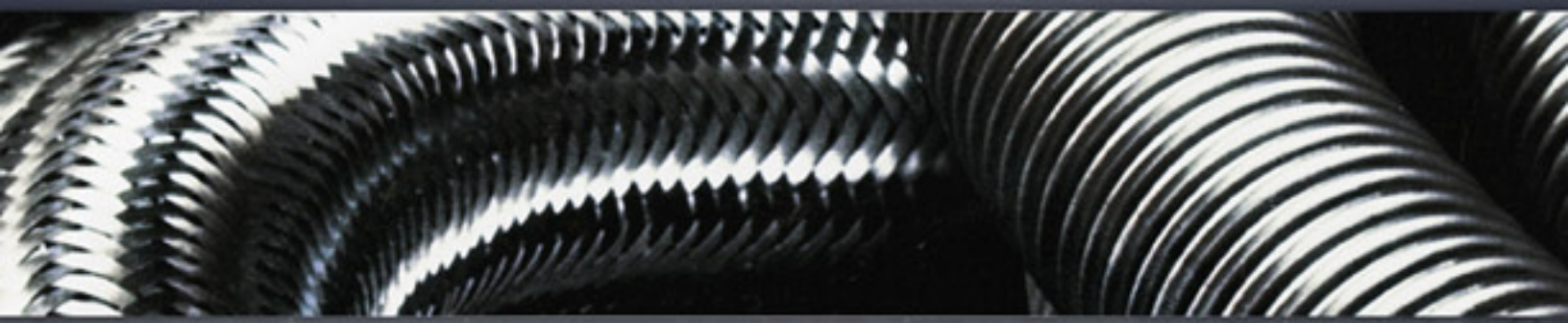
# PisaFlex



## Metal Hoses

PisaFlex

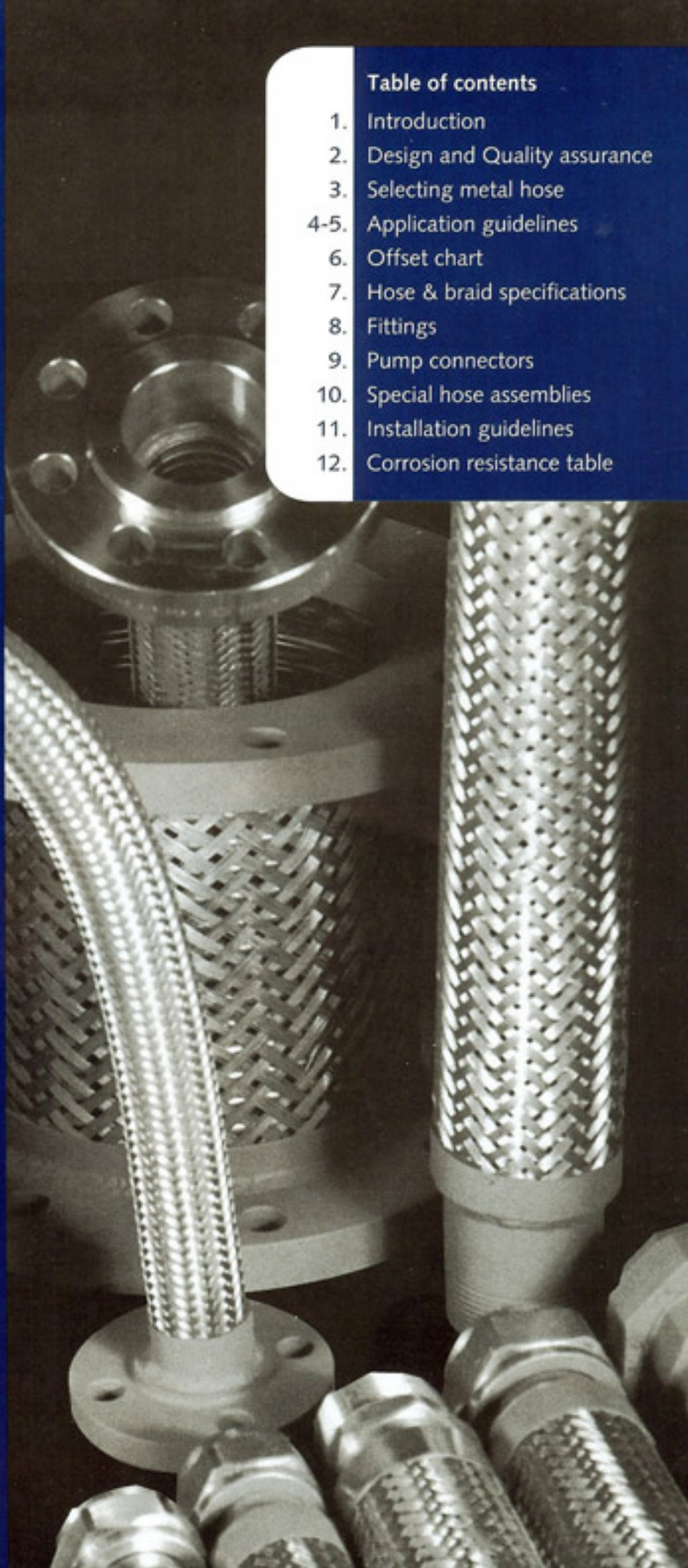
Promociones Industriales, S.A. de C.V. was founded in 1954 as an industrial supply company and manufacturer's representative headquartered in Monterrey, Mexico with four branches located throughout Mexico, to service basic industry while paying particular attention to the steel sector.

Ten years ago it was decided to refocus the company towards value added products and manufacturing.

We purchased our first welding machine in 1994 to manufacture metallic hose assemblies. In 1996 we acquired bellows forming machinery to produce metallic bellows and expansion joints, and in 2002 we started up our modern hose and braid manufacturing facilities.

PisaFlex today is Mexico's premier manufacturer of metallic hose and braid, hose assemblies, and expansion joints.

Our highly qualified team of engineers and technicians trained in Mexico and abroad are dedicated to the manufacture of high quality products required by our customers. We ask that you allow us to help service your requirements.



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# Design parameters

**ISO 10380**

Pisaflex design, manufacture, and testing of corrugated metallic hose and hose assemblies complies with the ISO 10380 standard.

**ISO 10380 specification**

ISO 10380 covers the following specifications:
Materials
Critical dimensions
Design
Construction
Testing

**Materials**

The standard covers materials for hose, braid, braid collars, and fittings.

**Critical dimensions:**

**Hose bore:**
The minimum bore shall be at least 98% of the manufacturer's published nominal diameter.

**Bend Radius:**
The bend radius is specified as static or dynamic, and is relative to the diameter of the hose. It is further broken down into a smaller radius Type I and a larger radius Type II for those unable to qualify for Type I.

**Overall length:**
The overall length of an assembly shall be the specific length ordered with a tolerance of –1% to +3%.

**Design:**

**Pressure:**
The specification determines the pressure relative to the size that the hose shall be tested.

**Elevated temperatures:**
Determines the correction to operating pressures at elevated temperatures.

**Construction:**

Two types of construction are identified: Type X – seamless or butt welded annular hose. Type Y – lap welded annular and helical hose either seamless, butt, or lap welded. Two types of flexibility are identified: Type I – corrugated hose of high flexibility. Type II – corrugated hose of moderate flexibility.

**Testing:**

The standard defines the criteria for cycle testing the hoses according to type. The hoses are tested to a specified bend radius and pressure according to size in a standard loop arrangement.

Six hoses of each size must be tested. The hoses must achieve average cycle life of 50,000 cycles. If one hose fails to reach 40,000 cycles, another set of six new hoses must be tested. The testing determines the reliability of the hose at published maximum working pressure and minimum bend radius.

Pisaflex annular butt welded hydro formed standard pitch and closed pitch hoses both conform with the ISO 10380 standard.

# Quality assurance

Quality assurance at Pisaflex is of vital importance. All stages of manufacturing are monitored by qualified QC personnel. Pisaflex has complete in house test facilities for the various types of tests required by ISO 10380 standard.

**The following tests are performed regularly:**

- **Weld test**
- **Leak test**
- **Fatigue or cycle life test**
- **Burst pressure and yield test**
- **Bend radius test**
- **Flame test**

All hose assemblies are tested pneumatically at 90 psi, or hydraulically at 1.5 times the design pressure. All raw materials used in the manufacture of hose, braid, and end fittings, undergo rigid inspection to ensure the highest quality standards.

Pisaflex is commited to continued quality assurance, service, and technical assistance to fulfill our customers requirements.

# Selecting metal hose

**Consider these selection factors for a particular application:**

### 1. Size of connecting pipe.

The size of metal hose for a given application is usually determined by the size of the existing piping and mating fittings. However, other considerations such as pressure drop, rate of flow, and velocity also influence your selection of the proper size of hose.

### 2. Temperature of operation in relation to pressure and material.

Temperature, of course, affects the physical properties of any material. This factor must be taken into account, as well as the working pressure and the specific application. Hose type, metal alloy, fittings, and attachments determine the temperature limit.

### 3. Media in relation to corrosion of hose material.

A primary consideration in specifying metal hose is to select a material which is resistant to the media to be conveyed through the hose; this is possible in most applications. Remember to consider the corrosive effects of the outside environment, as well as the media conveyed within. Both factors are significant. Remember also that metal hose, a thin walled material, will not have the same total usage life as pipe or tube that is heavier-walled material, even though both are of the same material.

### 4. Pressure – Operating, test and burst needed for the application.

The pressure rating for each type of flexible metal hose is affected by the conditions of actual use, such as, shock or pulsating conditions, temperature, and bending stresses. The maximum operating pressure is 25% of the Nominal Burst Pressure, while the maximum test pressure is 150% of the Maximum Operating Pressure. The Nominal Burst Pressure is the pressure at which the hose can be expected to rupture. When pulsating, surge or shock pressures exist, from conditions such as fast closing valves, the peak pressure should not exceed 50% of the Maximum Operating Pressure. Refer to page 4, which specifies the pressure ratings for each of these conditions, as it relates to both braided and unbraided hose. In addition, you should refer to page 4 for the pressure ratings as affected by temperatures in excess of 70° Fahrenheit.

### 5. Motion type affecting hose and amount of motion.

Flexible metal hose is specified for several different applications whenever there is excessive vibration, misaligned pipe or tube is encountered, or whenever flexibility is needed for manual handling. To select the proper hose for any of these applications requires, careful consideration of the material in regards to the design of the assembly, installation, and versatility expected of the hose.

### 6. Length of hose needed to absorb motion in relation to available space.

The type of motion, offset motion, vibration, as well as the live length required, are all factors to consider when making the proper hose selection. Refer to pages 4, 5, and, 6 for exact specifications for these conditions.

### 7. Fittings needed to connect to existing connections compatible with media, temperature, and pressure.

End fittings may have male or female threads. In addition to conventional unions – flanges, flared tube fittings – special designs or custom connectors are available. The attachment method: welding, soldering, silver brazing, or mechanical, is determined by the appropriate type of hose, alloy, and temperature. Contact PisaFlex for custom fitting information.

### 8. Flow velocity

High flow velocities in metal hose can cause vibration resulting in noise and premature failure. See page 4 for liner recommendations.

# Application guidelines

## Definitions

**Maximum Working Pressure:**
Maximum operating pressure to which the hose may operate through the stated bending range at this pressure.

**Test Pressure:**
To be specified in accordance with the application. Not to exceed 1.5 times maximum working pressure.

**Burst Pressure:**
The pressure at wich the hose can be expected to fail, based on the corrugated hose and/or the braid at 70° F.

**Pulsating Or Shock Pressures:**
When pulsating pressures exist use 1/2 of rated pressure. When shock pressures exist use 1/6 of rated pressure.

**Flow Velocity:**
Excessive flow velocities can cause fatigue failure in metal hose. The flow should not exceed 100 ft/sec gas or 50 ft/sec liquid in braided hose. A liner must be used for higher flow rates. If a hose is installed in a bent condition the flow must be reduced by 25% for a 45 bend, 50% for a 90° bend and so forth.

**Pressure Drop:**
The pressure drop through a straight metal hose is, as a rule of thumb, about three times as much as for black pipe. Consult factory for more accurate calculations, and when hoses are installed in bent conditions.

**Dynamic Bend Radius:**
The bend radius used in calculations involving applications where the hose is moving. This bend radius has a direct relation to cycle life. Bending the hose in a smaller radius than rated will adversely affect the life of the hose.

**Static Bend Radius:**
The bend radius to which a hose may be bent when no further motion is to be imposed.

**Live Length:**
The length of hose which will bend or the hose between the braid collars.

## Temperature

For operating temperatures exceeding 70° F the pressures must be decreased in accordance with the following table. For long time exposure over 1000° F consult the factory.

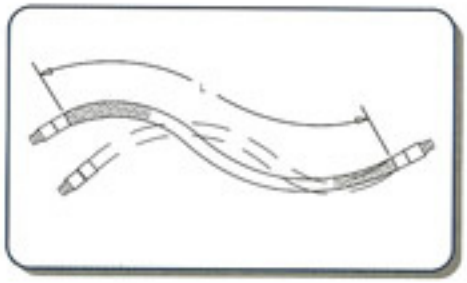
**Conversion Factors:**
Apply to pressure rating for elevated temperature.

| TEMPERATURE F° | STAINLESS STEEL |
|---|---|
| 70 | 1.00 |
| 150 | .97 |
| 200 | .94 |
| 250 | .92 |
| 300 | .88 |
| 350 | .86 |
| 400 | .83 |
| 450 | .81 |
| 500 | .78 |
| 600 | .74 |
| 700 | .70 |
| 800 | .66 |
| 900 | .62 |
| 1000 | .60 |
| 1100 | .58 |
| 1200 | .55 |
| 1300 | .50 |
| 1400 | .44 |
| 1500 | .40 |

## Motion

**Axial Motion:**
Motion that occurs when a hose is compressed along its longitudinal axis. Axial motion is only applicable in very short lengths of annular hose only. Helical hose and braided hose should not be subjected to axial motion.

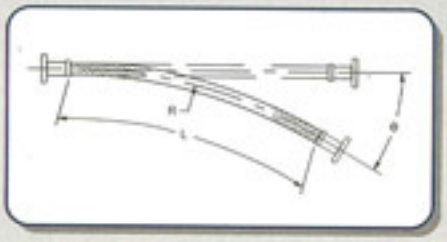
**Random Motion:**
Motion that occurs in a random planes such as a loading or unloading hose, or a fire hose.



The hose length is dependent on the confines of areas and distance to be covered.

## Angular Motion:

Motion that occurs when one end of a hose is moved in a simple bend when the ends do not remain parallel.

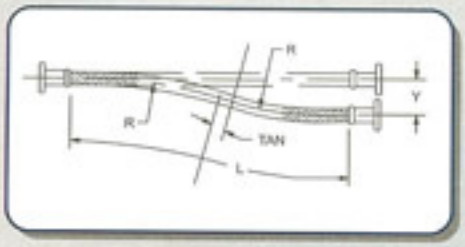



$$L = \frac{\pi R \theta}{180}$$

L = Live Length (inches)
R = ¢ Bend Radius (inches)
θ = Angle of Bend (degrees)
π = 3.1416 (inches)

## Offset Motion:

Motion that occurs when one end of the hose is deflected in a plane perpendicular to its longitudinal axis with the ends remaining parallel. In offset motion applications the offset should never exceed 25% of the center line bend radius.



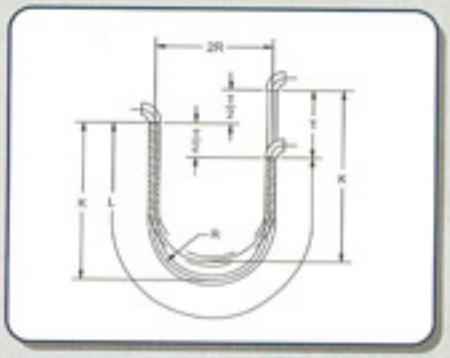

$$L = \sqrt{6YR + Y^2}$$

L= Hose Live Length (inches)
R= ¢ Bend Radius (inches)
Y= Offset, motion, plus or minus (inches)

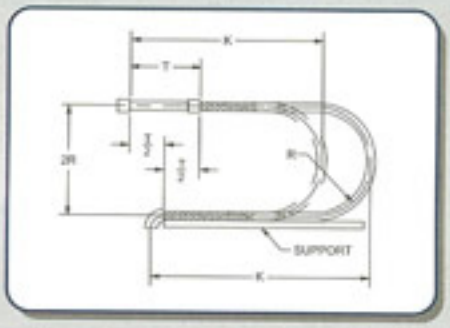
**Note:** Where Offset Motion "Y" occurs, both sides of ¢, the hose live length should be based on Total Travel or 2 times Y. For Intermittent flexing, the offset motion should never be greater than 25% of the centerline radius.

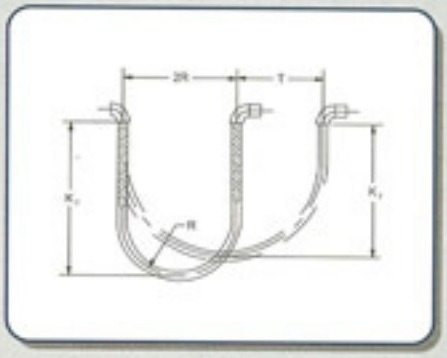
## Radial Motion:

Motion that occurs when a hose is bent in a circular arc.




$L = 4R + T/2$
$k = 1.43R + T/2$




$L = 4R + 1.5T$
$K_1 = 1.43R + .78T$
$K_2 = 1.43R + T/2$

L = Hose Live Length (inches)
T = Total Travel (inches)
R = ¢ Bend Radius (degrees)
K = Loop Length (inches)

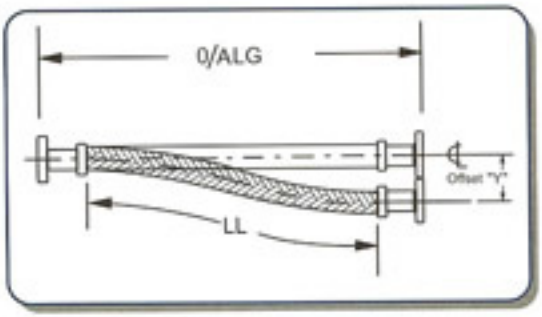
# Offset Chart

To determine required live length of an application, find the specific bend radius from the data sheets, Pages 7 – 10. Now locate that bend radius on the chart below. Then, from the offset (Y) across the top of the chart, locate the amount of offset in inches. Read down to the bend radius row and the figure will be the live length required. For intermittent flexing, the offset motion should never be greater than 25% of the centerline bend radius. Should the offset exceed 25% use a loop. See Page 5

**Example:**

If you have chosen 1" diameter hose from Page 7, the bend radius is 10.24. Locate on chart below. The amount of motion is 1", which is found across top of offset chart. The required live length 7.8". Where offset (Y) occurs on both sides of the centerline, the live length should be based on the total travel or 2 times Y.

For the minimum live length needed for normal industrial vibration only, use the bend radius of the selected hose and .25 inches of offset and read the minimum live length.




| BEND RADIUS | Offset Y (inches) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.25 | 0.50 | 0.75 | 1.0 | 1.25 | 1.50 | 2.0 | 2.50 | 3.00 | 4.00 | 5.00 | 6.00 | 8.00 | 10.00 | 12.00 |
| 0.50 | 0.9 | 1.3 | 1.7 | 2.0 | 2.3 | 2.6 | 3.2 | 3.7 | 4.2 | 5.3 | 6.3 | 7.3 | 9.4 | 11.4 | 13.4 |
| 1 | 1.3 | 1.8 | 2.3 | 2.6 | 3.0 | 3.4 | 4.0 | 4.6 | 5.2 | 6.3 | 7.4 | 8.5 | 10.6 | 12.6 | 14.7 |
| 2 | 1.8 | 2.5 | 3.1 | 3.6 | 4.1 | 4.5 | 5.3 | 6.0 | 6.7 | 8.0 | 9.2 | 10.4 | 12.6 | 14.8 | 17.0 |
| 3 | 2.1 | 3.0 | 3.8 | 4.4 | 4.9 | 5.4 | 6.3 | 7.2 | 7.9 | 9.4 | 10.7 | 12.0 | 14.4 | 16.7 | 19.0 |
| 4 | 2.5 | 3.5 | 4.3 | 5.0 | 5.6 | 6.2 | 7.2 | 8.1 | 9.0 | 10.6 | 12.0 | 13.4 | 16.0 | 18.4 | 20.8 |
| 5 | 2.8 | 3.9 | 4.8 | 5.6 | 6.3 | 6.9 | 8.0 | 9.0 | 9.9 | 11.7 | 13.2 | 14.7 | 17.4 | 20.0 | 22.4 |
| 6 | 3.0 | 4.3 | 5.3 | 6.1 | 6.8 | 7.5 | 8.7 | 9.8 | 10.8 | 12.6 | 14.3 | 15.9 | 18.8 | 21.4 | 24.0 |
| 7 | 3.3 | 4.6 | 5.7 | 6.6 | 7.4 | 8.1 | 9.4 | 10.5 | 11.6 | 13.6 | 15.3 | 17.0 | 20.0 | 22.8 | 25.5 |
| 8 | 3.5 | 4.9 | 6.0 | 7.0 | 7.8 | 8.6 | 10.0 | 11.2 | 12.4 | 14.4 | 16.3 | 18.0 | 21.2 | 24.1 | 26.8 |
| 9 | 3.7 | 5.2 | 6.4 | 7.4 | 8.3 | 9.1 | 10.6 | 11.9 | 13.1 | 15.2 | 17.2 | 19.0 | 22.3 | 25.3 | 28.1 |
| 10 | 3.9 | 5.5 | 6.8 | 7.8 | 8.8 | 9.6 | 11.1 | 12.5 | 13.7 | 16.0 | 18.0 | 19.9 | 23.3 | 26.5 | 29.4 |
| 12 | 4.3 | 6.0 | 7.4 | 8.5 | 9.6 | 10.5 | 12.2 | 13.6 | 15.0 | 17.4 | 19.6 | 21.6 | 25.3 | 28.6 | 31.7 |
| 14 | 4.6 | 6.5 | 8.0 | 9.2 | 10.3 | 11.3 | 13.1 | 14.7 | 16.2 | 18.8 | 21.1 | 23.2 | 27.1 | 30.7 | 33.9 |
| 16 | 4.9 | 6.9 | 8.5 | 9.8 | 11.0 | 12.1 | 14.0 | 15.7 | 17.2 | 20.0 | 22.5 | 24.7 | 28.8 | 32.6 | 36.0 |
| 18 | 5.2 | 7.4 | 9.0 | 10.4 | 11.7 | 12.8 | 14.8 | 16.6 | 18.2 | 21.2 | 23.8 | 26.2 | 30.5 | 34.4 | 37.9 |
| 20 | 5.5 | 7.8 | 9.5 | 11.0 | 12.3 | 13.5 | 15.6 | 17.5 | 19.2 | 22.3 | 25.0 | 27.5 | 32.0 | 36.1 | 39.8 |
| 22 | 5.8 | 8.1 | 10.0 | 11.5 | 12.9 | 14.2 | 16.4 | 18.3 | 20.1 | 23.3 | 26.2 | 28.8 | 33.5 | 37.7 | 41.6 |
| 24 | 6.0 | 8.5 | 10.4 | 12.0 | 13.5 | 14.8 | 17.1 | 19.1 | 21.0 | 24.3 | 27.3 | 30.0 | 34.9 | 39.2 | 43.3 |
| 26 | 6.3 | 8.8 | 10.8 | 12.5 | 14.0 | 15.4 | 17.8 | 19.9 | 21.8 | 25.3 | 28.4 | 31.2 | 36.2 | 40.7 | 44.9 |
| 28 | 6.5 | 9.2 | 11.3 | 13.0 | 14.5 | 15.9 | 18.4 | 20.6 | 22.6 | 26.2 | 29.4 | 32.3 | 37.5 | 42.2 | 46.5 |
| 30 | 6.7 | 9.5 | 11.6 | 13.5 | 15.1 | 16.5 | 19.1 | 21.4 | 23.4 | 27.1 | 30.4 | 33.4 | 38.8 | 43.6 | 48.0 |
| 35 | 7.3 | 10.3 | 12.6 | 14.5 | 16.3 | 17.8 | 20.6 | 23.0 | 25.3 | 29.3 | 32.8 | 36.0 | 41.8 | 46.9 | 51.6 |
| 40 | 7.8 | 11.0 | 13.4 | 15.5 | 17.4 | 19.0 | 22.0 | 24.6 | 27.0 | 31.2 | 35.0 | 38.4 | 44.5 | 50.0 | 55.0 |
| 45 | 8.2 | 11.6 | 14.3 | 16.5 | 18.4 | 20.2 | 23.3 | 26.1 | 28.6 | 33.1 | 37.1 | 40.7 | 47.2 | 52.9 | 58.2 |
| 50 | 8.7 | 12.3 | 15.0 | 17.3 | 19.4 | 21.3 | 24.6 | 27.5 | 30.1 | 34.9 | 39.1 | 42.8 | 49.6 | 55.7 | 61.2 |
| 55 | 9.1 | 12.9 | 15.8 | 18.2 | 20.3 | 22.3 | 25.8 | 28.8 | 31.6 | 36.6 | 40.9 | 44.9 | 52.0 | 58.3 | 64.1 |
| 60 | 9.5 | 13.4 | 16.4 | 19.0 | 21.3 | 23.3 | 26.9 | 30.1 | 33.0 | 38.2 | 42.7 | 46.9 | 54.3 | 60.8 | 66.8 |

# Hose & braid specifications

**Material:**

**Hose:**
321 and 316L stainless steel
**Braid:**
304 Stainless Steel

**Construction:**
Annular butt welded hydro formed standard pitched hose.

**Characteristics:**
Flexible, 50,000 cycle rated and pressure rated per ISO 10380. The hose is designed to meet most strenuous conditions.

| | | | | STATIC | DYNAMIC | PRESSURE RATINGS | | | WEIGHT |
|---|---|---|---|---|---|---|---|---|---|
| NOMINAL DIAMETER (INCHES) | ACTUAL ID (MM) | NUMBER OF BRAIDS | NOMINAL OD (INCHES) | MINIMUM BEND RADIUS (INCHES) | MINIMUM BEND RADIUS (INCHES) | MAXIMUM WORKING PRESSURE @70° F (PSIG) | MAXIMUM TEST PRESSURE P.S.I.G. @ 70° F (PSIG) | BURST PRESSURE @ 70° F (PSIG) | WEIGHT PER FOOT (POUNDS) |
| 1/4 | 6 | 0 | 0.48 | 0.99 | 4.33 | 138 | 3483 | 9288 | 0.08 |
| | | 1 | 0.53 | | | 2322 | | | 0.17 |
| | | 2 | 0.50 | | | 3204 | 4806 | 12816 | 0.27 |
| 3/8 | 10 | 0 | 0.63 | 1.51 | 5.91 | 116 | 2431 | 6484 | 0.11 |
| | | 1 | 0.69 | | | 1621 | | | 0.22 |
| | | 2 | 0.75 | | | 2309 | 3464 | 9236 | 0.34 |
| 1/2 | 12 | 0 | 0.69 | 1.79 | 6.50 | 72 | 2145 | 5720 | 0.12 |
| | | 1 | 0.75 | | | 1430 | | | 0.22 |
| | | 2 | 0.81 | | | 2102 | 3153 | 8408 | 0.33 |
| 3/4 | 20 | 0 | 1.00 | 2.79 | 8.86 | 60 | 1651 | 4404 | 0.22 |
| | | 1 | 1.06 | | | 1101 | | | 0.42 |
| | | 2 | 1.12 | | | 1684 | 2526 | 6736 | 0.64 |
| 1 | 25 | 0 | 1.34 | 3.39 | 10.24 | 42 | 1175 | 3132 | 0.24 |
| | | 1 | 1.42 | | | 783 | | | 0.46 |
| | | 2 | 1.52 | | | 1151 | 1727 | 4604 | 0.70 |
| 1 1/4 | 32 | 0 | 1.67 | 4.18 | 11.81 | 28 | 996 | 2656 | 0.32 |
| | | 1 | 1.75 | | | 664 | | | 0.61 |
| | | 2 | 1.83 | | | 956 | 1434 | 3824 | 0.92 |
| 1 1/2 | 40 | 0 | 2.03 | 5.18 | 13.39 | 22 | 857 | 2284 | 0.46 |
| | | 1 | 2.11 | | | 571 | | | 0.88 |
| | | 2 | 2.14 | | | 892 | 1338 | 3128 | 1.34 |
| 2 | 50 | 0 | 2.56 | 6.37 | 15.35 | 14 | 795 | 2120 | 0.71 |
| | | 1 | 2.66 | | | 530 | | | 1.24 |
| | | 2 | 2.76 | | | 790 | 1185 | 3160 | 1.83 |
| 2 1/2 | 65 | 0 | 3.19 | 7.97 | 18.11 | 10 | 647 | 1724 | 0.85 |
| | | 1 | 3.31 | | | 431 | | | 1.66 |
| | | 2 | 3.43 | | | 592 | 888 | 2368 | 2.55 |
| 3 | 80 | 0 | 3.82 | 9.56 | 20.47 | 6 | 587 | 1564 | 1.15 |
| | | 1 | 3.94 | | | 391 | | | 2.05 |
| | | 2 | 4.06 | | | 470 | 705 | 1880 | 3.04 |
| 4 | 100 | 0 | 4.65 | 11.55 | 23.62 | 4 | 435 | 1160 | 1.47 |
| | | 1 | 4.78 | | | 290 | | | 2.51 |
| | | 2 | 4.91 | | | 348 | 522 | 1392 | 3.66 |
| 5 | 125 | 0 | 5.98 | 12.60 | 27.80 | 3 | 345 | 920 | 2.16 |
| | | 1 | 6.11 | | | 230 | | | 3.56 |
| | | 2 | 6.24 | | | 276 | 414 | 1104 | 5.10 |
| 6 | 150 | 0 | 7.02 | 13.60 | 32.09 | 3 | 295 | 788 | 2.64 |
| | | 1 | 7.17 | | | 197 | | | 4.36 |
| | | 2 | 7.32 | | | 236 | 354 | 944 | 6.24 |
| | | 1BB | 7.27 | | | 294 | 440 | 1176 | 6.05 |
| 8 | 200 | 0 | 9.11 | 17.13 | 39.96 | 2 | 189 | 504 | 3.61 |
| | | 1 | 9.31 | | | 126 | | | 5.93 |
| | | 2 | 9.51 | | | 151 | 227 | 604 | 8.47 |
| | | 1BB | 9.47 | | | 210 | 315 | 840 | 7.68 |
| | | 1BB-A | 9.44 | | | 171 | 256 | 684 | 7.45 |

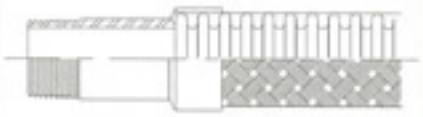
- Hose corrugation designs include standard pitch, open pitch, and superflex. Contact PisaFlex for specifications on open pitch and superflex hose.
- Consult factory for sizes above 8".
- Hose on reels available in sizes 1/4" thru 2".

# Fittings

Various fittings can be attached to metal hose. The fittings can be made of any material compatible with the hose and the media. Some of the most common ones are ilustrated below.

## Male Threaded

Plain nipples



Hex nipples

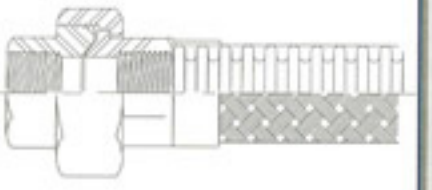
Male Swivel nipples

## Female Threaded

Full Couplings

Half Couplings

Female Unions



## Stub Ends With Floating Flanges

Forged Flange

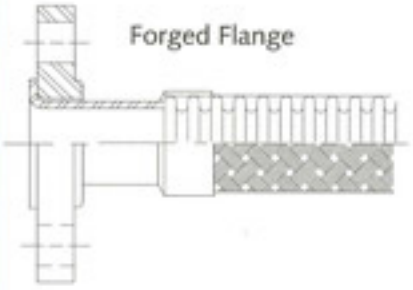
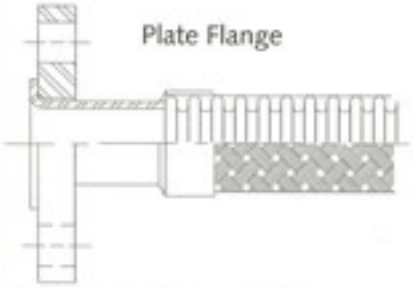
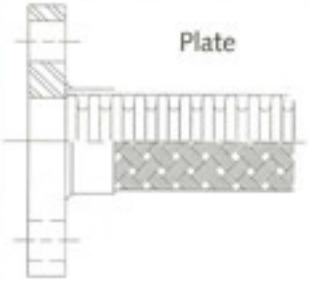


Plate Flange

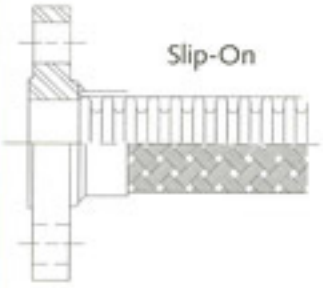


## Flanges

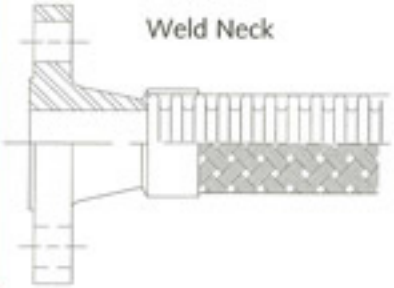
Plate



Slip-On

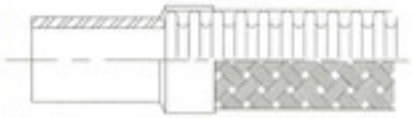


Weld Neck

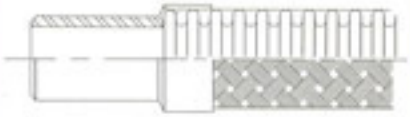


## Plain Weld Nipple

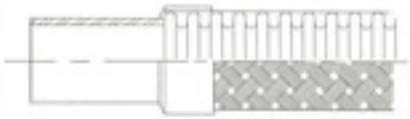
Square Cut



Beveled For Welding

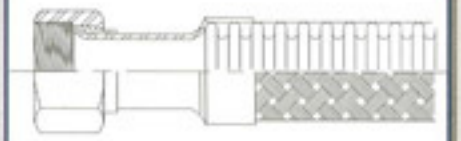


Plain Tubing



## JIC

Female Swivel, And Other Tube Fittings

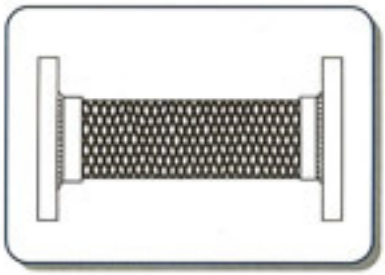


**Other Fittings With Thread or Weld End:**

Cam Lock
Quick Disconnect
Socket Weld
Elbows
Tees
Flanged Unions
Hydraulic

# Pump connectors

## PF Series Pump Connectors



### Specifications

- Plate Flanges: ASA 150 lb. Standard Carbon Steel
- Stainless Steel Hose
- Stainless Steel Single Braid

### Optional

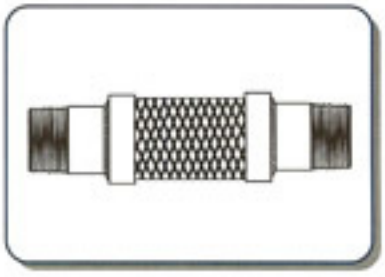
- 300 lb. or 600 lb. Flanges
- Double Braid

**PF Series Pump Connectors**

| Hose Inside Dia | Catalog Number | Overall Length (in) | Live Length (in) | Fitting Length (Each end) (in) | Working Pressure PSI @ 70° F.* | Weight per Unit (Approx.) |
|---|---|---|---|---|---|---|
| 2" | PF -2 | 9 | 5 3/4 | 5/8 | 400 | 11 |
| 2 1/2" | PF - 2 1/2 | 9 | 5 3/4 | 5/8 | 285 | 14 |
| 3" | PF - 3 | 9 | 5 3/4 | 5/8 | 240 | 15 |
| 4" | PF - 4 | 9 | 5 3/4 | 5/8 | 260 | 22 |
| 5" | PF - 5 | 11 | 7 1/2 | 3/4 | 220 | 29 |
| 6" | PF - 6 | 11 | 7 1/2 | 3/4 | 200 | 36 |
| 8" | PF - 8 | 12 | 8 | 1 | 125 | 60 |
| 8" H | PF - 8H | 12 | 8 | 1 | 170 | 60 |
| 10" | PF - 10 | 13 | 9 | 1 | 165 | 85 |
| 12" | PF - 12 | 14 | 10 | 1 | 125 | 120 |
| 14" | PF - 14 | 14 | 10 | 1 | 110 | 135 |

For larger sizes contact factory.

## PPF Series Pump Connectors



### Specifications

- Male NPT End Connections, Carbon Steel Schedule 40
- Stainless Steel Hose
- Stainless Steel Single Braid

### Optional

- Schedule 80 Fittings
- Stainless Steel Fittings
- Hex Nut Attachment
- Double Braid

**PPF Series Pump Connectors**

| Hose Inside Dia | Catalog Number | Overall Length (in) | Live Length (in) | Fitting Length (Each end) (in) | Working Pressure PSI @ 70° F.* | Weight per Unit (Approx.) |
|---|---|---|---|---|---|---|
| 2" | PPF - 1/2 | 6 1/2 | 2 1/2 | 1 1/2 | 1125 | .60 |
| 2 1/2" | PPF - 3/4 | 7 | 2 1/4 | 1 1/2 | 760 | .80 |
| 3" | PPF - 1 | 8 | 3 | 1 3/4 | 525 | 1.0 |
| 4" | PPF - 1 1/4 | 8 1/2 | 3 | 2 | 490 | 1.5 |
| 5" | PPF - 1 1/2 | 9 | 3 1/2 | 2 | 450 | 2.0 |
| 6" | PPF - 2 | 10 1/2 | 4 1/2 | 2 1/4 | 400 | 2.7 |
| 8" | PPF - 2 1/2 | 12 | 5 1/2 | 2 1/2 | 285 | 4.0 |
| 10" | PPF - 3 | 14 | 6 1/2 | 3 | 240 | 6.0 |
| 12" | PPF - 4 | 16 | 7 | 3 1/2 | 260 | 9.0 |

For larger sizes contact factory.

* To calculate pressure at elevated temperatures, see temperature connversion factors page 4.

# Special hose assemblies

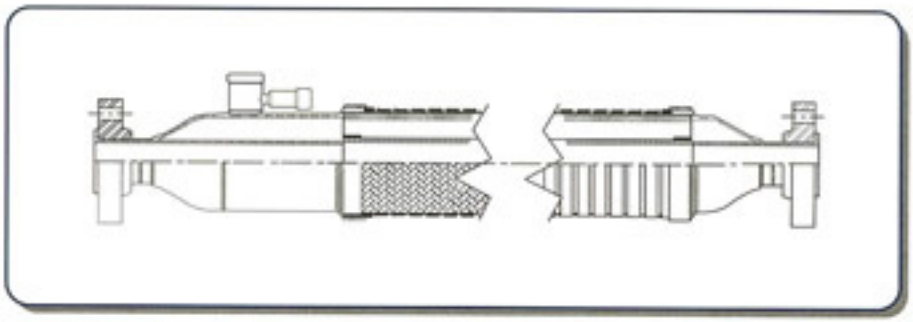
**PisaFlex has the proven capability of fabricating intricate and highly sophisticated assemblies to satisfy the needs of our customers. A sampling of these quality assured assemblies are as follows:**

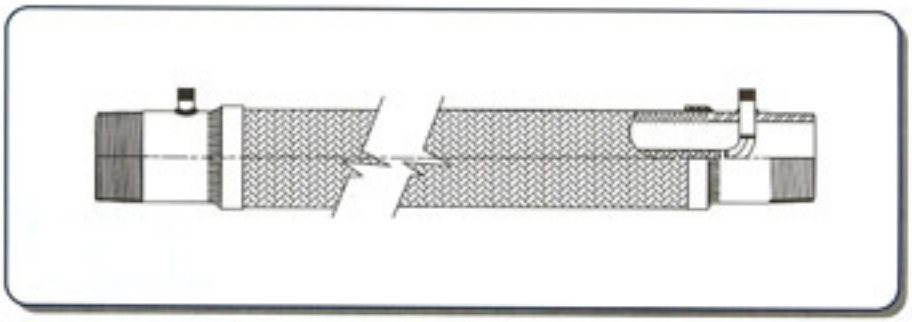
## Jacketed assembly

Jacketed assemblies are normally used in one of the following applications:

**(1)** As a heated transfer line for those products, such as sulphur, which must be maintained at an elevated temperature in order to flow readily. Steam or hot oil is circulated through the jacket, which in turn heats the product being conveyed in the core hose.

**(2)** As a cryogenic transfer line. Maintaining a high vacuum in the jacket effectively insulates cryogenic liquids being conveyed in the core hose.

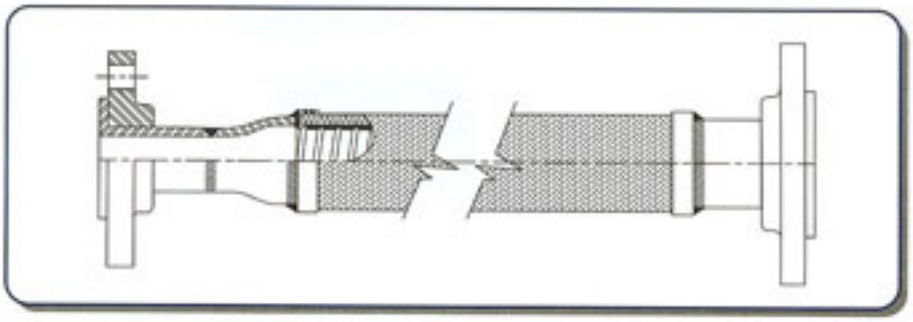




## Traced Assembly

Traced hose assemblies are used:

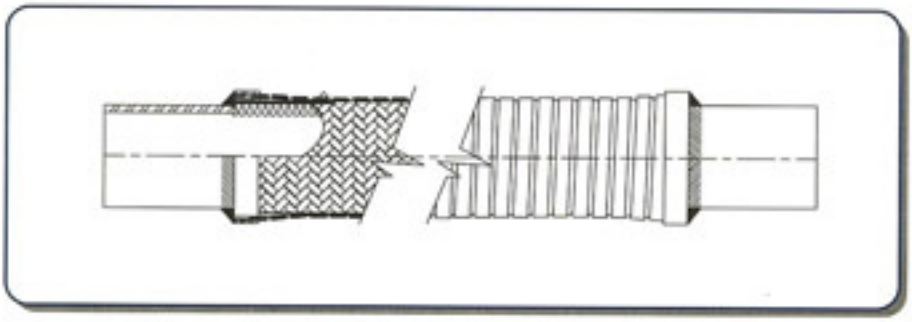
When the product being conveyed must be heated in order to flow freely. Steam or hot oil circulated through the inner hose heats the product in order to maintain flow rates.



## Lined assembly

Lined hose assemblies are used:

When high flow rate of the conveyed product could cause resonant vibration in an unlined corrugated metal hose.



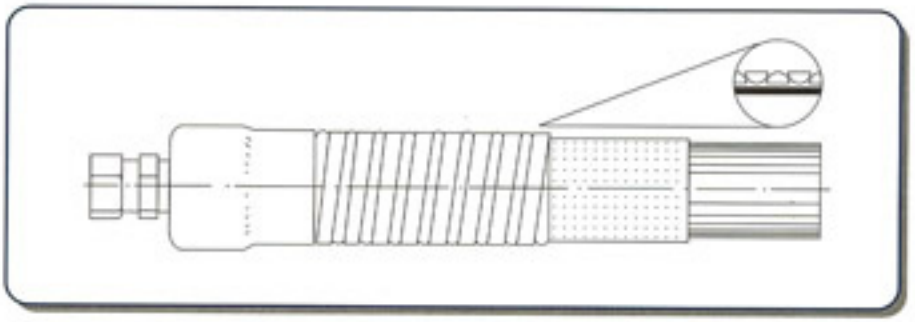
## Guared assembly

Guarded assemblies are used:

Where a corrugated metal hose could be damaged by rough handiling, abrasion, or over-bending.

## Ball-joint armored hose

Protection for hydraulic and industrial rubber hose subjected to severe heat, flame, shock, wear, and continuous flexing. Hose assemblies available in diameters of 3/4" thru 3".



# Installation Guidelines

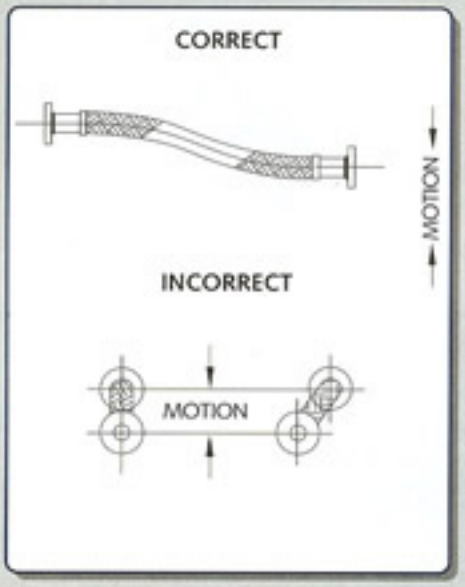
**1. Avoid Torque.**
Do not twist the hose assembly during installation when aligning the bolt holes in a flange or in mating up pipe threads. The utilization of lap joint flanges or pipe unions will minimize this condition. It is recommended that two wrenches be used in making the union connection: one to prevent the hose from twisting and the other to tighten the coupling.

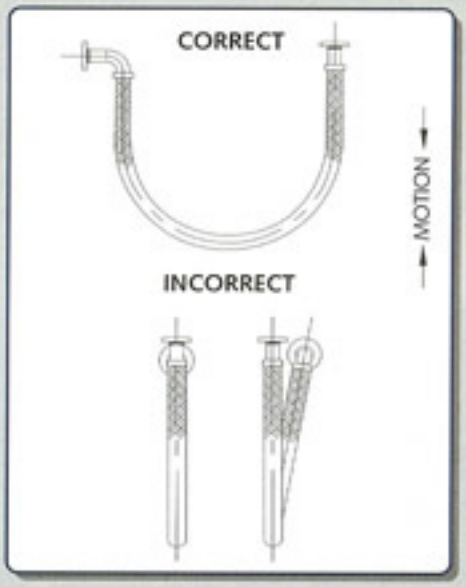
**2. Prevent out-of-plane flexing in an installation.**
Always install the hose so that the flexing takes place in only one plane - this being the plane in which the bending occurs.

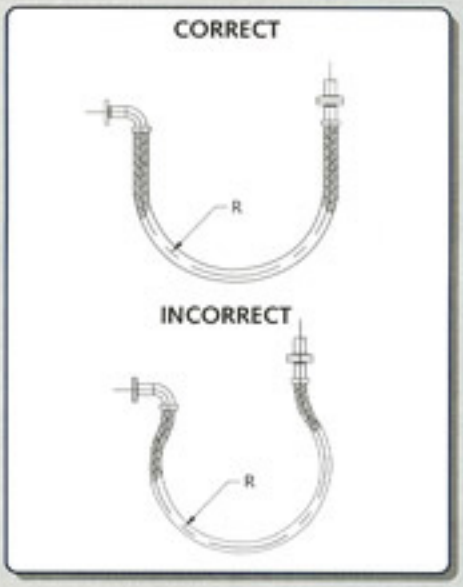
**3. Avoid over bending.**
The repetitive bending of a hose to a radius smaller that the radius listed in the specification tables for corrugated hose will result in early hose failure. Always provide sufficient length to prevent over-bending and to eliminate strain on the hose.

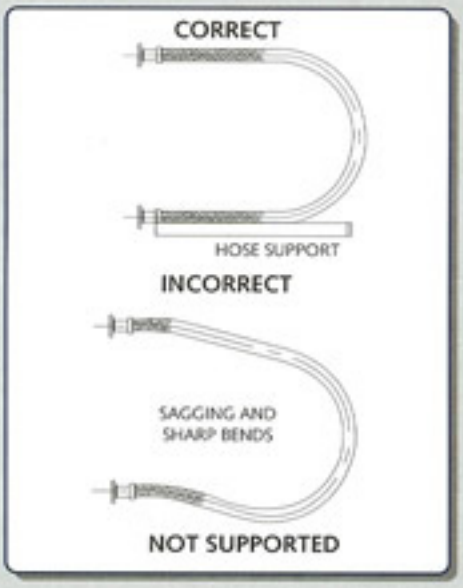
**4. Avoid careless handling of the hose assembly.**
Always lift or carry metal hose to prevent abrasion damage particularly to braided corrugated hose. Store metal hose assemblies away from areas where it can be subjected to spillage, corrosive fumes or sprays, weld splatter, etc.

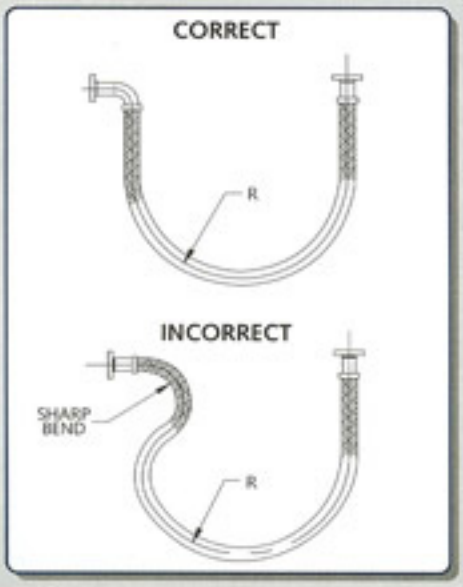
**5. Always support the piping.**
A piping system which utilizes metal hose to absorb movement must be properly anchored and / or guided. Always support the piping to prevent excessive weight from compressing the hose and relaxing the braid tension.

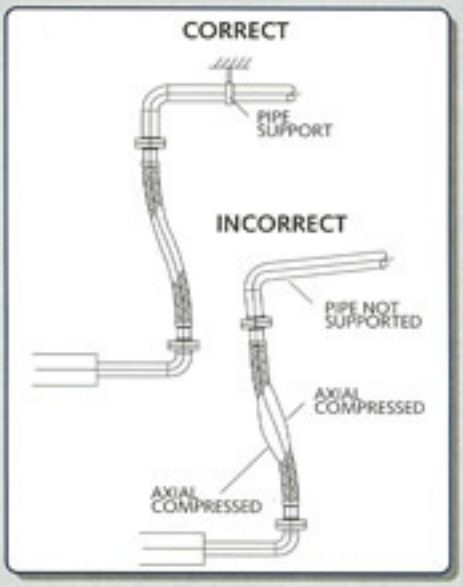


# Corrosion Resistance Table

The following tables may be used only as a guide in the selection of the most suitable hose and fitting material when conveying a given medium. The listed media are in general considered to be pure, at room temperature and, unless otherwise specified, dry. A change in any of these conditions may change the rating. No attempt has been made to account for variations in service conditions since these variables are too innumerable and complex. Additional information on service life and cautions is keyed to the following notes. "Dry" can also be referred to as "anhydrous". Additional questions should be directed to PisaFlex Engineering.

**Rating Code:** A = Suitable (normal condition) B = Limited Service C = Unsuitable

| | BRONZE | MONEL | CARBON STEEL | 304L/321 STAINLESS | 316 STAINLESS |
|---|---|---|---|---|---|
| Acetaldehyde | C[2] | A | B | A | A |
| Acetanilide | B[1] | B | B | B | B |
| Acetic Acid | C | B | C | B[1] | A[1] |
| Acetic Anhydride | B | B | C | B | B |
| Acetone | A | A | C | B | B |
| Acetophenone | A | A | A | B | B |
| Acetylene | C[2] | A | A | A | A |
| Acrylates | B | B | B | B | B |
| Acrylic Acid | B | B | C | B | B |
| Acrylonitrile | A[1] | A | A | A | A |
| Alcohols | A[1] | A | A[1] | A | A |
| Alum | B | B | C | B | B |
| Alumina | A | A | A | A | A |
| Aluminum Acetate | B | B | C | B | B |
| Aluminum Chloride-Dry | B[1] | A | B | A | A |
| Aluminum Chloride-Moist | C | B | C[1] | C[3,4] | C |
| Aluminum Fluoride | B | B | B | C | C |
| Aluminum Hydroxide | B | B | B | A | A |
| Aluminum Sulfate | C | B | C | B[1,3] | A[1] |
| Ammonia-Dry | A | A | A | A | A |
| Ammonia-Moist | C[1] | C | C[1] | A | A |
| Ammonium Acetate | C | A | A | A | A |
| Ammonium Bromide | C | B | C | C[4] | C[4] |
| Ammonium Chloride-Dry | C[4] | A | B | A | A |
| Ammonium Chloride-Moist | C[4] | B | C | C[3,4] | C[1] |
| Ammonium Hydroxide 6 | C[2] | A | B | A | A |
| Ammonium Nitrate | C[2] | C[2] | C[2] | A | A |
| Ammonium Sulfate | C | B | C | C[1] | B |
| Amyl Acetate | A | A | A | A | A |
| Amyl Alcohol | A | A | A | A | A |
| Amyl Chloride-Dry | A | A | B | A | A |
| Amyl Chloride-Moist | C | B | C | C[3,4] | C[1] |
| Aniline | C[1] | A | C | B | B |
| Anyline Dyes | C[2] | A | C | B | B |
| Asphalt | A | A | C | B[4] | A[4] |
| Atmosphere-Industrial | A | A | C | B[5] | A[5] |
| Atmosphere-Marine | A | A | C | B[4] | B[4] |
| Atmosphere-Rural | A | A | C | A | A |
| Barium Carbonate | B | B | B | B | B |
| Barium Chloride-Dry | B | A | A | A | A |
| Barium Chloride-Moist | B | B | B | C[3,4] | C[1] |
| Barium Hydroxide | C | B | B | B | A |
| Barium Sulfate | B | B | B | B | B |
| Barium Sulfide | C | C | C | B | B |
| Beer | A | A | C | A | A |
| Beat Sugar Syrups | C | B | B | B | A |
| Benzaldehyde | C | B | C | B | B |
| Benzene (Benzol) | A | A | A | A | A |
| Benzoic Acid | A | B | C | A | A |
| Benzylamine | C | B | B | B | B |
| Benzyl Chloride-Dry | B | A | A | A | A |
| Benzyl Chloride-Moist | B | B | C | C[3,4] | C[1] |

| | BRONZE | MONEL | CARBON STEEL | 304L/321 STAINLESS | 316 STAINLESS |
|---|---|---|---|---|---|
| Black Liquor, Sulfate Proccess | C | A | C | B | B |
| Bleaching Powder-Dry | B | A | C | A | A |
| Bleaching Powder-Moist | B[1] | B | C | C[3,4] | C[3,4] |
| Boraz | A | A | B | A | A |
| Bordeaux Mixture | B | A | B | A | A |
| Boric Acid | B | B | C | A | A |
| Boron Trichloride-Dry | B | B | A | B | B |
| Boron Trichloride-Moist | B | B | B | C[3,4] | C[1] |
| Boron Trifluoride-Dry | B | B | A | B | B |
| Brines | B | B | C | C[3,4] | C[1] |
| Bromic Acid | C | C | C | C | C |
| Bromine-Dry | A | A | C | B | B |
| Bromine-Moist | B | B | C | C | C |
| Butladene | A | A | A | A | A |
| Butane | A | A | A | A | A |
| Butano (Butyl Alcohol) | A | A | A[1] | A | A |
| Butyl Phenois | B | A | B[1] | B | B |
| Butylamine | C[1] | A | A | A | A |
| Butric Acid | B | B | C | B | B |
| Cadmium Chloride-Moist | B | B | C | C[3,4] | C[1] |
| Cadmium Chloride-Dry | B | A | A | A | A |
| Cadmium Sulfate | B | A | B | A | A |
| Calcium Bisulfite | B | B | B | B[1] | B |
| Calcium Bromide | B | B | C | C[1] | C[1] |
| Calcium Chloride-Moist | B | B | C | C[3,4] | C[1] |
| Calcium Chloride-Dry | B | A | A | A | A |
| Calcium Fluoride | B | B | C | C | C |
| Calcium Hydroxide | B | B | C | B | B |
| Calcium Hypochlorite-Moist | C | B | C | C[3,4] | C[3,4] |
| Calcium Hypochlorite-Dry | B | A | B | A | A |
| Calcium Nitrate | B | B | C[1] | B[1] | B |
| Calcium Oxide | A | A | A | A | A |
| Cane Sugar Syrups | A | A | B | A | A |
| Carbolic Acid (Phenol) | B | B | C | B | A |
| Carbon Dioxide-Dry | A | A | A | A | A |
| Carbon Dioxide-Moist | C[4] | A | C | A | A |
| Carbonated Beverages | B | A | C | A | A |
| Carbonated Water | B[4] | A | C | A | A |
| Carbon Disulfide | B | B | B | B | B |
| Carbon Tetrachloride-Dry | A | A | B | A | A |
| Carbon Tetrachloride-Moist | B | B | C | C[3,4] | C[4] |
| Castor Oil | A | A | A | A | A |
| Chlorine-Dry | A | A | B | A | A |
| Chlorine-Moist | C | B | C | C[3,4] | C[1] |
| Chloroacetic Acid | C | B | C | C[3,4] | C[1] |
| Chloric Acid | C | C | C | C[1] | C[1] |
| Chlorine Dioxide-Dry | B | A | B | A | A |
| Chlorine Dioxide-Moist | C | B | C | C[3,4] | C[1] |
| Chloroform-Dry | A | A | A | A | A |
| Chloroform-Moist | B | B | C | C[3,4] | C[1] |
| Chromic Acid | C | B | C[1] | C[3,4] | B |
| Chromic Fluorides | C | B | C | C | C |

| | BRONZE | MONEL | CARBON STEEL | 304L/321 STAINLESS | 316 STAINLESS |
|---|---|---|---|---|---|
| Chromic Hydroxide | B | B | B | B | B |
| Chromium Sulfate | B | B | C | B | B |
| Cider | A | A | C | A | A |
| Citric Acid | C | B | C | B | B |
| Cofee | A | A | C | A | A |
| Copper Chloride-Dry | A | A | B | A | A |
| Copper Chloride-Moist | B | B | C | C[3,4] | C[1] |
| Copper Nitrate | C | C | C | A | A |
| Copper Sulfate | C | B | C | B[1] | B |
| Corn Oil | A | A | A | A | A |
| Cottonseed Oil | A | A | A | A | A |
| Creosole | B | A | A | A | A |
| Crude Oil | B | A | C | C[1] | B |
| Cyclohexane | B | B | B | B | B |
| DDT | B | B[4] | C | A | A |
| Dichloroethane-Dry | A | A | A | A | A |
| Dichloroethane-Moist | C | B | C | C[4] | C[4] |
| Dichloroethylene-Dry | A | A | B | A | A |
| Dichloroethylene-Moist | C | B | C | C[4] | C[4] |
| Dichlorophenol | B | B | C | B[1] | B[1] |
| Diisocyanate | B | A | B | A | A |
| Dimethyl Sulfate | B | B | B | B | B |
| Epichlorohydrin-Dry | B[4] | A | C[4] | A | A |
| Epicholohydrin-Moist | C[4] | B | C[4] | C[3,4] | C[1] |
| Ethane | A | A | A | A | A |
| Ethers | A | A | B | A | A |
| Ethyl Acetate | A | B | B | B | B |
| Ethyl Alcohol | A | A | A | A | A |
| Ethyl Benzene | B[5] | B | B | B[1] | B |
| Ethyl Chloride-Dry | A | A | A | A | A |
| Ethyl Chloride-Moist | B | B | C | C[3,4] | C[1] |
| Ethylene | A | A | A | A | A |
| Ethylene Chlorohydrin-Dry | B | A | B | A | A |
| Ethylene Chlorohydrin-Moist | C | B | C | C[4] | C[4] |
| Ethylene Dyamine | C[1] | B | B | B | B |
| Ethylene Glicol | A | A | A | A | A |
| Ethylene Oxide | C[2] | B | B | A | A |
| Fatty Acids | C | B | C | B[1,4] | A |
| Ferric Chloride-Dry | B | A | B | A | A |
| Ferric Chloride-Moist | C | B | C | C[3,4] | C[3,4] |
| Ferric Nitrate | C | C | C | B | B |
| Ferric Sulfate | C | C | C | B[1] | A |
| Ferrus Chloride-Dry | B | A | B | A | A |
| Ferrus Chloride-Moist | C | B | C | C[3,4] | C[1] |
| Ferrus Sulfate | B | A | C | B[4] | B |
| Fluorine-Dry | B | A | A | A | A |
| Fluorine-Moist | C | B | C | C | C |
| Formaldehyde | A[1] | A[1] | B[1] | B | B |

**Notes:**
1. Susceptible to intergranular corrosion.
2. May Cause Explosive reaction.
3. Susceptible to stress corrosion cracking.
4. Susceptible to pitting type corrosion.
5. Discolors.
6. Concentration over 50% and/or temperature over 200°F. refer to our Engineering Dept.

**Rating Code:** A = Suitable (normal condition) B = Limited Service C = Unsuitable

| | BRONZE | MONEL | CARBON STEEL | 304L/321 STAINLESS | 316 STAINLESS |
|---|---|---|---|---|---|
| Formic Acid | B | B | C | B[1] | A |
| Freon | A | A | A | A | A |
| Fruit Juices | C | A | C | A | A |
| Fuel Oil | B | A | C | A | A |
| Furfural | A | A | B | A | A |
| Gasoline | A | A | B | A | A |
| Gelatine | A | A | C | A | A |
| Glucose | A | A | B | A | A |
| Glue | B | A | C | A | A |
| Glutamic Acid | C[1,3] | B | C | B[1,4] | B[1,4] |
| Glycerin (Glycerol) | A | A | B[1] | A | A |
| Heptane | A | A | A | A | A |
| Hexacloroethane-Dry | B | A | B | A | A |
| Hexacloroethane-Moist | C | B | C | C[4] | C[4] |
| Hydrazine | C[3] | C | C | A | A |
| Hydrobromic Acid | C | C | C | C[4] | C |
| Hydrocarbons, Pure | A | A | A | A | A |
| Hydrochloric Acid | C | B | C | C[4] | C[4] |
| Hydrocyanic Acid | C | B | C[3] | C[1,3] | C[3] |
| Hydrofluoric Acid | C | B | C | C[1,3] | C |
| Hydrofluorisilic Acid | C | B | C | C | C |
| Hydrogen | A | A | A | A | A |
| Hydrogen Chloride-Dry | A | A | B | A | A |
| Hydrogen Chloride-Moist | C | B | C | C[4] | C |
| Hydrogen Peroxide | C | C | C | B | B |
| Hydrogen Sulfide-Dry | A[5] | A | B | A | A |
| Hydrogen Sulfide-Moist | C[1,3] | B | C[2] | B[4] | A |
| Hydroquinone | B | B | B[1] | B | B |
| Kerosine | A | A | B | A | A |
| Lacquers | A | A | A | A | A |
| Lacquer Solvents | A | A | A | A | A |
| Lactic Acid | B | B | C | B[1,4] | B[1] |
| Lime | A | A | B | A | A |
| Lime Sulfur | C | B | C | B | B |
| Linseed Oil | A | A | B | A | A |
| Lithium Chloride-Dry | B | A | B | A | A |
| Lithium Chloride-Moist | B | B | B | C[3,4] | C[3] |
| Lithium Hydroxide | C | B | B | B | B |
| Magnesium Chloride-Dry | B | A | B | A | A |
| Magnesium Chloride-Moist | B | B | C | C[3,4] | C[3] |
| Magnesium Hydroxide | A | A | A | A | A |
| Magnesium Sulfate | A | A | B | B | A |
| Maleic Acid | C | B | B | B[1] | B |
| Mercurio Chloride-Dry | B | A | B | A | A |
| Mercurio Chloride-Moist | C | B | C | C[3,4] | C[3] |
| Mercurous Nitrate | C[3] | B[1] | B | B | B |
| Mercury | C | B[1] | B | B | B |
| Methyl Alcohol | A | A | A | A | A |
| Methane | A | A | A | A | A |
| Methyl Chloride-Dry | A | A | A | A | A |
| Methyl Chloride-Moist | B | B | C | C[3,4] | C[3] |
| Methyl Ethyl Ketone | B | B | B | B | B |
| Milk | B | A | C | A | A |
| Mine Water | C | B | C | B | B |
| Naphtalene | B | B | A | A | A |
| Natural Gas | A | A | A | A | A |

| | BRONZE | MONEL | CARBON STEEL | 304L/321 STAINLESS | 316 STAINLESS |
|---|---|---|---|---|---|
| Nickel Chloride-Dry | B | A | B | A | A |
| Nickel Chloride-Moist | C | B | C | C[3,4] | C[3] |
| Nitric Acid | C | C | C | A | A |
| Nitro Toluene | B | B | B | B | B |
| Nitrogen | A | A | A | A | A |
| Oleic Acid | B[1] | A | C | B[1] | B |
| Oleum (Fuming H2SO4) | C | C | B[1] | B | B |
| Oxalid Acid | B | B | C | C[1] | B[1] |
| Oxygen | A | A | C | A | A |
| Palmitic Acid | B | A | C | A | A |
| Parafin | A | A | B | A | A |
| Pentane | B | B | B | B | B |
| Phenol | B | B | C | B | A |
| Phosphoric Acid | C | B | C | C[1] | B[1] |
| Phthalic Acid | B | B | C | B[1] | B |
| Picric Acid | C | C | C | B | B |
| Potassium | B | B | C | C | C |
| Potassium Carbonate | B | A | B | A | A |
| Potassium Chloride-Dry | A | A | A | A | A |
| Potassium Chloride-Moist | B[1] | B | C | C[3,4] | C[3] |
| Potassium Chromate | B | B | C | B | B |
| Potassium Cyanide | C[4] | A | B | B | B |
| Potassium Dichromate | C | A | C | A | A |
| Potassium Fluoride | B | B | C | C | C |
| Potassium Hidroxide | C[3] | A[1] | B[1] | B[1] | A |
| Potassium Nitrate | B | B | B | B | A |
| Potassium Permanganate | B | B | B | B | B |
| Potassium Sulfate | B | B | C | B | B |
| Propane | A | A | A | A | A |
| Propylene | A | A | A | A | A |
| Propylene Oxide | C | C | C | A | A |
| Propylene Dichloride-Dry | B | A | B | A | A |
| Propylene Dichloride-Moist | C | B | C | C[4] | C[4] |
| Pyridine | B[1] | B | B[1] | B | B |
| Pyrrolidine | C[3] | B | B | B | A |
| Quinine | B | B | C | B | B |
| Rosin | A[1] | A | C[1] | A | A |
| Sea Water | B | B | C | C[3,4] | C[3] |
| Sewage | A | A | B | A | A |
| Silver Salts | C | A | C | B | B |
| Silver Nitrate | C | C | C[3] | B | A |
| Soap Solutions | A | A | B | A | A |
| Sodium | C | A | A | A | A |
| Silver Salts | B | B | B | B[4] | B |
| Sodium Bicarbonate | B | A | C | A | A |
| Sodium Bisulfate | B | B | C | B[1,4] | A |
| Sodium Bisulfite | C[4] | B[4] | C | B | B |
| Sodium Bromine | B | B | B | C | C |
| Sodium Carbonate | B | A | B | A | A |
| Sodium Chlorate-Dry | B | A | A | A | A |
| Sodium Chlorate-Moist | B | B | C | C[3,4] | C[3] |
| Sodium Chloride-Dry | B | A | B | A | A |
| Sodium Chloride-Moist | B | B | C | C[3,4] | C[3] |
| Sodium Chromate | A | A | B | A | A |
| Sodium Citrate | C | B | B | B | B |
| Sodium Cyanide | C[4] | B | B | B | B |

| | BRONZE | MONEL | CARBON STEEL | 304L/321 STAINLESS | 316 STAINLESS |
|---|---|---|---|---|---|
| Sodium Dichromate | C | B | C | A | A |
| Sodium Fluoride | B | A | B | C[4] | C |
| Sodium Hydroxide 6 | B[4] | A | B[1] | B[1] | B[1] |
| Sodium Hypochlorite-Dry | B | A | B | A | A |
| Sodium Hypochlorite-Moist | C | B | C | C[1,4] | C[4] |
| Sodium Metasilicate | B | A | B | A | A |
| Sodium Nitrate | B | A | B[1] | A | A |
| Sodium Nitrite | B | B | B | B | B |
| Sodium Peroxide | C | B | C | A | A |
| Sodium Phosphate | B | A | C | A | A |
| Sodium Silicate | A | A | B | A | A |
| Sodium Sulfate | A | A | B | B[1] | B |
| Sodium Sulfide | C | A | C | B[4] | B |
| Sodium Sulfite | B | A | C | B | B |
| Sodium Thiosulfate | C | A | C | B | B |
| Stannic Chloride-Dry | B | A | B | A | A |
| Stannic Chloride-Moist | C | B | C | C[3,4] | C[3] |
| Stannous Chloride-Dry | B | A | B | A | A |
| Stannous Chloride-Moist | C | B | C | C[3,4] | C[3] |
| Steam | A | A[1] | C | A | A |
| Stearic Acid | B | B | C[1] | B | B |
| Stronium Nirtate | B | B | C | B | B |
| Sulfate Black Liquor | C | B | B | B | B |
| Sulfate Green Licquor | C | B | B | B[1] | B |
| Sugar Solutions | A | A | B | A | A |
| Sulfur-Dry | C | A | B | A | A |
| Sulfur-Molten | C | C | C | C | B |
| Sulfur Chloride-Dry | B | A | C | A | A |
| Sulfur Chloride-Moist | C | B | C | C[3,4] | C[3] |
| Sulfur Dioxide-Dry | B | B | C | C[1] | B |
| Sulfur Dioxide-Moist | C[4] | C | C | C[1] | B |
| Sulfur Trioxide-Dry | A | A | C | A | A |
| Sulfuric Acid 95-100% | B | B | B | A | A |
| Sulfuric Acid 80-95% | B | B | C | B | A |
| Sulfuric Acid 40-80% | C | C | C | C[1] | C[1] |
| Sulfuric Acid 40% | C | C | C | C[1] | C[1] |
| Sulturous Acid | B | B | C | C[1,4] | C[1,4] |
| Tall Oil | C | B | B | B | B |
| Tannic Acid | B | B | C[1] | B | B |
| Tar | A | A | B | A | A |
| Tartaric Acid | C | B | C | B | B |
| Tetraphosphoric Acid | C | C | C | B | B |
| Toluene | A | A | A | A | A |
| Trichloroacetic Acid | C | B | C | C[1,4] | C[4] |
| Trichloroethane-Dry | A | A | A | A | A |
| Trichloroethane-Moist | C | B | C | C[4] | C[4] |
| Trichloroethylene-Dry | A | A | A | A | A |
| Trichloroethylene-Moist | C | B | C | C[4] | C[4] |
| Turpentine | A | A | B | A | A |
| Varnish | A | A | B | A | A |
| Vinegar | B | B | C | A | A |
| Water, Potable | A | A | C | A | A |
| Xylene | B | A | B | A | A |
| Zinc Chloride-Dry | B | A | A | A | A |
| Zinc Chloride-Moist | C[4] | B | C | C[3,4] | C[3] |
| Zinc Sulfate | B | B | C | B | A |

# Other *PisaFlex* products

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