

# Application Data

## Important Safety Information

### Read this page before using any of the infor- mation in this catalog.

This catalog is designed to be used as a guide in selecting the proper hose for the applications listed herein. It contains many cautions, warnings, guidelines, and directions for the safe and proper use of Boston hose. All these directions and footnotes should be read and understood before specifying or using any of these hoses.

Throughout this catalog, potentially harmful situations are highlighted with the following symbols.

 This symbol is used to indicate imminently hazardous situations which, if not avoided, will result in serious injury or death.

 This symbol is used to indicate potentially hazardous situations which, if not avoided, could result in serious injury or death.

 This symbol is used to indicate potentially hazardous situations which, if not avoided, may result in property or equipment damage.

Some of the most common problems in the chemical hose industry result from improper hose and coupling

selection, improper assembly techniques, failure to correctly inspect and test hose assemblies, and improper cleaning practices and hose assembly storage techniques.

In turn, these situations can lead to material leakage, spraying, spattering, end blow-offs, explosions, and other situations that may result in serious personal injury and property damage.

Personal injuries caused by improper hose assembly specification, installation, and usage could include cuts and abrasions, serious burns, irreparable eye damage, or even death.

Therefore, for your safety and the safety of others working around you, Eaton strongly urges you to read and comply with all safety information printed in this publication.

 **WARNING:** Failure to properly follow the manufacturer's recommended procedures for the care, maintenance and storage of a particular hose may result in its failure to perform in the manner intended and may result in serious injury, death, and damage to property.

 **WARNING:** Testing can be dangerous and should be done only by trained personnel using proper tools and procedures. Failure to follow such procedures might result in serious injury, death, or damage to property.

**Consult the coupling manufacturer to make sure you choose the correct coupling and proper assembly for the application, or contact Eaton Technical Support.**

**Before using any hoses in this catalog, consult the safety section in this catalog, and Chemical Compatibility Chart on page 21 or Boston Hose Chemical Resistance Guidelines. If you do not have the most recent copy, contact Eaton Customer Support at 1-888-258-0222.**

### Selection of Hose

Selection of the proper Boston hose for an application is essential to the proper operation and safe use of the hose and related equipment. Inappropriate hose selection may result in hose leakage, bursting, or other failure which may cause serious bodily injury or property damage from spraying

fluids or flying projectiles. To avoid serious bodily injury or property damage resulting from selection of the wrong hose, you should carefully review the information in this catalog. Some of the factors to consider in proper hose selection are:

- hose size
- hose length
- hose ends
- fluid conveyed
- bends
- temperature
- hose pressure
- static head pressure
- installation design

These factors and the supplemental information contained in this catalog should be considered in selecting the proper hose for your application. If you have any questions regarding the proper hose for your application, please contact Eaton at 1-888-258-0222.

# Application Data

## Important Safety Information

### Proper Selection of Hose Ends

Selection of the proper Boston hose end or coupling is essential to the proper operation and safe use of hose assemblies and related equipment. Inadequate attention to the selection of the end fittings may result in hose leakage, bursting, or other failure which may cause serious bodily injury or property damage from spraying fluids or flying projectiles. In order to avoid serious bodily injury or property damage resulting from selection of an incompatible hose end or coupling, you should carefully review the information in this catalog. Some of the factors which are involved in the selection of the proper hose couplings are:

- fluid compatibility
- temperature
- installation design
- hose size
- corrosion requirements
- fluid conveyed

The given hose and hose end selection factors and the other information contained in this catalog should be considered by you in selecting the proper hose end fitting for your application.

If you have any questions regarding the use of hose/hose ends, please contact Eaton Technical Support at 1-888-258-0222.

### Hose Installation

Proper installation is essential to the proper operation and safe use of the hose assembly and related equipment.

Improper hose assembly installation may result in serious injury or property damage caused by spraying fluids or flying projectiles. In order to avoid serious bodily injury or property damage resulting from improper hose assembly installation carefully review the information in this catalog. Some of the factors to be considered when installing a hose assembly are:

- hose elongation or contraction
- proper bend radius/hose routing under pressure
- elbows and adapters to relieve strain
- protection from rubbing or abrasion high temperature sources
- protection against excessive movement
- twisting from pressure spikes/surges

These hose assembly installation factors and the other information in this catalog should be considered by you before installing the hose assembly. If you have any questions regarding proper hose installation, please contact Eaton Technical Support at 1-888-258-0222.

### Hose Maintenance

Proper maintenance of the hose is essential to the safe use of the hose and related equipment. Hose should be stored in a dry place. Hose should also be visually inspected. Any hose that has a cut or gouge in the cover that exposes the reinforcement should be retired from service. Hoses should also be inspected for kinking or broken reinforcement. If the outside diameter of the hose is reduced by 20% or more, the hose should be repaired or removed from service. Inadequate attention to hose maintenance may result in hose leakage, bursting, or other failure which may cause serious bodily injury or property damage from spraying fluids, flying projectiles, or other substances.

### Coll-O-Crimp Hose, Hose Ends and Assembly Equipment Compatibility

The Coll-O-Crimp Equipment Package, Coll-O-Crimp Hose Ends and Coll-O-Crimp Hose have been engineered and designed as a complete hose assembly system. Each component of the Coll-O-Crimp hose assembly system is compatible with other Coll-O-Crimp components to which it relates. Component compatibility, along with the use of quality components, insures the production of reliable hose assemblies when assembled properly. The use or intermixing of fittings and hose not specifically engineered and designed for use with each other and Coll-O-Crimp equipment is not recommended and may result in the production of unsafe or unreliable hose assemblies. This can result in hose assembly leakage, hose separation or other failures which can cause serious bodily injury or property damage from spraying fluids, flying projectiles, or other substances.

# Couplings

## General Information



Swaged coupling



Crimped coupling



Internally expanded coupling

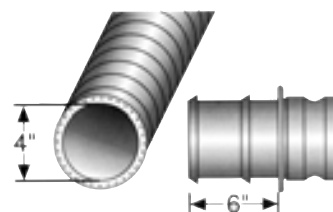
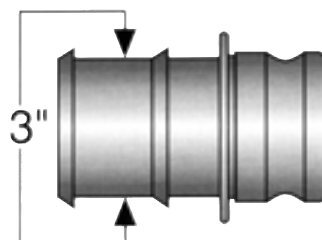
Some couplings have special coatings such as zinc or nickel plating. Always make certain any coating is compatible with the material being transferred and the external environment. Otherwise, contamination and/or failure could occur. The coupling manufacturer can provide you with this information.

To make certain you have selected the right coupling for your application, always consult the coupling manufacturer. To help make coupling selection easier, Eaton includes coupling thread data and flange size information in this catalog.

### Measuring Couplings

To determine the size of a coupling, measure the shank outer diameter (O.D.) between the shank barbs. The shank is the portion of a coupling that is inserted into the hose. A "three-inch" coupling will have a shank O.D. of three inches when the O.D. is measured between the shank barbs.

In general, the length of the coupling shank should be approximately one and a half times the inner diameter of the hose. For example, a hose with a four-inch diameter would require a coupling with a six-inch-long shank.



### Installing Field-Attachable Couplings

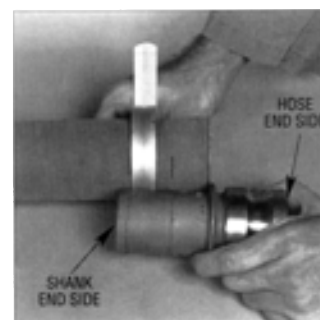
Before installing a coupling, be sure the shank is free of any burrs or sharp edges. This will make insertion into the hose easier and will help prevent inner tube hose damage.

**! WARNING:** Never alter the shank of the coupling beyond removing any burrs. Altering the shank can reduce some of the coupling holding power or create sharp edges which could cut the hose tube. The resulting spraying, leaking, or end blow-offs could result in personal injury or death.

If the coupling will be secured by bands, hold the coupling near the hose and use a marker to indicate where the bands are to be located. A variety of shank designs is available, so always follow the manufacturer's recommendations for positioning bands.

Three common shank styles include the two-barb coupling, the combination nipple which consists of multiple barbs of the same size, and the coupling which has two large barbs and two smaller barbs.

To attach bands to the two-barb coupling, hold the coupling along side the hose. Make a mark on the hose-end side of each barb. When attaching the coupling, place the bands just to the hose-end side of the marks.

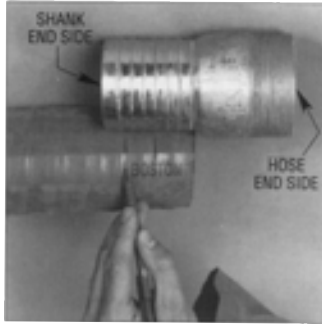


### Banding a two-barb coupling

To band a combination nipple coupling, place a mark just to the hose-end side of the last barb of the shank (farthest from the hose end). Place a second mark midway between the first mark you make and the hose end.

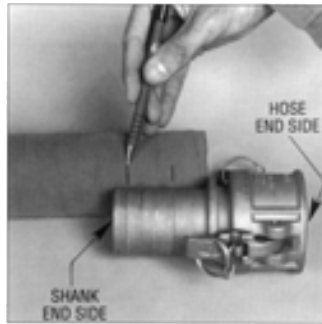
# Couplings

## General Information



### Banding a combination nipple shank.

To attach bands to a coupling with two large barbs and multiple small barbs, place marks on the hose end side of the two large barbs 180° from each other.



### Banding a coupling with two large barbs and two small barbs.

If two or more bands are to be installed, the band farthest from the end of the hose should be assembled at least half an inch from the end of the coupling shank.

Coat the coupling shank with a mild soap and water solution. Keep the hose and coupling shank aligned and press them together.

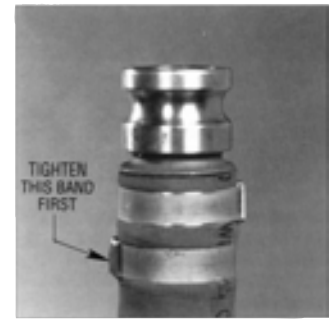
Aligning them will help prevent damage to the tube and assure that the coupling reaches full insertion depth. Eaton recommends using a hydraulic or pneumatic powered pusher during coupling installation to prevent inner tube hose damage that can occur when using a rubber mallet.



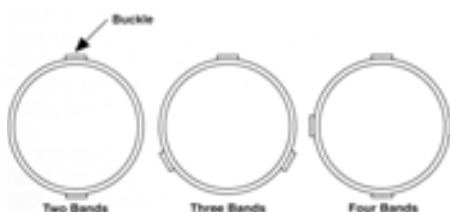
Align the hose and coupling to prevent tube and coupling damage. Eaton recommends using an automatic coupling inserter to help achieve proper coupling alignment.

If the shank won't fit properly into the hose, select another coupling and try again. There are minimum and maximum shank tolerance dimensions for each coupling type. Consult each coupling manufacturer for specifications. Make sure you don't damage the tube.

Finally, secure the coupling. There are a variety of tools, securing mechanisms, and assembly procedures, so always follow the manufacturer's recommended procedures. Bands should be placed inside of the marks, toward the hose end side. The band farthest from the hose end should be tightened first.



In situations where two bands are present, Eaton suggests rotating the clamp buckles 180° from each other when assembling them. Rotating the buckles prevents possible leak paths. Always tighten the band farthest from the end of the hose assembly first.



### These illustrations show correct buckle position.

If three bands are present, space the clamp buckles 120° apart. For more than three bands, contact your clamp supplier.

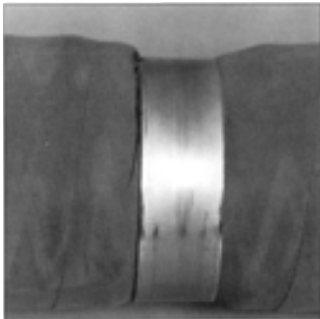
Eaton also recommends tightening the clamps in the same direction as the rotation of the wire helix (clockwise) if one is present. Doing so will prevent the wire helix and the bands from working against each other.

# Couplings

## General Information



**Tighten clamps in the same direction as the helical wire.**



**Overtightened band**

**! WARNING** Do not overtighten coupling securing mechanisms. Doing so can cut the hose and cause leaks, spraying, and end blow-offs. This could lead to personal injury or death.

### Installing Permanent Couplings

Permanent couplings are swaged, crimped or internally expanded onto the hose. Eaton is currently testing various couplings with Boston hose in order to make recommendations regarding assembly procedures. In the meantime, contact Eaton or the coupling and equipment manufacturers, or refer to the manufacturer's literature for further information.

### Coupling Repair

The following items can be replaced on female cam and groove couplings: cam arms (handles), pins, rings, gaskets, and in some cases the ring/clip lock. To determine if the ring/clip or locking mechanism can be replaced, check with the coupling manufacturer.

To replace a cam arm, start by placing the coupling in a vise. Close the vise on the coupling body so that the vise jaws contact the coupling just below the cam arms. Make sure the cam arms are in full open position. Snug the vise securely.

**! CAUTION** Do not tighten the vise excessively. Excessive vise pressure can distort the coupling.

Using a standard 1/4" round punch and a hammer or mallet, tap the cam arm pin through the cam arm and both lug holes. Holding onto the cam arm, remove the 1/4" round punch from cam arm lugs and lift out cam arm. Take the new cam arm pin and place either end into the cam arm lug hole. Using a hammer or mallet, gently tap the cam arm pin until it begins to enter the opening between the two cam arm lugs. Position the new cam arm between the two cam arm lugs and, with a hammer or mallet, gently tap the cam arm pin until it enters the hole in the cam arm. After the pin has entered that cam arm hole, continue tapping the pin until it is flush with the cam arm lug. Make sure the cam arm moves freely on the pin and that the pin fits snug in the lug holes.

Rings are replaced very easily. To take a ring off a cam arm, twist it off like you would take a key off of a key ring. The new ring is put on to the arm in the same fashion. When replacing a gasket, pull the old gasket out of the coupling with needle nose pliers. Next wipe the inside of the coupling where the gasket seats with a clean rag. Select a new replacement gasket that is the proper size and will meet the chemical compatibility requirements of the application. Finally, place the new gasket in the coupling so that it fits into the gasket recess and is seated flush against the coupling face.

Pressure test and tag any hose assembly that has been repaired.

# Couplings

## General Information

### Safety Information

Choosing the correct coupling is important for maximum hose efficiency and safety. Couplings must be applied properly. Incorrect or improperly applied couplings can result in shorter hose life and hose failures. These failures can result in serious bodily harm or property damage.

Hose couplings have been carefully engineered over the years to meet specific safety requirements.

Some factors you should consider when choosing the proper coupling for a particular application are:

1. What is the material to be handled?
  - a) Is it dangerous?
  - b) Is it corrosive?
  - c) Is it abrasive?
2. What are the pressures involved?
  - a) High pressure
  - b) Medium pressure
  - c) Low pressure
  - d) Suction
3. What means of connection are required?
  - a) Threads
  - b) Special locking
  - c) Flanged ends

When selecting couplings, the end user should inform the distributor of the application and pressures involved when ordering hose assemblies, and it's up to the distributor to supply the right hose and coupling for that application.

All hose assemblies should be treated with respect as potential hazards. Fittings, clamps or clips should be checked on a regular basis, and removed from service if damaged.

Shank length of coupling should be 1-1/2 times the inside diameter of the hose.

**Combination nipples should only be used for suction and low pressure discharge applications.**

**WARNING:** Consult with the Coupling Manufacturer to make sure you choose the correct coupling and proper assembly for the application. Such matching of hose and couplings, and assembling of couplings, should be performed only by trained personnel using proper tools and procedures. Failure to follow manufacturer's instructions or failure to use trained personnel may result in serious bodily injury and/or property damage.

### Short Shank



- Service:** Low pressure air and water service
- Size Range:** 3/16" to 1"
- Description:** Cast brass with serrated shank; GHT, NPSM or NPT male and NPSH female; washer seal
- Attachment:** Clamps or bands

### Long Shank

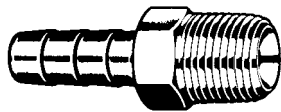


- Service:** Medium pressure air, water, sanitary and liquids in suction or discharge service
- Size Range:** 3/8" to 4"
- Description:** Machined steel or brass with serrated shank; NPT or NPSM male and female; thread seal to NPT and washer seal to NPSM female Attachment Bands or clamps

# Couplings

## General Information

### Barbed Insets



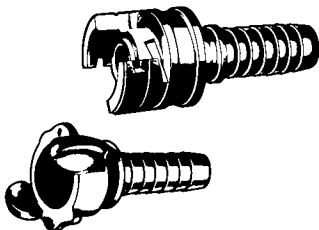
- Service:** Low or medium pressure air, water and fluids
- Size Range:** 3/16" to 1"
- Description:** Machined brass with serrated shank; NPT or NPTF male and rigid female, and NPSM swivel female; thread seal to NPT or NPTF female, and ball end or washer seal to NPSM female
- Attachment:** Bands or clamps

### Interlocking



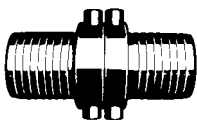
- Service:** High pressure air and water service, steam, high pressure spray, and LPG service
- Size Range:** 1/4" to 6"
- Description:** Plated malleable iron; insert and spud may be either steel or malleable iron; NPT male and female with ground joint or washer seal
- Attachment:** Four bolt or two bolt interlocking clamps

### Quick Acting



- Service:** Low to medium pressure; air, water or oil service where frequent and fast connections must be made
- Size Range:** 1/4" to 2"
- Description:** Plated malleable iron, stainless steel or bronze
- Attachment:** Interlocking clamps or bands

### Water Suction

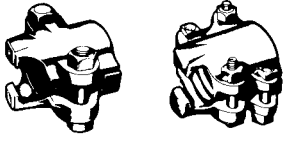


- Service:** Heavy duty water discharge and suction service
- Size Range:** 1" to 8"
- Description:** Malleable iron, aluminum and/or brass
- Attachment:** Clamps or bands

# Couplings

## General Information

### Interlocking Clamp



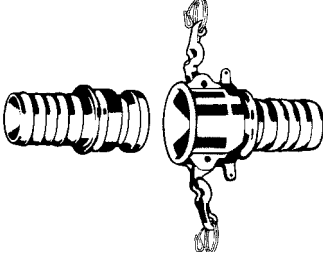
**Service:** Heavy duty high pressure applications such as air, steam, water, spray, LPG service

**Size Range:** 9/16" to 7 3/16" hose O.D.

**Description:** Malleable iron, plated

**Attachment:** Clamps bolted into position

### Cam and Groove



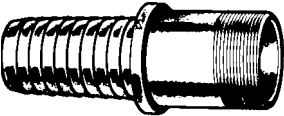
**Service:** Low and medium pressure water, petroleum and chemical transfer where fast connections are needed; also used for suction service

**Size Range:** 1/2" to 8"

**Description:** Aluminum, bronze, stainless steel, Monel, malleable iron; washer seal with no threads

**Attachment:** Clamps, bands, or crimp/swage ferrules

### Swaged or Crimped



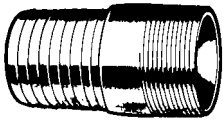
**Service:** For use on all types of hose where high pressures are used

**Size Range:** 1 1/4" to 8"

**Description:** Couplings consist of swaged fittings having serrated steel shanks with ferrules of plated steel

**Attachment:** Swaging or crimping equipment

### Combination Nipple



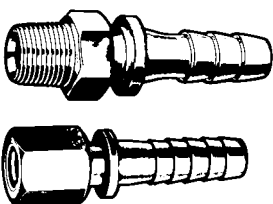
**Service:** Low or medium pressure suction and discharge of water, fluids, and material handling

**Size Range:** 1/2" to 12"

**Description:** Tubular steel, stainless, malleable iron, aluminum or brass with serrated shank; NPT male threads, grooved, or beveled for welding

**Attachment:** Clamps or bands

### Steel Nipple



**Service:** Medium to high pressure: wide variety of applications.

**Size Range:** 1/4" to 1"

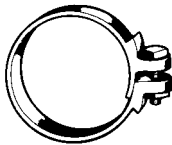
**Description:** Machined from cold drawn bar steel, heat treated for toughness.

**Attachment:** Interlocking clamps

# Couplings

## General Information

### Single Bolt Clamp



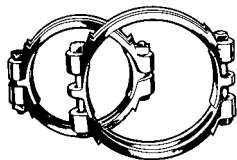
**Service:** Low pressure, and suction service on shank couplings, combination nipples, and pipe nipples

**Size Range:** 7/8" to 5 1/4" hose O.D.

**Description:** Cast malleable iron, plated.

**Attachment:** Bolted on hose

### Double Bolt Clamp



**Service:** Low or medium pressure, and suction service with large sizes of combination nipples, or couplings

**Size Range:** 3 1/2" to 17 1/2" hose O.D.

**Description:** Cast malleable iron, plated, and brass

**Attachment:** Applied over hose and bolted into position

### Band Clamp



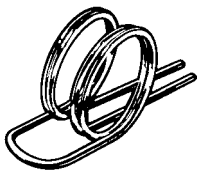
**Service:** Low or medium pressure, and suction service

**Size Range:** 3/4" to 6" hose O.D.

**Description:** Pre-formed flat stainless steel, high carbon steel

**Attachment:** Special locking band tool

### Wire Hose Clamp



**Service:** Suitable for medium pressure, air, water or general purpose hose; good for hose with helical wire or corrugations; available in larger sizes for pin lug, serrated pipe nipple or combination nipples

**Size Range:** 5/8" to 13 1/4" hose O.D.

**Description:** Pre-formed round wire made of stainless steel, galvanized steel, copper, bronze or aluminum

**Attachment:** Wire ends pulled and crimped with special tool or machine

### Brass Ferule



**Service:** Low or medium pressure air or water using general purpose hose and brass inserts

**Size Range:** 31/64" to 1 1/2" hose O.D.

**Description:** Made from various gauge brass tubing; stamped with Standard Industrial Part Number

**Attachment:** Crimped on using either ribbed or plain die