Flexible Hoses of Teflon® & Silicone

Design Manual

solving critical corrosion, purity, and longevity issues in process systems
Resistoflex specializes in solving tough fluid handling problems. Our customers make chemicals, paper, steel, and medicine. They process food, water, & minerals, convert energy, and build cars, ships and aircraft.

Our products combine the best materials with innovative manufacturing technology, to help customers operate more reliably, safely, and cost effectively.
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Resistoflex started manufacturing polyvinyl alcohol (PVA) lined braided hose in New Jersey in 1936. The PVA lined hoses were superior to rubber hose for all types of marine, automotive, and aviation applications both commercial and military. At the end of WWII, the jet engine put new demands on existing hose materials in terms of corrosion resistance and higher temperature handling capabilities. It was at that time that Resistoflex began working with a new material called Teflon® PTFE, and eventually developed and patented a process to extrude PTFE tubing. Resistoflex invented PTFE lined hose in 1953 for the aerospace and chemical industries, and in 1956 introduced the world’s first pipe and fittings lined with Teflon® PTFE.

Today, Resistoflex manufactures corrosion-resistant plastic lined pipe, fittings, and Teflon® chemical hoses in our 280,000 sq. ft. plant in Marion, NC. In addition to our domestic capacity, Resistoflex has announced the acquisition of two European facilities, Resistoflex GmbH in Germany, and Resistoflex B.V. in The Netherlands.

In 1995, Resistoflex Industrial added lined pipe and fittings manufacturing capacity in Singapore and established a joint venture in Thailand, making Resistoflex a truly global supplier of plastic lined piping products. To further strengthen the Resistoflex commitment to Asia, we opened a sales and fabrication center in China in 1997.

In 1998, Crane Resistoflex acquired the Plastic Line Piping Products division of The Dow Chemical Company (who invented Saran® lined pipe in 1943), making Resistoflex the largest and most technologically advanced lined piping manufacturer in the world. Resistoflex brings this vast array of experience and know-how to bear in the design, engineering, and manufacturing of corrosion-resistant plastic-lined pipe, fittings, and hoses.

Resistoflex flexible products are provided to the market through a network of knowledgeable and technically proficient manufacturer’s representatives and over 300 distributor locations. Please call the factory for your nearest representative or distributor.

Teflon® and Tefzel® are trademarks of DuPont
Saran® is a trademark of The Dow Chemical Company
Resistoflex Product Families

**FLANGED PLASTIC-LINED PIPE**
Resistoflex plastic lined pipe is made with a locked-in liner to minimize the adverse affects of differential thermal expansion between the liner and the steel. Available liners are: PP, Kynar® PVDF, and Teflon® PTFE or PFA.

**Thermalok Pipe**
- Stress relieved liner
- Unlimited housing material options
- Sizes ranging from 1” - 24" diameter

**Swaged Pipe**
- Used exclusively for CONQUEST® and MULTI-AXIS®
- Sizes ranging from 1” - 8”
- Threaded flanges and threaded rotatable flange assemblies only

**SPECIAL SHAPES**
- Custom fittings, manifolds, and small vessels
- Lined with TEFZEL® ETFE
- Available through 24" diameter

**CONQUEST® CONNECTIONS**
- Patented flangeless joint design
- Performance of a welded system
- Available in 1” - 4” for all liner types
- Virtually zero maintenance

**PLASTIC-LINED FITTINGS**
PP, Kynar® PVDF, and Teflon® PFA fittings are all injection or transfer molded. TEFZEL® lined fittings and special shapes are rotolined in custom housings. Teflon® PTFE liners are made by isostatic molding.

**Expansion Joints of TEFLOM®**
- 2, 3, or 5 Convolute Construction
- Bolt or Cable Limited
- Teflon® T-62 for Maximum Flex Life
- 1” - 24” Size Range
- DI or SS Flanges Available
Choosing the Right Hose

Liner Style
There are two basic hose styles to be considered.
1. Smoothbore: Hose liner has a smooth (TRUE ID) interior for applications that require no bacteria entrapment.
2. Convoluted: Hose liner is vacuum formed from a smooth liner for flexibility, increased vacuum capabilities, and kink resistance. Since the convolutions are open pitched and helical, the media is not as likely to be trapped as with wrapped convoluted hose. They are usually used in applications requiring tight bends and frequent flexing.

Temperature
Plastics have a tendency to lose strength as the working temperature increases. Resistoflex offers a pressure/vacuum chart for each hose and fitting style based on minimum and maximum working temperature.

Application
Careful consideration must be taken on the working conditions of the hose. If the assembly is constantly flexing, surging, or in a bent application, it could change the capabilities of the assembly. Kink guards, vacuum spring wires and armor guard protectors can be installed in some applications that will prolong the life of the hose assembly.

Media
Certainly media is a big factor in which product should be used. One factor to consider is permeation. Some media can diffuse through the liner wall and attack the exterior of the hose. Examples are chlorine, bromine, and hydrogen fluoride, among others. (see the permeation discussion on page 37 for more information). Resistoflex offers various hose systems to combat permeation such as TMH, TMH-Monel® dual containment systems, and exotic braided products with corrosion-resistant braid materials such as Hastelloy®, 316SS, and polypropylene. Custom braid materials such as Kynar® PVDF can also be provided in special applications.

Pressure/Vacuum
The pressure/vacuum rating coupled with temperature and application usually determines which hose product can be used.

End Fittings
Hose fittings come in multiple styles and sizes, and each are rated differently. A hose assembly’s actual operating pressure is usually limited by the fittings. Fitting material selection is another factor affecting corrosion resistance, purity conditions, and longevity of the assembly. In some cases, gaskets or clamping devices used will ultimately determine the final working pressure capabilities.

Testing/Qualifying
Resistoflex has a more vigorous quality assurance program than any other hose manufacturer. Resistoflex tests 100% of our hose assemblies both hydrostatically and pneumatically with nitrogen. This assures the end users of good fitting retention and a hose free of defects. See page 36 for testing and qualifying information.

Not All Teflon® is the Same
A frequent point of confusion and misapplication for users specifying hoses is the technical distinction among the various resin options available for high purity, chemical resistant hose liners. Adding to the confusion is the fact that various resins are marketed under the brand name Teflon®, including Teflon® PTFE (polytetrafluoroethylene) and Teflon® FEP (fluorinated ethylene propylene copolymer). Teflon® PTFE and Teflon® FEP are not equivalent in every hose application.

Teflon® PTFE T-62 has flex life up to 60 times greater than Teflon® FEP. In the case of a convoluted hose, pressurization imposes a flex load on the liner as the internal pressure attempts to straighten out the convolutions. Our experience has shown that premature failure may occur when FEP convoluted hoses are used in these applications due to its lower flex life.

Resistoflex does offer a rubber covered smooth bore Teflon® FEP lined hose. This hose is suitable in many applications and provides excellent chemical and abrasion resistance properties. Teflon® FEP is suitable in this hose construction because the EPDM materials limit the maximum use temperature. Further, the stiffness of the EPDM and its integrated wire reinforcement limits the radius to which the hose is flexed, thus reducing the potential for possible failure due to overbending.

When specifying hoses for use in harsh or high purity applications, it is important to verify which resin is being supplied. Be sure that you’re getting a resin suitable for your application. Not all fluoropolymer resins are created equal. Specifying hoses lined with Teflon® does not ensure that Teflon® PTFE will be supplied.
**Inner core:** Smooth Teflon® PTFE

**Reinforcement:** Neoprene rubber

### Construction

Extra-thick, natural or conductive smooth bore Teflon® PTFE liner locked internally inside (exclusive Resistoflex Thermalok™ system) multiple plies of fabric-supported Neoprene rubber carcass.

### Benefits

- Hose design ensures integrity in frequent handling/physical abuse applications
- “One Piece” carcass resists fitting detachment better than crimped-on fittings
- Withstands excessive forces on the end fittings; will not separate but literally pull the hose in half where most crimped fittings separate
- Flanged assemblies are “Flared Through”, providing no exposed metal to the media

### Applications

For applications which must require a smooth inner bore for improved flow and is easily cleaned in place. TR assemblies are designed to withstand the everyday abuse and handling for loading/unloading trucks, rail cars, barges and process vessels.

### Fittings

Auxiliary flanges can be added for flared end protection and easy replacement when ends are damaged, thus eliminating the need to replace the complete assembly.

### External Protective Accessories

Contact factory for details.

### TR HOSE PRESSURE RATINGS

<table>
<thead>
<tr>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch DN</td>
<td>Inch MM</td>
<td>Inch MM</td>
<td>PSIG BAR</td>
<td>PSIG BAR</td>
</tr>
<tr>
<td>1 25</td>
<td>0.875 22.2</td>
<td>1.625 41.3</td>
<td>150 10.3</td>
<td>600 41.4</td>
</tr>
<tr>
<td>1-1/2 40</td>
<td>1.375 34.9</td>
<td>2.188 55.6</td>
<td>150 10.3</td>
<td>600 41.4</td>
</tr>
<tr>
<td>2 50</td>
<td>1.875 47.6</td>
<td>2.813 71.5</td>
<td>150 10.3</td>
<td>600 41.4</td>
</tr>
<tr>
<td>3 80</td>
<td>2.813 71.5</td>
<td>3.813 96.9</td>
<td>150 10.3</td>
<td>600 41.4</td>
</tr>
<tr>
<td>4 100</td>
<td>3.813 96.9</td>
<td>4.938 125.4</td>
<td>150 10.3</td>
<td>600 41.4</td>
</tr>
</tbody>
</table>

**TR HOSE VACUUM RATINGS**

**Note:** Hose assembly pressure ratings may be limited by the fittings.

<table>
<thead>
<tr>
<th>Maximum Vacuum (Hg)</th>
<th>Operating Temperature (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>-20 to 120</td>
</tr>
<tr>
<td>25</td>
<td>-20 to 120</td>
</tr>
<tr>
<td>10</td>
<td>-20 to 120</td>
</tr>
</tbody>
</table>

For temperatures above 70°F consult factory.

- *Note:* Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.

[See pages 46-47]
SuperFlex SFT-Si Hose

**Inner core:** Smooth Teflon® PTFE

**Reinforcement:** Fiberglass braid, 300-series stainless steel braid, and a silicone cover.

**Construction**
Natural or conductive smooth bore Teflon® PTFE liner. Liner is covered with a fiberglass braid externally bonded to the liner in a patented process. This is followed by a stainless steel braid and silicone cover.

**Benefits**
- Ultra Flexible
- True I.D. Sizes
- Very high pressure capability
- No Entrapment Issues
- Wide Variety of Fittings Available
- Validation Almost a Non-Issue
- Vacuum-Rated

**Approvals**
- FDA (reference 21 CFR 177.1550)
- USDA (21 CFR 177.1550)
- 3A (Sanitary Standards)

**Fittings**
- Threaded
- Flanged
- Cam & Groove
- Sanitary

**Fitting Materials**
- Carbon Steel
- Solid Teflon®
- Solid Kynar®
- Solid Polypropylene
- Monel®
- Hastelloy®

*(consult factory for availability)*

**External Protective Accessories**
See Page 35.

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**SUPERFLEX HOSE PRESSURE RATINGS**

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose I.D.</th>
<th>Hose O.D.</th>
<th>Min. Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
<th>Natural Liner Part Number</th>
<th>Conductive Liner Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch</td>
<td>DN</td>
<td>Inch</td>
<td>MM</td>
<td>Inch</td>
<td>MM</td>
<td>Inch</td>
<td>MM</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>8</td>
<td>0.250</td>
<td>6.3</td>
<td>0.445</td>
<td>11.3</td>
<td>2.00</td>
<td>50.8</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>10</td>
<td>0.375</td>
<td>9.5</td>
<td>0.710</td>
<td>18</td>
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<td>63.5</td>
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<tr>
<td>1/2&quot;</td>
<td>15</td>
<td>0.500</td>
<td>12.7</td>
<td>0.890</td>
<td>22.6</td>
<td>3.00</td>
<td>76.2</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>20</td>
<td>0.750</td>
<td>19</td>
<td>1.120</td>
<td>28.4</td>
<td>5.00</td>
<td>127</td>
</tr>
</tbody>
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</tr>
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</table>

**OPERATING TEMPERATURE (F)**

**NOTE:** For assemblies, pressure ratings of fittings may be less than for the hose.

**SUPERFLEX HOSE VACUUM RATINGS**

**OPERATING TEMPERATURE (F)**

**NOTE:** Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.

**NOTE:** For assemblies, pressure ratings of fittings may be less than for the hose.
### Inner Core:
Smooth Teflon® FEP

### Reinforcement:
EPDM rubber

#### Construction
White smooth bore Teflon® FEP liner bonded to a reinforced green EPDM rubber cover. A carbon steel wire helically wound through the carcass provides crush, kink and vacuum resistance.

#### Benefits
- Low cost corrosion and kink resistance
- Highly flexible and abrasion resistant
- Full vacuum capability throughout temperature range up to 4” diameter

#### Applications
For applications requiring a true smooth inner bore for improved flow and which is easily cleaned in place. Ideal where flexibility is important and abrasive external conditions are present.

#### Fittings

<table>
<thead>
<tr>
<th>Sanitary</th>
<th>Industrial</th>
<th>Flanged</th>
<th>Cam &amp; Groove</th>
<th>Special</th>
</tr>
</thead>
</table>

#### Fitting Materials
Carbon Steel 316 S.S. Teflon® Encapsulated Teflon®
Solid Kynar® Solid Polypropylene
Monel® Hastelloy®
(consult factory for availability)

#### External Protective Accessories
See page 35.

Custom colors available upon request. Minimum order quantity applies.

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### TRC-FEP Rubber Covered Hose

#### TRC-FEP HOSE PRESSURE RATINGS

<table>
<thead>
<tr>
<th>Nominal Size</th>
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<tr>
<td>INCH</td>
<td>DN</td>
<td>INCH</td>
<td>MM</td>
<td>INCH</td>
<td>MM</td>
<td>INCH</td>
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<tr>
<td>1/2</td>
<td>15</td>
<td>0.525</td>
<td>13.3</td>
<td>1.125</td>
<td>28.6</td>
<td>2</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
<td>0.775</td>
<td>19.7</td>
<td>1.380</td>
<td>35.1</td>
<td>4.5</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>1.015</td>
<td>25.8</td>
<td>1.650</td>
<td>41.9</td>
<td>7</td>
</tr>
<tr>
<td>1-1/2</td>
<td>40</td>
<td>1.510</td>
<td>38.4</td>
<td>2.150</td>
<td>54.6</td>
<td>13</td>
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<tr>
<td>2</td>
<td>50</td>
<td>2.010</td>
<td>51.1</td>
<td>2.670</td>
<td>67.8</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>80</td>
<td>3.015</td>
<td>76.6</td>
<td>3.812</td>
<td>96.8</td>
<td>28</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>4.010</td>
<td>101.9</td>
<td>4.937</td>
<td>125.4</td>
<td>42</td>
</tr>
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</table>

**NOTE:** Hose assembly pressure ratings may be limited by the fittings.

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<td>125.4</td>
<td>42</td>
</tr>
</tbody>
</table>

**Note:** Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.
Inner core: Smooth Teflon® PTFE
Reinforcement: EPDM rubber

■ Construction
Extra-thick, natural or conductive smooth bore Teflon® PTFE liner bonded to a reinforced blue or light gray/white EPDM rubber cover. A carbon steel wire helically wound through the carcass provides crush, kink and vacuum resistance.

■ Benefits
- Extra-thick Teflon® PTFE smooth liner provides better permeation resistance (see permeation discussion on page 37) than thinner FEP lined hoses.
- EPDM cover provides great flexibility
- PTFE inner core provides better flex life than FEP lined hoses (see pages 6 and 38)

■ Applications
Designed for applications requiring a true smooth inner bore for improved flow and is easily cleaned in place. Ideal where abrasive external conditions, flexing or permeation situations are present.

■ Fittings

■ Fitting Materials
Carbon Steel 316 S.S.
Solid Teflon® Teflon® Encapsulated
Solid Kynar® Solid Polypropylene
Monel® Hastelloy®

■ External Protective Accessories
See Page 35.
**TRC Flared-Through Hose**

**Construction**
Extra-thick, natural or conductive smooth bore Teflon® PTFE liner bonded to a reinforced blue or light gray/white EPDM rubber cover. A carbon steel wire helically wound through the carcass provides crush, kink and vacuum resistance. Liner is flared out over the face of the fitting.

**Benefits**
- Patented Flare-Through Design
- Patented Thermalok™ Process
- Results in Interference Fit Liner
- No Entrapment Issues
- True Sanitary I.D. Dimensions
- Wide Variety of Fittings Available
- Full Vacuum-Rated

**Fittings**

<table>
<thead>
<tr>
<th>Fitting</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flared Flange</td>
<td>Patented ThermoLock™ Process</td>
</tr>
<tr>
<td>Flared Cam &amp; Groove</td>
<td>Interference Fit Liner</td>
</tr>
<tr>
<td>Flared Sanitary</td>
<td>No Entrapment Issues</td>
</tr>
</tbody>
</table>

**Fitting Materials**
- Carbon Steel 316 S.S.
- Solid Teflon®
- Teflon® Encapsulated
- Solid Kynar®
- Solid Polypropylene
- Monel®
- Hastelloy®

**External Protective Accessories**
See Page 35.

Custom colors available upon request. Minimum order quantity applies.

**TRC FLARE-THROUGH HOSE PRESSURE RATINGS**

<table>
<thead>
<tr>
<th>Size</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>250</td>
<td>2000</td>
</tr>
<tr>
<td>3/4</td>
<td>250</td>
<td>2000</td>
</tr>
<tr>
<td>1</td>
<td>250</td>
<td>2000</td>
</tr>
<tr>
<td>1-1/2</td>
<td>250</td>
<td>2000</td>
</tr>
<tr>
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<td>300</td>
<td>1200</td>
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**TRC FLARE-THROUGH HOSE VACUUM RATINGS**

<table>
<thead>
<tr>
<th>Size</th>
<th>Max. Vacuum (Hg)</th>
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</thead>
<tbody>
<tr>
<td>1/2</td>
<td>29.9</td>
</tr>
<tr>
<td>3/4</td>
<td>29.9</td>
</tr>
<tr>
<td>1</td>
<td>29.9</td>
</tr>
<tr>
<td>1-1/2</td>
<td>29.9</td>
</tr>
<tr>
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<td>30.9</td>
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**OPERATING TEMPERATURE (F)**

<table>
<thead>
<tr>
<th>Size</th>
<th>Hose I.D.</th>
<th>Hose O.D.</th>
<th>Min Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
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</thead>
<tbody>
<tr>
<td>1/2</td>
<td>15</td>
<td>0.500</td>
<td>12.7</td>
<td>250</td>
<td>2000</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
<td>0.750</td>
<td>19.05</td>
<td>250</td>
<td>2000</td>
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<tr>
<td>1</td>
<td>25</td>
<td>1.000</td>
<td>25</td>
<td>250</td>
<td>2000</td>
</tr>
<tr>
<td>1-1/2</td>
<td>30</td>
<td>1.500</td>
<td>38.1</td>
<td>250</td>
<td>2000</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>2.000</td>
<td>51</td>
<td>300</td>
<td>1200</td>
</tr>
</tbody>
</table>

**Inner core**: Smooth Teflon® PTFE

**Reinforcement**: EPDM rubber

**Construction**
Extra-thick, natural or conductive smooth bore Teflon® PTFE liner bonded to a reinforced blue or light gray/white EPDM rubber cover. A carbon steel wire helically wound through the carcass provides crush, kink and vacuum resistance. Liner is flared out over the face of the fitting.

**Benefits**
- Patented Flare-Through Design
- Patented Thermalok™ Process
- Results in Interference Fit Liner
- No Entrapment Issues
- True Sanitary I.D. Dimensions
- Wide Variety of Fittings Available
- Full Vacuum-Rated

**Fittings**

<table>
<thead>
<tr>
<th>Fitting</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flared Flange</td>
<td>Patented Thermalok™ Process</td>
</tr>
<tr>
<td>Flared Cam &amp; Groove</td>
<td>Interference Fit Liner</td>
</tr>
<tr>
<td>Flared Sanitary</td>
<td>No Entrapment Issues</td>
</tr>
</tbody>
</table>

**Fitting Materials**
- Carbon Steel 316 S.S.
- Solid Teflon®
- Teflon® Encapsulated
- Solid Kynar®
- Solid Polypropylene
- Monel®
- Hastelloy®

**External Protective Accessories**
See Page 35.

Custom colors available upon request. Minimum order quantity applies.

**TRC FLARE-THROUGH HOSE PRESSURE RATINGS**

**TRC FLARE-THROUGH HOSE VACUUM RATINGS**

**OPERATING TEMPERATURE (F)**

**TRC FLARE-THROUGH HOSE PRESSURE RATINGS**

**TRC FLARE-THROUGH HOSE VACUUM RATINGS**

**OPERATING TEMPERATURE (F)**

**TRC FLARE-THROUGH HOSE PRESSURE RATINGS**

**TRC FLARE-THROUGH HOSE VACUUM RATINGS**

**OPERATING TEMPERATURE (F)**

**TRC FLARE-THROUGH HOSE PRESSURE RATINGS**

**TRC FLARE-THROUGH HOSE VACUUM RATINGS**

**OPERATING TEMPERATURE (F)**

**TRC FLARE-THROUGH HOSE PRESSURE RATINGS**

**TRC FLARE-THROUGH HOSE VACUUM RATINGS**

**OPERATING TEMPERATURE (F)**
**SBT Braided Hose**

**Inner core:** Smooth Teflon® PTFE

**Reinforcement:** 300-series stainless steel braid

- **Construction**
  Extra-thick, natural or conductive smooth bore Teflon® PTFE liner braided with 300-series stainless steel heavy gauge wire (1" and 1-1/2" are double-braided for extra kink resistance).

- **Benefits**
  - Provides higher working temperatures and full vacuum capabilities
  - Heavy gauge stainless steel braid is corrosion resistant against most chemicals
  - Flanged assemblies can be “Flared Through” providing no bacteria traps
  - Available in long lengths
  - “True ID”, for superior flow characteristics and easy dimensional matchup

- **Applications**
  Designed for applications requiring a true smooth inner bore for improved flow and which is easily cleaned in place. Excellent in static applications where handling, flexing or abuse is minimal.

- **Fittings**

  - Threaded
  - Flanged
  - Cam & Groove
  - Sanitary

- **Fitting Materials**
  - Carbon Steel
  - 316 S.S.
  - Solid Teflon®
  - Teflon® Encapsulated
  - Solid Kynar®
  - Solid Polypropylene
  - Monel®
  - Hastelloy®

  (consult factory for availability)

- **External Protective Accessories**
  See Page 35.

Custom colors available upon request. Minimum order quantity applies.

Extruded silicone protection sleeve offered with designation SBT-Si

---

### SBT HOSE PRESSURE RATINGS

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
<th>Natural Part Number</th>
<th>Conductive Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch DN</td>
<td>Inch MM</td>
<td>Inch MM</td>
<td>Inch MM</td>
<td>PSIG</td>
<td>BAR</td>
<td>PSIG</td>
<td>BAR</td>
</tr>
<tr>
<td>1/4</td>
<td>8</td>
<td>0.250</td>
<td>6.3</td>
<td>.375</td>
<td>9.5</td>
<td>3</td>
<td>50.8</td>
</tr>
<tr>
<td>3/8</td>
<td>10</td>
<td>0.375</td>
<td>9.5</td>
<td>.515</td>
<td>13</td>
<td>5</td>
<td>127</td>
</tr>
<tr>
<td>1/2</td>
<td>15</td>
<td>0.500</td>
<td>12.7</td>
<td>.633</td>
<td>16.1</td>
<td>6.5</td>
<td>165.1</td>
</tr>
<tr>
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<td>20</td>
<td>0.750</td>
<td>19.1</td>
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<td>22.2</td>
<td>8.2</td>
<td>208.3</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>1.000</td>
<td>25.4</td>
<td>1.190</td>
<td>30.2</td>
<td>12</td>
<td>304.8</td>
</tr>
<tr>
<td>1-1/2</td>
<td>40</td>
<td>1.500</td>
<td>38.1</td>
<td>1.762</td>
<td>44.8</td>
<td>14</td>
<td>355.6</td>
</tr>
</tbody>
</table>

Note: Hose assembly pressure ratings may be limited by the fittings.

---

**S B T H O S E V A C U U M R A T I N G S**

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
<th>Natural Part Number</th>
<th>Conductive Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch DN</td>
<td>Inch MM</td>
<td>Inch MM</td>
<td>Inch MM</td>
<td>PSIG</td>
<td>BAR</td>
<td>PSIG</td>
<td>BAR</td>
</tr>
<tr>
<td>1/4</td>
<td>8</td>
<td>0.250</td>
<td>6.3</td>
<td>.375</td>
<td>9.5</td>
<td>3</td>
<td>50.8</td>
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<td>3/8</td>
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<td>15</td>
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<td>.633</td>
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<td>6.5</td>
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<tr>
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<td>20</td>
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<td>8.2</td>
<td>208.3</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>1.000</td>
<td>25.4</td>
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<td>12</td>
<td>304.8</td>
</tr>
<tr>
<td>1-1/2</td>
<td>40</td>
<td>1.500</td>
<td>38.1</td>
<td>1.762</td>
<td>44.8</td>
<td>14</td>
<td>355.6</td>
</tr>
</tbody>
</table>

Note: Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.
For 1/4”-3/8” high temperature pressure ratings, consult factory.

**Construction**

Extra-thick, natural or conductive smooth bore Teflon® PTFE liner braided with 300-series stainless steel heavy gauge wire (1” and 1-1/2” are double-braided for extra kink resistance).

**Benefits**

- “Flared Through” system allows Teflon® PTFE protection of all wetted surfaces
- Provides higher working temperatures and full vacuum capabilities
- Heavy gauge stainless steel braid is corrosion resistant against most chemicals
- Available in long lengths
- “True ID”, for superior flow characteristics and easy dimensional matchup

**Applications**

Designed for applications requiring a true smooth inner bore for improved flow and which is easily cleaned in place. Excellent in static applications where handling, flexing or abuse is minimal.

**Fittings**

- Flared Flange
- Flared Cam & Groove
- Flared Sanitary

**Fitting Materials**

- Carbon Steel
- 316 S.S.
- Solid Teflon®
- Teflon® Encapsulated
- Solid Kynar®
- Solid Polypropylene
- Monel®
- Hastelloy®

(consult factory for availability)

**External Protective Accessories**

See Page 35.

Custom colors available upon request. Minimum order quantity applies. Extruded silicone protection sleeve offered with designation SBT-Si

---

**SBTF HOSE PRESSURE RATINGS**

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
<th>Natural Part Number</th>
<th>Conductive Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch DN Inch</td>
<td>MM</td>
<td>Inch MM</td>
<td>Inch MM</td>
<td>PSIG</td>
<td>BAR</td>
<td>PSIG</td>
<td>BAR</td>
</tr>
<tr>
<td>1/2</td>
<td>15</td>
<td>0.540</td>
<td>13.7</td>
<td>.760</td>
<td>19.3</td>
<td>8.2</td>
<td>208.3</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
<td>0.750</td>
<td>19.1</td>
<td>.875</td>
<td>22.2</td>
<td>8.2</td>
<td>208.3</td>
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<tr>
<td>1</td>
<td>25</td>
<td>1.000</td>
<td>25.4</td>
<td>1.190</td>
<td>30.2</td>
<td>12</td>
<td>304.8</td>
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<tr>
<td>1-1/2</td>
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<td>1.500</td>
<td>38.1</td>
<td>1.762</td>
<td>44.8</td>
<td>14</td>
<td>355.6</td>
</tr>
</tbody>
</table>
Primary Containment (inner core): Smooth Teflon® PTFE
Secondary containment: 316 stainless steel, convoluted metal hose
Reinforcement: 316 stainless steel braid

**Construction**
Extra-thick natural or conductive smooth bore Teflon® PTFE liner locked inside (exclusive Thermalok™ system) a 316 stainless steel carcass with welded flange retainers and over braided with 316 stainless steel. The liner is “Flared Through” the stub ends providing no exposed metal fittings to the media.

**Benefits**
- Dual Containment - welded 316 SS carcass acts as a barrier between the inner liner of Teflon® and the atmosphere
- Reduced risk of the catastrophic failure and environmental releases
- Vent acts as a warning system, allowing the hose to be removed prior to failure
- A coupling can be installed over the vent hole to contain or recycle permeants.

**Applications**
For severe service applications where leak prevention is imperative.

**Fittings**
Auxiliary flanges can be added for flanged end protection and easy replacement when ends are damaged, thus eliminating the need to replace the complete assembly

**Optional Vent Systems**
- Vent hole
- Vent coupling 1/8” female pipe
- Hastelloy® leak detection system (factory)

**External Protective Accessories**
Contact factory for details.

---

### TMH HOSE PRESSURE RATINGS

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch</td>
<td>DN</td>
<td>Inch</td>
<td>MM</td>
<td>Inch</td>
<td>MM</td>
</tr>
<tr>
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<td>4.840</td>
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<td>150</td>
<td>5.688</td>
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<td>7.160</td>
<td>181.9</td>
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<td>200</td>
<td>7.718</td>
<td>196.0</td>
<td>9.310</td>
<td>236.5</td>
</tr>
</tbody>
</table>
TMH-Monel® Dual Containment System

Primary Containment (inner core): **Smooth Teflon® PTFE**
Secondary containment: Monel® 400, convoluted metal hose (Hastelloy available)
Reinforcement: Heavy gauge Monel® braid

**Construction**
Extra-thick natural or conductive smooth bore Teflon® PTFE liner locked inside (exclusive Thermalok™ system) a Monel® 400 carcass with welded Monel® flange retainers and over braided with heavy gauge Monel®. The liner is “Flared Through” the stub ends providing no exposed metal fittings to the media.

**Benefits**
• Dual Containment - welded Monel® carcass acts as a barrier between the inner liner of Teflon® and the atmosphere (excellent chlorine transfer hose)
• Reduced risk of the catastrophic failure and environmental releases.
• Vent acts as a warning system, allowing the hose to be removed prior to failure.
• A coupling can be installed over the vent hole to contain or recycle permeants.

**Applications**
TMH-Monel® assemblies with Thermalok™ PTFE liner designed to withstand extreme corrosive applications such as chlorine, HCl, where leak prevention is imperative and chlorine can stress crack stainless steel.

**Fittings**
Auxiliary flanges can be added for flared end protection and easy replacement when ends are damaged, thus eliminating the need to replace the complete assembly.

**Optional Vent Systems**
• Vent hole
• Vent coupling 1/8" female pipe
• Hastelloy® leak detection system (factory)

**External Protective Accessories**
Contact factory for details.

---

**Nominal Size** | **Hose ID** | **Hose OD** | **Bend Radius** | **Max. Working Pressure at 70°F (21°C)** | **Burst Pressure at 70°F (21°C)** | **Natural Part Number**
--- | --- | --- | --- | --- | --- | ---
1 | 25 | 0.875 | 22.2 | 1.590 | 40.4 | 12 | 304.8 | 692 | 47.7 | 2768 | 115.5 | See pages 46-47
1-1/2 | 40 | 1.375 | 34.9 | 2.270 | 57.7 | 15 | 381.0 | 419 | 28.9 | 1676 | 82.7 | See pages 46-47
2 | 50 | 1.875 | 47.6 | 2.910 | 73.9 | 21 | 533.4 | 313 | 21.6 | 1252 | 86.3 | See pages 46-47
3 | 80 | 2.797 | 71.0 | 3.690 | 93.7 | 28 | 711.2 | 300 | 20.7 | 1200 | 82.7 | See pages 46-47
4 | 100 | 3.766 | 95.7 | 4.840 | 122.9 | 46 | 1168.4 | 263 | 18.1 | 1052 | 72.5 | See pages 46-47
Seamless Vent Tubing

**Construction**
Extra-thick, natural or conductive “seamless” helical convoluted Teflon® PTFE with “Flared Through” flanges, pipe or tubing sized cuffs or crimped-on fitting options.

**Benefits**
SVT - “Seamless” Vent Tubing assemblies are vacuum formed in an open pitched, helical design for easy cleaning.
- “Flared Through” and cuffed end system allows Teflon® PTFE protection of all wetted surfaces
- Eliminates bacteria traps
- Crush resistant and easy to flex
- Fitting-to-hose crevices are eliminated, increasing flow rates
- Optional external vacuum wire provides increased crush resistance and vacuum capability.

**Applications**
For low pressure vent or vapor recovery systems, pharmaceutical, chemical, food and beverage, and other applications requiring an extremely flexible, lightweight Teflon® PTFE assembly.

**Fittings**
- Threaded
- Flanged
- Cam & Groove
- Sanitary
- Cuff
- Flared Flange
- Flared Cam & Groove
- Flared Sanitary

**Fitting Materials**
- Carbon Steel
- Solid Teflon®
- Solid Kynar®
- Solid Polypropylene
- Monel®
- Hastelloy®

**External Protective Accessories**
See Page 35.

---

**SVT HOSE PRESSURE RATINGS**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
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<tr>
<td>1/2</td>
<td>0.500</td>
<td>0.700</td>
<td>17.8</td>
<td>2</td>
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<tr>
<td>3/4</td>
<td>0.760</td>
<td>0.990</td>
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<td>50.8 PSIG 25 BAR 100</td>
<td>6.9 PSIG 100</td>
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<td>1.025</td>
<td>1.280</td>
<td>32.5</td>
<td>3</td>
<td>76.2 PSIG 25 BAR 100</td>
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<tr>
<td>1-1/2</td>
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<td>4.5</td>
<td>114.3 PSIG 25 BAR 100</td>
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<td>203.2 PSIG 25 BAR 100</td>
<td>5.5 PSIG 100</td>
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<td>508.0 PSIG 15 BAR 60</td>
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Note: Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.
**Twister™ CRC Hose**

**CRC HOSE PRESSURE RATINGS**

<table>
<thead>
<tr>
<th>Size</th>
<th>Hose I.D.</th>
<th>Hose O.D.</th>
<th>Min. Bend Radius</th>
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<th>Burst Pressure at 70°F (21°C)</th>
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</tbody>
</table>

**CRC HOSE VACUUM RATINGS**

- **NOTE:** Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.

**FITTING MATERIALS**

- **Fittings**
  - Sanitary
  - Flanged
  - Flared (future)
  - Cam & Groove
  - Special
  - Industrial

**CONVOLUTED (consult factory for availability)**

**Fitting Materials**

- Carbon Steel 316 S.S.
- Solid Teflon®
- Solid Kynar®
- Solid Polypropylene
- Monel®
- Hastelloy®

**Benefits**

- Ultra Flexible
- Virtually Kink-Proof
- Self-Draining Helical Convolutes
- Wide Variety of Fittings Available
- Tough Rubber Outer Cover
- Vacuum-Rated
- Patent Pending

**Inner core:** Convoluted Teflon® PTFE

**Reinforcement:** SS reinforcing wire and EPDM cover

**Convoluted Teflon® PTFE Rubber-Covered Hose**

**External Protective Accessories**

See Page 35.
### CB—Convoluted Stainless Braided

**Inner core:** “Seamless” convoluted Teflon® PTFE

**Reinforcement:** 316 stainless steel braid (Hastelloy® and custom braids available)

#### Construction
Extra-thick natural or conductive “seamless” helical convoluted Teflon® PTFE liner braided with 316 stainless steel heavy gauge wire.

#### Benefits
- Open-pitched, helical convolutions for easy cleaning
- Rated for both medium pressure and full vacuum applications
- Crush resistant and easy to flex
- Tighter bend radii than smooth bore
- Optional external vacuum wire provides increased crush resistance and vacuum capability.

#### Applications
For pharmaceutical, chemical, food and beverage, and other applications requiring an extremely flexible, lightweight Teflon® PTFE hose assembly.

#### Fittings
See CBF, pg. 19, for “Flared Through” assemblies.

#### Fitting Materials
- Carbon Steel 316 S.S.
- Solid Teflon® Teflon® Encapsulated
- Solid Kynar® Solid Polypropylene
- Monel® Hastelloy®

(consult factory for availability)

#### External Protective Accessories
See Page 35.

### CB HOSE PRESSURE RATINGS

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
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<tr>
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<td>DN</td>
<td>Inch MM</td>
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<td>BAR</td>
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Note on Vector
- Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.

### CB HOSE VACUUM RATINGS

**NOTE:** Hose assembly pressure ratings may be limited by the fittings and options.

### OPERATING TEMPERATURE (F)

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<th>Nominal Size</th>
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<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
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<td>3.937</td>
<td>100.0</td>
<td>227.0</td>
<td>206.4</td>
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</table>
CBF—Convoluted Stainless Braided Flared-Through

Inner core: “Seamless” convoluted Teflon® PTFE
Reinforcement: 316 stainless steel braid
(Hastelloy® and custom braids available)

- **Construction**
  Extra-thick natural or conductive “seamless” helical convoluted Teflon® PTFE liner braided with 316 stainless steel heavy gauge wire. The liner is passed through the inside of the fitting and flared over the face, creating a self-gasketing sealing surface.

- **Benefits**
  * Open-pitched, helical convolutions for easy cleaning
  * “Flared Through” system allows Teflon® PTFE protection of all wetted surfaces
  * Eliminates bacteria traps
  * Fitting-to-hose crevices are also eliminated, thereby increasing flow rates
  * Optional external vacuum wire provides increased crush resistance and vacuum capability.

- **Applications**
  For pharmaceutical, chemical, food and beverage, and other applications requiring an extremely flexible, lightweight Teflon® PTFE hose with no metal exposed to the media.

- **Fittings**
  [See Page 35.]

- **Fitting Materials**
  Carbon Steel 316 S.S.
  Solid Teflon® Teflon® Encapsulated
  Solid Kynar® Solid Polypropylene
  Monel® Hastelloy®
  (consult factory for availability)

- **External Protective Accessories**
  See Page 35.

### CBF HOSE PRESSURE RATINGS*

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
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</table>

* Use these pressure ratings for CB hose with optional wire wrap.

**NOTE:** Hose assembly pressure ratings may be limited by the fittings.

### CBF HOSE VACUUM RATINGS*

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
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<td>16</td>
<td>406.4</td>
</tr>
</tbody>
</table>

* Use these vacuum ratings for CB hose with optional wire wrap.

**NOTE:** Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.

---

* CBF HOSE PRESSURE RATINGS*

* CBF HOSE VACUUM RATINGS*

**OPERATING TEMPERATURE (F)**

* Use these pressure ratings for CB hose with optional wire wrap.
**Inner core:** “Seamless” convoluted Teflon® PTFE liner

**Reinforcement:** Hastelloy® C276 heavy gauge wire braid

**Construction**

Extra-thick conductive “seamless” helical convoluted Teflon® PTFE liner braided with Hastelloy® C276 heavy gauge wire braid.

**Benefits**

- Open-pitched, helical convolutions for easy cleaning
- Rated for both medium pressure and full vacuum applications
- Crush resistant and easy to flex
- Tighter bend radii than smooth bore alternatives
- Hastelloy® C276 braid is resistant to most chemicals introduced to the external surface of the hose through permeation, spillage, or atmospheric conditions
- Optional external vacuum wire provides increased crush resistance and vacuum capability.

**Applications**

For applications requiring an extremely flexible, lightweight Teflon® PTFE hose assembly conveying chemicals that permeate aggressively, or for harsh atmospheric conditions that require extreme corrosion resistance on the exterior of the assembly.

**Fittings**

- Threaded
- Flanged
- Cam & Groove
- Sanitary
- Flared

**Fitting Materials**

- Carbon Steel 316 S.S.
- Solid Teflon®
- Teflon® Encapsulated
- Solid Kynar®
- Solid Polypropylene
- Monel®
- Hastelloy®

(consult factory for availability)

**External Protective Accessories**

See Page 35.

**CHB Hose Pressure Ratings**

**CHB Hose Vacuum Ratings**

**Operating Temperature (°F)**

**Nominal Size**

- 1/2
- 3/4
- 1
- 1-1/2
- 2

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
<th>Natural Part Number</th>
<th>Conductive Part Number</th>
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<td>MM</td>
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<td>MM</td>
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<td>11.9</td>
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<td>62.6</td>
<td>7.5</td>
<td>190.5</td>
</tr>
</tbody>
</table>

Note: Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.
CKB–Convoluted Kynar® Braided

Inner core: "Seamless" convoluted Teflon®PTFE
Reinforcement: Kynar® PVDF heavy
double braid

■ Construction
Extra-thick, natural or conductive "seamless" helical convoluted Teflon® PTFE liner braided with Kynar® PVDF monofilament heavy gauge wire braid.

■ Benefits
• Open-pitched, helical convolutions for easy cleaning
• Rated for both medium pressure and full vacuum applications
• Crush resistant and easy to flex
• Tighter bend radii than smooth bore alternatives
• Kynar® braid is resistant to most chemicals introduced to the external surface of the hose through permeation, spillage, or atmospheric conditions.
• Optional external vacuum wire provides increased crush resistance and vacuum capability.

■ Applications
For applications requiring an extremely flexible, lightweight Teflon® PTFE hose assembly conveying chemicals that permeate aggressively, or for harsh atmospheric conditions that require extreme corrosion resistance on the exterior of the assembly.

■ Fittings

■ Fitting Materials
Carbon Steel 316 S.S.
Solid Teflon® Teflon® Encapsulated
Solid Kynar® Solid Polypropylene
Monel® Hastelloy®

(consult factory for availability)

■ External Protective Accessories
See Page 35.

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
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<th>Weight lbs./ft.</th>
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<td>MM</td>
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(conductive liner shown)
Inner core: “Seamless” convoluted Teflon® PTFE
Reinforcement: Blue polypropylene, UV-stabilized braid

**Construction**
Extra-thick natural or conductive “seamless” helical convoluted Teflon® PTFE liner braided with thick, high density, polypropylene braid.

**Benefits**
- Open-pitched, helical convolutions for easy cleaning
- Rated for both medium pressure and full vacuum applications
- Crush resistant and easy to flex
- Tighter bend radii than smooth bore alternatives
- Abrasion resistant braid
- Reduced risk of hand injury from metal braids
- Optional external vacuum wire provides increased crush resistance and vacuum capability.

**Applications**
For pharmaceutical, chemical, food and beverage, and other applications requiring an extremely flexible, lightweight Teflon® PTFE hose assembly, with better abrasion resistance than metal braids.

**Fittings**

See CPBF (Page 23) for “Flared Through” assemblies.

**Fitting Material Availability**
Carbon Steel 304/316 S.S.
Solid Teflon®
Solid Kynar®
Solid Polypropylene
Monel®
Hastelloy®

**External Protective Accessories**
See page 39

---

### CPB Hose Pressure Ratings

<table>
<thead>
<tr>
<th>Max. Working Pressure at 70°F (21°C)</th>
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**NOTE:** Hose assembly pressure ratings may be limited by the fittings.

### CPB Hose Vacuum Ratings

Consult factory for 3”-4” vacuum ratings at elevated temperatures.

**External Protective Accessories**
See page 39
CPBF - Convoluted Polypropylene Braided Flared-Through

Inner core: “Seamless” convoluted Teflon® PTFE
Reinforcement: Blue polypropylene, UV-stabilized braid

■ Construction
Extra-thick natural or conductive “seamless” helical convoluted Teflon® PTFE liner braided with thick, high denier, polypropylene braid. The liner is passed through the inside of the fitting and flared over the face, creating a self-gasketing sealing surface.

■ Benefits
• Open-pitched, helical convolutions for easy cleaning
• “Flared Through” system allows Teflon® PTFE protection of all wetted surfaces
• Eliminates bacteria traps
• Fitting-to-hose crevices are also eliminated, thereby increasing flow rates
• Optional external vacuum wire provides increased crush resistance and vacuum capability.

■ Applications
For pharmaceutical, chemical, food and beverage, or any application requiring an extremely flexible, lightweight Teflon® PTFE hose with no metal exposure to the media.

■ Fittings

■ Fitting Material Availability
Carbon Steel 304/316 S.S.
Solid Teflon® Teflon® Encapsulated
Solid Kynar® Solid Polypropylene
Monel® Hastelloy®

■ External Protective Accessories
See Page 35.

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inch</td>
<td>DN</td>
<td>Inch MM</td>
<td>Inch MM</td>
<td>PSIG</td>
</tr>
<tr>
<td>1/2</td>
<td>15</td>
<td>0.470</td>
<td>11.9</td>
<td>0.855</td>
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<td>3.937</td>
<td>100.0</td>
<td>5.221</td>
<td>132.6</td>
</tr>
</tbody>
</table>
**SHBT– Smooth Bore Chlorine/Bromine Transfer Hose Assembly**

**Inner core:** “Seamless” conductive smoothbore Teflon® PTFE

**Reinforcement:** Hastelloy® C276 braid

**External Protection:** HDPE plastic spiral guard

**Construction**

Extra-thick conductive “seamless” smoothbore Teflon® PTFE liner braided with Hastelloy® C276 heavy gauge wire braid, and HDPE spiral guard as a protective cover (per the Chlorine Institute pamphlet 6 instructions.)

**Benefits**

- Meets Chlorine Institute Pamphlet 6 instructions
- Smoothbore liner has significantly less surface area than convoluted liner - that means reduced permeation.
- Rated for full vacuum
- Designed to handle the rigors of everyday handling at chlorine transfer stations
- Crush resistant and easy to flex

**Applications**

For use in Chlorine/Bromine transfer to 1-ton cylinders (CGA 820 fitting). These assemblies meet or exceed the Chlorine Institute’s pamphlet 6 recommendations for transfer of chlorine or bromine.

**Fittings**

- Monel® fittings standard

---

**SHBT HOSE PRESSURE RATINGS**

*(available in 1/2” size, only)*

**SHBT HOSE VACUUM RATINGS**

**Operating Temperature (F)**

**NOTE:** Hose assembly pressure ratings may be limited by the fittings.

**Operating Temperature (F)**

**SHBT HOSE PRESSURE RATINGS**

**OPERATING TEMPERATURE (F)**

**SHBT HOSE VACUUM RATINGS**

**Note:** Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Hose ID</th>
<th>Hose OD</th>
<th>Bend Radius</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
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</thead>
<tbody>
<tr>
<td>1/2</td>
<td>15</td>
<td>0.470</td>
<td>11.9</td>
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<td>BAR</td>
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<tr>
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<td>2500</td>
<td>172.4</td>
<td>See pages 46-47</td>
<td></td>
</tr>
</tbody>
</table>
**NOTE:** Hose assembly pressure ratings may be limited by the fittings.

**Inner core:** “Seamless” conductive convoluted Teflon® PTFE

**Reinforcement:** Hastelloy® C276 braid or Kynar® double braid

**External Protection:** HDPE plastic spiral guard

**Construction**

Extra-thick, natural or conductive “seamless” helical convoluted Teflon® PTFE liner braided with Hastelloy® C276 heavy gauge wire braid, and HDPE spiral guard as a protective cover (per the Chlorine Institute pamphlet 6 instructions.)

**Benefits**

- Meets Chlorine Institute Pamphlet 6 instructions
- Open-pitched, helical convolutions for easy cleaning
- Rated for full vacuum
- Designed to handle the rigors of everyday handling at chlorine transfer stations
- Crush resistant and easy to flex
- Tighter bend radii than smooth bore alternatives

**Applications**

For use in Chlorine/Bromine transfer from rail cars, trucks, and 1-ton cylinders (CGA 820 fitting). These assemblies meet or exceed the Chlorine Institute’s pamphlet 6 recommendations for transfer of chlorine or bromine. (See Permeation, page 37.)

**Fittings**

- Threaded
- Flanged (300 lb.)

### CTH HOSE PRESSURE RATINGS

**NOTE:** Hose assembly pressure ratings may be limited by the fittings.

### CTH HOSE VACUUM RATINGS

**Operating Temperature (F) Note:** Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.
Sanitary Tri-Clamp® and Mini Sanitary

**Tri-Clamp®**
- Surface finishes meet or exceed FDA, USDA, and 3A standards. 25 Ra to custom electropolishing available

- **Tri-Clamp®**
  - Part # Examples
    - SAN-08X08-SS Tri-Clamp
    - SAN-08X12-SS Tri-Clamp 1 Step
    - SAN-08X16-SS Tri-Clamp 2 Step
    - SAN-08X24-SS Tri-Clamp 3 Step

- **Standard Sizes Available**
  - 1/2” - 08X08* 1” 16X24
  - 1/2” - 08X12* 1” 16X32
  - 1/2” - 08X16* 1-1/2” 24X24
  - 1/2” - 08X24* 1-1/2” 24X32
  - 3/4” - 12X12 2” 32X32
  - 3/4” - 12X16 3” 48X48
  - 3/4” - 12X24 4” 64X64
  - 1” - 16X16

  Size = (Hose Shank X Fitting)
  Other jump sizes and elbow fittings available.

- **Standard Material**
  - SS - 316 Stainless Steel
  - TEF - Teflon® PFA Encapsulated

- **Custom Material**
  - K - Kynar®
  - M - Monel®
  - ST - Solid Teflon®

*Not available in Teflon® Encapsulated

**Mini Sanitary** (also available in elbows and flared-through)
- Surface finishes meet or exceed FDA, USDA, and 3A standards. Custom finishes available upon request.

- **Mini Sanitary**
  - Part # Example
    - MSAN-08X08-SS
    - MSAN-08X12-SS Tri-Clamp 1 Step
    - MSAN = Mini Sanitary

- **Standard Sizes Available**
  - 1/4” = - 04
  - 1/2” = - 08
  - 3/8” = - 06
  - 3/4” = - 12

- **Standard Material**
  - SS - 316 Stainless Steel

- **Custom Material**
  - K - Kynar®
  - M - Monel®
  - H - Hastelloy®
  - ST - Solid Teflon®

**NOTE:** Gaskets and clamping devices will ultimately decide the pressure rating of these fittings. Consult the manufacturer of each to determine final working pressures.
Sanitary I-Line® and Bevel Seat

**I-Line®**

- Surface finishes meet or exceed FDA, USDA, and 3A standards. Custom finishes available upon request.
- **Sanitary I-Line®**
  - **Part # Example:**
    - MIL-16-SS
      - MIL = Male I-Line
      - FIL = Female I-Line
  - **Sizes Available**
    - 1" - 16
    - 3" - 48
    - 1-1/2" - 24
    - 4" - 64
    - 2" - 32
- **Standard Material**
  - SS - 316 Stainless Steel
- **Custom Material**
  - M - Monel®
  - H - Hastelloy®

**Bevel Seat**

- Surface finishes meet or exceed FDA, USDA, and 3A standards. Custom finishes available upon request.
- **Sanitary Bevel Seat**
  - **Part # Example:**
    - MBS-16-SS
      - MBS = Male Bevel Seat
      - FBS = Female Bevel Seat
  - **Sizes Available**
    - 1" - 16
    - 2" - 32
    - 1-1/2" - 24
- **Standard Material**
  - SS - 316 Stainless Steel
- **Custom Material**
  - M - Monel®
  - H - Hastelloy®

**NOTE:** Gaskets and clamping devices will ultimately decide the pressure rating of these fittings. Consult the manufacturer of each to determine final working pressures.

Flared-Through Assemblies Available with I-Line and Bevel Seat Fittings
**Cam & Groove**

- **Female/Male Cam Insert**
  - **Standard insert:** Solid metal or plastic
  - **Teflon® PFA encapsulated:** Injection molded high purity PFA Teflon® over entire hose shank and throughout wetted areas of fitting
  - **Teflon® PTFE flared-through:** Hose liner extends throughout the insert and is flared over the face under the cam gasket on the female cam only

- **Cam & Groove**
  - **Part # Example:** FCG-08-SS
  - FCG = Female Cam & Groove (swivel)
  - FCGL = Female Cam & Groove (swivel) with locking handles
  - MCG = Male Cam & Groove

- **Sizes Available**
  - 1/2" - 08*
  - 3/4" - 12
  - 1" - 16
  - 1-1/2" - 24
  - 2" - 32
  - 3" - 48
  - 4" - 64**

- **Standard Insert Material**
  - SS – 316 Stainless Steel
  - TEF – Teflon® PFA Encapsulated

- **Custom Insert Material**
  - H - Hastelloy®
  - K - Kynar®
  - M - Monel®
  - PP - Polypropylene

- **Rotating Female Cam Body**
  - 316 SS is standard. Custom materials are available. Female cams are available with standard or locking handle systems.

- **Female Cam Body Options**
  - SS - 316 Stainless Steel

- **Female Cam Body Custom Options**
  - H - Hastelloy®
  - K - Kynar®
  - M - Monel®
  - PP - Polypropylene

### STAINLESS STEEL CAM & GROOVE PRESSURE RATINGS

<table>
<thead>
<tr>
<th>MAXIMUM WORKING PRESSURE - PSIG</th>
<th>OPERATING TEMPERATURE (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>70</td>
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<tr>
<td>125</td>
<td>140</td>
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<tr>
<td>100</td>
<td>210</td>
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<td>75</td>
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<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Liquid service only.

- **Flange X Cam Adapter**
  - **PFA Encapsulated**
  - Sizes available: 3/4" through 3", rotating flanges all materials (see page 42-43).
  - Available Flange X Male Cam and Flange X Female Cam.
  - Consult factory for information.
**Rotating Flanges**
150# and 300#

**Part # Example:** FR-08-SS  
FR = Flange Retainer

**Sizes Available**
- 1/2" - 08*
- 3/4" - 12
- 1" - 16
- 1-1/2" - 24
- 2" - 32
- 3" - 48
- 4" - 64*

**Standard Material**
- FT – Flared Through
- H – Hastelloy®
- M – Monel®
- SS – 316 Stainless Steel
- TEF – Teflon® Encapsulated

**Custom Material**
- K - Kynar®
- CP - CPVC
- PP - Polypropylene
- ST - Solid Teflon®

**Flange Option:**
150# and 300#
- DI – Ductile Iron
- E – Carbon Steel Epoxy Coated
- M – Monel®
- SS – 316 Stainless Steel

**Custom Flange Option**
- H - Hastelloy®
- K - Kynar®
- P – PVDF
- PP - Polypropylene
- ST - Solid Teflon®

*Not available in Teflon® Encapsulated*
Female JIC Swivel
- Joint Industrial Conference SAEJ514 specifications
- 37º JIC metal-to-metal sealing

JIC
Part # Example: FJX-08-SS
FJX = JIC Female Swivel

Sizes Available
- 1/4” - 04
- 3/8” - 06
- 1/2” - 08
- 3/4” - 12
- 1” - 16
- 1 1/2” - 24
- 2” - 32

Standard Material
- CS – Carbon Steel
- SS – 316 Stainless Steel

Custom Material*
- H - Hastelloy®
- M - Monel®

* Mixed combination fittings available:
  Standard – Nut and insert same material
  Combination – Nut and insert different
  Example: Hastelloy® insert with 316 SS nut

Female JIC Stainless Fittings Pressure Ratings

Female JIC Monel Fittings Pressure Ratings
Pipe Thread Fittings

**Male/Female Rigid NPT**
- NPT: American National Standard
- Optional: JIS, BSPT and metric standards

**NPT**
- Part # Example: MP-08-SS
  - MP = Male Pipe Rigid Hex
  - FP = Female Pipe Rigid Hex

**Sizes Available**
- 1/4" - 04
- 3/8" - 06
- 1/2" - 08
- 3/4" - 12
- 1" - 16
- 1 1/2" - 24
- 2" - 32
- 3" - 48
- 4" - 64

**Standard Material**
- SS – 316 Stainless Steel
- M - Monel®
- CS – Carbon Steel

**Custom Material**
- H - Hastelloy®
- K - Kynar®
- PP - Polypropylene

Custom materials available.
Compression Tube

- **Compression Tube Adapter/Connector**
  - Tube adapter plain or with nut and ferrule
  - Tube connector plain or with nut and ferrule

- **Compression Tube**
  - Part # Example:
  - TUBEC-08-SS
  - TUBEC = Tube Connector
  - TUBECX = Tube Connector with Nut and Ferrule
  - TUBEA = Tube Adapter
  - TUBEAX = Tube Adapter with Nut and Ferrule

- **Sizes Available**
  - 1/4” - 04
  - 3/8” - 06
  - 1/2” - 08
  - 3/4” - 12
  - 1” - 16

- **Standard Material**
  - SS – 316 Stainless Steel

- **Custom Material**
  - H - Hastelloy®
  - M - Monel®

### 316 SS COMPRESSION FITTINGS PRESSURE RATINGS

**MAXIMUM WORKING PRESSURE - PSIG**

**OPERATING TEMPERATURE (F)**

**Tube Adapter**

**Tube Connector**

**Tube Connector with Nut and Female**

32 FITTINGS
Butt Weld Fittings
- Schedule 5, 10, and 40 pipe
- Sanitary O.D. tube
- Extra-long lengths available

Butt Weld
Part # Example: BWP5-08-SS

BWP5 = Sch. 5 Butt Weld Pipe
BWP10 = Sch. 10 Butt Weld Pipe
BWP40 = Sch. 40 Butt Weld Pipe
BWT = Butt Weld Tube

Sizes Available
- 1/4" - 04
- 3/8" - 06
- 1/2" - 08
- 3/4" - 12
- 1" - 16
- 1 1/2" - 24
- 2" - 32
- 3" - 48
- 4" - 64

Standard Material
SS – 316 Stainless Steel

Custom Material
CS - Carbon Steel
H - Hastelloy®
M - Monel®

* Available pipe only.

Note: Buttweld fittings are available for purchase as bulk fittings, only, and are not available on factory-made assemblies.
Adapter Fittings

Reducing Flanges

- PTFE, PVDF, or Polypropylene-Lined
  - Available in stainless steel and other alloys
  - Available in ANSI, DIN, JIS, and other drillings.

Sanitary Adapters

- PTFE and PFA-Lined
  - Straight or reducing
  - Tri-Clamp, I-Line, Bevel Seat x Flange, Cam-Lock and other connections

Flange Adapters

- PTFE and PFA-Lined
  - Available in stainless steel and other alloys
  - ANSI, DIN, JIS, and other drillings x sanitary, camlock and other connections.
Accessories & Options

**Anti-Kink Guard**
- **Stainless Steel Heavy Duty Anti-Kink Armor Guard**
  - Entire length
  - End protectors any length

**HDPE Spiral Guard**
- **High Density Polyethylene Spiral Cut Sleeve**
  - Entire length
  - End protectors any length
  - Standard black color (other colors available)

**External Vacuum Wire**
- **Vacuum Wire for Convoluted Hoses**
  - Entire length
  - Available for any convoluted hose (standard on Twister™ CRC hose)
  - Provides increased crush and vacuum resistance
  - Reduced pressure handling capability in some hose styles (consult factory)

**Heat Shrink Sleeve**
- **Polyolefin Heat Shrink**
  - Entire length
  - Color coded special lengths
  - Multiple colors available
1.0 Test Method

1.1 Qualification Tests: Hoses lined with Teflon® shall be capable of passing qualification tests designed to demonstrate the hose’s ability to withstand severe operating conditions. Once a hose design has passed qualification testing, re-testing is not required. If the manufacturer changes the hose design, however, the new design must be re-tested. The hose manufacturer shall make hose qualification test reports available upon request. Qualification testing is as follows:

1.1.1 Burst Testing: Subject hose to destructive burst test to determine allowable operating pressure and proof test pressure.

1.) Install hose on test stand, Introduce hydraulic fluid into hose, purge all air.
2.) Pressurize at an approximate rate of 100 psi/sec. until hose fails.
3.) Record burst pressure.
4.) Allowable operating pressure is defined as 25% of burst pressure for a 4:1 safety factor.
5.) For Chlorine Transfer Hose, allowable operating pressure is 20% of burst pressure for a 5:1 safety factor.

Note: Allowable operating pressure is also known as “rated working pressure” and “working pressure.”

1.1.2 Steam-Cold Water Cycling: Subject representative Teflon®-lined hose samples to steam-cold water cycling to determine the ability of the lined hoses to withstand rapid temperature changes. Procedure is as follows:

1.) Install hose on closed-loop test stand and circulate saturated steam at 125±5 psig (50 psig for TRC hose) until the skin temperature varies no more than ±2.5°F for 10 minutes. Temperature shall be measured by a thermocouple attached to the crimp collar.
2.) Close off the steam and immediately circulate water at a maximum temperature of 77°F until the skin temperature reaches 122°F.
3.) Vent and introduce air to purge the test hose for a minimum of one minute to completely drain hose of water.
4.) Repeat steps 1-3 for a total of 100 cycles.
5.) During the 100 cycles, leakage is cause for rejection.

1.1.3 Impulse Testing: Subject hose assemblies to rapid and frequent pressure cycling to determine hose assembly’s ability to withstand long-term pressure cycling. (Note: impulse testing is not required for TR or TMH)

1.) Install hose on test stand and pressurize hose with hydraulic fluid to 125% of rated working pressure, return to ambient pressure, return to 125% of rated working pressure. This is defined as one cycle.
2.) Continue at a rate of approximately 70 cycles/ min. until 50,000 cycles have been completed. (100,000 cycles for TRC non flare-through)
3.) During the test, any leakage is cause for rejection.

1.1.4 Vacuum Testing: Subject representative hose assemblies to vacuum conditions to determine rated vacuum for hose at a given temperature.

1.) Seal assembly ends with modified fittings and the desired vacuum/temperature level and hold for 48 hrs.
2.) At the end of the 48 hrs. turn off the oven and allow the hose to cool to ambient temperature while still under the same vacuum level.
3.) Remove the hose and inspect for buckling or collapse of the liner. Any buckling or collapse of the liner shall be cause for rejection.
4.) If no collapse or buckling has occurred, the vacuum and temperature shall be considered acceptable.

1.2 Proof Testing for Customer Orders: 100% of finished hose assemblies shall be proof tested.

1.2.1 Factory-made assemblies shall be proof tested hydrostatically at 1.5 times rated working pressure and/or pneumatically tested (submerged in water) at 1 times rated working pressure. Chlorine Transfer Hose is proof tested at 2 times rated working pressure according to the Chlorine Institute recommendations. TR and TMH are not pneumatically tested.

1.2.2 Hose assemblies made at an Authorized Fabricating Distributor location shall be hydrostatically or pneumatically proof tested. (TR and TMH are fabricated at the factory, only)

2.0 Quality Documentation

2.1 Manufacturer’s design, engineering, manufacturing, sales, and service shall be certified to ISO 9001.
Permeation

Permeation is a process in which one material, usually a gas, diffuses into and through a solid barrier. All materials are permeable to a degree. The permeation of fluoropolymers in lined hose and piping systems is an important consideration because of the conditions under which they operate and the fluids they are meant to contain.

Many variables effect permeation rates through fluoropolymers. These can be broken into categories as follows:
1. Type of fluoropolymer and its associated molecular structure. PVDF, PFA, and PTFE all have different permeability, which is dependent upon all the other variables.
2. The way in which the polymer is processed and its physical state – polymer crystallinity and liner thickness have a profound impact on permeability.
3. The permeant itself – the smaller the molecule and greater its polarity, the faster it is likely to permeate through fluoropolymers.
4. Operating and environmental parameters – temperature and pressure have direct correlation to permeation rates. Temperature differential between process and the pipe wall also impacts permeation rates.

Fluoropolymers are sometimes viewed as more permeable than other plastics. This view arises in part because fluoropolymers, especially PTFE, are used at higher temperatures and carry more aggressive fluids than other types of materials are capable of.

When conditions are favorable for permeation to occur, it is important to minimize the contributing variables, provide a vent path for permeants to escape, and use exterior materials resistant to the permeant.

---

**Static Electricity Considerations for Fluoropolymer Lined Hoses**

**Static Electricity Considerations**

Electrostatic Discharge is a sudden flow of electric current through a material that is normally an insulator. As certain liquids flow through PTFE lined hoses, static charge generation can occur. These charges accumulate when they are not dissipated as fast as they are generated. Electrostatic discharge occurs when the potential difference between the liner and ground generates such a strong electric field that the liner’s atoms turn into current conducting ions. The energy is then released through this newly formed conductor in the form of an electric spark.

Charge generation depends upon the potential of the hose to accept or donate electrons, the fluid and its velocity, and the conductivity of the hose liner. In applications where charge generation is a concern, conductive fluoropolymer liners should be used. The conductive properties of the liner allow the generated charge to be dissipated quickly, reducing the risk of electrostatic discharge.
Technical Information

Properties of Teflon® PTFE T-62 Resin

Resistoflex uses only DuPont Teflon PTFE T-62 resin because of the extraordinary performance it provides.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Unit</th>
<th>Teflon® PTFE T-62 Copolymer</th>
<th>PTFE Homopolymer</th>
<th>FEP</th>
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<tbody>
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<td>500°F</td>
<td>300°F</td>
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<td>Tensile Strength</td>
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<td>Cycles</td>
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</table>

Recommended Bolt Torques for Hoses with Flared-Through Design or Encapsulated Flange Retainers

ANSI Class 150 systems
Lightly oiled A193 B7 bolts and A194 2H nuts

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Bolt Torque (ft-lb per bolt)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flared -Through</td>
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<tr>
<td></td>
<td>Min.</td>
</tr>
<tr>
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<td>8</td>
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<tr>
<td>1.5</td>
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<td>39</td>
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<td>3</td>
<td>62</td>
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</tr>
<tr>
<td>6</td>
<td>75</td>
</tr>
<tr>
<td>8</td>
<td>100</td>
</tr>
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</table>

ANSI Class 300 systems
Lightly oiled A193 B7 bolts and A194 2H nuts

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Bolt Torque (ft-lb per bolt)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flared -Through</td>
</tr>
<tr>
<td></td>
<td>Min.</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>1.5</td>
<td>28</td>
</tr>
<tr>
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<td>20</td>
</tr>
<tr>
<td>3</td>
<td>37</td>
</tr>
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NOTE: These maximum torques are only valid for LIGHTLY OILED A193 B7 bolts and A194 nuts. Lightly oiled is considered lubrication with WD-40® or equivalent. The maximum recommended torque values are suggested for lined systems operating at or near the maximum recommended pressures and temperatures. Systems operating under less severe conditions can in general experience leak-free performance using lower torque values. Additionally, anytime gaskets or spring type washers are used, we suggest using the minimum recommended torque value and that the torque be increased only to obtain satisfactory sealing. For systems that will require frequent disassembly, we suggest using the minimum recommended torque value initially to avoid distortion of the plastic face.

*WD-40 is a registered trademark of WD-40 Company, San Diego, CA.

NOTE: For metal flanged joints, where the hose liner does not form the gasket, use the bolt torques specified by the manufacturer of the gaskets to be used.
Related Definitions

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

Proof Test Pressure: Not to exceed 1-1/2 times rated working pressure. Chlorine Transfer Hose proof test pressure is 2 times rated working pressure. See page 40 for detailed information.

Burst Pressure: The average pressure at which the hose can be expected to fail at 70°F.

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

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.

Live Length: The length of hose that will bend, or the length of hose between the braid collars (LL).

Overall Length: The total face-to-face length of a straight hose (OAL).

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<th>Length Tolerances:</th>
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<td>50” and longer assemblies</td>
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Installation and Motion Considerations

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. Plastic lined hose should not be subjected to axial motion.

Lateral Offset Motion: (Fig. 1) 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 applications where motion is repeated, the offset should never exceed 25% of the minimum bend radius.

OAL = LL + Fitting Length A + Fitting Length B + (2 X nominal hose diameter)

Note: Where offset motion “Y” occurs on both sides of hose centerline, the hose live length should be based on total travel, or 2Y.

Angular Offset Motion: Angular movement is defined as the bending of the hose so that the ends are no longer parallel. Amount of movement is measured in degrees from centerline of the hose.

Radial Motion: This type of movement occurs when the hoses are bent in a 180 degree arc such as in vertical or horizontal loops. In this configuration, two types of movement are possible. One is where the bend radius remains constant and one end of the hose moves parallel to the other end. The other is where the ends move perpendicular to each other so as to enlarge or decrease the width of the loop.

For more consideration on best practices for hose installation and determining the proper length of a hose assembly, please refer to the NAHAD website at www.nahad.org.
Fraction-Decimal and Unit Conversions

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Measurement Definitions

Length Conversions

- Millimeters x .03937 = Inches
- Meters x 39.39 = Inches
- Meters x 3.2808 = Feet
- Meters x 1.09361 = Yards
- Kilometers x 3.280.8 = Feet
- Inches x .0254 = Meters
- Feet x .30480 = Meters
- Yards x .91440 = Meters
- Feet x .0003048 = Kilometers

Weight Conversions

- Grams x .03527 = Ounces (Avd.)
- Grams x .033818 = Fluid Oz. (Water)
- Kilograms x 35.27 = Ounces (Avd.)
- Kilograms x 2.20462 = Pounds (Avd.)
- Ounces (Avd.) x 28.35 = Grams
- Fluid Ounces (Water) x 29.57 = Grams
- Ounces (Avd.) x .02835 = Kilograms
- Pounds (Avd.) x .45359 = Kilograms

Pressure Measurements

1 Pound Per Square Inch
= 144 Pounds Per Square Foot
= 0.068 Atmosphere
= 2.042 Inches of Mercury at 62°F
= 27.7 Inches of Water at 62°F
= 2.31 Feet of Water at 62°F

1 Atmosphere
= 30 Inches of Mercury at 62°F
= 14.7 Pounds Per Square Inch
= 2116.3 Pounds Per Square Foot
= 33.95 Feet of Water at 62°F

1 Foot of Water at 62°F
= 62.355 Pounds Per Square Foot
= 0.433 Pounds Per Square Inch

1 Inch of Mercury at 62°F
= 1.132 Feet of Water
= 13.58 Inches of Water
= 0.491 Pounds Per Square Inch

Column of Water 12 Inches High,
= 1 Inch in Diameter = .341 Pounds
If the given temperature (in the shaded column) is Celsius, read Fahrenheit in the column to the right. If the given temperature (in the shaded column) is Fahrenheit, read Celsius in the column to the left.
Assembly Part Numbers

Hose Size
- 1/16” 01
- 1/8” 02
- 3/16” 03
- 1/4” 04
- 3/8” 06
- 1/2” 08
- 5/8” 10
- 3/4” 12
- 7/8” 14
- 1” 16
- 1-1/4” 20
- 1-1/2” 24
- 2” 32
- 2-1/2” 40
- 3” 48
- 4” 64
- 5” 96
- 8” 99
- Special Size 00

Hose Style
- Natural (White) W
- Conductive (Black) B
- Platinum-Cured Silicone S
- Special Tube X

Tube Code

Fitting #1 Style

Fitting #1 Material
- 316 SS 6
- Monel® M
- Hastelloy® H
- Solid Teflon® T
- Solid Polypropylene P
- Spec EP/Passivation Q
- 15 Ra EP 316SS R
- Carbon Steel C
- Special Material X
- None 0

Flange #1 Code

Industrial Fittings
- Male Pipe (NPT) 10
- Female Pipe (NPT) 11
- Male Pipe Union 12
- Male NPT Step-Down 14
- Male NPT Step-Up 16
- Female Pipe Union 13
- Female JIC (Swivel) 15
- Male NPT Union Step-Down 17
- Male NPT Union Step-Up 19
- Female NPT Union Step-Down 18
- Tube Connector (Plain) 20
- Tube Connector (w/Nut & Ferrule) 21
- Tube Adapter (Plain) 25
- Tube Adapter (2/Nut & Ferrule) 26
- Grooved End (Victaulic®) 29
- CGA 820 Chlorine One Ton Ftg 23

Flanged
- Flange Retainer 30
- Flange Beaded End (Flare Through) 38

Cuffed & Flared SVT Assemblies
- Cuffed (Tube OD) 43
- Cuffed (Pipe OD) 44
- Flared Flange, No Retainer 40

Sanitary
- TriClamp® 50
- TriClamp® (One Step Up) 51
- TriClamp® (Two Steps Up) 52
- TriClamp® 45° Elbow 57
- TriClamp® 90° Elbow 53
- TriClamp® (Flare Through) 54
- Mini-Sanitary 55
- Mini-Sanitary 45° Elbow 5K
- Mini-Sanitary 90° Elbow 5L
- Mini Sanitary (Flare through) 56
- Mini-Sanitary Step-Up 58
- I-Line Male (Flare Through) 59
- I-Line Male 60
- I-Line Female 61
- I-Line Female (One Step Up) 62
- I-Line Female (Flare Through) 63
- Bevel Seat Male 65
- Bevel Seat Female 66
- Female RJT Swivel 67
- Female SMS Swivel 68
- Female DIN Swivel 69

Cam & Groove
- Male Cam 70
- Female Cam (Step-Up) 75
- Female Cam w/Locking Handle-PT 77
- Female Cam w/Locking Handle-W-Lok 78
- Female Cam (Flare Through) 79

Special Fitting
- Non-Standard Special 99

Convolute
- Unbraided (SVT or crimped) U
- Unbraided Conv. w/SS vac wire (SVT or crimped) V
- Braided CB Stainless S
- CPB Polypropylene P
- CPB Stainless Braid, SS Vacuum Wire E
- CPWB Poly Braid, SS Vacuum Wire R
- CHB Hastelloy® Braid, (CTH) H
- CKB Kynar® Braid K

Rubber Covered Convolute
- CRC® (Victrex®) Yellow EPDM w/conv. PTFE Tube A
- FEP Green EPDM w/PTFE Teflon® G
- WTRC-FEP Light Gray EPDM w/PTFE Teflon® W

Rubber Covered Smooth Bore PTFE Teflon®
- TRC Blue EPDM w/PTFE Tube B
- Smooth Bore Braided (True Bore ID) F
- SBT Stainless Braid (True ID) J
- SBF Superflex® SS Braid, Fiberglass, Silicone Cover
- SHB Hastelloy® Braid Smooth Bare T
- TMH Dual Containment
- TMH 316 Stainless Hose w/PTFE Liner M
- TMH-Monet® Hose w/PTFE Liner Y
- TMH-Hastelloy® Hose w/PTFE Liner Q
- TR Truck-Rail Hose
- TR Heavy Neoprene w/Smooth PTFE T

* Indicates Limited Lengths

Note: Some configurations are not feasible. Refer to the price page of each product for availability of components.
### Assembly Part Numbers

**Fitting #2**
- **Style**
- **Material**
- **Flange #2**
- **Code**

**Assembly Length Code**
- Whole Inches
- 1/8"

**Accessory Codes (if required)**

---

**Industrial Fittings**
- Male Pipe (NPT)
- Female Pipe (NPT)
- Male Pipe Union
- Male NPT Step-Down
- Male NPT Step-Up
- Female Pipe Union
- Female JIC (Swivel)
- Male NPT Union Step-Down
- Male NPT Union Step-Up
- Tube Connector (Plain)
- Tube Connector (w/ Nut & Ferrule)
- Tube Adapter (Plain)
- Tube Adapter (2/ Nut & Ferrule)
- Grooved End (Victaulic®)
- CGA 820 Chlorine One Ton Trg

**Flanged**
- Flange Retainer
- Flare Through
- Flange Beaded End (Flare Through TR)

**Cuffed & Flared SVT Assemblies**
- Cuffed (Tube OD)
- Cuffed (Pipe OD)
- Flared Flange, No Retainer

**Sanitary**
- TriClamp®
- TriClamp® (One Step Up)
- TriClamp® (Two Steps Up)
- TriClamp® 45° Elbow
- TriClamp® 90° Elbow
- TriClamp® (Flare Through)
- Mini-Sanitary
- Mini-Sanitary 90° Elbow
- Mini Sanitary (Flare hrough
- Mini-Sanitary Step-Up
- I-Line Male (Flare Through)
- I-Line Male
- I-Line Female
- I-Line Female (One Step Up)
- I-Line Female (Flare Through)
- Bevel Seat Male
- Bevel Seat Female
- Female RJT Swivel
- Female SMS Swivel
- Female DIN Swivel

**Cam & Groove**
- Male Cam
- Female Cam (Step-Up)
- Female Cam w/ Locking Handle-PT
- Female Cam w/ Locking Handle-W-Lok
- Female Cam (Flare Through)

**Special Fitting**
- Non-Standard Special

**Accessories**
- SS Anti-Kink Casing
- SS Bend Guard 12"
- SS Bend Guard 18"
- SS Bend Guard 24"
- SS Bend Guard 150# (epoxy coated)
- SS Bend Guard 300# (epoxy coated)
- Carbon Steel 150# (uncoated)
- Carbon Steel 300# (uncoated)
- 304 Stainless 150# (Domestic)
- 316 Stainless 150# (Domestic)
- 316 Stainless 300# (Domestic)
- 316 Stainless 600#
- 316 Stainless DIN PN10
- Monel® 150#
- Monel® 300#
- Hastelloy® 150#
- Hastelloy® 300#
- Kynar® 150#
- Polypropylene 150#
- CPVC 150#
- None

**Teflon® Encapsulated (Natural)**
- E
- A

**Teflon® Encapsulated (Conductive)**
- 6
- K

**316 SS**
- M

**Hastelloy®**
- H

**Solid Kynar®**
- K

**Solid Teflon®**
- T

**Solid Polypropylene**
- P

**Spec EP/Pasivation**
- Q

**15 Ra EP 316SS**
- R

**Carbon Steel**
- C

**Special Material**
- X

**None**
- 0

---

**Example:** Hose Length = 12-1/2" Length Code = 0124

---

**Ductile Iron 150# (Galvanized)**
- D
- I

**Carbon Steel 150# (epoxy coated)**
- C

**Carbon Steel 300# (epoxy coated)**
- B

**Hastelloy 150#**
- 2

**Hastelloy 300#**
- 6

**Kynar® 150#**
- K

**Polypropylene 150#**
- P

**CPVC 150#**
- V

**None**
- 0

**Other colors available on request.**

**Auxiliary Flange One End**
- R

**Auxiliary Flange Two End**
- S

**TMH Vent Coupling One End**
- 1

**TMH Vent Coupling Both Ends**
- 2

**TMH Vent Monitor Port (no threads)**
- 4

**TMH Vent Monitor Port (female pipe)**
- 6

**Metal Tag Attached (see note)**
- T

**Paper Tag**
- TP

**Note:** Content for tags to be specified in the description.

**Special Accessory**
- X
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