High Purity Hoses of Teflon® & Silicone

Design Manual
ResistoPure™ is a brand of products offered by Resistoflex for the Biotech, Pharmaceutical, Food & Beverage, and Cosmetics industries. The ResistoPure™ brand differs from traditional Resistoflex fluid handling components in that products and processes are designed to meet the critical needs of the sanitary and aseptic markets.
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Cirrus™ HP Hose

Inner core: Smooth Teflon® FEP
Reinforcement: EPDM rubber

■ Construction
White smooth bore Teflon® FEP liner bonded to a reinforced gray EPDM rubber cover. Cover is shiny and cleanable. A helical wound wire embedded in the carcass provides crush, kink and vacuum resistance.

■ Benefits
- Teflon® FEP liner acceptable per FDA CFR 177.1550 and USP 28, NSF 23, 2005 for Class VI plastics
- USP Class VI approval
- Will Not Absorb Media
- Low Minimum Bend Radius and Force-to-Bend
- Designed Not to Elongate Under Working Pressure
- Long Service Life
- Meets or Exceeds Common Working Conditions in BioPharm Industries
  > Steam Cleaning
  > CIP
  > Autoclaving
  > Vacuum-Rated
- Factory-Rated
- Documented Lot Traceable
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

■ Fittings
Sanitary, Industrial, Flanged, Cam & Groove, Special

■ Fitting Material Availability
316 S.S., Teflon® Encapsulated

■ External Protective Accessories
Spiral guards, kink guards, and shrink sleeves available.

ResistoPure®

Cirrus™ HP HOSE PRESSURE RATINGS

MAXIMUM WORKING PRESSURE - PSIG

OPERATING TEMPERATURE (F)

MAXIMUM VACUUM (Hg)

OPERATING TEMPERATURE (F)

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

<table>
<thead>
<tr>
<th>Size</th>
<th>Hose O.D.</th>
<th>O.D. Tolerance</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
<th>Approximate Weight</th>
<th>Bend Radius</th>
<th>Natural Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INCH</td>
<td>DN</td>
<td>INCH</td>
<td>MM</td>
<td>INCH</td>
<td>MM</td>
<td>PSIG</td>
</tr>
<tr>
<td>1/2</td>
<td>15</td>
<td>0.97</td>
<td>24.6</td>
<td>+/- 0.032</td>
<td>+/- 0.8</td>
<td>500</td>
<td>34.5</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
<td>1.27</td>
<td>32.3</td>
<td>+/- 0.032</td>
<td>+/- 0.8</td>
<td>500</td>
<td>34.5</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>1.48</td>
<td>37.6</td>
<td>+/- 0.038</td>
<td>+/- 1.0</td>
<td>400</td>
<td>27.6</td>
</tr>
<tr>
<td>1-1/2</td>
<td>40</td>
<td>2.04</td>
<td>51.8</td>
<td>+/- 0.038</td>
<td>+/- 1.0</td>
<td>250</td>
<td>17.2</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>2.54</td>
<td>64.5</td>
<td>+/- 0.045</td>
<td>+/- 1.1</td>
<td>200</td>
<td>13.8</td>
</tr>
</tbody>
</table>

NOTE: For assemblies, pressure ratings of fittings may be less than for the hose.
# TRC Flared-Through Hose

**Inner core:** Smooth Teflon® PTFE

**Reinforcement:** EPDM rubber

## Construction

Extra-thick, natural or conductive smooth bore Teflon® PTFE liner bonded to a reinforced 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

- Teflon® PTFE liner acceptable per FDA CFR 177.1550 and USP 28, NSF 23, 2005 for Class VI plastics
- USP Class VI approval
- 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
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

## Fittings

- Flared Flange
- Flared Cam & Groove
- Flared Sanitary

## Fitting Materials

316 S.S. Teflon® Encapsulated

## External Protective Accessories

Spiral guards, kink guards, and shrink sleeves available.

Custom colors available upon request. Minimum order quantity applies.

### TRC FLARE-THROUGH HOSE PRESSURE RATINGS

<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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inch</td>
<td>DN</td>
<td>Inch</td>
<td>MM</td>
<td>Inch</td>
</tr>
<tr>
<td>1/2</td>
<td>15</td>
<td>0.750</td>
<td>19.05</td>
<td>1.30</td>
<td>33</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
<td>0.750</td>
<td>19.05</td>
<td>1.30</td>
<td>33</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>1.000</td>
<td>25</td>
<td>1.56</td>
<td>39.6</td>
</tr>
<tr>
<td>1-1/2</td>
<td>40</td>
<td>1.500</td>
<td>38.1</td>
<td>2.05</td>
<td>52</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>2.000</td>
<td>51</td>
<td>2.56</td>
<td>65</td>
</tr>
</tbody>
</table>

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

### TRC FLARE-THROUGH HOSE VACUUM RATINGS

<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>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>15</td>
<td>0.750</td>
<td>19.05</td>
<td>1.30</td>
<td>33</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
<td>0.750</td>
<td>19.05</td>
<td>1.30</td>
<td>33</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>1.000</td>
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<td>1.56</td>
<td>39.6</td>
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<tr>
<td>1-1/2</td>
<td>40</td>
<td>1.500</td>
<td>38.1</td>
<td>2.05</td>
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<td>50</td>
<td>2.000</td>
<td>51</td>
<td>2.56</td>
<td>65</td>
</tr>
</tbody>
</table>

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

**Inner core:** Smooth Teflon® PTFE
**Reinforcement:** Fiberglass braid, 300-series stainless steel braid, and a silicone cover.

**Construction**
Natural 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
- Documented Lot Traceable
- Meets or Exceeds 3A Standards
- Vacuum-Rated
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

**Approvals**
- FDA (reference 21 CFR 177.1550)
- USDA (21 CFR 177.1550)
- USP Class VI

**Fittings**
Threaded, Flanged, Cam & Groove, Sanitary, Flared

**Fitting Material Availability**
316 S.S., Teflon® Encapsulated

**External Protective Accessories:** Spiral guards, kink

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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>Approximate Weight</th>
<th>Natural 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</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</td>
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<td>0.375</td>
<td>9.5</td>
<td>0.710</td>
<td>18</td>
<td>2.50</td>
<td>63.5</td>
</tr>
<tr>
<td>1/2</td>
<td>15</td>
<td>0.500</td>
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<td>0.890</td>
<td>22.6</td>
<td>3.00</td>
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<tr>
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<td>19</td>
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<td>28.4</td>
<td>5.00</td>
<td>127</td>
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</tbody>
</table>

**SuperFlex HOSE VACUUM RATINGS**

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

**Fiberglass Braid Externally Bonded to the Teflon® Tube in a Patented Process**

**Silicone Cover**

**Stainless Steel Reinforcing Braid**

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**Threaded**

**Flanged**

**Cam & Groove**

**Sanitary**

**Flared**

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**OPERATING TEMPERATURE (F)**

**MAXIMUM WORKING PRESSURE - PSIG**

**MAXIMUM VACUUM (-in. Hg)**

**OPERATING TEMPERATURE (F)**

**Note:** Vacuum ratings are based on testing done on straight assemblies. Bent assemblies may have reduced vacuum resistance.
Si-B Braid-Reinforced Silicone Hose

- Platinum-Cured Silicone
- Polyester Braid
- Extremely Flexible
- Hose produced in a Certified Class 100 Clean Room

Benefits
- Suitable for pharmaceutical, biomedical, cosmetic and food applications
- -50 °F – 350 °F temperature range
- Sterilizable/Autoclavable
- 65A Shore Hardness
- Documented lot traceable
- Available in custom lengths and color coding
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

Approvals
- USP Class VI

Meets or Exceeds:
- FDA CFR 177.2600
- USDA and 3A Standards
- ISO 10993
- European Pharmacopoeia 3.1.9

Fittings

Fitting Material Availability
316 S.S.
Teflon® Encapsulated

Si-B HOSE PRESSURE RATINGS

<table>
<thead>
<tr>
<th>Nominal I.D.</th>
<th>Wall Thickness</th>
<th>Hose O.D.</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
<th>Approximate Weight</th>
<th>Product 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>PSIG</td>
</tr>
<tr>
<td>1/2</td>
<td>15</td>
<td>.150</td>
<td>3.8</td>
<td>.80</td>
<td>20.3</td>
<td>130</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
<td>.175</td>
<td>4.5</td>
<td>1.10</td>
<td>27.9</td>
<td>110</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>.180</td>
<td>4.6</td>
<td>1.36</td>
<td>34.5</td>
<td>110</td>
</tr>
</tbody>
</table>

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

NOTE: Bulk tubing available in 25 ft., 50 ft., or 100 ft. coils.
1/8", 1/4", 3/8", and 1 1/4" sizes available - Consult factory
Si-B HD Braid-Reinforced Silicone Hose

- Platinum-Cured Silicone
- Polyester Braid
- High Pressure
- Extremely Flexible
- Hose produced in a Certified Class 100 Clean Room

**Benefits**
- Suitable for pharmaceutical, biomedical, cosmetic and food applications
- -50 °F – 350 °F temperature range
- Sterilizable/Autoclavable
- 65A Shore Hardness
- Documented lot traceable
- Available in custom lengths and color coding
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

**Approvals**
- USP Class VI

**Meets or Exceeds:**
- FDA CFR 177.2600
- USDA and 3A Standards
- ISO 10993
- European Pharmacopoeia 3.1.9

**Fittings**

**Fitting Material Availability**
316 S.S.
Teflon® Encapsulated

**Si-B HD HOSE PRESSURE RATINGS**

<table>
<thead>
<tr>
<th>Nominal I.D.</th>
<th>Wall Thickness</th>
<th>Hose O.D.</th>
<th>Max. Working Pressure at 70°F (21°C)</th>
<th>Burst Pressure at 70°F (21°C)</th>
<th>Approximate Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inch</td>
<td>DN</td>
<td>Inch</td>
<td>MM</td>
<td>Inch</td>
</tr>
<tr>
<td>1/2</td>
<td></td>
<td>15</td>
<td>.220</td>
<td>5.6</td>
<td>.940</td>
</tr>
<tr>
<td>3/4</td>
<td></td>
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<td>.250</td>
<td>6.4</td>
<td>1.250</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>25</td>
<td>.230</td>
<td>5.8</td>
<td>1.470</td>
</tr>
</tbody>
</table>

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

**NOTE:** Bulk tubing available in 25 ft., 50 ft., or 100 ft. coils.
### Si-W Fabric-Reinforced Silicone Hose

**Benefits**
- Low Volatile Grade Platinum-Cured Silicone
- Multi-Ply Polyester Fabric Reinforcement
- High Pressure
- Hose Produced in a Certified Class 100 Clean Room

**Approvals**
- USP Class VI

**Meets or Exceeds:**
- FDA CFR 177.2600
- USDA and 3A Standards
- ISO 10993
- European Pharmacopoeia 3.1.9

**Fittings**
- Sanitary
- Industrial
- Flanged
- Cam & Groove
- Special

**Fitting Material Availability**
- 316 S.S.
- Teflon® Encapsulated

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### Si-W Hose Pressure Ratings

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

| Nominal I.D. | Wall Thickness | Hose O.D. | Min. Bend Radius | Max. Working Pressure at 70°F (21°C) | Burst Pressure at 70°F (21°C) | Approximate Weight | Product Number |
|--------------|---------------|-----------|------------------|--------------------------------------|-------------------------------|--------------------|----------------|----------------|
| Inch | DN | Inch | MM | Inch | MM | Inch | MM | PSIG | BAR | PSIG | BAR | LBS./FT. | KG/M |
| 1/2 | 15 | .180 | 4.6 | 0.834 | 21.2 | 2.50 | 63.5 | 150 | 10.3 | 600 | 41.3 | .30 | .45 | 08-Si-W |
| 3/4 | 20 | .200 | 5.1 | 1.16 | 29.4 | 4.50 | 114.3 | 150 | 10.3 | 600 | 41.3 | .39 | .58 | 12-Si-W |
| 1 | 25 | .200 | 5.1 | 1.39 | 35.3 | 9.00 | 228.6 | 150 | 10.3 | 600 | 41.3 | .43 | .60 | 16-Si-W |
| 1-1/2 | 40 | .200 | 5.1 | 1.90 | 48.8 | 12.00 | 304.8 | 150 | 10.3 | 600 | 41.3 | .72 | 1.07 | 24-Si-W |
| 2 | 50 | .200 | 5.1 | 2.38 | 60.5 | CALL FACTORY | 150 | 10.3 | 600 | 41.3 | 1.08 | 1.61 | 32-Si-W |
Si-V Silicone Suction Hose

- Low Volatile Grade Platinum-Cured Silicone
- 4-Ply Polyester Braid, SS Wire Reinforced.
- Rated for Full Vacuum
- Hose Produced in a Certified Class 100 Clean Room

**Benefits**
- Suitable for pharmaceutical, biomedical, cosmetic and food applications
- -50 °F – 350 °F temperature range
- Rated for full vacuum to 300°F
- Sterilizable/Autoclavable
- 50A Shore Hardness
- Documented lot traceable
- Available in custom lengths (up to 24 feet) and color coding
- Factory Assembly and Packaging in a Class 10,000 Clean Room Available

**Approvals**
- USP Class VI

**Meets or Exceeds:**
- FDA CFR 177.2600
- USDA and 3A Standards
- ISO 10993
- European Pharmacopoeia 3.1.9

**Fittings**

**Fitting Material Availability**
316 S.S. Teflon® Encapsulated

**Si-V HOSE PRESSURE RATINGS**

<table>
<thead>
<tr>
<th>Nominal I.D.</th>
<th>Wall Thickness</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>Vacuum Rating at 300°F (149°C)</th>
<th>Approximate Weight</th>
<th>Product Number</th>
</tr>
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<td>Inch</td>
<td>MM</td>
<td>Inch</td>
<td>MM</td>
<td>Inch</td>
<td>MM</td>
<td>Inch</td>
<td>MM</td>
<td>PSIG</td>
</tr>
<tr>
<td>1/2</td>
<td>15</td>
<td>.180</td>
<td>4.6</td>
<td>0.890</td>
<td>22.6</td>
<td>2.00</td>
<td>50.8</td>
<td>400</td>
</tr>
<tr>
<td>3/4</td>
<td>20</td>
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<td>5.1</td>
<td>1.19</td>
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<td>2.50</td>
<td>63.5</td>
<td>400</td>
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<tr>
<td>1</td>
<td>25</td>
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<td>5.1</td>
<td>1.39</td>
<td>35.3</td>
<td>3.50</td>
<td>88.9</td>
<td>400</td>
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<td>1-1/2</td>
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<td>60.7</td>
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<td>152.4</td>
<td>275</td>
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**NOTE:** For assemblies, pressure ratings of fittings may be less than for the hose.

**NOTE:** 1 1/4", 2 1/2", 3", and 4" sizes available - Consult factory
Sanitary Fittings

<table>
<thead>
<tr>
<th>Shank Size</th>
<th>Tri-Clamp®</th>
<th>Mini Sanitary</th>
<th>Male I-Line®</th>
<th>Female I-Line®</th>
<th>Bevel Seat (Male or Female)</th>
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<td>1 1/2&quot;</td>
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Part Number Example
- SAN-08X08-SS
- MSAN-06X12-SS
- MIL-16-SS
- FIL-24-SS
- Male: MBS-32-SS
- Female: FBS-16-SS

Surface Finish
- SS = 25 Ra
- EP = 15 Ra
Surface finishes meet or exceed FDA, USDA, and 3A standards. Custom finishes and electropolishing available for most fittings.

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

Color Code for Assembly Lead Times With These Fittings:
- Green: 1-2 working days (w/d) for SS or electropolished (EP)
- Yellow: 1-2 w/d for SS; 7 w/d for EP
- Orange: 12 w/d for SS; 15 w/d for EP

For 1 1/4", 2 1/2" in all fittings, and other sizes of MSAN, consult factory.
Adaptors and Accessories

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.

Tagging/Marking Options

- PaperTag
- SS Tag Wired on Hose
- Encapsulated Label for Silicone Hoses (pictured)
- Pin Stamp on Collar
**Features Comparison**

<table>
<thead>
<tr>
<th>Hose</th>
<th>Description</th>
<th>Clean Packaging of Assemblies</th>
<th>Fitting Lot Traceability (Contact Surface)</th>
<th>Hose Liner Lot Traceability</th>
<th>Charted Hydrostatic Test</th>
<th>USP Class VI Certification</th>
<th>Meets or Exceeds FDA CFR:</th>
<th>USDA AND 3A Accepted</th>
<th>Meets or Exceeds ISO 10993</th>
<th>Meets or Exceeds European Pharmacopoeia 3.1.9</th>
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<tr>
<td>Si-B</td>
<td>Braid Reinforced Silicone Hose</td>
<td>Max. 100 Ft.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>Si-B HD</td>
<td>Braid Reinforced Silicone Hose</td>
<td>Max. 100 Ft.</td>
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<td>✓</td>
<td>✓</td>
<td>177.2600</td>
<td>✓</td>
<td>✓</td>
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<td>High Pressure Silicone Hose</td>
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<td>✓</td>
<td>✓</td>
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<td>Si-V</td>
<td>Silicone Suction Hose</td>
<td>Max. 24 Ft.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>177.2600</td>
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<td>✓</td>
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<td>Cirrus HP</td>
<td>Smooth Teflon® FEP-Lined EPDM Rubber Covered Hose</td>
<td>Max. 75 Ft.</td>
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<td>✓</td>
<td>✓</td>
<td>177.1550</td>
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<td>✓</td>
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<tr>
<td>SuperFlex SFT-SI</td>
<td>Smooth Teflon® PTFE-Lined Fiberglass/SS Double Braid Silicone Cover</td>
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<td>✓</td>
<td>✓</td>
<td>177.1550</td>
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<td>✓</td>
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<tr>
<td>TRC Flared Through</td>
<td>Smooth Teflon® PTFE-Lined EPDM Rubber Covered Hose</td>
<td>Max. 20 Ft.</td>
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<td>✓</td>
<td>✓</td>
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Quality Assurance

ResistoPure hoses are qualified to an extremely rigorous quality assurance program. The following tests are performed on 100% of our hose designs, ensuring that every unit meets performance specifications.

Resistoflex Qualification Testing

1.0 Test Method

1.1 Qualification Tests: Hose designs shall pass 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.
   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 testing, 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.) Reach the desired vacuum/temperature level and hold for 48 hrs.
2.) 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 with high-purity deionized water
1.2.2 Hose assemblies made at an Authorized Fabricating Distributor location shall be hydrostatically proof tested.

2.0 Quality Documentation

2.1 Manufacturer’s design, engineering, manufacturing, sales, and service shall be certified to ISO 9001.
2.2 Wetted surface traceability documentation provided with all silicone hoses, Cirrus HP, and SuperFlex assemblies.
**Teflon® in High Purity Applications**

Only Teflon® PTFE used in ResistoPure hoses offers true protection against all sources of contamination. We’ve been making our PTFE hose liner for more than 50 years! ResistoPure PTFE liners contain no plasticizers, fillers, or antioxidants that leach out and react with process fluids.

Properly designed sanitary fittings are a given. However, the surface area exposure of fittings is minimal compared to the hose liner. ResistoPure hoses feature DuPont Teflon® PTFE resin which meets every major high-purity classification:

- Meets 3A Sanitary Standards
- Meets FDA 21 CFR 177.1550
- USDA Accepted

This is where we begin. Following are the results of where we end with a product of unequalled purity. We challenge the competition to meet our standards.

In the effort to produce water of the highest purity for the semiconductor, pharmaceutical, and biotech industries, engineers are designing fluid handling systems that do more than just last for a short period of time. These fluid handling systems must be designed to prove that they contribute less than parts per billion of extractables to the process water.

Particulate, ionic, organic, or microbial contaminants in process fluids reduce product yields dramatically – requiring purity levels which are orders of magnitude greater than yesterday’s needs. One of the harshest and most widely publicized agents used for wet processing is deionized 18 megohm-cm water. To determine the effect 18 megohm-cm water has on Resistoflex PTFE lined hoses, an extractable analysis was conducted by AT&T Analytical Services. AT&T’s analysis consisted of “dynamic rinsing” of ResistoPure PTFE lined hose samples and subsequent ionic characterization.

![Fig. 1: Megohms – cm](image)

<table>
<thead>
<tr>
<th>Minutes</th>
<th>4</th>
<th>10</th>
<th>19</th>
<th>26</th>
<th>33</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtrate, megohm – cm</td>
<td>7.0</td>
<td>17.6</td>
<td>17.8</td>
<td>17.9</td>
<td>18.0</td>
<td>18.1</td>
</tr>
</tbody>
</table>

As can be seen in Fig. 1, rinse to background occurred within 5 minutes. Organicis were determined by total organic carbon (TOC) analysis, which also can be seen in Fig. 2. TOCs were below background levels within 10 minutes.

![Fig. 2: Total Organic Content – ppb](image)

<table>
<thead>
<tr>
<th>Minutes</th>
<th>4</th>
<th>10</th>
<th>19</th>
<th>26</th>
<th>33</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtrate, ppb</td>
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<td>1.39</td>
<td>1.46</td>
<td>1.41</td>
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<tr>
<td>Background, ppb</td>
<td>1.52</td>
<td>1.45</td>
<td>1.47</td>
<td>1.46</td>
<td>1.56</td>
<td></td>
</tr>
</tbody>
</table>

Particulate dynamic rinse data is shown if Fig. 3. Particle count rinsed to background levels within 50 minutes, proving that ResistoPuer PTFE liner has a very smooth, contamination-free surface that will not support microbe growth.

![Fig. 3: Particulate Count](image)

<table>
<thead>
<tr>
<th>Minutes</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
<th>110</th>
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<tr>
<td>Filtrate, (.05µ)</td>
<td>68.8</td>
<td>13.3</td>
<td>9.6</td>
<td>4.4</td>
<td>6.2</td>
<td>2.7</td>
<td>3.4</td>
<td>3.4</td>
<td>5.8</td>
<td>4.3</td>
<td>1.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Background (.05µ)</td>
<td>5.3</td>
<td>4.9</td>
<td>4.9</td>
<td>3.7</td>
<td>3.6</td>
<td>3.7</td>
<td>4.1</td>
<td>4.5</td>
<td>2.1</td>
<td>3.3</td>
<td>2.9</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Finally, Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS) data for 68 metals and anion analysis samples were taken at 24 hours of dynamic rinse exposure with 18 megohm water. In all cases, extractables were below detectable limits for ResistoPure PTFE hoses.

The use of ozone in ultrapure water processing has proven to be a quick and reliable method of microbial control. Ozonization of ultrapure water is considered a “clean” process and does not produce any undesirable chemical byproducts. Unlike traditional chemical disinfectants, ozone dissipates from the treated water due to its own natural decay properties. Because of this, ozone is gaining increasing popularity in electronics, pharmaceuticals, and other ultrapure water-dependent industries. However, the same aggressive nature that gives ozone the ability to attack and kill microorganisms also makes it especially tough on the materials with which it comes in contact. As opposed to silicone hoses, ResistoPure PTFE hoses are chemically inert and non-reactive with ozone.

Please contact us for AT&T’s detailed report.
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.

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).

Length Tolerances:
- Min.-18” assemblies: +/- .250”
- 19”-36” assemblies: +/- .500”
- 37”-50” assemblies: +/- .750”
- 51”-Max. assemblies: +/- 1.5”

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. Hoses 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.

$$\text{OAL} = \text{LL} + \text{Fitting Length A} + \text{Fitting Length B}$$

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.
Resistoflex Industrial Hose Products

**Chlorine Hose (CTH)**
Specifically designed for making, moving, and packing chlorine and bromine

**TMH**
A smooth Teflon® liner inside a corrugated metal hose with a protective braid

**The CB Family**
Convoluted Teflon® liner inside braided cover - of your choosing - from PP to Hastelloy®

**The TRC Family**
Smoothbore Teflon® liner in a tough EPDM carcass

**Truck & Rail (TR)**
50 years later, still the toughest loading / unloading hose on the planet

**The Twister™ (CRC )**
A Convoluted Teflon® PTFE liner in a tough EPDM carcass. Virtually Kink-proof, lightweight, and flexible

**Wide Fittings Assortment**
- Flange
- Buttweld
- Cam-Lock
- Encapsulated Cam-Lock
- Pipe Thread
- Special Materials (PVDF, Hastelloy®, etc.)
### Assembly Part Numbers

<table>
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<tr>
<th>Hose Size</th>
<th>Hose Style</th>
<th>Tube Code</th>
<th>Fitting #1 Style</th>
<th>Fitting #1 Material</th>
<th>Flange #1 Code</th>
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<td>1/4&quot;</td>
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<td>Natural (White)</td>
<td>W</td>
<td>Platinum-Cured Silicone S</td>
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<td>S</td>
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### Sanitary

- TriClamp®
- TriClamp® (One Step Up)
- TriClamp® (Two Steps Up)
- TriClamp® 45° Elbow
- TriClamp® 90° Elbow
- TriClamp® (Flare Through)*
- Mini-Sanitary
- Mini-Sanitary 45° Elbow
- Mini-Sanitary 90° Elbow
- Mini Sanitary (Flare through)*
- 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

### 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
- Female NPT Union Step-Down

### Flanged

- Flange Retainer
- Flare Through

* Flare Through available on TRC PTFE Hose, only

### Special Fitting

- Non-Standard Special

---

**Note:** Some configurations are not feasible.
## Assembly Part Numbers

### Assembly Length Code

- **Whole Inches**
- **1/8”**

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

### Fitting #2

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<td>TriClamp® 45° Elbow</td>
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<td>Female RJT Swivel</td>
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<td>Female Pipe Union</td>
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<td>Female NPT Union Step-Down</td>
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<td>Flanged</td>
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<tr>
<td>Flange Retainer</td>
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<td>30</td>
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<tr>
<td>Flare Through</td>
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<td>35</td>
</tr>
</tbody>
</table>

* Flare Through available on TRC PTFE Hose, only

### Special Fitting

- Non-Standard Special 99

### Metal Tag Attached (see note)
- Paper Tag TP
- Pin Stamp on Collar TC
- Encapsulated Label L

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

**Special Accessory:** X
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