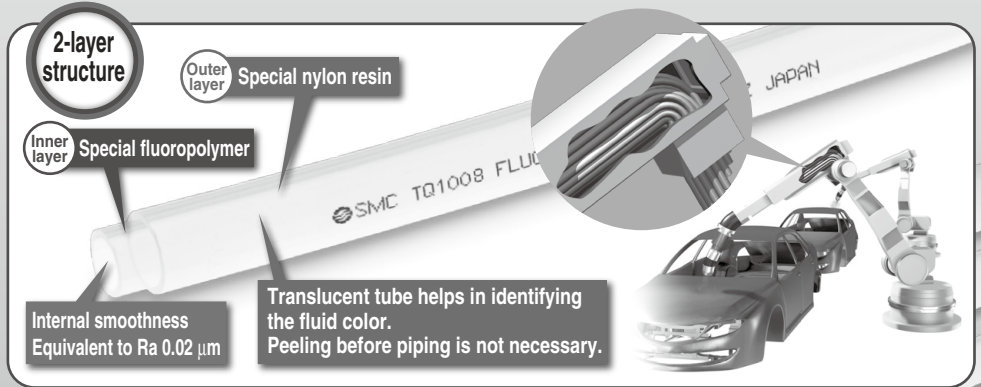


# 2-Layer Soft Fluoropolymer Tubing

## TQ Series

RoHS

Carries fluid such as solvent with a soft and abrasion resistant tube.



### Flexibility

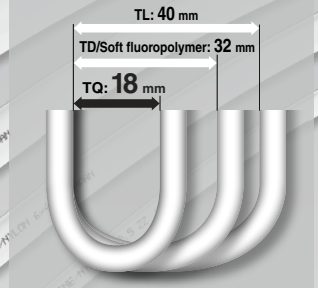
Improved by up to **55%\***

Minimum bending radius (Tube close bend radius)

TQ: **9 mm** ← TL: **20 mm**

(Fluoropolymer Tubing, Super PFA)

\*1. Compared with SMC Fluoropolymer Tubing/TL ( $\phi 6 \times \phi 4$ )



### Wearing of outer layer tube

Reduced to **1/30**

TQ: **1  $\text{mg}^{-2}$**  ← TL: **30  $\text{mg}^{-2}$**

(Fluoropolymer Tubing)

\*2. Based on friction test of tubes

### Light weight

Weight reduced by approximately **44%\*3**

\*3. 2-Layer Soft Fluoropolymer Tubing (TQ): 26.5 g/m  
Fluoropolymer Tubing (TL): 47 g/m ( $\phi 8 \times \phi 6$ )

### Applications

Automobile

Semiconductor

Food

Medical

Machine tools

### Series Variations

Designation	TQ0425	TQ0604	TQ0806	TQ1008	TQ1209
O.D. (mm)	4	6	8	10	12
I.D. (mm)	2.5	4	6	8	9
20 m roll	●	●	●	●	●
100 m roll	●	●	●	●	●

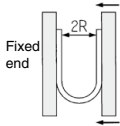
# 2-Layer Soft Fluoropolymer Tubing

## TQ Series

RoHS



### How to measure the minimum bending radius



Bend the tube into a U shape at a temperature of 20°C. Fix one end and bend the loop gradually at 100 mm/min. Measure 2R when the tube breaks or is crushed.

### How to Order

**TQ0425** - **20**

Tubing designation

Symbol	Length
<b>20</b>	20 m
<b>100</b>	100 m

Length per roll

### Applicable Fluid List

Fluid in the list below are chemically inert <sup>Note 1)</sup>, to tubing material. Possible physical effects may occur such as penetration and swelling due to temperature, pressure and chemical density. To use tubing in a solvent environment, tests should be performed with the same environment to ensure no problem occurs with operating environment.

Chemical	Inner layer Special fluoropolymer	Outer layer Special nylon resin	Chemical	Inner layer Special fluoropolymer	Outer layer Special nylon resin
Hydrochloric acid	○	△	Citric acid	○	△
Sulfuric acid	○	△	Stearic acid	○	△
Nitric acid	○	x	Formic acid	○	△
Caustic soda	○	△	Ethyl acetate	○	○
Caustic potash	○	△	Butyl acetate	○	△
Ammonium hydroxide	○	○	Methyl alcohol	○	○
Hydrogen peroxide	○	△	Ethyl alcohol	○	○
Water	○	○	Butyl alcohol	○	○
Phenol	○	x	Isopropyl alcohol	○	○
Benzene	○	△	Cellosolve	△	△
Toluene	○	△	Hexane	○	△
Xylene	○	△	Cyclohexane	○	△
Carbon tetrachloride	○	x	Mineral oil ASTM No.3	○	○
Acetone	○	△	Naphtha	○	○
Methyl ethyl ketone	○	△			

Note 1) "Chemically inert" means – not to cause any chemical reaction.

Note 2) Criteria: ○ Applicable, △ Not recommended, x Inapplicable

Note 3) Applicable Fluid List shows the reference value based on test results performed under specific conditions. Application for products is not guaranteed.

Note 4) Applicable Fluid List is for tube materials. For use in environments containing solvents, please contact SMC.

### Specifications

Designation	TQ0425	TQ0604	TQ0806	TQ1008	TQ1209
O.D. (mm)	4	6	8	10	12
I.D. (mm)	2.5	4	6	8	9
Roll	20 m	●	●	●	●
	100 m	●	●	●	●
Color <sup>Note 1)</sup>	Translucent (Material color)				
Fluid <sup>Note 2)</sup>	Air, Water, Inert gas, Solvent				
Applicable fittings <sup>Note 3,7)</sup>	Insert fittings KF, KFG2, VCK series Miniature fittings M, MS series (Hose nipple type) Fluoropolymer fittings LQ1, LQ3 series <sup>Note 6)</sup>				
Max. operating pressure (MPa) <sup>Note 4)</sup>	20°C				
	2.0	1.9	1.5	1.1	1.2
Min. bending radius (tube close bend radius) <sup>Note 5)</sup> (mm)	4	9	26	42	37
Fluid temperature (fixed usage)	Air, Inert gas: -20 to 100°C, Water, Solvent: 0 to 70°C (No freezing)				
Material	Inner layer: Special fluoropolymer, Outer layer: Special nylon resin				

Note 1) There may be plasticizer (white powder) deposits on the external surface of the tube. Please be careful when the tube is used in clean rooms. Otherwise, the clean level may decrease.

Note 2) When solvent is used, make sure to test in the same environment as the actual operating environment, and confirm that no problem will occur in the operating conditions. The standard value of the Applicable Fluid List below is the reference value based on the test result performed under specific conditions.

The product can be physically affected by temperature, pressure, chemical density, etc, causing permeation or swelling, and this may cause some problems.

Note 3) Perform periodic maintenance inspections. If leakage continues to occur after tightening, replace the tube with a new one. (Refer to Maintenance in the Specific Product Precautions on page 717.)

When the tube rotates, perform a test to make sure no problem occur in the actual operating conditions. When the product is used with motion for a long time, or at a high temperature, the tubes may have leakage due to deterioration of the materials.

Note 4) Observe the lesser value of the maximum operating pressure between the tubing and fitting. The surge pressure must not exceed the maximum operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to tubes and fittings. Furthermore, abnormal temperature rise caused by adiabatic compression may result in the tube bursting.

Note 5) Minimum bend radius (tube close bend radius) is not guaranteed. The value of 2R in the left figure is measured with a bent or flattened tube.

Note 6) For the installation of fluoropolymer fitting LQ1 and LQ3, please contact SMC.

Note 7) A fitting that seals the outer diameter of the tube such as One-touch fitting is not applicable since it is in contact with the wetted part of the external layer nylon material.

### Max. Operating Pressure

Temperature (°C)	TQ0425	TQ0604	TQ0806	TQ1008	TQ1209
-20 to 20	2.0	1.9	1.5	1.1	1.2
30	1.7	1.6	1.2	0.9	1.0
40	1.4	1.4	1.0	0.8	0.9
50	1.2	1.1	0.8	0.6	0.8
60	1.1	1.0	0.7	0.5	0.7
70	1.0	0.9	0.6	0.4	0.6
80	0.9	0.8	0.5	0.4	0.5
90	0.8	0.7	0.4	0.3	0.4
100	0.7	0.6	0.4	0.3	0.3

Unit: MPa



# TQ Series Specific Product Precautions

Be sure to read this before handling the products.

Refer to page 11 for safety instructions and pages 14 to 18 for fittings and tubing precautions.

## Selection

### ⚠ Warning

#### 1. Check the specifications.

Give careful consideration to operating conditions such as the application, fluid and environment, and use within the operating ranges specified in this catalog. Tube may burst or lead to operation failure if operating conditions are out of the specification range. The specifications of the catalog are designed assuming the product is used with the fixed conditions.

#### 2. When using the product for medical care

This product is designed for use with compressed fluid 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.

#### 3. Maintenance

Perform periodic maintenance inspections, securing enough space for maintenance.

### ⚠ Caution

#### 1. When toxic solvent is used, make sure to test in the same environment as the actual operating environment, and confirm that no problem will occur in the operating conditions.

#### 2. When the joint of the tube or fitting rotates, make sure to test it in the same environment as the actual operating environment, and confirm that no problems will occur in the operating conditions.

#### 3. The surge pressure must not exceed the maximum operating pressure.

#### 4. There may be plasticizer (white powder) deposits on the external surface of the tube. Please be careful when the tube is used in clean rooms. Otherwise, the clean level may decrease.

#### 5. If fittings of brands other than SMC are used, be sure to confirm that no problem will occur with the operating conditions.

#### 6. Trademark, product number, the material of inner/outer layer, O.D. x I.D. size, production lot number, and country of origin are printed in 500 mm intervals on the outer surface of the tube. Printed letters may be erased depending on fluid.

## Mounting

### ⚠ Caution

#### 1. Check the model number, size, etc. before installing. Check tubing for damage, gouges, cracks, etc.

#### 2. Before piping, perform air blow (flushing) or cleaning to remove any dust, etc. from the piping.

#### 3. There may be plasticizer (white powder) deposits on the surface of the tube, but there is no impact on performance.

#### 4. Cut the tube perpendicularly using a tube cutter. If the tube is cut incorrectly, fluid can leak or the tube can fall out as a result.

#### 5. When connecting tubing, allow a sufficient margin considering the change of tube diameter and length due to pressure.

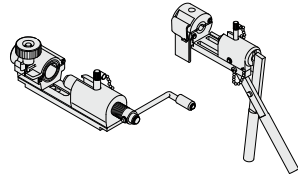
#### 6. Do not apply unnecessary forces such as twisting, pulling, moment loads on fittings or tubing. It may cause leakage, the fitting to fracture or the tube to be crushed, burst or fall off.

## Mounting

### ⚠ Caution

#### 7. Mount so that tubing is not damaged due to tangling and abrasion. This can cause flattening, bursting or disconnection of tubing, etc. If the LQ1 or LQ3 fitting is used, connect the tube with the specialized tool.

Refer to the pamphlet "High-Purity Fluoropolymer Fittings HYPER FITTING/LQ1, 2 series Work Procedure Instructions" (M-E05-1) or "High Purity Fluoropolymer Fittings Hyper Fitting / Flare Type LQ3 series Fitting Procedure" (M-E06-4) for connecting tubing and special tools. (Downloadable from our website)



## Operating Environment

### ⚠ Warning

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

#### 2. When vibration or impact is applied, make sure to test in the same environment as the actual operating environment, and confirm that no problem will occur in the operating conditions.

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

## Maintenance

### ⚠ Caution

#### 1. Check the following after the initial installation and for each periodic inspection. If any problem is confirmed, replace the tube with a new product or reconsider the customer's operating conditions.

- Cracks, gouges, wearing, corrosion
- Leakage, penetration, dissolution
- Twists or crushing of tubing
- Hardening, deterioration, softening of tubing

\* There may be plasticizer (white powder) deposits on the surface of the tube, but there is no impact on performance.

#### 2. The two layers of the tube are completely bonded. If separation is confirmed between them, replace the tube with a new one or reconsider the customer's operating conditions.

#### 3. If the tube and the fitting are removed or replaced, eliminate the residual fluid with air or water.

#### 4. When using insert, miniature or fluoropolymer fittings over a long period, some leakage may occur due to age deterioration of the materials. If any leakage is detected, correct the problem by additional tightening. If tightening becomes ineffective, replace the fittings with a new product immediately.

#### 5. Do not repair or patch the replaced tubing or fittings for reuse.