FEP Tubing (Fluoropolymer)

- Heat resistance: **200°C**
  It changes according to the operating pressure. Refer to the graph of the max. operating pressures on page 1.

- **4 Colour variations**
  - Translucent
  - Black
  - Red
  - Blue

- **8 Size variations**
  Metric size: ø4 to ø12

- **Applicable fittings**
  One-touch fittings (Series KQ2,KJ)
  Miniature fittings (Series M,MS) (Hose nipple type)
  Insert fittings (Series KF)
  High Purity Fluoropolymer fittings (Series LQ)

- Applications
  - General pneumatic piping
    - Food
    - Semiconductor
    - Medical care
    - Automobile

- Certified to current Food Sanitation Legislation
  (Ministry of Japanese Health and Safety, directive #370,1959)
FEP Tubing (Fluoropolymer)

**Series TH**

<table>
<thead>
<tr>
<th>Model</th>
<th>TH0402</th>
<th>TH0425</th>
<th>TH0604</th>
<th>TH0625</th>
<th>TH0806</th>
<th>TH1075</th>
<th>TH1008</th>
<th>TH1209</th>
<th>TH1210</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tubing O.D. (mm)</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Tubing I.D. (mm)</td>
<td>2</td>
<td>2.5</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>7.5</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Colour</td>
<td>Symbol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transparent</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red (Transparent)</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue (Transparent)</td>
<td>BU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black (Opaque)</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Specifications |

**Fluid**
- Air, Water
- Note 1: Inert gas

**Applicable fittings**
- One-touch fittings: Series KQ, KJ
- Insert fittings: Series KF
- Fluoropolymer fittings: Series LQ
- Miniature fittings: Series M, MS (Hose nipple type)

**Max. operating pressure**
- Refer to below “Max. Operating Pressure.”

**Min. bending radius (mm)**
- 15

**Operating temperature**
- Air, Inert gas: -20 to 200°C
- Water: 0 to 100°C (No freezing)

**Material**
- FEP (Fluorinated Ethylene Propylene Resin)

**How to Order**

<table>
<thead>
<tr>
<th>Metric size</th>
<th>TH0604</th>
<th>N</th>
<th>20</th>
</tr>
</thead>
</table>

**How to measure the minimum bending radius.**

At a temperature of 20°C, bend the tubing into a U shape. Fix one end and gradually move the other end closer. Measure 2R at the point where the outside diameter’s rate of change is 5%.

**Max. Operating Pressure**

Note 1: When using a fluid in liquid form, the surge pressure must not exceed the maximum operating pressure. A surge pressure higher than the maximum operating pressure can cause breakage of the fittings, or rupture of the tubing.

Furthermore, an abnormal temperature increase due to adiabatic compression can also result in ruptured tubing.

Note 2: Do not use in locations where the FEP tubing will move.

Be sure to operate under the maximum operating pressure conditions using the lower maximum operating specification of either the tubing or fittings.

After long term use or under high temperatures, some fittings leakage may occur due to material deterioration with age. Perform periodic inspections, and if any leakage is detected, replace with a new product immediately.

(Refer to maintenance part of “Tubing Precautions 1” on the page 4.)

Refer to Best Pneumatics 4 in “Fittings and Tubing” for all other precautions.

For High Purity Fluoropolymer, refer to the precautions of CAT.ES70-17, “High Purity Fluoropolymer Fittings & Tubing.”

Note 3: Minimum bending radius is measured as shown left as representative values.

Allow extra length when piping since the tubing may crush if bent more than the min. bending radius.

Note 4: Consult SMC if using any other fluids.
Chemical Resistance of the Fluoropolymer FEP Material

Chemicals in this table are inactive against FEP material \(^{Note\ 1}\), however physical properties may be effected by temperature or pressure change. Please make sure that operating conditions do not cause problems since the use of FEP tubing under chemical environment is unsecured.

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Chemical</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-nitro-2-methyl propanol</td>
<td>Sodium hypochlorite</td>
<td>Dimethyl phthalate</td>
</tr>
<tr>
<td>2-nitrobutanol</td>
<td>Carbon tetrachloride</td>
<td>Hydrofluoric acid</td>
</tr>
<tr>
<td>Pentabasic benzamide</td>
<td>Dioxane</td>
<td>Naphthalene fluoride</td>
</tr>
<tr>
<td>N-butylamine</td>
<td>Cyclohexanone</td>
<td>Nitrobenzene fluoride</td>
</tr>
<tr>
<td>N-octadecanol</td>
<td>Cyclohexane</td>
<td>Furan</td>
</tr>
<tr>
<td>N-butyl acetate</td>
<td>Dimethyl ether</td>
<td>Hexachlorehthane</td>
</tr>
<tr>
<td>O-cresol</td>
<td>Dimethylsulfoxide</td>
<td>Hexane</td>
</tr>
<tr>
<td>Di-isobutyl adipate</td>
<td>Dimethylformamide</td>
<td>Ethyl hexanoate</td>
</tr>
<tr>
<td>Acetophenone</td>
<td>Bromine</td>
<td>Phenylcarbinol</td>
</tr>
<tr>
<td>Acetone</td>
<td>Deionized water</td>
<td>Benzaldehyde</td>
</tr>
<tr>
<td>Alilnine</td>
<td>Nitric acid</td>
<td>Benzonitrile</td>
</tr>
<tr>
<td>Abietic acid</td>
<td>Mercury</td>
<td>Borax</td>
</tr>
<tr>
<td>Sulphuric chloride</td>
<td>Ammonium hydroxide</td>
<td>Boric acid</td>
</tr>
<tr>
<td>Isooctane</td>
<td>Potassium hydroxide</td>
<td>Formic aldehyde (Formalin)</td>
</tr>
<tr>
<td>Liquid ammonia</td>
<td>Sodium hydroxide</td>
<td>Acrylic anhydride</td>
</tr>
<tr>
<td>Ethyl alcohol</td>
<td>Cetane</td>
<td>Acetic anhydride</td>
</tr>
<tr>
<td>Ethyl ether</td>
<td>Soap, detergent</td>
<td>Methacrylic acid</td>
</tr>
<tr>
<td>Ethylene glycol</td>
<td>Diethyl sebacate</td>
<td>Allyl methacrylate</td>
</tr>
<tr>
<td>Ethylenediamine</td>
<td>Diethyl carbonate</td>
<td>Vinyl methacrylate</td>
</tr>
<tr>
<td>Zinc chloride</td>
<td>Tetrachloroethylene</td>
<td>Methyl alcohol</td>
</tr>
<tr>
<td>Aluminum chloride</td>
<td>Tetrahydrofuran</td>
<td>Methyl ethyl ketone</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>Tetrabromoethane</td>
<td>Methylene chloride</td>
</tr>
<tr>
<td>Calcium chloride</td>
<td>Triethanolamine</td>
<td>Sulphuric acid</td>
</tr>
<tr>
<td>Sulphuric chloride</td>
<td>Trichloroethylene</td>
<td>Phosphoric acid</td>
</tr>
<tr>
<td>Iron chloride (III)</td>
<td>Trichloroacetic acid</td>
<td>Iron phosphate (III)</td>
</tr>
<tr>
<td>Benzoyl chloride</td>
<td>Toluene</td>
<td>Tri-n-butyl phosphate</td>
</tr>
<tr>
<td>Magnesium chloride</td>
<td>Naphtha</td>
<td>Tricesyl phosphate</td>
</tr>
<tr>
<td>Hydrochloric acid</td>
<td>Naphthalene</td>
<td></td>
</tr>
<tr>
<td>Chlorine (absolute)</td>
<td>Naphthol</td>
<td></td>
</tr>
<tr>
<td>Aqua regia</td>
<td>Lead</td>
<td></td>
</tr>
<tr>
<td>Ozone</td>
<td>Carbon dioxide</td>
<td></td>
</tr>
<tr>
<td>Hydrogen peroxide</td>
<td>Nitrogen dioxide</td>
<td></td>
</tr>
<tr>
<td>Natrum peroxide</td>
<td>Nitrobenzene</td>
<td></td>
</tr>
<tr>
<td>Gasoline</td>
<td>Nitromethane</td>
<td></td>
</tr>
<tr>
<td>Permanganate</td>
<td>Perchloroethylene</td>
<td></td>
</tr>
<tr>
<td>Formic acid</td>
<td>Perchloroxylene</td>
<td></td>
</tr>
<tr>
<td>Xylene</td>
<td>Unsymmetrical dimethylhydrazine</td>
<td></td>
</tr>
<tr>
<td>Chromic acid</td>
<td>Hydrazine</td>
<td></td>
</tr>
<tr>
<td>Chlorosulfonic acid</td>
<td>Pinene</td>
<td></td>
</tr>
<tr>
<td>Chloroform</td>
<td>Piperidine</td>
<td></td>
</tr>
<tr>
<td>Paraffinum liquidum</td>
<td>Glacial acetic acid (Acetic acid)</td>
<td></td>
</tr>
<tr>
<td>Allyl acetate</td>
<td>Pyridine</td>
<td></td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>Phenol</td>
<td></td>
</tr>
<tr>
<td>Potassium</td>
<td>Phthalic acid</td>
<td></td>
</tr>
<tr>
<td>Butyl acetate</td>
<td>Dybutyl phthalate</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) “Inactive in chemistry terminology” means - not to cause any chemical reaction.

Reference cited: Teflon®, the fluoropolymer handbook, Manual for the chemical applications of Teflon®, Du Pond-Mitsui Fluorochemicals Co., Ltd.

Teflon® is a registered trademark for the fluoropolymer produced by E.I du Pont de Nemours & Company (Inc.) and Du Pond-Mitsui Fluorochemicals Co., Ltd.
These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by a label of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠️ 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 possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power – General rules relating to systems
Note 2) JIS B 8370: Pneumatic system axiom

⚠️ Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications. Since the products specified here are used in various operating conditions, their compatibility with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalogue information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment. Compressed air can be dangerous if handled incorrectly. Assembly, handling or maintenance of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.
   1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driven object have been confirmed.
   2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
   3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

4. Contact SMC if the product is to be used in any of the following conditions:
   1. Conditions and environments beyond the given specifications, or if product is used outdoors.
   2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuit in press applications, or safety equipment.
   3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.
**Series TH**

**Tubing Precautions**

Be sure to read before handling. Refer to page 3 for Safety Instructions.

---

### Selection

**Warning**

1. Confirm the specifications.

   The products appearing in this catalogue are designed for use only in compressed air systems (including vacuum).
   Do not use outside the specified ranges of pressure, temperature, etc., as this may cause damage or malfunction. (Refer to specifications.)
   SMC cannot assure the product quality when fluids other than air, water and inert gas are used.
   Consult with SMC for details.

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 contact with human bodily fluids, body tissues or transfer applications to a human living body.

---

### Air Supply

**Warning**

1. Types of fluid

   This product is designed for use with compressed air. Consult SMC if a different fluid is to be used.
   Consult SMC regarding products for use with general purpose fluids, to confirm which fluids can be used.

2. When there is a large amount of drainage.

   Compressed air containing a large amount of drainage can cause the malfunction of pneumatic equipment. An air dryer or Drain Catch should be installed upstream from filters.

3. Drain management

   If air filter drains are not flushed regularly, the drainage will flow downstream leading to the malfunction of pneumatic equipment.
   In cases where the management of drain flushing will be difficult, the use of filters with automatic drains is recommended.
   For details on the quality of compressed air mentioned above, refer to SMC's "Best Pneumatics" catalogue vol. 4.

---

### Operating Environment

**Warning**

1. Do not operate in locations in an explosive atmosphere.
2. Do not operate in locations where vibration or impact occurs.
3. In locations near heat resources, block off radiant heat.

---

### Maintenance

**Caution**

1. Check for the following during regular maintenance, and replace components as necessary.
   a) Scratches, gouges, abrasion, corrosion
   b) Leakage
   c) Twisting, flattening or distortion of tubing
   d) Hardening, deterioration or softness of tubing
2. Do not repair or patch the replaced tubing or fittings for reuse.
3. When using insert or miniature fittings over a long period, some leakage may occur due to age deterioration of the materials.
   Perform periodic inspections, and if any leakage is detected, correct the problem by additional tightening. If tightening becomes ineffective, replace the fittings with a new product immediately.

---

### Piping

**Caution**

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. Do not allow chips of the piping thread or the seal material to go in.
EUROPEAN SUBSIDIARIES:

Austria
SMC Pneumatik GmbH (Austria).
Girskistrasse 8, A-2100 Korneuburg
Phone: +43 2262-62285, Fax: +43 2262-62285
E-mail: office@smc.at
http://www.smc.at

Belgium
SMC Pneumatics N.V./S.A.
Nijverheidstraat 25, B-2160 Wommelgem
Phone: 03-355-1464, Fax: 03-355-1466
E-mail: post@smcneumatics.be

Bulgaria
SMC Industrial Automation Bulgaria o.o.d.
Witnia str., bl. 89, entr. V app. 41, BG-1517 Sofia
E-mail: sales@smc.bg
http://www.smc.bg

Czech Republic
SMC Pneumatic A/S
Kudusminde 4B, DK-8300 Odder
Phone: (45)70252900, Fax: (45)70252901
E-mail: smc@smc-pneumatik.dk

DENMARK

Estonia
SMC Pneumatics Estonia OÜ
Laiki 12-101, 106 21 Tallin
Phone: 06 593540, Fax: 06 593541
http://www.smcneumatics.ee

Finland
SMC Pneumatics Finland OY
PL72, Tistinsilintie 4, SF-02031 ESPOO
Phone: 09-859 580, Fax: 09-859 6595
http://www.smcfipec.ifi

France
SMC Pneumatics S.A.
1, Boulevard de Strasbourg, Parc Gustave Eiffel
Bussy Saint Georges
F-77007 Marne La Vallée Cedex 3
Phone: 01-6476 1000, Fax: 01-6476 1010

Germany
SMC Pneumatik GmbH
Boschring 13-15, D-83329 Egelsbach
Phone: 06103-4020, Fax: 06103-402139
E-mail: info@smc-pneumatik.de
http://www.smc-pneumatik.de

Greece
S. Panaropoulus S.A.
7, Konstantinoupoles Street,
GR-11855 Athens
Phone: 01-3426076, Fax: 01-3455578

Hungary
SMC Hungária Ipari Automatizálási Kft.
Budaköd ut 107-113, H-1117 Budapest
Phone: +36 1 3771343, Fax: +36 1 3771344
E-mail: office@smc-automation.hu
http://www.smc-automation.hu

Ireland
SMC Pneumatics (Ireland) Ltd.
2002 Citywest Business Campus,
Naas Road, Saggart, Co. Dublin
Phone: 01-463 5000, Fax: 01-464-0500

Italy
SMC Italia S.p.A.
Via Garibaldi 62, I-20061 Carugate, (Milano)
Phone: 02-92711, Fax: 02-9271365
E-mail: mailbox@smcitalia.it
http://www.smcitalia.it

Latvia
SMC Pneumatics Laba SIA
Smerla 1-705, Riga LV-1006, Latvia
Phone: 0777-94, Fax: 0777-94-75
http://www.smclv.lv

Lithuania
UAB Oltenergas
Savonari pr. 180, LT-2600 Vilius, Lithuania
Phone/Fax: 370-2651602

Netherlands
SMC Pneumatics BV
De Ruyterkade 120, N-1011 AB Amsterdam
Phone: 020-5318888, Fax: 020-5318880
E-mail: info@smcpneumatics.nl
http://www.smc-norge.no
http://www.smc.org

Poland
SMC Industrial Automation Polska Sp.z.o.o.
ul. Konstruktorska 11A, PL-02-673 Warszawa
Phone: +48 22 548 5087, Fax: +48 22 548 5087
E-mail: office@smc.pl
http://www.smc.pl

Portugal
SMC Pneumatics Portugal, S.A.
R. da Engº Ferreira Dias 452, 4100-246 Porto
Phone: 22-610-89-22, Fax: 22-610-89-38
E-mail: postpt@smc.smces.es
http://www.smc Portugal

Romania
SMC Romania srl
Str Frunzei 29, Sector 2, București
Phone: 01-324-2626, Fax: 01-324-2627
E-mail: smccadm@canad.ro
http://www.smcromania.ro

Russia
SMC Pneumatics LLC,
36/40 Sredny pr. St. Petersburg 199004
Phone: (812) 118 5449, Fax: (812) 118 5449
E-mail: smcfa@peterlink.ru
http://www.smc-pneumatics.co.uk

Slovakia
SMC Priemyselna Automatizaciya, s.r.o.
Námestie Martina Benku 10
SK-81107 Bratislava
Phone: +421 2 444 56028, Fax: +421 2 444 56028
E-mail: office@smc.sk
http://www.smc.sk

Spain
SMC Industrias Pneumaticas, S.A.
Avenida de Laredo, 11, 28230 Las Rozas (Madrid)
Phone: +34 91 785 7820, Fax: +34 91 785 7820
E-mail: office@smc-industrial.com
http://www.smc-industrial.com

Sweden
SMC Pneumatics Sweden AB
Elihagsvägen 29-31, S-141 71 Huddinge
Phone: 08-603 07 00, Fax: 08-603 07 10
http://www.smc.nu

Norway
SMC Industrial Automation Poljska Sp.z.o.o.
ul. Konstruktorska 11A, PL-02-673 Warszawa
Phone: +48 22 548 5087, Fax: +48 22 548 5087
E-mail: office@smc.pl
http://www.smc.pl

Turkey
Perpa Tic. Merkez. Kat: 11 No: 1625,
TR-80270 Okmeydani Istanbul
Phone: 0212-221-1512, Fax: 0212-221-1519
http://www.enteke.com.tr

UK
SMC Pneumatics (UK) Ltd
Vincent Avenue, Crownhill,
Milton Keynes, MK5 8AN
Phone: 0800 1382930 Fax: 01908-555064
E-mail: sales@smcneumatics.co.uk
http://www.smcneumatics.co.uk

OTHER SUBSIDIARIES WORLDWIDE:
ARGENTINA, AUSTRALIA, BOLIVIA, BRASIL, CANADA, CHILE, CHINA, HONG KONG, INDIA, MALAYSIA, MEXICO, NEW ZEALAND,
PHILIPPINES, SINGAPORE, SOUTH KOREA, TAIWAN, THAILAND, USA, VENEZUELA

http://www.smceu.com
http://www.smceu.com