Blue) 1/2" O.D. nylon tubing assembly.
- 1/2" -14 NPTF end fitting with heavy gauge spring.
- Assemblies meet SAE J844 and DOT FMVSS 106 requirements.
- Temp rating -40° +208°

| Part # | Length | Pigtail Length Tractor end | Pigtail Length Trailer end | List Price |
|--------|--------|-------------------------------|-------------------------------|---------------|
| 39404 | 12' | 6" | 6" | |
| 39400 | 15' | 12" | 12" | |
| 39402 | 15' | 40" | 12" | |
| 39406 | 20' | 12" | 12" | |



FIFTH WHEEL SLIDER COIL

- Temperatures range -40 to 208°F
- 150 psi max pressure rating
- Meets SAE J844 and DOT FMVSS 106 requirements.
- (2) 1/4" OD fittings assembled

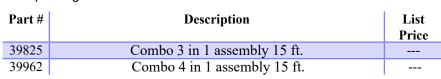
| | Part # | Description | Length | Fittings | List Price |
|---|--------|-----------------------|-----------|--------------|------------|
| | 39839 | 5th Wheel slider coil | up to 54" | (2) 1/4" MPT | |
| Ī | 39838 | 5th Wheel slider coil | up to 72" | (2) 1/4" MPT | |

3-IN-1 AND 4-IN-1 COMBINATION AIRLINE CABLE

- (2) 3/8" ID SAE J1402 rubber service and emergency with blue (service) and red (emergency) gladhand grip handle
- Color-coded grip helps to minimize incorrect tractor/trailer connections have glad handle with Vibraseal
- ABS power line (green) meets SAE J2222 requirements
- Auxiliary power line (yellow) fitted with SAESS60 plugs that have an inverted (male)

ground pin 4-in-1 only

- SAE J560 Plugs with sleeves for superior corrosion protection and strain relief
- Corrosion resistant all brass fittings 1/2" male NPT w/ Vibraseal
- Tapered grip flexes with airline during tight turns for kink protection
- Temp rating -40 208°F





HYDRAULIC ADAPTERS & ACCESSORIES



STEEL ADAPTERS

HYDRAULIC QUICK DISCONNECTS

| Thread to Connect - Wing | 422 |
|--------------------------|-----|
| ISO A Interchange | 422 |
| ISO B Interchange | 422 |
| Flush Face ISO | 423 |
| VEP Series | 423 |
| AG Interchange | 424 |
| Hydraulic Jack Q/D | 424 |

HYDRAULIC VALVES & ACCESSORIES

| Hydraulic Motor | 425 |
|-----------------------|-----|
| Hydraulic Gear Pump | 426 |
| Flow Control Valve | 428 |
| Variable Flow Counter | 429 |
| Air Breathers | 429 |

PLATING SPECIFICATION

Our standard Trivalent, Cr⁺³ plating performs at nearly double the S.A.E. corrosion resistance requirement. The plating meets ASTM B633, Fe/Zn 5. The thickness is 5um-13um. This plating is silver in appearance and has been testing at 96 hours to white rust and 120 hours to red rust.