Wear Resistant Tubing

Abrasition: Approx. 1/3
(Compared with SMC polyurethane tubing TU series)

<table>
<thead>
<tr>
<th>Description</th>
<th>Maximum abrasion (mm) After 10 million cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear resistant tubing</td>
<td></td>
</tr>
<tr>
<td>TUZ series</td>
<td>0.16</td>
</tr>
<tr>
<td>Polyurethane tubing</td>
<td></td>
</tr>
<tr>
<td>TU series</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Note) Comparison based on the SMC’s specific testing condition

6-colour variations
Black, White, Red, Blue, Yellow, Green

5-size variations
Tubing O.D.: ø4, ø6, ø8, ø10, ø12
**Wear Resistant Tubing Series TUZ**

---

### Model Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>TUZ0425</th>
<th>TUZ0604</th>
<th>TUZ0805</th>
<th>TUZ1065</th>
<th>TUZ1208</th>
</tr>
</thead>
<tbody>
<tr>
<td>O.D. (mm)</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>I.D. (mm)</td>
<td>2.5</td>
<td>4</td>
<td>5</td>
<td>6.5</td>
<td>8</td>
</tr>
</tbody>
</table>

- **Black (B)**
- **White (W)**
- **Red (R)**
- **Blue (BU)**
- **Yellow (Y)**
- **Green (G)**

---

### Specifications

- **Fluid**: Air
- **Applicable fittings**: One-touch fittings KQ/KJ series, Insert fittings KF series, Stainless steel 316 insert fittings KFG series, Miniature fittings M/MS series (hose nipple type)
- **Max. operating pressure**: 20°C, 0.8 MPa; 60°C, 0.4 MPa
- **Burst pressure**: Refer to the burst pressure characteristics curve.
- **Min. bending radius (mm)**: 10, 15, 20, 27, 35
- **Operating temperature**: –20 to +60°C
- **Material**: Special polyurethane

---

**How to Order**

**TUZ0425 BU 20**

- **Tubing model**: TUZ0425, TUZ0604, TUZ0805, TUZ1065, TUZ1208
- **O.D. x I.D. (mm)**: 4 x 2.5, 6 x 4, 8 x 5, 10 x 6.5, 12 x 8
- **Colour**: Black (B), White (W), Red (R), Blue (BU), Yellow (Y), Green (G)
- **Length per roll**: 20 m roll, 100 m roll

---

**How to Calculate Minimum Bending Radius**

Bend the tube into U-form at the temperature of 20°C. Fix one end and close loop gradually. Measure 2R when the tube breaks or is crushed.

---

**Burst Pressure Characteristics Curve and Operating Pressure**

**How to Order**

---

---
Reference Data: Abrasion due to Flexible Protection Tube

Test Conditions

<table>
<thead>
<tr>
<th>Test tube</th>
<th>TUZ0604, TU0604</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity of tube tested</td>
<td>5 pcs. for each</td>
</tr>
<tr>
<td>Operating speed</td>
<td>1500 mm/sec</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>90 c.p.m</td>
</tr>
<tr>
<td>Stroke L</td>
<td>500 mm</td>
</tr>
<tr>
<td>Bending radius R</td>
<td>28 mm</td>
</tr>
<tr>
<td>Material of flexible protection tube</td>
<td>Special engineering plastic</td>
</tr>
<tr>
<td>Tube tie</td>
<td>Not used</td>
</tr>
</tbody>
</table>

Test Results

<table>
<thead>
<tr>
<th>Model</th>
<th>Maximum abrasion after 10 million cycles (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUZ0604</td>
<td>0.16</td>
</tr>
<tr>
<td>TU0604</td>
<td>0.46</td>
</tr>
</tbody>
</table>

As this test was an acceleration test, the tube bending radius was out of the flexible protection tube manufacturer's allowable range. When the flexible protection tube is used in the actual application, check the manufacturer's catalogue specifications. The values in the table above are representative values, and not guaranteed.

Made to Order TFU-X73

Flat type of the TUZ series
The identification line is not shown. Colour combinations are also available. Please contact SMC for detailed specifications, dimensions, and delivery.

How to Order

TFU0425 BU 2 - 10 - X73

- Colour
  - B Black
  - W White
  - R Red
  - BU Blue
  - Y Yellow
  - G Green

- Special polyurethane
- Length per roll
- Number of cores

<table>
<thead>
<tr>
<th>Tubing model</th>
<th>O.D. x I.D. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFU0425</td>
<td>4 x 2.5</td>
</tr>
<tr>
<td>TFU0604</td>
<td>6 x 4</td>
</tr>
<tr>
<td>TFU0805</td>
<td>8 x 5</td>
</tr>
<tr>
<td>TFU1065</td>
<td>10 x 6.5</td>
</tr>
<tr>
<td>TFU1208</td>
<td>12 x 8</td>
</tr>
</tbody>
</table>

Test Conditions

- Bend the tube into U-form at the temperature of 20°C. Fix one end and close loop gradually. Measure 2R when the tube breaks or is crushed.
- Burst pressure
  - Fixed end
  - TUZ0604: 3.0 MPa
  - TUZ0805: 2.0 MPa
  - TUZ1065: 1.0 MPa
  - TUZ1208: 0.4 MPa
- Operating temperature: -20 to +60°C
- Material: Special polyurethane

Test Results

<table>
<thead>
<tr>
<th>Model</th>
<th>Maximum abrasion after 10 million cycles (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUZ0604</td>
<td>0.16</td>
</tr>
<tr>
<td>TU0604</td>
<td>0.46</td>
</tr>
</tbody>
</table>

As this test was an acceleration test, the tube bending radius was out of the flexible protection tube manufacturer's allowable range. When the flexible protection tube is used in the actual application, check the manufacturer's catalogue specifications. The values in the table above are representative values, and not guaranteed.
Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC), Japan Industrial Standards (JIS)*1 and other safety regulations*2.

1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
   ISO 4413: Hydraulic fluid power – General rules relating to systems.
   IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
   JIS B 9960-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
   JIS B 8361: General rules for hydraulic equipment.
   JIS B 8370: General rules for pneumatic equipment.
   JIS B 8361: General rules for hydraulic equipment.
   JIS B 9960-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
   etc.

2) Labour Safety and Sanitation Law, etc.

---

**Caution:** Operator error could result in injury or equipment damage.

**Warning:** Operator error could result in serious injury or loss of life.

**Danger:** In extreme conditions, there is a possibility of serious injury or loss of life.

---

**Warning**

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
   The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.
Safety Instructions

⚠️ Caution

The product is provided for use in manufacturing industries. The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch.

Limited Warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited Warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

Limited Warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.²³
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.
   * 3) Vacuum pads are excluded from this 1 year warranty.
      A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
      Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law).
**Series TUZ**

**Specific Product Precautions**

Be sure to read before handling.
Refer to back pages 1 and 2 for Safety Instructions, “Handling Precautions for SMC Products” (M-E03-3) for Fittings and Tubing Precautions.

---

### Selection

**Warning**

1. **Confirm the specifications.**
   - Products represented in this catalogue are designed only for use with compressed air system applications (including vacuum).
   - Do not use at pressure or temperature beyond the range of specifications, as this can cause damage or malfunction. (Refer to the specifications.)

2. **In case of using the product for medical care**
   - This product is designed for use with compressed air system applications for medical care purposes. Do not use in transfer applications to a human living body, or in contact with human body substance.

**Caution**

1. **Do not use in locations where the connecting threads and tube connection will slide or rotate.**
   - The connecting threads and tube connection will come apart under these conditions.
   - Use rotary type one-touch fittings (KS, KX series) in cases where sliding or rotation will occur.

2. **Use the tube at or above the minimum bending radius.**
   - Using below the minimum bending radius can cause breakage or flattening of the tube.

3. **Never use the tube for anything flammable, explosive or toxic such as gas, fuel gas, or cooling mediums, etc.**
   - Because the contents may penetrate outward.

4. **Use the suitable fittings for the tube size.**

---

### Piping

**Warning**

1. **Preparation before piping**
   - Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe. Not allowing chips of the piping thread or the seal material to go in.
   - The minimum bending radius assumes static piping. If the tube is used in a moving part, provide extra length to the tube.
   - Check the bending radius recommended by the flexible protection tube manufacturer to assure that the tube is used in the flexible protection tube.

---

### Mounting

**Caution**

1. **Confirm model number, size, etc. before installing.**
   - Check if there is damage, gouge, crack, etc. on the tube.

2. **When the tube is connected, consider factors such as changes in the tubing length due to pressure, and allow sufficient leeway.**

3. **Do not apply unnecessary forces such as twisting, pulling, moment loads, etc. on fittings and tube.**
   - This will cause damage to fittings or flattening, bursting or disconnection of the tube, etc.

4. **Mount so that the tube is not damaged due to tangling.**
   - This will cause flattening, bursting or disconnection of tube, etc.

---

### Air Supply

**Warning**

1. **Types of fluid**
   - This product is designed for use with compressed air.

2. **In case of excessive condensation**
   - Excessive condensation in compressed air may cause malfunction of pneumatic devices. Installation of an air dryer, water separator before filter is recommended.

3. **Drain flushing**
   - If condensation in the drain bowl of an air filter is not emptied on a regular basis, the condensation will enter the outlet side, causing malfunction of pneumatic devices.
   - If the drain flushing is difficult, installation of a filter with an auto-drain option is recommended.
   - For compressed air quality, refer to SMC’s “Air Preparation Equipment Model Selection Guide.”

---

### Operating Environment

**Warning**

1. **Do not use in locations having an explosive atmosphere.**

2. **Do not operate in locations where vibration or impact occurs.**

3. **In locations near heat sources, block off radiated heat.**

---

### Maintenance

**Caution**

1. **Perform periodic inspections to check the following problems and replace the tube, if necessary.**
   - a) Cracks, gouges, wearing, corrosion
   - b) Air leakage
   - c) Twists or crushing of tube
   - d) Hardening, deterioration, softening of tube

2. **Do not repair or patch the replaced tube or fittings for reuse.**
1. Confirm model number, size, etc. before installing.

2. Use the suitable fittings for the tube size.

3. Do not use in locations having an explosive atmosphere.

4. Mount fittings properly considering factors such as pulling, moment loads, etc. on fittings and tube. This will prevent the connection of the tube from slipping.

5. Check if there is damage, gouge, crack, etc. on the tube. Because the contents may penetrate outward.

6. If there is any damage, correct it or replace the tube.

7. Do not use in locations where vibration or impact occurs.

8. Drain flushing is necessary for reuse. If condensation in the drain bowl of an air filter is not emptied, installation of an air dryer, water separator before filter is recommended.

9. In case of excessive condensation, this product is designed for use with compressed air.

10. For compressed air quality, refer to SMC's "Air Preparation Equipment Model Selection Guide."

11. In cases of condensation, using a filter with an automatic drain option is recommended.

12. If the drain flushing is difficult, installation of a filter with an automatic drain is necessary.

13. Operating Environment

   a) Cracks, gouges, wearing, corrosion
   b) Air leakage
   c) Twists or crushing of tube
   d) Hardening, deterioration, softening of tube

14. Tube threading and tube connection will slide or rotate. Use products with torque to prevent this from happening.

15. In case of using the product for medical care purposes, the range of the fluid is limited to gas, fuel, etc. Do not use in locations having flammable, explosive atmospheres.

16. This product is designed only for medical purposes. (Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Fittings and Tubing Precautions. Be sure to read before handling.)

17. Check the bending radius recommended by the flexible protection tube manufacturer to assure that the tube is used in the range of the fluid.

18. The minimum bending radius assumes static piping. If the tubing thread or the seal material to go in.

19. Before piping, before washing to remove chips, cutting oil and other debris from inside the pipe. Not allowing chips of the pipe to enter the system. Before piping, be sure to wipe the tube with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe. Not allowing chips of the pipe to enter the system.

20. Because the fittings have one-touch design, they can be connected or disconnected with ease. This product is designed for use with compressed air.

21. The flexible protection tube manufacturer to assure that the tube is used in the range of the fluid.

22. The minimum bending radius assumes static piping. If the tubing thread or the seal material to go in.

23. Before piping, before washing to remove chips, cutting oil and other debris from inside the pipe. Not allowing chips of the pipe to enter the system. Before piping, be sure to wipe the tube with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe. Not allowing chips of the pipe to enter the system.

24. Check the bending radius recommended by the flexible protection tube manufacturer to assure that the tube is used in the range of the fluid.

25. The minimum bending radius assumes static piping. If the tubing thread or the seal material to go in.

26. Before piping, before washing to remove chips, cutting oil and other debris from inside the pipe. Not allowing chips of the pipe to enter the system. Before piping, be sure to wipe the tube with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe. Not allowing chips of the pipe to enter the system.