

Soft Fluoropolymer Tubing

- **Flexibility: Approx. 20% improved**

* SMC comparison (with fluoropolymer tubing TL/TIL series)

- **Applications**

- Food • Semiconductor
- Life Science • Automobile
- Machine Tool

- **Conforms to Food Sanitation Law**

- Passed Japan's Food Sanitation Law test from 1959.
- Passed the United States FDA (Food and Drug Administration) elution test §177-1550.



Material

- **Denatured PTFE**

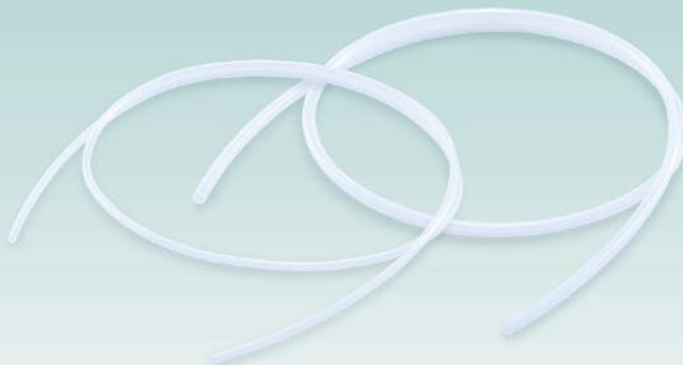
Operating temperature ^{Note)}

- **MAX. 260°C**

Note) Varies depending on the operating pressure. See the maximum operating pressure graph on page 1 and 2.

- **Available in 10 sizes**

- Metric size: $\varnothing 4$ to $\varnothing 12$
- Inch size: 1/8" to 1/2" ($\varnothing 3.18$ to $\varnothing 12.7$)



Series **TD/TID**

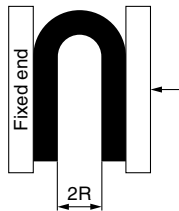


Soft Fluoropolymer Tubing Metric Size Series TD

Model/Specifications

Size		Metric size				
Model		TD0425	TD0604	TD0806	TD1075	TD1209
Tubing O.D. (mm)		4	6	8	10	12
Tubing I.D. (mm)		2.5	4	6	7.5	9
Roll	10 m	●	●	●	●	●
	20 m	●	●	●	●	●
Color		Translucent (material colour)				
Fluid ^{Note 1)}		Air, Water, Inert gas				
Applicable fittings ^{Note 2)}		Insert fitting KF series Stainless steel 316 insert fitting KFG series Miniature fittings M, MS series (Hose nipple type) Fluoropolymer fitting LQ2 series				
Max. operating pressure (MPa)	20°C	1.6	1.4	0.9	0.9	0.9
	100°C	0.9	0.7	0.5	0.5	0.5
	200°C	0.45	0.35	0.25	0.25	0.25
	260°C	0.23	0.2	0.15	0.15	0.15
Min. bending radius (mm) ^{Note 3)}	Recommended radius	15	25	45	55	75
	Refraction value	8	16	31	35	41
Max. operating temperature (fixed usage)		260°C				
Material		Denatured PTFE (Polytetrafluoroethylene resin)				

How to measure the minimum bending radius



Bend the tube into the U-form at a temperature of 20°C. Fix one end and close loop gradually. Measure 2R when the deformed ratio of the tube diameter at bending reaches 5%.

Note 1) When using a liquid fluid, the surge pressure must be under the maximum operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes. Furthermore, abnormal temperature rise caused by adiabatic compression may result in the tube bursting.

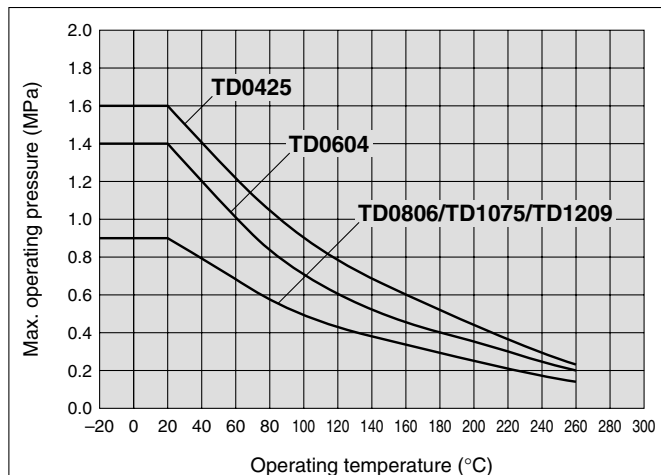
Note 2) Do not use this product in a manner in which the tube is not fixed.

Observe the lesser value of the maximum operating pressure between the tube and fitting. A material change over a long duration or due to high-temperature may cause leakage. Perform periodic maintenance and replace with a new product immediately when abnormalities are detected. Refer to the "Maintenance" precautions in the TD/TID tubing. For other precautions, see the "Fittings & Tubing" precautions in the "Best Pneumatics catalogue". When using the fluoropolymer fittings, please refer to the precautions in the relevant catalogue CAT. ES70-17.

Note 3) The minimum bending radius is the representative value measured as shown below.

- Use a tube above the recommended minimum bending radius.
- The tube may be bent if used under the recommended minimum bending radius. Therefore, refer to the refraction value and make sure that the tube is not bent or flattened.
- Please note that the refraction value is not warranted because of the value when 2R is measured by the method shown above on the left if the tube is bent or flattened, etc.

Maximum Operating Pressure



How to Order

Metric size

TD0425 - **10**

• Length per roll

Symbol	Length
10	10 m roll
20	20 m roll

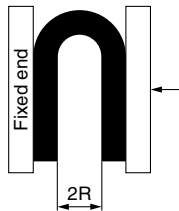
• Tubing model

Soft Fluoropolymer Tubing Inch Size Series *TID*

Model/Specifications

Size		Inch size				
Model		TID01	TID05	TID07	TID11	TID13
Tubing O.D.	inch	1/8"	3/16"	1/4"	3/8"	1/2"
	mm	3.18	4.75	6.35	9.53	12.7
Tubing I.D.	inch	0.086"	0.124" (1/8")	0.156" (5/32")	0.25" (1/4")	0.374" (3/8")
	mm	2.18	3.15	3.95	6.33	9.5
Roll	8 m	●	●	●	●	●
	16 m	●	●	●	●	●
Color	Translucent (material colour)					
Fluid ^{Note 1)}	Air, Water, Inert gas					
Applicable fittings ^{Note 2)}	Fluoropolymer fitting LQ2 series					
Max. operating pressure (MPa)	20°C	1.4	1.4	1.6	1.4	0.9
	100°C	0.7	0.7	0.9	0.7	0.5
	200°C	0.35	0.35	0.45	0.35	0.25
	260°C	0.2	0.2	0.23	0.2	0.15
Min. bending radius (mm) ^{Note 3)}	Recommended radius	15	20	25	40	75
	Refraction value	9	10	15	23	42
Max. operating temperature (fixed usage)	260°C					
Material	Denatured PTFE (Polytetrafluoroethylene resin)					

How to measure the minimum bending radius



Bend the tube into the U-form at a temperature of 20°C. Fix one end and close loop gradually. Measure 2R when the deformed ratio of the tube diameter at bending reaches 5%.

Note 1) When using a liquid fluid, the surge pressure must be under the maximum operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes. Furthermore, abnormal temperature rise caused by adiabatic compression may result in the tube bursting.

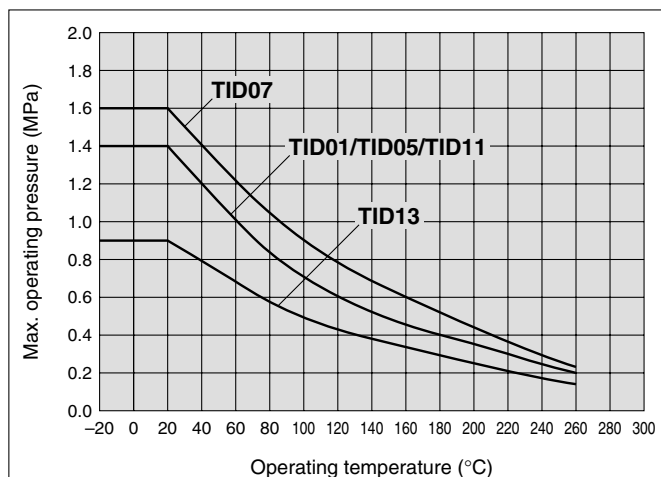
Note 2) Do not use this product in a manner in which the tube is not fixed.

Observe the lesser value of the maximum operating pressure between the tube and fitting. A material change over a long duration or due to high-temperature may cause leakage. Perform periodic maintenance and replace with a new product immediately when abnormalities are detected. Refer to the "Maintenance" precautions in the TD/TID tubing. For other precautions, see the "Fittings & Tubing" precautions in the "Best Pneumatics" catalogue. When using the fluoropolymer fittings, please refer to the precautions in the relevant catalogue CAT. ES70-17.

Note 3) The minimum bending radius is the representative value measured as shown below.

- Use a tube above the recommended minimum bending radius.
- The tube may be bent if used under the recommended minimum bending radius. Therefore, refer to the refraction value and make sure that the tube is not bent or flattened.
- Please note that the refraction value is not warranted because of the value when 2R is measured by the method shown above on the left if the tube is bent or flattened, etc.

Maximum Operating Pressure



How to Order

Inch size

TID01 - 8

• Length per roll

Symbol	Length
8	25 ft (8 m) roll
16	50 ft (16 m) roll

• Tubing model



Applicable Fluid List

Chemical resistance of Fluoropolymer denatured PTFE material

Chemicals in the list below are chemically inert ^{Note)} to denatured PTFE material. Possible physical effects may occur such as penetration and swelling due to temperature, pressure and chemical concentration.

To use modified PTFE tube in a chemical environment, tests should be performed with the same environment to ensure no problem occurs with operating environment.

1,1,1-Trichloroethane	Formic acid	Trichloroethylene
1,1,2-Trichloroethane	Ethyl formate	Trichloroacetic acid
1,2,3-Trichloropropane	Propyl formate	Toluene
1,2-Dichlorobutane	Methyl formate	Naphtha
2,4-Dichlorotoluene	Xylene	Carbon dioxide
2-chloropropane	Glycol	Nitrogen dioxide
2-nitro-2-methylpropane	Glycerine	Nitrobenzene
2-nitrobutanol	Cresol	Nitromethane
Pentabasic benzamide	Chromic acid	Carbon disulfide
Hydrochlorofluorocarbon-22	Chloroacetic acid	Piperidine
N-octadecanol	Chlorosulfonic acid	Pyridine
N-butylamine	Chloroform	Pyrogallol
o-chlorotoluene	Paraffinum liquidum	Phenol
Isobutyl adipate	Acetate	Butanol
Acetyl chloride	Amyl acetate	Phthalic acid
Acetophenone	Ethyl acetate	Hydrofluoric acid
Acetone	Potassium	Furan
Aniline	Butyl acetate	Ethyl propionate
Sulfurous acid gas	Propyl acetate	Propyl propionate
Allyl chloride	Methyl acetate	Methylpropionate
Benzoic acid	Salicylic acid	Propylene chloride
Ammonium	Sodium hypochlorite	Bromobenzene
Sulfur	Diisobutyl ketone	Hexachlorethane
Isoamyl alcohol	Diethylamine	Hexane
Isooctane	Carbon tetrachloride	Heptane
Ethanol	Dioxane	Benzyl alcohol
Ethyl ether	Cyclohexanone	Benzaldehyde
Ethylene glycol	Cyclohexane	Benzine
Ethylene chloride	Dichloroethylene	Benzoyl chloride
Ethylenediamine	Dichloropropylene	Benzonitrile
Zinc chloride	Dibutyl phthalate	Pentachloroethane
Aluminum chloride	Dimethyl ether	Boric acid
Ammonium chloride	Dimethylsulfoxide	Sodium boric acid
Calcium chloride	Dimethylformamide	Formaldehyde
Ferrous chloride	Hydrobromic acid	Acetic anhydride
Mercuric chloride	Potassium dichromate	Methanol
Stannous chloride	Bromine	Methyl ether
Ferric chloride	Deionized water	Methyl ethyl ketone
Cupric chloride	Nitric acid	Methylene chloride
Sodium chloride	Ammonium hydroxide	Ethyl butyrate
Magnesium chloride	Potassium hydroxide	Methyl butyrate
Hydrochloric acid	Sodium hydroxide	Hydrogen sulfide
Chlorine	Soap, detergent	Sulphuric acid
Aqua regia	Diethyl carbonate	Zinc sulfate
Ozone	Sodium carbonate	Ammonium sulfate
Oleic acid	Tetrachloroethane	Ferrous sulfate
Perchlorate	Tetrachloroethylene	Copper sulfate
Hydrogen peroxide	Tetrahydrofuran	Phosphoric acid
Natrium peroxide	Tetrabromoethane	Sodium phosphate
Gasoline	Triethanolamine	
Potassium permanganate	Triethylamine	


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





Series *TD/TID*

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels 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 the 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 for the specific pneumatic system must be based on specifications or post analysis and/or tests to meet the specific requirements. The expected performance and safety assurance are 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 repair 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 objects have been confirmed.
2. When equipment is removed, confirm that safety process as mentioned above. Turn off 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 quick extension of a cylinder piston rod, etc.

4. If the equipment will be used in the following conditions or environment, please contact SMC first and be sure to take all necessary safety precautions.

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 circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, requiring special safety analysis.

■ Exemption from Liability

1. SMC, its officers and employees shall be exempted from liability for any loss or damage arising out of earthquakes or fire, action by a third person, accidents, customer error with or without intention, product misuse, and any other damages caused by abnormal operating conditions.
2. SMC, its officers and employees shall be exempted from liability for any direct or indirect loss or damage, including consequential loss or damage, loss of profits, or loss of chance, claims, demands, proceedings, costs, expenses, awards, judgments and any other liability whatsoever including legal costs and expenses, which may be suffered or incurred, whether in tort (including negligence), contract, breach of statutory duty, equity or otherwise.
3. SMC is exempted from liability for any damages caused by operations not contained in the catalogues and/or instruction manuals, and operations outside of the specification range.
4. SMC is exempted from liability for any loss or damage whatsoever caused by malfunctions of its products when combined with other devices or software.



Series TD/TID Tubing Precautions

Be sure to read this before handling.

Selection

⚠ Warning

1. Confirm the specifications.

Products represented in this catalogue are designed only for use in compressed air systems (including vacuum). Do not operate at pressures or temperatures, etc., 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 contact with human bodily fluids, body tissues or transfer applications to a human living body.

⚠ Caution

1. Do not use in locations where the connecting threads and tubing connection will slide or rotate.

The connecting threads and tubing connection will come apart under these conditions.

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

3. Never use the tubing for anything flammable, explosive or toxic such as gas, fuel gas, or cooling mediums etc.

Because the contents may penetrate outward.

4. Use the fittings applicable to the tubing size.

Mounting

⚠ Caution

1. Confirm model no., size, etc. before installing.

Check tubing for damage, gouges, cracks, etc.

2. When tubing 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 or tubing.

This will cause damage to fittings and will crush, burst or release tubing.

4. Mount so that tubing is not damaged due to tangling and abrasion.

This can cause flattening, bursting or disconnection of tubing, etc.

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. Not allowing chips from the piping thread or the seal material to go in.

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 a compressed air system may cause pneumatic equipment to malfunction. Installation of an air dryer, water separator before filter is recommended.

3. Drain flushing

If condensation in the drain bowl is not emptied on a regular basis, the bowl will overflow and allow the condensation to enter the compressed air lines. It causes malfunction of pneumatic devices.

If the drain bowl is difficult to check and remove, installation of a drain bowl with an auto drain option is recommended.

For compressed air quality, refer to our "Best Pneumatics" catalogue.

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. Reform periodic inspections to check the following problems and replace tubing, if necessary.

- 1) Cracks, gouges, wearing, corrosion
- 2) Air leakage
- 3) Twists or crushing of tubing
- 4) Hardening, deterioration, softening 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. If any leakage is detected, correct the problem by additional tightening.

If tightening becomes ineffective, replace the fittings with a new product immediately.



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