NOTE: Because the hose/coupling interface is critical to hose assembly performance, always follow the specific instructions of hose and coupling manufacturers regarding the match of hose/fittings and assembly procedures. Trained personnel using proper tools and procedures should make hose assemblies. Failure to follow hose and couplings manufacturers’ instructions or failure to use trained personnel might be dangerous and could result in damage to property and serious bodily injury.

Couplings are designated by Numbers, and are described as to construction and source. Adapters and fittings are available for special applications. Each coupling has a pressure rating of Low, Medium or High. These terms have a general meaning as follows:

Low Pressure.......................................................... 100 psi maximum
Medium Pressure................................................... 315 psi maximum
High Pressure......................................................... 800 psi maximum

Coupling ratings apply only where the recommended clamps, bands, crimp sleeves or ferrules are used.

The proper clamp size should be selected carefully, since many clamps will fit only one hose size or a narrow range of sizes. For certain critical fluids, specific couplings are used, as follows:

Critical Applications

1. Use only the couplings recommended in this catalog for conveying:
   Steam
   LP Gas
   Corrosive Chemicals
   Petroleum Products

2. For conveying flammable fluids, use couplings made of nonsparking materials, such as brass or aluminum.

3. For ground fueling of aircraft, use certified coupled assemblies only.

When you have selected a hose from the Hose Section, you will have found one or more coupling recommendations for that hose. The following procedure will help you make the final selection:

A. If more than one coupling is recommended, make a final selection for type of coupling on basis of cost, sizes available, thread type available and application.

B. Determine how the coupling is to be fastened to the hose – crimp sleeve, ferrule, band or clamp.
COUPLING INSTALLATION

Before making any hose assembly, check these general instructions and precautions:

1. **Square Ends**—Before attaching a coupling to the hose, make sure the end is cut square. This will help prevent leakage of the coupling.

2. **Proper Fit of Ferrules and Clamps**—This is important. Make sure you are using the correct sizes for the hose being coupled. Never buff the cover, except when specified for certain hydraulic hose couplings, and you should not enlarge the hose tube in any way to make the coupling insert fit. Occasionally, a nipple pusher tool will be helpful in pushing the insert into the hose.

3. **Installation Lubricants**—Use of lubricants on coupling inserts and ferrules will simplify coupling installation and reduce possibility of damage to the hose. Some lubricants to use are water, soap solution or Lactol. Or, you can use a solution of glycerin and alcohol made up of one (1) part glycerin and 15 parts wood alcohol by volume.

4. **Appearance of the Hose Assembly**—A properly installed coupling significantly improves customer acceptance of the product. It also provides added assurance of satisfactory service and safety of assembly.

5. **Seal the Ends**—Where the hose is intended for use in petroleum transfer applications and hose ends will be exposed after couplings are attached, apply a sufficient amount of quality Neoprene cement or shellac to seal the ends.

6. **Critical Applications.**
   
   (a) Use only the couplings recommended in this Hose Coupling Section for conveying:
   
   - Steam
   - Petroleum Products
   - LP Gas
   - Edible Products
   - Corrosive Chemicals

   (b) For conveying flammable fluids, use couplings made of nonsparking materials; i.e., brass or aluminum.

   (c) For aircraft ground fueling hose, use factory coupled assemblies only.

**NOTE:** Refer to NAHAD Industrial Hose Assembly Guidelines for installation information and additional general information.
There are several terms or abbreviations which have come into common use for denoting pipe threads. Some of these are:

Iron Pipe Threads
- IPT
- Tapered IPT
- Straight IPT
- IP—S
- IP—T
- NPT

These may be satisfactory for general reference, but since there are several types of pipe thread, it is best to use the notations as given by a recognized standard (ANSI B2.1). The types in this standard which are used with industrial hose couplings are listed later in this section.

Compatibility of threads and method of sealing determine which type of thread is to be used.

An NPT male and female form a pressure-tight joint, and usually some type of sealing compound is placed on the threads. NPTF threads are similar in that the seal is made by tight fit between the threads. However the fit is close enough that a sealing compound is not needed.

NPSM threads are used for either male or female fittings, but the seal is formed by compressing a packing or by metal contact between chamfers on the male and female. Size range is from 1/4” through 6” nominal pipe I.D.

NPSH threads are similar to NPSM threads but are used mostly for fire hose or special couplings. Size range is from 1/2” through 2” nominal pipe I.D. The seal is made by compressing packing. GHT, garden hose threads, are a form of NPSH threads used on water hose. There is only one basic size of thread, 3/4 – 11-1/2. It is not compatible with 3/4-14NPT, NPSH or NPSM threads.

Couplings which come in sets usually have a female with NPSM threads and washer; and a male with NPT or NPSM threads.

Long shank couplings and pin lug couplings are examples where the male has NPSM threads. Reusable petroleum couplings are examples of sets in which the male has NPT threads.

Standard brass inserts have NPTF males and solid females and NPSM swivel females. The seal is made by contact of chamfers or tight fit of threads.

Couplings for hydraulic hose have threads which may conform to the above descriptions. In addition, there are many other types peculiar to the hydraulic field. For a complete description of threads, identification, sizes, methods of sealing and other related data, see Hydraulic Hose Catalog #25093.

**Combinations of Pipe Threads that Are Compatible:**

<table>
<thead>
<tr>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPT (Thread Seal)</td>
<td>NPTF (Thread Seal)</td>
</tr>
<tr>
<td>NPTF (Thread Seal)</td>
<td>NPTF (Dryseal)</td>
</tr>
<tr>
<td>NPSM (Washer Seal)</td>
<td>NPTF (Thread Seal)</td>
</tr>
<tr>
<td>NPSM (Mechanical Seal)</td>
<td>NPTF (Thread Seal)</td>
</tr>
<tr>
<td>NPSH (Washer Seal)</td>
<td>NPSH (Washer Seal)</td>
</tr>
<tr>
<td>GHT (Washer Seal)</td>
<td>GHT (Washer Seal)</td>
</tr>
</tbody>
</table>

**Couplings which come in sets:**

- Female with NPSM threads and washer
- Male with NPT or NPSM threads

**Long shank couplings and pin lug couplings:**

- Male with NPSM threads

**Reusable petroleum couplings:**

- Male with NPT threads

**Standard brass inserts:**

- NPTF males and solid females
- NPSM swivel females

**Sealing methods:**

- Contact of chamfers
- Tight fit of threads

**Compatibility table:**

- NPT and NPTF (Thread Seal)
- NPTF and NPTF (Dryseal)
- NPSM and NPT (Washer Seal)
- NPSM and NPSM (Mechanical Seal)
- NPSH and NPSH (Washer Seal)
- GHT and GHT (Washer Seal)
### Chart No. 1
American Standard Pipe Threads (ANSI B2.1)

<table>
<thead>
<tr>
<th>Nominal Pipe Size (In.)</th>
<th>Pipe O.D.</th>
<th>Threads Per Inch</th>
<th>NPT &amp; NPTF</th>
<th>NPT</th>
<th>NPSM**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>.405</td>
<td>27</td>
<td>0.36331</td>
<td>0.37476</td>
<td>0.409</td>
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<tr>
<td>1/4</td>
<td>.504</td>
<td>18</td>
<td>0.47739</td>
<td>0.48969</td>
<td>0.541</td>
</tr>
<tr>
<td>3/8</td>
<td>.675</td>
<td>18</td>
<td>0.61201</td>
<td>0.62701</td>
<td>0.678</td>
</tr>
<tr>
<td>1/2</td>
<td>.784</td>
<td>14</td>
<td>0.75843</td>
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<td>0.844</td>
</tr>
<tr>
<td>3/4</td>
<td>1.050</td>
<td>14</td>
<td>0.96768</td>
<td>0.98887</td>
<td>1.054</td>
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<tr>
<td>1</td>
<td>1.315</td>
<td>11-1/2</td>
<td>1.21383</td>
<td>1.23863</td>
<td>1.318</td>
</tr>
<tr>
<td>1-1/4</td>
<td>1.660</td>
<td>11-1/2</td>
<td>1.55713</td>
<td>1.58338</td>
<td>1.663</td>
</tr>
<tr>
<td>1-1/2</td>
<td>1.900</td>
<td>11-1/2</td>
<td>1.79699</td>
<td>1.82234</td>
<td>1.902</td>
</tr>
<tr>
<td>2</td>
<td>2.375</td>
<td>11-1/2</td>
<td>2.26902</td>
<td>2.29827</td>
<td>2.376</td>
</tr>
<tr>
<td>2-1/2</td>
<td>2.875</td>
<td>8</td>
<td>2.71583</td>
<td>2.76216</td>
<td>2.877</td>
</tr>
<tr>
<td>3</td>
<td>3.500</td>
<td>8</td>
<td>3.34662</td>
<td>3.38850</td>
<td>3.503</td>
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<tr>
<td>3-1/2</td>
<td>4.000</td>
<td>8</td>
<td>3.83750</td>
<td>3.88881</td>
<td>4.003</td>
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<td>8</td>
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<td>5</td>
<td>5.563</td>
<td>8</td>
<td>5.30073</td>
<td>5.44929</td>
<td>5.564</td>
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</table>

* Dimensions A & B shown on the sketch above
** Loose Fitting

### Chart No. 2
American Standard Straight Pipe Threads for Hose Couplings and Nipples

<table>
<thead>
<tr>
<th>GHT</th>
<th>Threads Per In.</th>
<th>Pitch</th>
<th>Depth of Thread</th>
<th>Major Diam. Min.</th>
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</thead>
<tbody>
<tr>
<td>1/2, 5/8, 3/4</td>
<td>11-1/2</td>
<td>Coupling</td>
<td>0.08696</td>
<td>0.05648</td>
</tr>
<tr>
<td>1/2, 5/8, 3/4</td>
<td>11-1/2</td>
<td>Nipple</td>
<td>0.06696</td>
<td>0.05648</td>
</tr>
<tr>
<td>Female</td>
<td>1/2</td>
<td>14</td>
<td>0.07143</td>
<td>0.04639</td>
</tr>
<tr>
<td></td>
<td>3/4</td>
<td>14</td>
<td>0.07143</td>
<td>0.04639</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>11-1/2</td>
<td>0.08696</td>
<td>0.05648</td>
</tr>
<tr>
<td></td>
<td>1-1/4</td>
<td>11-1/2</td>
<td>0.08696</td>
<td>0.05648</td>
</tr>
<tr>
<td></td>
<td>1-1/2</td>
<td>11-1/2</td>
<td>0.08696</td>
<td>0.05648</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>11-1/2</td>
<td>0.08696</td>
<td>0.05648</td>
</tr>
<tr>
<td>NPSH</td>
<td>1/2</td>
<td>14</td>
<td>0.07143</td>
<td>0.04639</td>
</tr>
<tr>
<td></td>
<td>3/4</td>
<td>14</td>
<td>0.07143</td>
<td>0.04639</td>
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<tr>
<td></td>
<td>1</td>
<td>11-1/2</td>
<td>0.08696</td>
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<tr>
<td></td>
<td>2</td>
<td>11-1/2</td>
<td>0.08696</td>
<td>0.05648</td>
</tr>
</tbody>
</table>
COUPLINGS FOR GATES HOSE

1 Long Shank

Description: Cast brass, serrated shank, set has hex male and hex swivel female couplings, with a washer seal. Threads are GHT or NPSM.
Sources: A P G
Dixon Valve & Coupling Co.
Seal-Fast, Inc.

2 Lightweight Water Hose

Description: Spun or wrought brass serrated shank, round swivel female and solid male, both GHT, washer seal.
Sources: American Coupling Co.
L.R. Nelson Corp.

3 Cast Brass or Zinc Short Shank

Description: Cast brass, serrated shank, hex swivel female with washer, solid male, GHT threads, 3/4-11-1/2.
Sources: A P G
J.C. Gadd Co.
Seal-Fast, Inc.

4 Machined Brass Short Shank

Description: Machined brass, serrated shank. Each set has round swivel female and solid male, GHT, washer seal. Octagon nut male and female.
Sources: American Coupling Co.
Anderson Fittings
A P G
Campbell Fittings, Inc.
Lenz, Inc.

5 Brass Pin Lug

Description: Cast brass shank and swivel, shank is serrated. NPSM threads in female and male, with washer seal. Sizes under 3" have lugs on female only.
Sources: A P G
Dixon Valve & Coupling Co.
P-T Coupling Co.

6 Malleable Iron Pin Lug

Description: Malleable iron shank and swivel with serrated shank, cadmium plated. NPSM threads in male and female, washer seal. Pin lugs on female only.
Sources: A P G
Dixon Valve & Coupling Co.
P-T Coupling Co.
Seal-Fast, Inc.

7 Combination Nipple

Victaulic Nipple

Description: Swaged steel with scored or serrated shank, NPT threads same nominal size as I.D. of hose. Special plastic materials available.
Sources: A P G
Band-H-DEX, Inc.
Campbell Fittings, Inc.
Dixon Valve & Coupling Co.
Martin Brass Works, Inc.
P-T Coupling Co.
Seal-Fast, Inc.

8 Tri-Lokt

Description: Machined steel insert, male NPT threads only. Held in place with steel yoke and Band-It Jr. clamps. Insert is reusable — can be reinstalled with new yoke and clamps.
Source: Band-It-DEX, Inc.

10 Single or Double Bolt Malleable Iron Clamp

Description: Cast malleable iron, cadmium plated.
Source: Dixon Valve & Coupling Co.

14 Interlocking, Ground Joint

Description: Malleable iron swivel. Inserts and spud may be either steel or malleable iron. All parts are cadmium plated. Male and female threads both NPT with same nominal size as hose I.D. Ground joint between spud and female insert. Available with 2- and 4-bolt clamps.
Sources: A P G
Dixon Valve & Coupling Co.
P-T Coupling Co.
Seal-Fast, Inc.

15 Interlocking, Washer Joint

Description: Malleable iron swivel. Insert and spud may be either malleable iron or steel. All parts are cadmium plated. Female thread in spud is NPT with same nominal size as hose I.D. Washer joint between insert and spud. Available with 2- and 4-bolt clamps.
Sources: Campbell Fittings, Inc.
Dixon Valve & Coupling Co.
P-T Coupling Co.
18 Universal Quick Acting

Description: Cast malleable iron with cadmium plate, cast bronze. Washer seal between two quick-acting heads. Several types of heads are available, but all have same-size attaching heads regardless of hose size. Fingers lock together with quarter-turn rotation.

Sources: A P G Campbell Fittings, Inc.
Dixon Valve & Coupling Co.
P-T Coupling Co.
Seal-Fast, Inc.

19 Standard Air Hose

Description: Machined brass, with serrated shank, NPTF threads on hex solid male and on hex solid female, and NPSM threads on hex swivel female.

Sources: American Coupling Co.
Anderson Fittings
A P G Dixon Valve & Coupling Co.
Lenz, Inc.
National Coupling Co.
Plews-Schrader

20 Ferrules

Description: All stock ferrules are plain drawn brass.

Sources: American Coupling Co.
Anderson Fittings
Dixon Valve & Coupling Co.
Jagemann Stamping Co.
Plews-Schrader
Truex, Inc.
Winzler Stamping Co.

21 Preformed Band Clamps

Description: A preformed ring clamp of rust-resistant carbon steel or Type 301 stainless steel. Also available in Type 316 stainless steel, and non-sparking silicon bronze.

Sources: Band-it
Fast-Lok Hose Clamps
Punch-Lok Co.

21 Band Rolls

Description: Available in 100-foot rolls, carbon steel or stainless steel. Buckles—100 per box

Sources: Band-it-IDEX, Inc.
Fast-Lok Hose Clamps
Punch-Lok Co.

23 Reusable Gasoline Pump

Description: Various materials; Two piece construction. Male NPT or IPT threads (also see coupling 47).

Sources: J.C. Gadd Co.
P-T Coupling Co.
Serv-AII Die and Tool Co.

24 Permanent Gasoline Pump Hose

Description: Various materials; One piece construction. Male NPT or IPT threads.

Sources: J.C. Gadd Co.
Serv-AII Die and Tool Co.

26 Internal Expansion-Brass

Description: Body is forged brass. Ferrule is cold-drawn copper alloy. Male coupling has NPT threads, female swivel coupling has NPSH threads. All threads same nominal size as hose I.D. except 1-3/8" I.D. size which has 1-1/2" – 11-1/2 threads. On 1-1/2" and larger sizes, female has special tightening lugs.

Sources: Dixon Valve & Coupling Co.
ProGrip Co.
United Metal Industries, Inc.

26 Ferrules for Internal Expansion

Sources: Dixon Valve & Coupling Co.
ProGrip Co.
United Metal Industries, Inc.
27 Reusable Petroleum Hose (Compression Ring)

Description: Machined brass coupling body, cast brass sleeve, flat steel wire compression ring. Male NPT or female swivel with NPSM threads and washer seal. Threads are same nominal size as hose I.D.
Sources: United Metal Industries, Inc.

28 Barrel Pump

Description: Various materials with serrated shank. Threads are male NPT only.
Sources: J.C. Gadd Co.
Serv-All Die and Tool Co.

34 Stainless Steel Nipples

Description: Type 316 stainless steel, with serrated shank, solid male NPT threads, hex swivel female, NPSM threads, washer seal. Threads same nominal size as hose I.D.
Sources: Dixon Valve & Coupling Co.
Martin Brass Works, Inc.

35 Four-Finger Boss Clamp

Description: Plated iron, stainless steel and brass clamps in 2, 3 and 4 gripping finger configurations. Corresponding stems come in NPT or beveled ends. Available in 2-, 4- and 6-bolt clamps. Follow manufacturer’s recommendations for bolt torque and tightening sequence procedures.
Sources: Dixon Valve & Coupling Co.

36 Sandblast

Description: Sand blast couplings are designed for use on sand blast hose. Couplings are supplied with screws.
Sources: A P G
Campbell Fitting, Inc.
Dixon Valve & Coupling Co.
P-T Coupling Co.
Seal-Fast, Inc.

47 Reusable Fuel Oil

Description: This coupling is similar to 23 except it has a brass finish, instead of chrome plating. Male NPTF threads, female NPSM threads, washer seal. Threads same nominal size as hose I.D., except as noted.
Sources: United Metal Industries, Inc.

48 Band-It Nipples

Description: Machined steel hex inserts, rust-resistant blued finish, serrated shank, male NPT threads.
Source: Band-It-DEX, Inc.
COUPLINGS FOR GATES HOSE - continued

49 Quick-Connecting

Description: The basic parts of this coupling are a bronze female shank coupler and a male adapter, which have a washer seal but no threads. These two parts fit snugly together and are held in place by two cams on the female shank coupler which rotate against a groove in the male adapter. This allows the coupling to be connected or disconnected very quickly. Adapters and dust caps are available as shown below. Standard materials are bronze or aluminum.

Sources: A P G Dixon Valve & Coupling Co. OPW Engineered Systems P-T Coupling Co. Scully Signal Co. Seal-Fast, Inc.

NOTE: Part A and Part D have female NPT threads. Part B and Part F have male NPT threads. Above threads have same nominal size as hose I.D. The above couplers and adapters are used to convert threaded-end couplings to quick connect.

61 Center Punch

Description: Open-end band or preformed band of rust-resistant steel. Also available in stainless steel.

Sources: Fast-Lok Hose Clamps Punch-Lok Co.

71 Permanent Swaged or Crimped

Solid Male
Ferrule

Description: API or NPT threads on connecting end of stem for easy flange attachment. Strong collar to anchor ferrule to stem. Electroplated steel. Also available in stainless steel, brass and other special metals.

Sources: Campbell Fittings, Inc. (Max. 1500 psi) Dixon Valve & Coupling Co. George Myer Company, Inc. ProGrip Co. (Max. 500 psi)

72 Gates Power Crimp®

PCS Male
PC Male

PCS Ferrule
PC Ferrule

Description: API or NPT threads on connecting end of stem for easy flange attachment. Strong collar to anchor ferrule to stem. Electroplated steel. Also available in stainless steel.

Sources: Gates Corp.

73 Permanent Swaged or Crimped

Cam and Groove

Description: NPT threads on connecting end of stem for easy flange attachment. Strong collar to anchor ferrule to stem. Electroplated steel. Also available in stainless steel, brass and other special metals.

Sources: A P G Dixon Valve & Coupling Co. ProGrip Co.

74 Gates MegaCrimp®

Description: NPT threads on connecting end of stem for easy flange attachment. Tuffcoat plated steel. The “C” insert assures an even distribution of crimping forces to form a concentric seal.

Sources: Gates Corp.
COUPLINGS FOR GATES HOSE - continued

75 Gates GLX®

**Male Pipe**

**Female Swivel**

**Description:** One piece staked ferrule design. Smooth ferrule ID designed for textile reinforced hoses. Male and female pipe, female JIC 37° flare swivel and male and female SAE 45° flare terminations. TuffCoat™ plated steel for 400 hour red rust corrosion protection (SAE-J516 and ASTMB-117 salt spray conditions).

**Sources:** Gates Corp.

76 Permanent Crimped Steam

**Male Pipe**

**Female Ground Joint**

**Description:** Permanently crimped steam hose couplings – Female Viton® Seal Ground Joint or Male NPT Thread. Precision metal to metal contact with a Viton seal provides leak-free performance. Streamlined permanently crimped ferrule eliminates protruding bolts that require retightening and can catch on equipment or cause injury.

**Sources:** Campbell Fittings, Inc.

77 Gates GSH™ with Integral 2” Fig. 1502 Hammer Unions

**Description:** One piece, no skive, staked ferrule design. Stem terminations are integral (not Welded) mating male or female Fig. 1502 hammer union subs. The male sub is supplied with a hammer union nut. The female sub is supplied with a rubber lip seal.

**Sources:** Gates Corp.

78 Crimp Sleeves

**Description:** Available in plated steel, 316 stainless steel and aluminum. Suitable for replacing band clamps when using pin lug, combination nipple or cam and groove stems. Working pressures are determined by the type of couplings and hose used.

**Sources:** APG, Campbell Fittings, Inc., Dixon Valve & Coupling Co., P-T Coupling Co.

79 Hoedall Permanent Swaged – Long Style

**Description:** Patented Hoedall couplings include a Hoedall stem and specially engineered ferrule. This multi-purpose, high-pressure coupling system requires no bolts and results in a clean coupling with no protrusions.

**Sources:** Dixon Valve & Coupling Co.

80 Gates GSP®

**Description:** Two piece, no skive design engineered for high-pressure, high-impulse applications. TuffCoat™ plated steel for 400 hour red rust corrosion protection (SAE-J516 and ASTMB-117 salt spray conditions).

**Sources:** Gates Corp.

81 Gates GL

**Description:** One piece staked ferrule design. Smooth ferrule ID designed for textile and helical reinforced transfer hoses. Male and female pipe, male and female JIC 37° flare and male and female SAE 45° flare terminations. TuffCoat™ plated steel for 400 hour red rust corrosion protection (SAE-J516 and ASTMB-117 salt spray conditions).

**Sources:** Gates Corp.

82 Gates SS

**Description:** Two piece, no skive design. Made of stainless steel for high corrosion resistance.

**Sources:** Gates Corp.
# COUPLING SOURCES

<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>Phone Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Couplings Company</td>
<td>A Dixon Company</td>
<td>(800) 323-4440</td>
</tr>
<tr>
<td>Anderson Fittings</td>
<td>Oak Forrest, IL 60452</td>
<td>(800) 323-5284</td>
</tr>
<tr>
<td>A P G</td>
<td>Houston, TX 77020</td>
<td>(800) 888-5223</td>
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<tr>
<td>Band-IT-IDEX, Inc.</td>
<td>Denver, CO 80216</td>
<td>(303) 320-4555</td>
</tr>
<tr>
<td>Campbell Fittings, Inc.</td>
<td>Boyertown, PA 19512</td>
<td>(800) 367-3678</td>
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<tr>
<td>Dixon Valve &amp; Coupling Co.</td>
<td>Chestertown, MD 21620</td>
<td>(800) 355-1991</td>
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<tr>
<td>Fast-Lok Hose Clamps Division of Deco Products Co.</td>
<td>Decorah, IA 52101</td>
<td>(800) 327-9751</td>
</tr>
<tr>
<td>George Myer Company, Inc.</td>
<td>Houston, TX 77023</td>
<td>(800) 600-3074</td>
</tr>
<tr>
<td>Jagemann Stamping Company</td>
<td>Manitowoc, WI 54221</td>
<td>(888) 337-7853</td>
</tr>
<tr>
<td>Lenz, Inc.</td>
<td>Dayton, OH 45401</td>
<td>(937) 277-9364</td>
</tr>
<tr>
<td>Martin Brass Works, Inc.</td>
<td>Jamaica, NY 11433</td>
<td>(718) 523-3146</td>
</tr>
<tr>
<td>National Coupling Co.</td>
<td>Stafford, TX 77477</td>
<td>(281) 499-2583</td>
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<tr>
<td>LR Nelson Corp.</td>
<td>Peoria, IL 61615</td>
<td>(309) 690-2200</td>
</tr>
<tr>
<td>OPW Engineered Systems</td>
<td>Lebanon, OH 45036</td>
<td>(800) 547-9393</td>
</tr>
<tr>
<td>P-T Coupling Co. ProGrip Co.</td>
<td>Enid, OK 73701</td>
<td>(800) 654-0320</td>
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<tr>
<td>Plews-Schrader Division of Tomkins Ind. &amp; Auto</td>
<td>Dixon, IL 61021</td>
<td>(815) 288-3344</td>
</tr>
<tr>
<td>Scully Signal Co.</td>
<td>Wilmington, MA 01887</td>
<td>(800) 272-8559</td>
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<td>Seal-Fast, Inc.</td>
<td>Houston, TX 77220</td>
<td>(800) 231-0734</td>
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<tr>
<td>Serv-All Die and Tool Co.</td>
<td>Crystal Lake, IL 60014</td>
<td>(815) 459-2900</td>
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<tr>
<td>Truex, Inc.</td>
<td>Pawtucket, RI 02861</td>
<td>(800) 458-7839</td>
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<tr>
<td>United Metal Industries, Inc.</td>
<td>New Hyde Park, NY 11040</td>
<td>(800) 359-6801</td>
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<tr>
<td>Winzler Stamping Company</td>
<td>Montpelier, OH 43543</td>
<td>(419) 485-3147</td>
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