

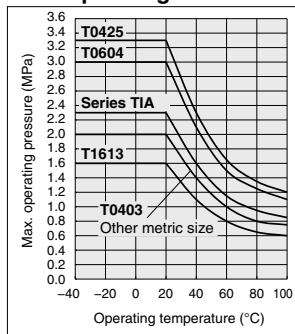
# Nylon Tubing Series T/TIA

RoHS

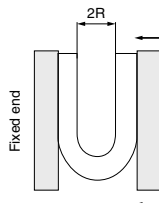


For general pneumatic tubing, Nylon tubing

## Max. Operating Pressure



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 10%.



## Precautions

Be sure to read before handling.  
Refer to front matter 56 for Safety Instructions and pages 13 to 16 for Fittings and Tubing Precautions.

## Caution

- Applicable for general industrial water. Please consult with SMC if using other kinds of fluid. Surge pressure must be under the max. operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes.
- Please exercise caution when using this item in a clean room. There is a possibility of plasticizer and other materials precipitating on the tube surface and detracting from the cleanliness level of the room.

## Model

● — 20 m roll □ — 100 m roll (T1613 is reel.)

Model	Tubing size												
	Metric size (Series T)						Inch size (Series TIA)						
T0425	T0403	T0604	T0645	T0806	T1075	T1209	T1613	TIA01	TIA05	TIA07	TIA11	TIA13	
Tubing O.D. (mm)	4	4	6	6	8	10	12	16	3.18	4.76	6.35	9.53	12.7
Tubing I.D. (mm)	2.5	3	4	4.5	6	7.5	9	13	2.18	3.48	4.57	6.99	9.56
Black (B)	●	●	●	●	●	●	●	●	●	●	●	●	●
White (W)	□	□	□	□	□	□	□	□	□	□	□	□	□
Red (R)					●	●	●						
Blue (BU)					●	●	●						
Yellow (Y)					●	●	●						
Green (G)				●									
	5/32"				3/16"				Nominal size (inch)				
									1/8" 3/16" 1/4" 3/8" 1/2"				
									Nominal size (mm)				
									3.2				

## Specifications

Fluid	Air/Water													
	20°C or less	3.3	2.0	3.0	2.0	2.0	2.0	2.0	1.6	2.3	2.3	2.3	2.3	
Max. operating pressure (MPa)	40°C	2.3	1.4	2.1	1.4	1.4	1.4	1.4	1.1	1.6	1.6	1.6	1.6	
	60°C	1.65	1.0	1.5	1.0	1.0	1.0	1.0	0.8	1.15	1.15	1.15	1.15	
	80°C	1.35	0.8	1.25	0.8	0.8	0.8	0.8	0.65	0.95	0.95	0.95	0.95	
	100°C	1.2	0.75	1.1	0.75	0.75	0.75	0.75	0.6	0.85	0.85	0.85	0.85	
Applicable fittings	Note 1) Note 2)	One-touch fittings, Insert fittings, Self-align fittings, Miniature fittings												
Min. bending radius (mm)	Min. bending radius	13	20	24	30	40	50	60	100	15	25	30	50	65
	Bending value (Reference)	10	15	18	23	30	40	45	75	12	20	23	40	48
Operating temperature	Note 1)	-40 to +100°C, Water: 0 to +70°C (No freezing)												
Material		Nylon 12												

Note 1) Be sure to operate under the maximum operating pressure conditions using the lower maximum operating specification of either the tubing or fittings.

Note 2) Mount an inner sleeve when using metal One-touch fittings in high-temperature environments of 60°C or more. Use self-align fittings at a temperature of 60°C or less.

Note 3) The minimum bending radius is the representative value measured as shown in the left figure.

• Use a tube above the recommended minimum bending radius.

• The tubing may be bent if used under the recommended minimum bending radius.

• Therefore, refer to the refraction value and make sure that the tubing 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 in the left figure if the tubing is bent or flattened, etc.

## How to Order

T0425 B - 20

Tubing model

Length per roll

Symbol	Color
B	Black (Translucent)
W	White (Material color)
R	Red (Translucent)
BU	Blue (Translucent)
Y	Yellow (Translucent)
G	Green (Translucent)

Symbol	Length
20	20 m roll
100	100 m roll (Black and white only)

**Made to Order**

(Please contact SMC for specifications in detail, dimensions, delivery and specifications other than those mentioned above.)

**100 m reel** Metric size and Inch size except ø16: Suffix "-X3" to the end of part number. Ex.) T0425R-100-X3

**Longer length reel** Metric size: Suffix "-X3" to the end of part number. Ex.) T0425G-500-X3

**20 m roll** Inch size: Suffix "-X4" to the end of part number. Ex.) TIA01BU-20-X4

**Reinforced corrugated cardboard specification longer length reel** ø6, Black and White only: Suffix "-X64" to the end of part number. Ex.) T0604B-500-X64

**Made to Order Availability**

Part no.	Length	Model	T0425 *	T0604 *	T0806 *	T1075 *	T1209 *	TIA01 *	TIA05 *	TIA07 *	TIA11 *	TIA13 *	Color
<b>X3</b>	100 m reel		○	○	○	○	○	○	○	○	○	○	Black, White, Red, Blue, Yellow, Green
	150 m reel					○							
	200 m reel				○								
	500 m reel		○	○									
<b>X4</b>	20 m roll							○	○	○	○	○	Red, Blue, Yellow, Green
	500 m reel												
<b>X64</b>	250 m reel			○									Black, White
	500 m reel			○									

**KQ2**

**KQB2**

**KS  
KX**

**KM**

**KF**

**M**

**H/DL  
L/LL**

**KC**

**KK**

**KK130**

**DM**

**KDM**

**KB**

**KR**

**KA**

**KQG2**

**KG**

**KFG2**

**MS**

**KKA**

**KP**

**LQ**

**MQR**

**T**

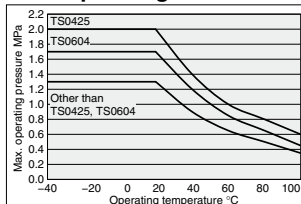


# Soft Nylon Tubing Series TS/TISA

RoHS

For general pneumatic tubing  
Pliable soft nylon tubing

## Max. Operating Pressure



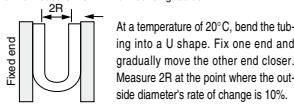
## ⚠️ Precautions

Be sure to read before handling. Refer to front matter 56 for Safety Instructions and pages 13 to 16 for Fittings and Tubing Precautions.

## ⚠️ Caution

- Compatible with water due to a change in materials. Compatible fluid types are printed on the tube body for differentiation, so please be sure to check this. <sup>Note 1</sup> If using the previous TS/TISA series with "water", the tube may shrink and cause air leakage or the tube may fall out.
- The products which changed the material are applicable for general industrial water. Please contact SMC if using other kinds of fluid. Surge pressure must be under the max. operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes.
- Please exercise caution when using this item in a clean room. There is a possibility of plasticizer and other materials precipitating on the tube surface and detracting from the cleanliness level of the room.

How to measure the minimum bending radius



## Made to Order

100 m reel

Longer length reel

20 m roll

### Made to Order Availability

Part no.	Length	Model	TS0425*	TS0604*	TS0806*	TS1075*	TS1209*	TISA01*	TISA05*	TISA07*	TISA11*	TISA13*	Color
X3	100 m reel		○	○	○	○	○	○	○	○	○	○	Black, White, Red, Blue, Yellow, Green
	150 m reel												
	200 m reel												
X4	500 m reel		○	○									Red, Blue, Yellow, Green
	20 m roll												

## Model

● — 20 m roll □ — 100 m roll (TS1612 is reel.)

Model	Tubing size																	
	Metric size (Series TS)						Inch size (Series TISA)											
Tubing O.D. (mm)	4	6	8	10	12	16	3.18	4.76	6.35	9.53	12.7							
Tubing I.D. (mm)	2.5	4	6	7.5	9	12	2.18	3.48	4.57	6.99	9.56							
Black (B)	●	●	●	●	●	●	●	●	●	●	●	●						
White (W)	●	●	●	●	●	●	●	●	●	●	●	●						
Red (R)	●	●	●	●	●	●	●	●	●	●	●	●						
Blue (BU)	●	●	●	●	●	●	●	●	●	●	●	●						
Yellow (Y)	●	●	●	●	●	●	●	●	●	●	●	●						
Green (G)	●	●	●	●	●	●	●	●	●	●	●	●						
	5/2" =						5/16" =						Nominal size (inch)					
													1/8" 3/16" 1/4" 3/8" 1/2"					
													Nominal size (mm)					
													3.2					

## Specifications

Fluid	Air/Water <sup>Note 1)</sup>											
	20°C or less	2.0	1.7	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
Max. operating pressure	40°C	1.4	1.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	
	60°C	1.0	0.85	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	
	80°C	0.8	0.65	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	100°C	0.6	0.45	0.35	0.35	0.35	0.4	0.35	0.35	0.35	0.35	
Applicable fittings <sup>Note 2)3)</sup>		One-touch fittings, Insert fittings, Self-align fittings, Miniature fittings										
Min. bending radius mm <sup>Note 4)</sup>	15	23	45	55	65	90	18	27	30	55	65	
Operating temperature <sup>Note 2)</sup>		12	17	34	42	50	70	12	15	23	42	50
Material		-40 to +100°C, Water: 0 to +50°C (No freezing) Nylon 12										

- Note 1) Refer to the "Printing/Fluid".  
 Note 2) Be sure to operate under the maximum operating pressure and operating temperature conditions using the lower specifications of either the tubing or fittings.  
 Note 3) Mount an inner sleeve when using metal One-touch fittings in high-temperature environments of 60°C or more. Use self-align fittings at a temperature of 60°C or less.  
 Note 4) The minimum bending radius is the representative value measured as shown in the left figure.  
 • Use a tube above the minimum bending radius.  
 • The tubing may be bent if used under the minimum bending radius. Therefore, refer to the bending value and make sure that the tubing is not bent or flattened.  
 • Please note that the bending value is not warranted because of the representative value when 2R is measured by the method in the left figure if the tubing is bent or flattened, etc.

## Printing/Fluid

	Print code	Fluid
Previous	SMC TS 0604 SOFTNYLON 6 x 4	Air
NEW	● SMC TS 0604 SOFTNYLON 6 x 4	Air/Water

## How to Order

TS0604 W - 100

Length per roll

Symbol	Length
20	20 m roll
100	100 m roll (Black and white only)

Color

Symbol	Color
B	Black (Translucent)
W	White (Material color)
R	Red (Translucent)
BU	Blue (Translucent)
Y	Yellow (Translucent)
G	Green (Translucent)

Tubing model

(Please contact SMC for specifications in detail, dimensions, delivery and specifications other than those mentioned above.)

Metric size and Inch size except ø16: Suffix "-X3" to the end of part number. Ex.) TS0425R-100-X3

Metric size: Suffix "-X3" to the end of part number. Ex.) TS0425G-500-X3

Inch size: Suffix "-X4" to the end of part number. Ex.) TISA01BU-20-X4

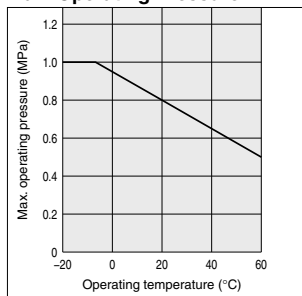
# Polyurethane Tubing Series TU/TIUB

RoHS



For general pneumatic tubing  
Flexible  
Polyurethane tubing  
Additional 21 new colors.

## Max. Operating Pressure

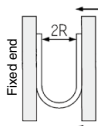


## ⚠️ Precautions

Be sure to read before handling.  
Refer to front matter 56 for Safety  
Instructions and pages 13 to 16 for  
Fittings and Tubing Precautions.

## ⚠️ Caution

- Applicable for general industrial water. Please consult with SMC if using for the other kind of fluid. Also, the surge voltage 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.
- The value of the max. operating pressure is at a temperature of 20°C. Refer to the burst pressure characteristics curve for other temperatures. Furthermore, abnormal temperature rises caused by adiabatic compression may result in the burst of the tube.
- The value of the minimum bending radius is measured at the temperature of 20°C as shown in the figure below.



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

## Model/Specifications

● — 20 m roll □ — 100 m roll (TU1610 is reel) ◇ — 100 m roll, 200 m roll  
△ — Option ■ — Manufactured upon receipt of order (Please consult with SMC.)

Model	Tubing size											
	Metric size (Series TU)						Inch size (Series TIUB)					
Tubing O.D. (mm)	TU0212	TU0425	TU0604	TU0805	TU1065	TU1208	TU1610	TIUB01	TIUB05	TIUB07	TIUB11	TIUB13
Tubing I.D. (mm)	1.2	2.5	4	5	6.5	8	10	2	3.18	4.23	6.35	8.46
Black (B)	●	●	◇	●	●	●	●	●	●	●	●	●
White (W)	●	●	◇	●	●	●	●	●	△	△	△	△
Red (R)	●	●	◇	●	●	●	●	●	△	△	△	△
Blue (BU)	●	●	◇	●	●	●	●	●	●	●	●	●
Yellow (Y)	●	●	◇	●	●	●	●	●	△	△	△	△
Green (G)	●	●	◇	●	●	●	●	●	△	△	△	△
Clear (C)	●	●	◇	●	●	●	●	●	△	△	△	△
Orange (YR)	■	■	◇	■	■	■	■	■	△	△	△	△
Solid blue (BU1)	■	■	◇	■	■	■	■	■	■	■	■	■
Clear blue (BU2)	■	■	◇	■	■	■	■	■	■	■	■	■
Medium blue (BU3)	■	■	◇	■	■	■	■	■	■	■	■	■
Brown (BR1)	■	■	◇	■	■	■	■	■	■	■	■	■
Solid green (G1)	■	■	◇	■	■	■	■	■	■	■	■	■
Clear green (G2)	■	■	◇	■	■	■	■	■	■	■	■	■
Neon green (G3)	■	■	◇	■	■	■	■	■	■	■	■	■
Dark green (G4)	■	■	◇	■	■	■	■	■	■	■	■	■
Gray (GR1)	■	■	◇	■	■	■	■	■	■	■	■	■
Light gray (GR2)	■	■	◇	■	■	■	■	■	■	■	■	■
Neon pink (P1)	■	■	◇	■	■	■	■	■	■	■	■	■
Solid purple (PU1)	■	■	◇	■	■	■	■	■	■	■	■	■
Clear purple (PU2)	■	■	◇	■	■	■	■	■	■	■	■	■
Solid red (R1)	■	■	◇	■	■	■	■	■	■	■	■	■
Clear red (R2)	■	■	◇	■	■	■	■	■	■	■	■	■
Silver (S1)	■	■	◇	■	■	■	■	■	■	■	■	■
Solid yellow (Y1)	■	■	◇	■	■	■	■	■	■	■	■	■
Clear yellow (Y2)	■	■	◇	■	■	■	■	■	■	■	■	■
Neon yellow (Y3)	■	■	◇	■	■	■	■	■	■	■	■	■
Clear orange (YR1)	■	■	◇	■	■	■	■	■	■	■	■	■
Neon orange (YR2)	■	■	◇	■	■	■	■	■	■	■	■	■

Nominal size (inch)	1/8"	3/16"	1/4"	3/8"	1/2"
Nominal size (mm)	3.2				

Fluid	Air/Water	
Max. operating pressure	20°C	0.8
	40°C	0.65
	60°C	0.5
Applicable fittings	One-touch fittings, Insert fittings, Self-align fittings, Miniature fittings	
Min. bending radius (mm)	4	10
	15	20
	27	35
	45	10
	15	23
	27	35
Operating temperature	-20 to +60°C (Water: 0 to 40°C) (No freezing)	
Material	Polyurethane	

### How to Order

**TU0425 BU - 20**

Tubing model

Length per roll

Symbol	Length
<b>20</b>	20 m roll
<b>100</b>	100 m roll
<b>200</b>	200 m roll

Color

Symbol	Color	Symbol	Color
<b>B</b>	Black (Opaque)	<b>GR1</b>	Gray (Opaque)
<b>W</b>	White (Opaque)	<b>GR2</b>	Light gray (Opaque)
<b>R</b>	Red (Translucent)	<b>P1</b>	Neon pink (Opaque)
<b>BU</b>	Blue (Translucent)	<b>PU1</b>	Solid purple (Opaque)
<b>Y</b>	Yellow (Opaque)	<b>PU2</b>	Clear purple (Translucent)
<b>G</b>	Green (Opaque)	<b>R1</b>	Solid red (Opaque)
<b>C</b>	Clear (Material color)	<b>R2</b>	Clear red (Translucent)
<b>YR</b>	Orange (Opaque)	<b>S1</b>	Silver (Opaque)
<b>BU1</b>	Solid blue (Opaque)	<b>Y1</b>	Solid yellow (Opaque)
<b>BU2</b>	Clear blue (Translucent)	<b>Y2</b>	Clear yellow (Translucent)
<b>BU3</b>	Medium blue (Opaque)	<b>Y3</b>	Neon yellow (Opaque)
<b>BR1</b>	Brown (Opaque)	<b>YR1</b>	Clear orange (Translucent)
<b>G1</b>	Solid green (Opaque)	<b>YR2</b>	Neon orange (Opaque)
<b>G2</b>	Clear green (Translucent)		
<b>G3</b>	Neon green (Opaque)		
<b>G4</b>	Dark green (Opaque)		

### Made to Order

(Please contact SMC for specifications in detail, dimensions, delivery and specifications other than those mentioned above.)

<b>100 m reel</b>	Metric size and Inch size: Suffix "-X3" to the end of part number. Ex.) TU0425R-100-X3
<b>Longer length reel</b>	Metric size: Suffix "-X3" to the end of part number. Ex.) TU0425G-500-X3
<b>20 m roll</b>	Inch size: Suffix "-X4" to the end of part number. Ex.) TIUB07W-20-X4
<b>Compatible with the Food Sanitation Law</b>	Metric size: Suffix "-X217" to the end of part number. Ex.) TU0425BU-20-X217

### Made to Order Availability

Part no.	Length	Model	TU0425 *	TU0604 *	TU0805 *	TU1065 *	TU1208 *	TIUB01 *	TIUB05 *	TIUB07 *	TIUB11 *	TIUB13 *	Color
<b>X3</b>	100 m reel		○	○	○	○	○	○	○	○	○	○	Black, White, Red, Blue, Yellow, Green, Clear, Orange
	200 m reel			○									
	400 m reel			○									
<b>X4</b>	500 m reel		○										Red, White, Yellow, Green, Clear, Orange
	20 m roll								○	○	○	○	
<b>X217</b>	20 m roll		○	○	○	○	○						Black, White, Blue, Clear

\* Note that the model number is not printed on the tube body.

**Multi-core, Multi-color Specification Flat Tubing**

Refer to page 413-1 for details.

**KQ2**

**KQB2**

**KS  
KX**

**KM**

**KF**

**M**

**H/DL  
L/LL**

**KC**

**KK**

**KK130**

**DM**

**KDM**

**KB**

**KR**

**KA**

**KQG2**

**KG**

**KFG2**

**MS**

**KKA**

**KP**

**LQ**

**MQR**

**T**

# Polyurethane Flat Tubing

## Multi-core, Multi-color Specification

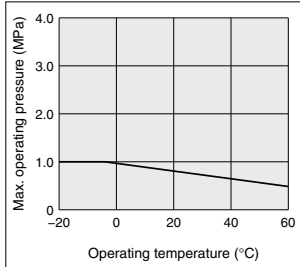
# Series TU



RoHS

Compact piping possible  
8 color variations

Max. Operating Pressure



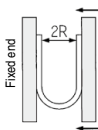
### ⚠️ Precautions

Be sure to read this before handling. For Safety Instructions and Fittings & Tubing Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, <http://www.smcworld.com>

### ⚠️ Caution

- Please consult with SMC if using for any fluids other than air.
- Abnormal temperature rise caused by adiabatic compression may result in the tube bursting.
- The value of the minimum bending radius is measured at the temperature of 20°C as shown in the figure below.
- As a result of product design characteristics, there are cases of very slight leakage.

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. Measure 2R when the tube breaks or is crushed.

### Specifications

Model	TU0212	TU0425	TU0604	TU0805	TU1065	TU1208
Tubing O.D. (mm)	2	4	6	8	10	12
Tubing I.D. (mm)	1.2	2.5	4	5	6.5	8
Black (B)	●	●	●	●	●	●
White (W)	●	●	●	●	●	●
Red (R)	●	●	●	●	●	●
Blue (BU)	●	●	●	●	●	●
Yellow (Y)	●	●	●	●	●	●
Green (G)	●	●	●	●	●	●
Clear (C)	●	●	●	●	●	●
Orange (YR)		●	●	●	●	●
Number of cores <small>Note</small>	2 cores	X169 (Roll)/X200 (Reel)				
	3 cores	X170 (Roll)/X201 (Reel)				
	4 cores	X171 (Roll)/X202 (Reel)				
	5 cores	X172 (Roll)/X203 (Reel)				
	6 cores	X204 (Roll)/X207 (Reel)				
Fluid	Air					
Max. operating pressure MPa	20°C	0.8				
	40°C	0.65				
	60°C	0.5				
Applicable fittings	One-touch fitting, Insert fitting, Miniature fitting					
Min. bending radius (mm)	4	10	15	20	27	35
Operating temperature	-20 to +60°C					
Material	Polyurethane					

Note) Refer to "How to Order" for the combination of tubing size and the number of cores.

How to Order

Roll

Please contact SMC for delivery.

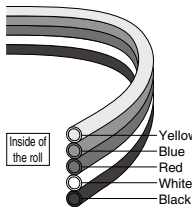
Tube length per roll: **1, 2, 3, 4, 5, 10, 20** m

**TU 0425 - 12345 A - X172**

Tubing model

Tubing size

Symbol	O.D. x I.D.
0212	ø2 x ø1.2
0425	ø4 x ø2.5
0604	ø6 x ø4
0805	ø8 x ø5
1065	ø10 x ø6.5
1208	ø12 x ø8



Color<sup>\*1</sup>

Symbol	Color	Symbol	Color
1	Black	5	Yellow
2	White	6	Green
3	Red	7	Clear
4	Blue	8	Orange <sup>*2</sup>

\*1 Colors of the example (12345)

\*2 Except TU0212

Multi-core, multi-color specification

Symbol	Number of cores
X169	2 cores
X170	3 cores
X171	4 cores
X172	5 cores
X204	6 cores

Tube length per roll [m]

Symbol	Length	Symbol	Length
A	1	E	5
B	2	F	10
C	3	G	20
D	4		

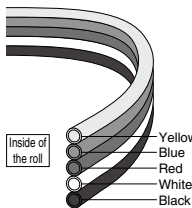
Tube length per roll: **50** m

**TU 0425 - 12345 H - X172**

Tubing model

Tubing size

Symbol	O.D. x I.D.
0425	ø4 x ø2.5
0604	ø6 x ø4
0805	ø8 x ø5
1065	ø10 x ø6.5
1208	ø12 x ø8



Color<sup>\*1</sup>

Symbol	Color	Symbol	Color
1	Black	5	Yellow
2	White	6	Green
3	Red	7	Clear
4	Blue	8	Orange

\*1 Colors of the example (12345)

Multi-core, multi-color specification

Symbol	Number of cores	Applicable tubing O.D.				
		ø4	ø6	ø8	ø10	ø12
X169	2 cores	●	●			
X170	3 cores	●	●	●		
X171	4 cores	●	●	●	●	
X172	5 cores	●	●	●	●	●
X204	6 cores	●	●	●	●	●

Tube length per roll [m]

Symbol	Length
H	50

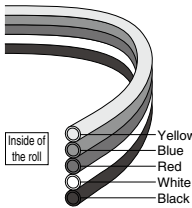
Tube length per roll: **100** m

**TU 0425 - 12345 J - X172**

Tubing model

Tubing size

Symbol	O.D. x I.D.
0425	ø4 x ø2.5
0604	ø6 x ø4
0805	ø8 x ø5



Color<sup>\*1</sup>

Symbol	Color	Symbol	Color
1	Black	5	Yellow
2	White	6	Green
3	Red	7	Clear
4	Blue	8	Orange

\*1 Colors of the example (12345)

Multi-core, multi-color specification

Symbol	Number of cores	Applicable tubing O.D.		
		ø4	ø6	ø8
X169	2 cores	●	●	
X170	3 cores	●	●	●
X171	4 cores	●	●	●
X172	5 cores	●	●	●
X204	6 cores	●	●	●

Tube length per roll [m]

Symbol	Length
J	100

KQ2  
KQB2  
KS  
KX  
KM  
KF  
M  
H/DL  
L/LL  
KC  
KK  
KK130  
DM  
KDM  
KB  
KR  
KA  
KQG2  
KG  
KFG2  
MS  
KKA  
KP  
LQ  
MQR  
T



## How to Order

### Reel

Please contact SMC for delivery.

Tube length per roll: **10, 20** m

**TU 0212 - 12345 F - X203**

**Color<sup>\*1</sup>**

Symbol	Color	Symbol	Color
1	Black	5	Yellow
2	White	6	Green
3	Red	7	Clear
4	Blue	8	Orange <sup>*2</sup>

<sup>\*1</sup> Colors of the example (12345)  
<sup>\*2</sup> Except TU0212

Yellow  
Blue  
Red  
White  
Black

**Tube size**

Symbol	O.D. x I.D.
0212	ø2 x ø1.2
0425	ø4 x ø2.5
0604	ø6 x ø4
0805	ø8 x ø5
1065	ø10 x ø6.5
1208	ø12 x ø8

**Multi-core, multi-color specification**

Symbol	Number of cores	Applicable tubing O.D.				
		ø2	ø4	ø6	ø8	ø10   ø12
X200	2 cores	●	●	●	●	●
X201	3 cores	●	●	●	●	●
X202	4 cores	●	●	●	●	●
X203	5 cores	●	●	●	●	●
X207	6 cores	●	●	●	●	●

**Tube length per roll [m]**

Symbol	Length
F	10
G	20

Tube length per roll: **50** m

**TU 0425 - 12345 H - X203**

**Color<sup>\*1</sup>**

Symbol	Color	Symbol	Color
1	Black	5	Yellow
2	White	6	Green
3	Red	7	Clear
4	Blue	8	Orange

<sup>\*1</sup> Colors of the example (12345)

Yellow  
Blue  
Red  
White  
Black

**Tube size**

Symbol	O.D. x I.D.
0425	ø4 x ø2.5
0604	ø6 x ø4
0805	ø8 x ø5
1065	ø10 x ø6.5

**Multi-core, multi-color specification**

Symbol	Number of cores	Applicable tubing O.D.			
		ø4	ø6	ø8	ø10
X200	2 cores	●	●	●	●
X201	3 cores	●	●	●	●
X202	4 cores	●	●	●	●
X203	5 cores	●	●	●	●
X207	6 cores	●	●	●	●

**Tube length per roll [m]**

Symbol	Length
H	50

Tube length per roll: **100** m

**TU 0425 - 12345 J - X203**

**Color<sup>\*1</sup>**

Symbol	Color	Symbol	Color
1	Black	5	Yellow
2	White	6	Green
3	Red	7	Clear
4	Blue	8	Orange

<sup>\*1</sup> Colors of the example (12345)

Yellow  
Blue  
Red  
White  
Black

**Tube size**

Symbol	O.D. x I.D.
0425	ø4 x ø2.5
0604	ø6 x ø4
0805	ø8 x ø5

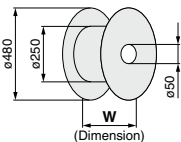
**Multi-core, multi-color specification**

Symbol	Number of cores	Applicable tubing O.D.		
		ø4	ø6	ø8
X200	2 cores	●	●	●
X201	3 cores	●	●	●
X202	4 cores	●	●	●
X203	5 cores	●	●	●
X207	6 cores	●	●	●

**Tube length per roll [m]**

Symbol	Length
J	100

### Tube reel dimensions



Model	W (mm)	Tube length per roll (m)			
		10	20	50	100
X200 (2 cores)	TU0212	51	51	—	—
	TU0425	51	51	51	51
	TU0604	51	51	81	156
	TU0805	81	81	156	156
	TU1065	156	156	156	—
X201 (3 cores)	TU1208	156	156	—	—
	TU0212	51	51	—	—
	TU0425	51	51	51	51
	TU0604	81	81	156	156
	TU0805	156	156	156	—

Model	W (mm)	Tube length per roll (m)			
		10	20	50	100
X202 (4 cores)	TU0212	51	51	—	—
	TU0425	51	51	81	81
	TU0604	81	81	156	205
	TU0805	156	156	—	—
X203 (5 cores)	TU0212	51	51	—	—
	TU0425	51	51	81	156
	TU0604	156	156	156	—
X207 (6 cores)	TU0212	51	51	—	—
	TU0425	51	51	81	156
	TU0604	156	156	156	—

# Soft Polyurethane Tubing Series TUS

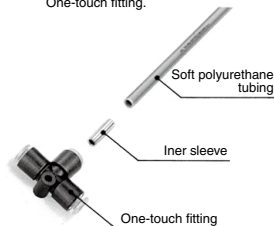
RoHS



Suitable for piping in confined spaces  
Extremely flexible  
Soft polyurethane tubing

## TUS related accessories Inner sleeve Series TJ

Reinforces soft polyurethane tubing.  
Insert an inner sleeve into soft polyurethane tubing when used with a One-touch fitting.



## Model

Model	Applicable tubing model	Length
TJ-0425	TUS0425	18
TJ-0604	TUS0604	19
TJ-0805	TUS0805	20.5
TJ-1065	TUS1065	23
TJ-1208	TUS1208	24

## Specifications

Material	C2700T (Electroless nickel plated)
Wall thickness	0.2 mm

## ⚠️ Precautions

Be sure to read before handling.  
Refer to front matter 56 for Safety Instructions and pages 13 to 16 for Fittings and Tubing Precautions.

## ⚠️ Caution

1. Use a nylon or polyurethane tubing for general industrial water, otherwise the tube may result in being fallen out or bursted when the max. operating pressure is lower and the surge pressure is occurred.
2. Abnormal temperature rises caused by adiabatic compression may result in the burst of the tube.
3. The value of the minimum bending radius is measured at the temperature of 20°C as shown in the figure on the right.
4. Use inner sleeve, taking the removing force into consideration when used with One-touch fittings.

## Model/Specifications

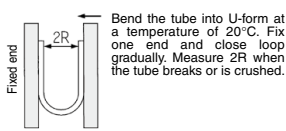
● — 20 m roll □ — 100 m reel

Model	TUS0425	TUS0604	TUS0805	TUS1065	TUS1208
Tubing O.D. (mm)	4	6	8	10	12
Tubing I.D. (mm)	2.5	4	5	6.5	8
Black (B)	●	●	●	●	●
White (W)	●	●	●	●	●
Red (R)	●	●	●	●	●
Blue (BU)	□	□	□	□	□
Yellow (Y)	●	●	●	●	●
Green (G)	●	●	●	●	●
Translucent (N) <sup>(1)</sup>	●	●	●	●	●
Yellow brown (YB)	●	●	●	●	●

Fluid	Air					
Max. operating pressure	20°C	0.6				
	40°C	0.6				
	60°C	0.4				
MPa						
Applicable fittings	One-touch fitting, Insert tube fitting, Miniature fitting (Hose nipple type) <sup>(3)</sup>					
Min. bending radius (mm) <sup>(2)</sup>	8	15	15	22	29	
Operating temperature	-20 to +60°C (No freezing)					
Material	Polyurethane					
Tube drawing strength (N) (Using One-touch fitting)	Without inner sleeve	15	60	60	85	110
	With inner sleeve	80	230	250	300	480

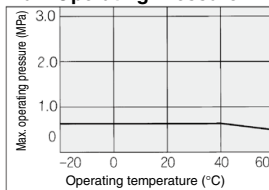
Note 1) Not clear, but translucent due to material.

Note 2) Min. bending radius is measured as shown in the figure below.



Note 3) Always use inner sleeve (Series TJ) in safety circuit or critical area.

## Max. Operating Pressure



## How to Order

TUS1065 B - 100

Tubing model

Length per roll

Symbol	Length
20	20 m roll
100	100 m reel (Black, Blue only)

## Color

Symbol	Color	Symbol	Color
B	Black (Opaque)	Y	Yellow (Opaque)
W	White (Opaque)	G	Green (Opaque)
R	Red (Opaque)	N	Translucent (Material color)
BU	Blue (Opaque)	YB	Yellow brown (Opaque)

## Made to Order

Multi-core, Multi-color  
Specification Flat Tubing

Refer to page 414-1 for details.



KQ2

KQB2

KS  
KX

KM

KF

M

H/DL  
L/L

KC

KK

KK130

DM

KDM

KB

KR

KA

KQG2

KG

KFG2

MS

KKA

KP

LQ

MQR

T

# Soft Polyurethane Flat Tubing

## Multi-core, Multi-color Specification

# Series TUS

RoHS

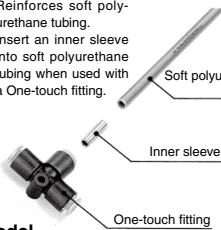
Compact piping possible  
8 color variations

### TUS related accessories

#### Inner sleeve

#### Series TJ

Reinforces soft polyurethane tubing.  
Insert an inner sleeve into soft polyurethane tubing when used with a One-touch fitting.



#### Model

Model	Applicable tubing model	Length
TJ-0425	TUS0425	18
TJ-0604	TUS0604	19
TJ-0805	TUS0805	20.5
TJ-1065	TUS1065	23
TJ-1208	TUS1208	24

#### Specifications

Material	C2700T (Electroless nickel plated)
Wall thickness	0.2 mm

### ⚠ Precautions

Be sure to read this before handling.  
For Safety Instructions and Fittings & Tubing Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, <http://www.smcworld.com>

### ⚠ Caution

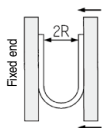
- Abnormal temperature rise caused by adiabatic compression may result in the tube bursting.
- The value of the minimum bending radius is measured at the temperature of 20°C as shown in the figure on the upper right.
- Use inner sleeve, taking the removing force into consideration when used with One-touch fittings.
- As a result of product design characteristics, there are cases of very slight leakage.

#### Specifications

Model	TUS0425	TUS0604	TUS0805	TUS1065	TUS1208	
Tubing O.D. (mm)	4	6	8	10	12	
Tubing I.D. (mm)	2.5	4	5	6.5	8	
Black (B)	●	●	●	●	●	
White (W)	●	●	●	●	●	
Red (R)	●	●	●	●	●	
Blue (BU)	●	●	●	●	●	
Yellow (Y)	●	●	●	●	●	
Green (G)	●	●	●	●	●	
Translucent (N)	●	●	●	●	●	
Yellow brown (YB)	●	●	●	●	●	
Number of cores	2 cores	X169 (Roll)				
	3 cores	X170 (Roll)				
	4 cores	X171 (Roll)				
	5 cores	X172 (Roll)				
Fluid	Air					
Max. operating pressure MPa	20°C	0.6				
	40°C	0.6				
	60°C	0.4				
Applicable fittings	One-touch fitting <sup>Note 2)</sup> , Insert fitting, Miniature fitting (Hose nipple type)					
Min. bending radius <sup>Note 1)</sup> (mm)	8	15	15	22	29	
Operating temperature	-20 to +60°C					
Material	Polyurethane					
Tube drawing strength (N) (Using One-touch fitting)	Without inner sleeve	15	60	60	85	110
	With inner sleeve	80	230	250	300	480

Note 1) Min. bending radius is measured as shown in the figure below.

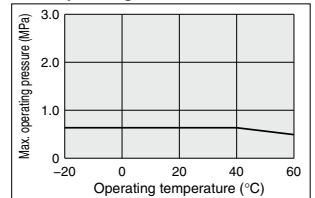
#### How to measure the minimum bending radius



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

Note 2) Always use inner sleeve (Series TJ) in safety circuit or critical area.

#### Max. Operating Pressure



#### How to Order

Please contact SMC for delivery.

**TUS 0425 - 12345 A - X172**

• Tubing model

• Tubing size

Symbol	O.D. x I.D.
0425	ø4 x ø2.5
0604	ø6 x ø4
0805	ø8 x ø5
1065	ø10 x ø6.5
1208	ø12 x ø8

• Color<sup>1)</sup>

Symbol	Color	Symbol	Color
1	Black	5	Yellow
2	White	6	Green
3	Red	7	Translucent <sup>2)</sup>
4	Blue	8	Yellow brown

<sup>1)</sup> Colors of the example (12345)

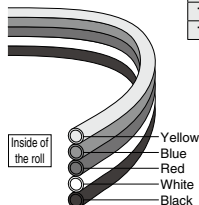
<sup>2)</sup> Not clear, but translucent due to material.

• Multi-core, multi-color specification

Symbol	Number of cores
X169	2 cores
X170	3 cores
X171	4 cores
X172	5 cores

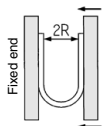
• Tube length per roll [m]

Symbol	Length
A	1
B	2
C	3
D	4
E	5
F	10
G	20



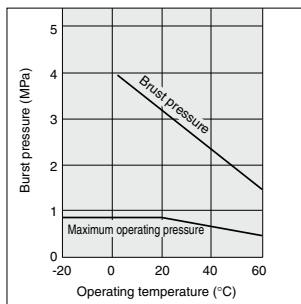
# Hard Polyurethane Tubing/Standard Type

# Series *TUH*



Bend the tube into U-form at a 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



## Precautions

Be sure to read before handling. Refer to front matter 56 for Safety Instructions and pages 13 to 16 for Fittings and Tubing Precautions.

## Caution

- Please consult with SMC regarding other fluids. Because ester polyurethane is used, water cannot be used due to the occurrence of hydrolysis.
- The value of the max. operating pressure is at a temperature of 20°C. Refer to the burst pressure characteristics curve for other temperatures. Furthermore, abnormal temperature rises caused by adiabatic compression may result in the burst of the tube.
- The value of the minimum bending radius is measured at the temperature of 20°C as shown in the figure above.

## Model/Specifications

● — 20 m roll □ — 100 m roll

Model	TUH0428	TUH0644	TUH0858	TUH1073	TUH1288
O.D. (mm)	4	6	8	10	12
I.D. (mm)	2.8	4.4	5.8	7.3	8.8

Black (B)	●	●	●	●	●
White (W)	●	●	●	●	●
Blue (BU)	●	●	●	●	●
Translucent (N)	●	●	●	●	●

Fluid	Air				
Max operating pressure (at 20°C)	0.8 MPa				
Applicable fittings	One-touch fittings				
Min. bending radius (mm)	10	18	24	30	36
Burst pressure	Refer to the burst pressure characteristics curve.				
Operating temperature	-20 to 60°C				
Material	Polyurethane				

## How to Order

**TUH0644** **B** - **20**

Tubing model

Length per roll

Symbol	Length
20	20 m roll
100	100 m roll

Color

Symbol	Color
B	Black
W	White
BU	Blue
N	Translucent

KQ2

KQB2

KS  
KX

KM

KF

M

H/DL  
L/LL

KC

KK

KK130

DM

KDM

KB

KR

KA

KQG2

KG

KFG2

MS

KKA

KP

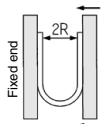
LQ

MQR

T

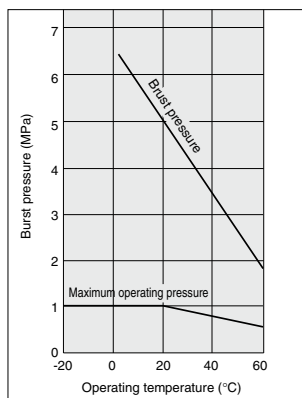
# Hard Polyurethane Tubing/High Pressure Type

# Series *TUH*



Bend the tube into U-form at a 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



## ⚠ Precautions

Be sure to read before handling. Refer to front matter 56 for Safety Instructions and pages 13 to 16 for Fittings and Tubing Precautions.

## ⚠ Caution

- Please consult with SMC regarding other fluids. Because ester polyurethane is used, water cannot be used due to the occurrence of hydrolysis.
- The value of the max. operating pressure is at a temperature of 20°C. Refer to the burst pressure characteristics curve for other temperatures. Furthermore, abnormal temperature rises caused by adiabatic compression may result in the burst of the tube.
- The value of the minimum bending radius is measured at the temperature of 20°C as shown in the figure above.

## Model/Specifications

● — 20 m roll □ — 100 m roll

Model	TUH0425	TUH0604	TUH0805	TUH1065	TUH1208
O.D. (mm)	4	6	8	10	12
I.D. (mm)	2.5	4	5	6.5	8

Black (B)	●	●	●	●	●
White (W)	●	●	●	●	●
Blue (BU)	●	●	●	●	●
Translucent (N)	●	●	●	●	●

Fluid	Air				
Max operating pressure (at 20°C)	1.0 MPa				
Applicable fittings	One-touch fittings, Insert fittings, Self-align fittings, Miniature fittings				
Min. bending radius (mm)	10	15	20	27	35
Burst pressure	Refer to the burst pressure characteristics curve.				
Operating temperature	-20 to 60°C				
Material	Polyurethane				

## How to Order

**TUH0604** **B** - **20**

● **Length per roll**

Symbol	Length
20	20 m roll
100	100 m roll

● **Color**

Symbol	Color
B	Black
W	White
BU	Blue
N	Translucent

● **Tubing model**

# Wear Resistant Tubing

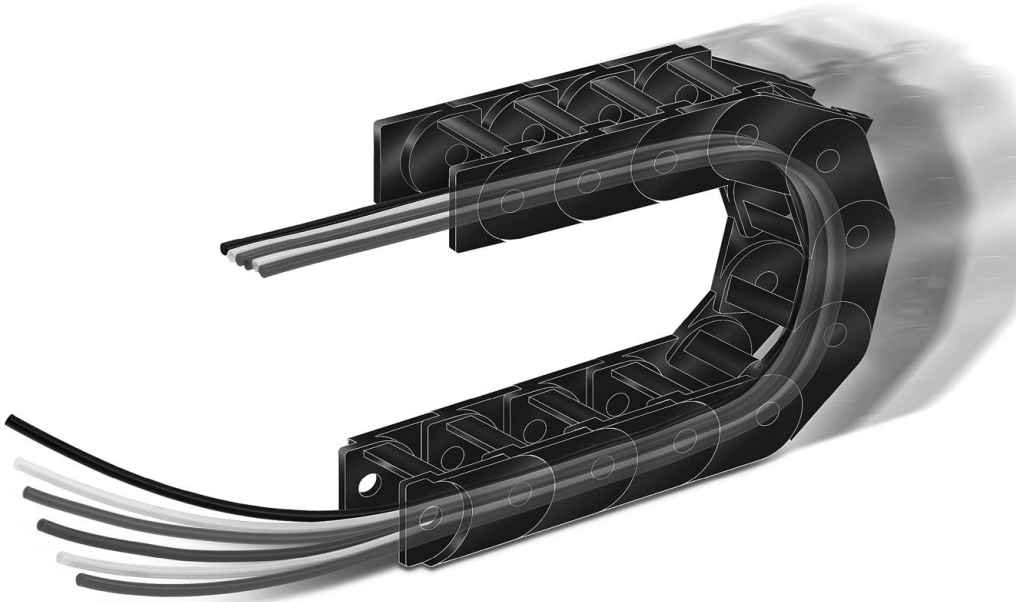
## Series TUZ

RoHS

**Abrasion: Approx.  $\frac{1}{3}$**   
 (Compared with SMC polyurethane tubing TU series)

Description	Maximum abrasion (mm) After 10 million cycles
<b>Wear resistant tubing TUZ series</b>	<b>0.16</b>
Polyurethane tubing TU series	0.46

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



### 6-color variations



### 8-size variations



KQ2  
 KQB2  
 KS  
 KX  
 KM  
 KF  
 M  
 H/DL  
 L/LL  
 KC  
 KK  
 KK130  
 DM  
 KDM  
 KB  
 KR  
 KA  
 KQG2  
 KG  
 KFG2  
 MS  
 KKA  
 KP  
 LQ  
 MQR  
**T**

# Wear Resistant Tubing Series TUZ

RoHS



## Model

Model	TUZ0212	TUZ3220	TUZ0425	TUZ0604	TUZ0805	TUZ1065	TUZ1208	TUZ1610
Tubing O.D. (mm)	2	3.2	4	6	8	10	12	16
Tubing I.D. (mm)	1.2	2	2.5	4	5	6.5	8	10

● — 20 m roll □ — 100 m roll

Black (B)	□	●	●	●	●	●	●	□
White (W)		●	●	●	●	●	●	
Red (R)			●	●	●	●	●	
Blue (BU)		●	●	●	●	●	●	
Yellow (Y)			●	●	●	●	●	
Green (G)			●	●	●	●	●	

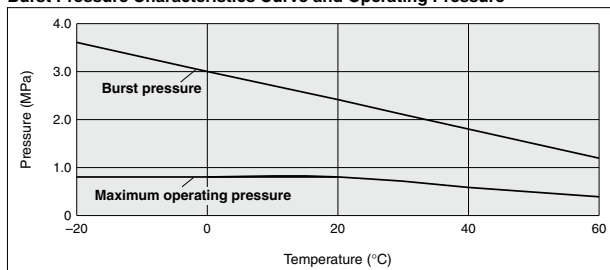
## Specifications

Fluid	Air/Water							
Applicable fittings	One-touch fittings KO2 series, Insert fittings KF series, Stainless steel 316 insert fittings KFG2 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)	4	10	10	15	20	27	35	45
Operating temperature	-20 to +60°C (Water: 0 to 40°C) (No freezing)							
Material	Special polyurethane							

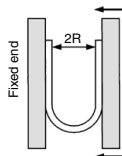
Note 1) The minimum bending radius means the value measured by the method shown in the figure at the right at the temperature of 20°C when the tube is bent. The minimum bending radius assumes static piping. If the tube is used in a moving part, provide extra length to the tube. Check the bending radius recommended by the flexible protection tube manufacturer for sure if the tube is used in the flexible protection tube.

Note 2) Applicable for general industrial water. Please consult with SMC if using other kinds of fluid. Surge pressure must be under the max. operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes.

## Burst Pressure Characteristics Curve and Operating Pressure



## 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.

## How to Order

**TUZ0425 BU - 20**

### Tubing model

Model	O.D. x I.D. (mm)
TUZ0212	2 x 1.2
TUZ3220	3.2 x 2
TUZ0425	4 x 2.5
TUZ0604	6 x 4
TUZ0805	8 x 5
TUZ1065	10 x 6.5
TUZ1208	12 x 8
TUZ1610	16 x 10

### Color

Symbol	Color
B	Black
W	White
R	Red
BU	Blue
Y	Yellow
G	Green

### Length per roll

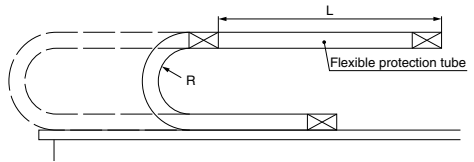
Symbol	Length
20	20 m roll
100	100 m roll

(Note) Not clear, but translucent due to material.

## Reference Data: Abrasion due to Flexible Protection Tube

### Test Conditions

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



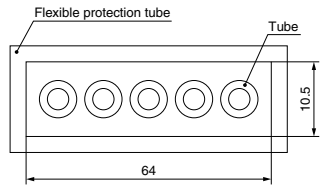
### Test Results

Model	Maximum abrasion after 10 million cycles (mm)
<b>TUZ0604</b>	0.16
<b>TU0604</b>	0.46

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 catalog specifications.

The values in the table above are representative values, and not guaranteed.



Tube dimensions inside the flexible protection tube

## Made to Order

### Multi-core, same color specification TFU-X73

#### Flat type of the TUZ series

Number of cores: 2 to 12 cores

Specification: **Same color**

### Multi-core, multi-color specification TUZ-X169 to X172, -X204

Number of cores: 2 to 12 cores

Specification: **Multi-color**

Refer to page 419-1 for details.

The identification line is not shown.

Please contact SMC for detailed specifications, dimensions, and delivery.

### How to Order

**TFU0425 BU - 2 - 20 - X73**

Color

Symbol	Color
<b>B</b>	Black
<b>W</b>	White
<b>R</b>	Red
<b>BU</b>	Blue
<b>Y</b>	Yellow
<b>G</b>	Green

Note) Not clear, but translucent due to material.

Special polyurethane  
(Multi-core, same color specification)

#### Length per roll

<b>Nil</b>	10 m
<b>n</b>	n m (Note)

Note) It is also available in lengths other than 10 m.

Enter the length you need (1, 2, 3, 4, 5, 20).

Example) **TFU0425BU-2-20-X73**

Number of cores  
2 to 12

20 m

#### Tubing model

Model	O.D. x I.D. (mm)
<b>TFU0425</b>	4 x 2.5
<b>TFU0604</b>	6 x 4
<b>TFU0805</b>	8 x 5
<b>TFU1065</b>	10 x 6.5
<b>TFU1208</b>	12 x 8

**KQ2**

**KQB2**

**KS**  
**KX**

**KM**

**KF**

**M**

**H/DL**  
**L/LL**

**KC**

**KK**

**KK130**

**DM**

**KDM**

**KB**

**KR**

**KA**

**KQ62**

**KG**

**KFG2**

**MS**

**KKA**

**KP**

**LQ**

**MQR**

**T**



# Wear Resistant Flat Tubing Multi-core, Multi-color Specification Series TUZ

RoHS

Compact piping possible  
6 color variations

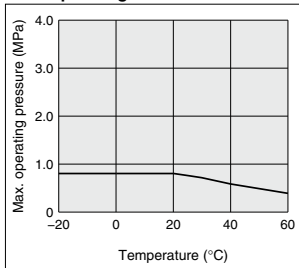
**Abrasion: Approx. 1/3**

\* Compared with SMC polyurethane tubing TU series (Refer to the table below)

Description	Maximum abrasion (mm) After 10 million cycles
<b>Wear resistant tubing Series TUZ</b>	<b>0.16</b>
Polyurethane tubing Series TU	0.46

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

## Max. Operating Pressure



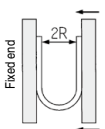
## ⚠️ Precautions

Be sure to read this before handling.  
For Safety Instructions and Fittings & Tubing Precautions, refer to "Handling Precautions for SMC Products" and the Operation Manual on SMC website, <http://www.smcworld.com>

## ⚠️ Caution

- Please consult with SMC if using for any fluids other than air.
- Abnormal temperature rise caused by adiabatic compression may result in the tube bursting.
- The value of the minimum bending radius is measured at the temperature of 20°C as shown in the figure below.
- As a result of product design characteristics, there are cases of very slight leakage.

## 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. Measure 2R when the tube breaks or is crushed.

## Specifications

Model	TUZ0425	TUZ0604	TUZ0805	TUZ1065	TUZ1208
<b>Tubing O.D. (mm)</b>	4	6	8	10	12
<b>Tubing I.D. (mm)</b>	2.5	4	5	6.5	8
<b>Black (B)</b>	●	●	●	●	●
<b>White (W)</b>	●	●	●	●	●
<b>Red (R)</b>	●	●	●	●	●
<b>Blue (BU)</b>	●	●	●	●	●
<b>Yellow (Y)</b>	●	●	●	●	●
<b>Green (G)</b>	●	●	●	●	●
<b>Number of cores</b>	2 cores	X169 (Roll)			
	3 cores	X170 (Roll)			
	4 cores	X171 (Roll)			
	5 cores	X172 (Roll)			
	6 cores	X204 (Roll)			
<b>Fluid</b>	Air				
<b>Max. operating pressure MPa</b>	20°C	0.8			
	40°C	0.6			
	60°C	0.4			
<b>Applicable fittings</b>	One-touch fitting, Insert fitting, Miniature fitting (Hose nipple type)				
<b>Min. bending radius<sup>Note)</sup> (mm)</b>	10	15	20	27	35
<b>Operating temperature</b>	-20 to +60°C				
<b>Material</b>	Special polyurethane				

Note) The minimum bending radius means the value measured by the method shown in the figure on the left below at the temperature of 20°C when the tube is bent. 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 for sure if the tube is used in the flexible protection tube. In addition, refer to the **WEB catalog** or the Best Pneumatics No. 6 for abrasion.

How to Order

Roll

Please contact SMC for delivery.

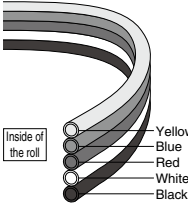
Tube length per roll: **1, 2, 3, 4, 5, 10, 20** m

**TUZ 0425 - 12345 A - X172**

Tubing model

Tubing size

Symbol	O.D. x I.D.
0425	ø4 x ø2.5
0604	ø6 x ø4
0805	ø8 x ø5
1065	ø10 x ø6.5
1208	ø12 x ø8



Color<sup>\*1\*2</sup>

Symbol	Color	Symbol	Color
1	Black	4	Blue
2	White	5	Yellow
3	Red	6	Green

\*1 Colors of the example (12345)

\*2 Not clear, but translucent due to material.

Multi-core, multi-color specification

Symbol	Number of cores
X169	2 cores
X170	3 cores
X171	4 cores
X172	5 cores
X204	6 cores

Tube length per roll [m]

Symbol	Length	Symbol	Length
A	1	E	5
B	2	F	10
C	3	G	20
D	4		

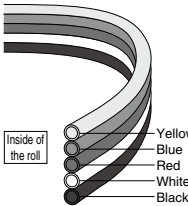
Tube length per roll: **50** m

**TUZ 0425 - 12345 H - X172**

Tubing model

Tubing size

Symbol	O.D. x I.D.
0425	ø4 x ø2.5
0604	ø6 x ø4
0805	ø8 x ø5
1065	ø10 x ø6.5
1208	ø12 x ø8



Color<sup>\*1\*2</sup>

Symbol	Color	Symbol	Color
1	Black	4	Blue
2	White	5	Yellow
3	Red	6	Green

\*1 Colors of the example (12345)

\*2 Not clear, but translucent due to material.

Multi-core, multi-color specification

Symbol	Number of cores	Applicable tubing O.D.			
		ø4	ø6	ø8	ø10
X169	2 cores	●	●		
X170	3 cores	●	●	●	
X171	4 cores	●	●	●	●
X172	5 cores	●	●	●	●
X204	6 cores	●	●	●	●

Tube length per roll [m]

Symbol	Length
H	50

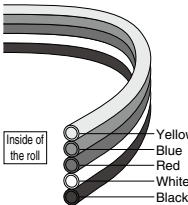
Tube length per roll: **100** m

**TUZ 0425 - 12345 J - X172**

Tubing model

Tubing size

Symbol	O.D. x I.D.
0425	ø4 x ø2.5
0604	ø6 x ø4
0805	ø8 x ø5



Color<sup>\*1\*2</sup>

Symbol	Color	Symbol	Color
1	Black	4	Blue
2	White	5	Yellow
3	Red	6	Green

\*1 Colors of the example (12345)

\*2 Not clear, but translucent due to material.

Multi-core, multi-color specification

Symbol	Number of cores	Applicable tubing O.D.		
		ø4	ø6	ø8
X169	2 cores	●	●	
X170	3 cores	●	●	●
X171	4 cores	●	●	●
X172	5 cores	●	●	●
X204	6 cores	●	●	●

Tube length per roll [m]

Symbol	Length
J	100

KQ2

KQB2

KS

KX

KM

KF

M

H/DL

L/LL

KC

KK

KK130

DM

KDM

KB

KR

KA

KQG2

KG

KFG2

MS

KKA

KP

LQ

MQR

T



## Series TUZ

# Specific Product Precautions

Be sure to read before handling.

Refer to front matter 56 for Safety Instructions,  
pages 13 to 16 for Fittings and Tubing Precautions.

### Selection

#### Warning

##### 1. Confirm the specifications.

Products represented in this catalog 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 bodily fluids, body tissues.

#### 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.

### 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 tube, etc.

##### 4. Mount so that tube is not damaged due to tangling.

This will cause flattening, bursting or disconnection of tube, 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 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 for sure if the tube is used in the flexible protection tube.

### 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.

- Cracks, gouges, wearing, corrosion
- Air leakage
- Twists or crushing of tube
- Hardening, deterioration, softening of tube

##### 2. Do not repair or patch the replaced tube or fittings for reuse.

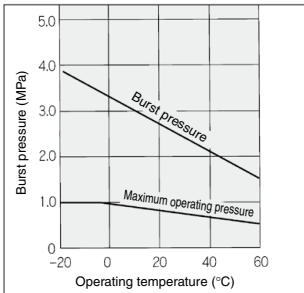
# Polyurethane Coil Tubing

## Series TCU



RoHS

For flexible tubing  
Compact piping possible  
Burst Pressure Characteristics  
Curve and Operating Pressure



### ⚠ Precautions

Be sure to read before handling.  
Refer to front matter 56 for Safety  
Instructions and pages 13 to 16 for  
Fittings and Tubing Precautions.

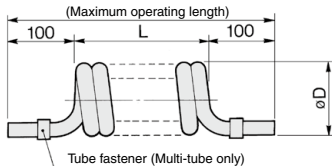
### ⚠ Caution

- Please consult with SMC regarding use with any fluids other than air.
- Refer to the burst pressure characteristics curve for other temperatures. Furthermore, abnormal temperature rises caused by adiabatic compression may result in the burst of the tube.
- Please do not cut the coil and insert it into the fitting. This may cause air leakage, or tubing to come out after installation.

### Made to Order

Change of coil turns, Change of color

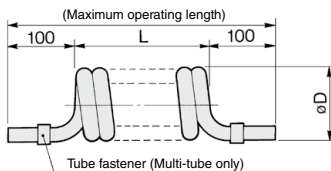
(Please contact SMC for specifications in detail, dimensions and delivery.)



### Model/Specifications

Model	TCU 0425B-1	TCU 0425B-2	TCU 0425B-3	TCU 0604B-1	TCU 0604B-2	TCU 0604B-3	TCU 0805B-1
Number of cores	1 core	2 cores	3 cores	1 core	2 cores	3 cores	1 core
Tubing O.D. (mm)	4			6			8
Tubing I.D. (mm)	2.5			4			5
Fluid	Air						
Max. operating pressure (at 20°C)	0.8 MPa						
Applicable fittings	One-touch fittings, Insert fittings, Self-align fittings, Miniature fittings						
Burst pressure	Refer to the burst pressure characteristics curve.						
Operating temperature	-20 to +60°C						
Material	Polyurethane						
Color	Black						

### Dimensions



Model	Tubing size (mm)		Coil (mm)		No. of cores	No. of coil windings per tube length	Max. operating length (m)	Standard unit of packing
	O.D.	I.D.	L	øD				
TCU0425B-1	4	2.5	210	18	1	52 ± 2	1.5	5 tubes/case
TCU0425B-2			280	28	2	35 ± 1		
TCU0425B-3			265		3	22 ± 1		
TCU0604B-1	6	4	325	24	1	54 ± 2	2	
TCU0604B-2			305		37	2	27 ± 1	
TCU0604B-3			305	3	17 ± 1	1		
TCU0805B-1	8	5	330	31	1	41 ± 2	2	

\* The number of coil windings per tube length and dimensions are changeable due to material.

Model	Tubing size (mm)		Coil (mm)		No. of cores	No. of coil windings per tube length (N)	Max. operating length (mm)	Model	Tubing size (mm)		Coil (mm)		No. of cores	No. of coil windings per tube length (N)	Max. operating length (mm)
	O.D.	I.D.	L	øD					O.D.	I.D.	L	øD			
TCU0425□-1-N-X6	4	2.5	N x 4	18	1	3 to 90	L x 5.9 + 200	TCU0805□-1-N-X6	8	5	N x 8	31	1	3 to 90	L x 5.2 + 200
TCU0425□-2-N-X6			N x 8	28	2	3 to 90	L x 4.4 + 200	TCU0805□-2-N-X6			N x 16	42	2	3 to 40	L x 3 + 200
TCU0425□-3-N-X6			N x 12	28	3	3 to 63	L x 2.9 + 200	TCU1065□-1-N-X6			N x 10	52	1	3 to 45	L x 5 + 200
TCU0604□-1-N-X6	6	4	N x 6	24	1	3 to 90	L x 5.3 + 200	TCU1065□-2-N-X6	10	6.5	N x 20	52	2	3 to 35	L x 3 + 200
TCU0604□-2-N-X6			N x 12	37	2	3 to 66	L x 3.8 + 200	TCU1208□-1-N-X6			N x 12	67	1	3 to 35	L x 5 + 200
TCU0604□-3-N-X6			N x 18	37	3	3 to 44	L x 2.5 + 200	TCU1208□-2-N-X6			N x 24	67	2	3 to 30	L x 3 + 200

\* □: B (Black), W (White), R (Red), BU (Blue), Y (Yellow), G (Green), C (Clear), YR (Orange)

KQ2

KQB2

KS  
KX

KM

KF

M

H/DL  
L/LL

KC

KK

KK130

DM

KDM

KB

KR

KA

KQG2

KG

KFG2

MS

KKA

KP

LQ

MQR

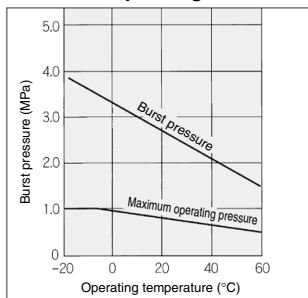
T

# Polyurethane Flat Tubing Series **TFU**



RoHS

Compact piping possible  
With line markings for  
piping differentiation  
**Burst Pressure Characteristics  
Curve and Operating Pressure**

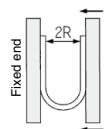


## ⚠ Precautions

Be sure to read before handling.  
Refer to front matter 56 for Safety  
Instructions and pages 13 to 16 for  
Fittings and Tubing Precautions.

## ⚠ Caution

- Please consult with SMC regarding use with any fluids other than air.
- Refer to the burst pressure characteristics curve for other temperatures. Furthermore, abnormal temperature rises caused by adiabatic compression may result in the burst of the tube.
- The value of the minimum bending radius is measured at the temperature of 20°C as shown in the figure on the right.
- As a result of product design characteristics, there are cases of very slight leakage.



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

## Model/Specifications

Model	TFU 0425B-2	TFU 0425B-3	TFU 0604B-2	TFU 0604B-3	TFU 0805B-2	TFU 0805B-3
No. of cores	2 cores	3 cores	2 cores	3 cores	2 cores	3 cores
Tubing O.D. (mm)	4		6		8	
Tubing I.D. (mm)	2.5		4		5	
Fluid	Air					
Max. operating pressure (at 20°C)	0.8 MPa					
Burst pressure	Refer to the burst pressure characteristics curve.					
Applicable fittings	One-touch fittings, Insert fittings, Self-align fittings, Miniature fittings					
Operating temperature	-20 to +60°C (No freezing)					
Material	Polyurethane					
Color	Black					
Min. bending radius (mm)	10		15		20	
Tube length per roll (m)	10					

## How to Order

**TFU0425 B - 2**

Tubing model

Color

Symbol	Color
B	Black

No. of tubes

Symbol	No. of cores
2	2 cores
3	3 cores

## Made to Order

(Please contact SMC for specifications in detail, dimensions and delivery.)

● — 10 m roll △ — 50 m reel □ — 100 m reel

### 1. Change of color (10 m roll)

Suffix "-X4" to the end of part number.

Ex.) TFU0604BU-2-10-**[X4]**

• W: White, R: Red, BU: Blue, Y: Yellow, G: Green, C: Clear, YR: Orange, (All tubes are the same color regardless of 2 cores or 3 cores.)

### 2. Reel (50 m, 100 m length, Color changes)

Suffix "-X3" to the end of part number.

Ex.) TFU0425B-2-50-**[X3]**

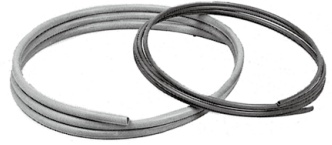
### 3. No. of cores (10 m roll, each color)

Suffix "-X4" to the end of part number.

Ex.) TFU0604B-4-10-**[X4]**

Model	TFU0425 □	TFU0604 □	TFU0805 □	TFU1065 □	TFU1208 □
Tubing O.D. (mm)	4	6	8	10	12
Tubing I.D. (mm)	2.5	4	5	6.5	8
No. of cores	2	●	●	●	●
	3	●	●	●	●
	4	●	●	●	●
	5	●	●	●	●
	6	●	●	●	●
	7	●	●	●	●
	8	●	●	●	●

# Flame Resistant (Equivalent to UL-94 Standard V-0) FR Soft Nylon Tubing Series TRS

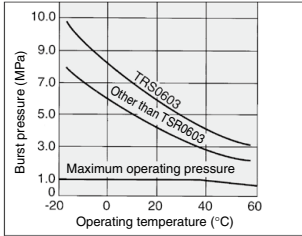


RoHS

Suitable for air and water piping in environments where sparks from spot welders, etc., may be a problem.

Flame resistant tubing

Burst Pressure Characteristics Curve and Operating Pressure



## ⚠️ Precautions

Be sure to read before handling.  
Refer to front matter 56 for Safety Instructions and pages 13 to 16 for Fittings and Tubing Precautions.

### ⚠️ Caution

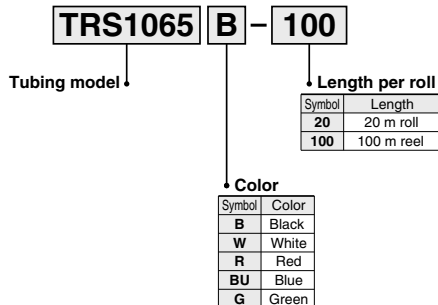
- Applicable for general industrial water. Please consult with SMC if using for the other kind of fluid. Also, the surge voltage pressure must be under the maximum operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes.
- The value of the max. operating pressure is at a temperature of 20°C. Refer to the burst pressure characteristics curve for other temperatures. Furthermore, abnormal temperature rises caused by adiabatic compression may result in the burst of the tube.

## Model/Specifications

Model	TRS0603	TRS0805	TRS1065	TRS1208
Tubing O.D. (mm)	6	8	10	12
Tubing I.D. (mm)	3	5	6.5	8
Black (B)	●	●	●	●
White (W)	□	□	□	□
Red (R)	●	●	●	●
Blue (BU)	●	●	●	●
Green (G)	□	□	□	□

Fluid	Air/Water			
Max. operating pressure (at 20°C)	1.2 MPa			
Burst pressure	Refer to the burst pressure characteristics curve.			
Applicable fittings	FR one-touch fittings; Series KR-W2			
Minimum bending radius (mm)	17	19	27	32
Operating temperature	-20 to +60°C (Water: 0 to 60°C) (No freezing)			
Material	Flame resistant nylon (Equivalent to UL-94 standard V-0)			

## How to Order



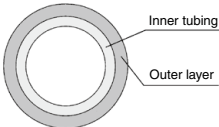
- KQ2
- KQB2
- KS
- KX
- KM
- KF
- M
- H/DL
- L/LL
- KC
- KK
- KK130
- DM
- KDM
- KB
- KR
- KA
- KQG2
- KG
- KFG2
- MS
- KKA
- KP
- LQ
- MQR
- T

# Flame Resistant (Equivalent to UL-94 Standard V-0) FR Double Layer Tubing Series *TRB*



Suitable for air and water piping in environments where sparks from spot welders, etc., may be a problem.

Double layer design using flame resistant resin (equivalent to UL-94 Standard V-0) for outer layer.



Sectional view of FR double layer tubing

## Model

● — 20 m roll □ — 100 m reel

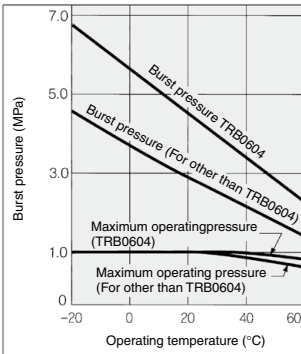
Model	TRB0604	TRB0806	TRB1075	TRB1209
Inner tubing O.D. (mm)	6	8	10	12
Inner tubing I.D. (mm)	4	6	7.5	9
Outer layer thickness (mm)	1	1	1	1
External layer color <small>(Note)</small>	Black (B)	●	●	●
	White (W)	□	□	□
	Red (R)	●	●	●
	Blue (BU)	●	●	●
	Yellow (Y)	●	●	●
	Green (G)	●	●	●
Min. bending radius (mm)	15	28	35	45

## Specifications

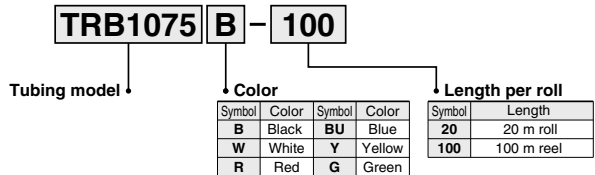
Fluid	Air/Water	
Max. operating pressure (at 20°C)	1.0 MPa	
Burst pressure	Refer to the burst pressure characteristics curve.	
Recommended fittings	FR One-touch fittings: Series KR-W2	
Ambient and fluid temperature	-20 to +60°C (Water: 0 to 60°C) (No freezing)	
Material	Inner tubing	Nylon 12
	Outer layer	PVC (Equivalent to UL-94 Standard V-0)

(Note) The color of all inner tubing is black.

## Burst Pressure Characteristics Curve and Operating Pressure



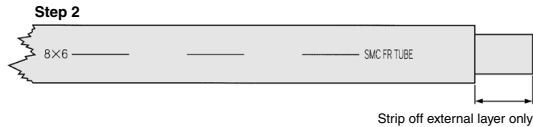
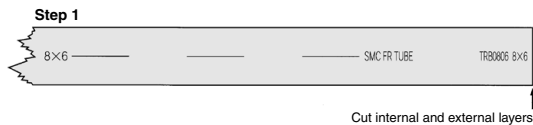
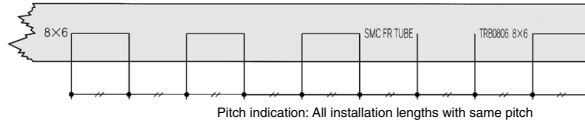
## How to Order



## Installation on One-touch Fittings

### **⚠ Caution**

Length of tubing to be inserted into One-touch fittings is indicated on the outer layer of TRB tubing. Cut the tube according to this indication, (Step 1) and then strip off the outer layer (Step 2) for installing into fittings.



### **⚠ Precautions**

**Be sure to read before handling.**

**Refer to front matter 56 for Safety Instructions and pages 13 to 16 for Fittings and Tubing Precautions.**

### **⚠ Caution**

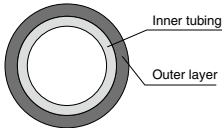
1. Applicable for general industrial water. Please consult with SMC if using for the other kind of fluid. Also, the surge voltage pressure must be under the maximum operating pressure.  
If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubing.
2. The value of the max. operating pressure is at a temperature of 20°C. Refer to the burst pressure characteristics curve for other temperatures.  
Furthermore, abnormal temperature rises caused by adiabatic compression may result in the burst of the tube.

KQ2
KQB2
KS KX
KM
KF
M
H/DL L/LL
KC
KK
KK130
DM
KDM
KB
KR
KA
KQG2
KG
KFG2
MS
KKA
KP
LQ
MQR
T



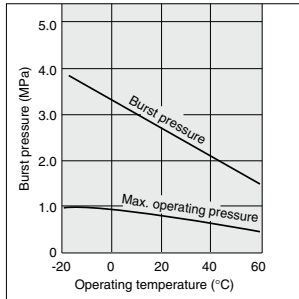
# Flame Resistant (Equivalent to UL-94 Standard V-0) FR Double Layer Polyurethane Tubing Series **TRBU**

RoHS



Sectional view of FR double layer tubing

## Burst Pressure Characteristics Curve and Operating Pressure



## Model

● — 20 m roll □ — 100 m reel

Model	TRBU0604	TRBU0805	TRBU1065	TRBU1208
Inner tubing O.D. (mm)	6	8	10	12
Inner tubing I.D. (mm)	4	5	6.5	8
External layer thickness (mm)	1	1	1	1
External layer color <small>(Note)</small>	Black (B)	● □	● □	● □
	White (W)	● □	● □	● □
	Red (R)	● □	● □	● □
	Blue (BU)	● □	● □	● □
	Yellow (Y)	● □	● □	● □
	Green (G)	● □	● □	● □
Minimum bending radius (mm)	15	20	27	35

## Specifications

Fluid	Air/Water	
Max. operating pressure (at 20°C)	0.8 MPa	
Burst pressure	Refer to the burst pressure characteristics curve.	
Applicable fittings	FR one-touch fittings: Series KR-W2	
Ambient and fluid temperature	-20 to +60°C Water: 0 to 40°C (No freezing)	
Material	Internal tubing	Polyurethane
	Outer layer	Polyolefin (Equivalent to UL-94 standard V-0)

(Note) The color of all inner tubing is black.

## How to Order

**TRBU1065** **B** - **100**

Tubing model

Length per roll

Symbol	Length
20	20 m roll
100	100 m reel

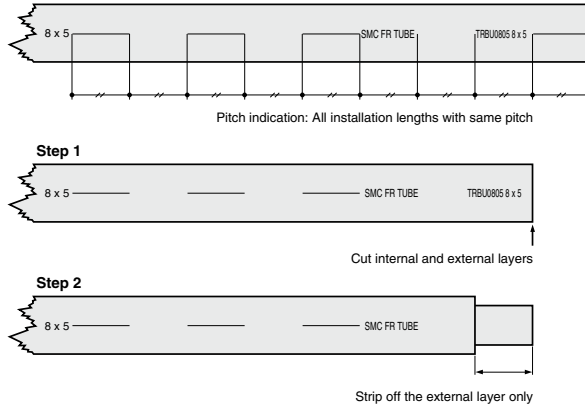
Color

Symbol	Color	Symbol	Color
B	Black	BU	Blue
W	White	Y	Yellow
R	Red	G	Green

## Installation on One-touch Fittings

### ⚠ Caution

Lengths of tubes to be inserted into One-touch fittings are indicated on the outer layer of TRBU tubes. Cut the tube according to this indication, (Step 1) and then strip off the outer layer (Step 2) for installing into fittings.

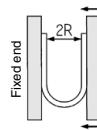


### ⚠ Precautions

**Be sure to read before handling.**  
**Refer to front matter 56 for Safety Instructions and pages 13 to 16 for Fittings and Tubing Precautions.**

### ⚠ Caution

1. Applicable for general industrial water. Please consult with SMC if using for the other kind of fluid. Also, the surge voltage pressure must be under the maximum operating pressure.
2. Refer to the burst pressure characteristics curve for other temperatures. Furthermore, abnormal temperature rises caused by adiabatic compression may result in the burst of the tube.
3. The value of the minimum bending radius is measured at the temperature of 20°C as shown in the figure on the right.



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

KQ2
KQB2
KS KX
KM
KF
M
H/DL L/LL
KC
KK
KK130
DM
KDM
KB
KR
KA
KQG2
KG
KFG2
MS
KKA
KP
LQ
MQR
T

# Related Products: Double Layer Tube Stripper Series *TKS*



Allows easy stripping of the outer layer from double layer tubes.

Even the double layer polyurethane tubing (Series TRBU), which is highly adhesive to the external layer can be stripped easily.

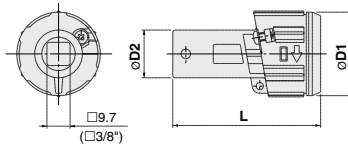


## Model

Model	Tip color	Applicable tubing *	Dimensions (mm)			Weight (g)
			D1	D2	L	
TKS-06	Orange	TRB0604, TRBU0604	35	16	58	45
TKS-08	Yellow	TRB0806, TRBU0805		18		
TKS-10	Blue	TRB1075, TRBU1065		20		
TKS-12	Green	TRB1209, TRBU1208		22	62	50

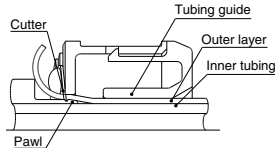
\* Inner tubing material/TRB: Nylon, TRBU: Polyurethane

## Dimensions



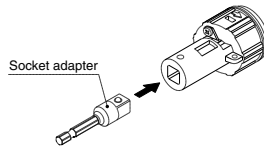
## Able to strip without damaging the inner tubing

The outer tube can be stripped without damaging the inner tube because a pawl is inserted between the inner and outer tube layers.



## Can be attached to tools

Stripping work can be automated by attaching an air driver, etc. with it.

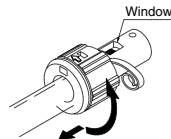


## Adjustment of cutter and stripping length is unnecessary

A constant stripping length is always possible due to the fixed cutter with angle that cuts until the tube reaches the end surface inside the stripper.

## Removal of stripped tube is unnecessary.

Since the stripped tube is discharged to the outside, no additional labor is required to remove it.





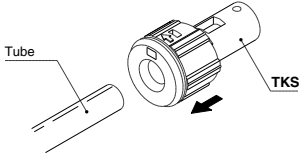
# Series TKS Specific Product Precautions

Be sure to read before handling.  
Refer to front matter 56 for Safety Instructions and pages 13 to 16 for Fittings and Tubing Precautions.

## Operation

### ⚠ Caution

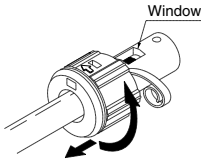
1. Insert the tube into the double layer tube stripper (Series TKS).



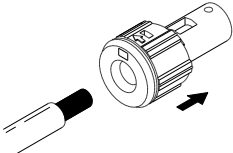
2. Rotate the TKS in the arrow direction while pushing it.
3. Strip the outer layer until the cut end of the tubing strikes the end surface inside the stripper.

The end surface can be confirmed in the window.

Note) Stripping is not possible by rotating in the opposite direction.



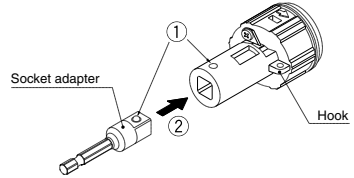
4. Pull the TKS off of the tubing to complete stripping.  
The tube can be attached as it is to a FR One-touch fitting.



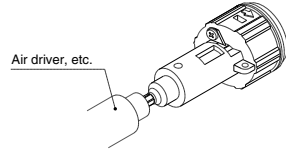
## Attachment to Tools

### ⚠ Caution

1. Align the socket of the TKS with a commercially available male socket adapter (9.5 mm square).
2. Connect the socket adapter to the TKS.



3. Connection with tools such as an air driver is also possible.  
Note) Ensure the TKS does not shake or vibrate.



## Operation

### ⚠ Caution

1. When using a tool such as air driver, use a push-start type which rotates after the tubing is inserted.
2. Do not insert the tube when the TKS is rotating, as the pawl may be damaged.

QK2

QKB2

KS  
KX

KM

KF

M

H/DL  
L/LL

KC

KK

KK130

DM

KDM

KB

KR

KA

QKG2

KG

KFG2

MS

KKA

KP

LQ

MQR

T

# FR Three-layer Polyurethane Tubing

## Series TRTU

Flame Resistant (Equivalent to UL-94 Standard V-0)

RoHS

### Improved spatter resistance

Spatter resistance is **twice** that of FR double layer polyurethane tubing TRBU series. \* In SMC conditions

For general pneumatic and water piping in environments exposed to sparks from arc welding, etc.

Spatter resistance is improved by installing an aluminum layer between the outer layer and inner tube.

Three-layer design

Outer layer Flame resistant polyolefin (Equivalent to UL-94 standard V-0)

Middle layer Aluminum laminated film

Inner tube Polyurethane

### 6-color variations



### Model

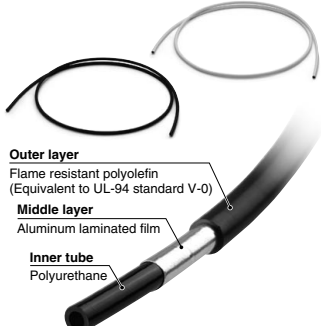
● — 20 m roll □ — 100 m reel

Model	TRTU0604	TRTU0805	TRTU1065	TRTU1208
Inner tube O.D. (mm)	6	8	10	12
Inner tube I.D. (mm)	4	5	6.5	8
Outer layer thickness (mm)	1	1	1	1
Outer layer color	Black (B)	●	●	●
	White (W)	●	●	●
	Red (R)	●	●	●
	Blue (BU)	●	●	●
	Yellow (Y)	●	●	●
	Green (G)	●	●	●

# Flame Resistant (Equivalent to UL-94 Standard V-0) FR Three-layer Polyurethane Tubing

## Series *TRTU*

RoHS



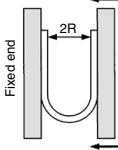
**Outer layer**  
Flame resistant polyolefin  
(Equivalent to UL-94 standard V-0)

**Middle layer**  
Aluminum laminated film

**Inner tube**  
Polyurethane

For general pneumatic and water piping in environments exposed to sparks from arc welding, etc.

### 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%.

### Model

Model	TRTU0604	TRTU0805	TRTU1065	TRTU1208
Inner tube O.D. (mm)	6	8	10	12
Inner tube I.D. (mm)	4	5	6.5	8
Outer layer thickness (mm)	1	1	1	1

Outer layer color	● — 20 m roll □ — 100 m reel			
	Black (B)	●	●	●
White (W)	●	●	●	●
Red (R)	●	●	●	●
Blue (BU)	●	●	●	●
Yellow (Y)	●	●	●	●
Green (G)	●	●	●	●

### Specifications

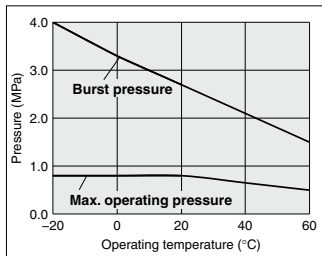
Fluid <sup>Note 1)</sup>	Air, Water			
Applicable fittings	FR One-touch fittings: Series KR-W2 Metal One-touch fittings: Series KQB2			
Max. operating pressure	At 20°C	0.8 MPa		
	At 40°C	0.65 MPa		
	At 60°C	0.5 MPa		
Burst pressure	Refer to the burst pressure characteristics curve.			
Min. bending radius (mm) <sup>Note 2)</sup>	50	60	70	80
Ambient and fluid temperature	-20 to +60°C, Water: 0 to 40°C (No freezing)			
Material	Inner tube	Polyurethane		
	Middle layer	Aluminum laminated film		
	Outer layer	Polyolefin (Equivalent to UL-94 standard V-0)		

Note 1) Applicable for general industrial water. Please consult with SMC if using for the other kind of fluid. Also, 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.

Note 2) The minimum bending radius is the representative value measured as shown in the left figure. Allow extra length when piping since the tube may be bent if used under the minimum bending radius.

Note 3) The color of all inner tubes is black.

### Burst Pressure Characteristics Curve and Operating Pressure



### How to Order

TRTU1065 B - 20

Tubing model

Model	Inner tube O.D. x I.D. (mm)
TRTU0604	6 x 4
TRTU0805	8 x 5
TRTU1065	10 x 6.5
TRTU1208	12 x 8

Color

Symbol	Color
B	Black
W	White
R	Red
BU	Blue
Y	Yellow
G	Green

Length per roll

Symbol	Length
20	20 m roll
100	100 m reel

## Installation on One-touch Fittings

Pitch length for installation on a One-touch fitting is indicated on the outer layer of the TRTU tubing.

(There are two types of applicable fittings, so two types of pitch length for installation are available.)

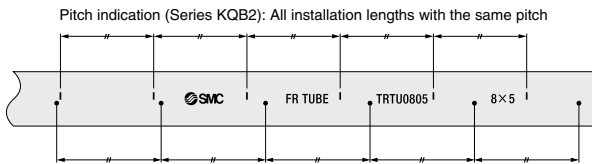
Cut the tube according to this indication (Step 1) and strip off the outer layer (Step 2) using a special tool.

Strip off the aluminum laminated film to prevent the inner tube from being damaged (Step 3) and install it on the One-touch fitting.

Refer to the Operation Manual for details of installation on the One-touch fitting.

The Operation Manual can be downloaded from the SMC URL below.

<http://www.smcworld.com>

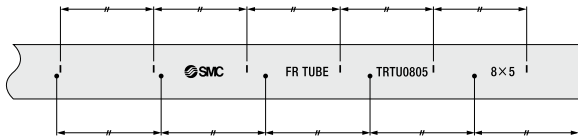


Pitch indication (Series KR-W2): All installation lengths with the same pitch

Identification of the pitch length for installation  
 " | " : Series KQB2  
 " • " : Series KR-W2

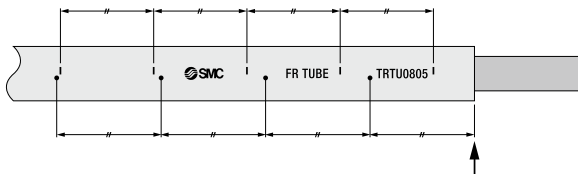
## Installation on the KR-W2 series

### Step 1



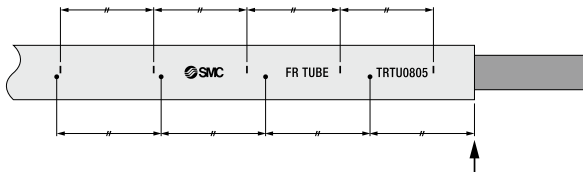
Outer layer, aluminum laminated film and inner tube are cut at the "•" mark.

### Step 2



Strip off the outer layer.

### Step 3



Strip off the aluminum laminated film to prevent the inner tube from being damaged.

## Metal One-touch fittings Series KQB2



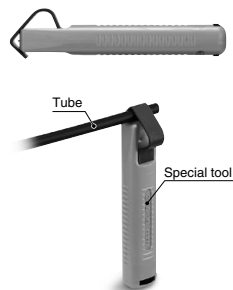
## Flame resistant (equivalent to UL-94 standard V-0) FR One-touch fittings Series KR-W2



Use a special tool for stripping off the outer layer.

Part no.: YS-100

\* Refer to the Operation Manual for details of how to use the special tool.

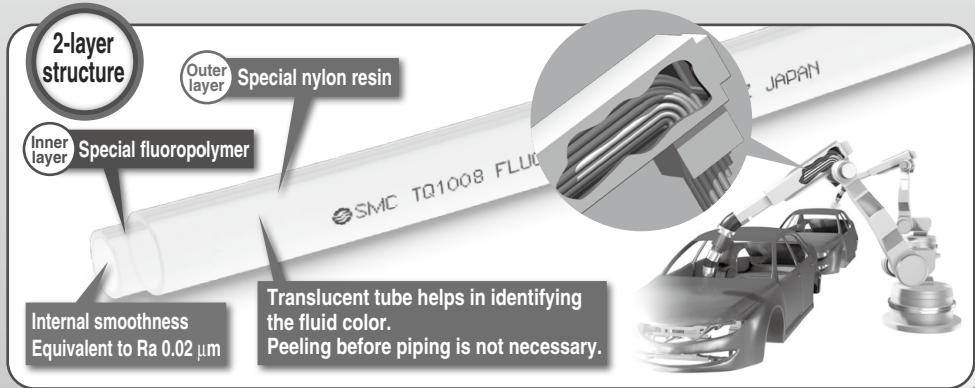


# 2-Layer Soft Fluoropolymer Tubing

## Series TQ

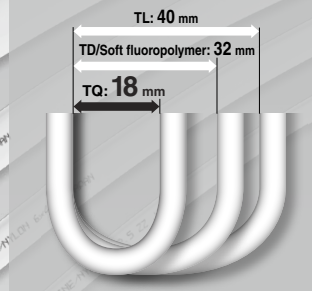
RoHS

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 (ø6 x ø4)



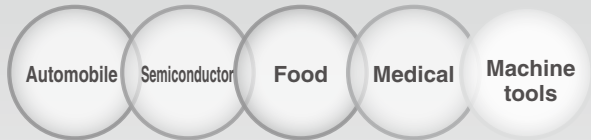
**Wearing of outer layer tube** Reduced to **1/30**  
**TQ: 1 mg<sup>-2</sup>** ← **TL: 30 mg<sup>-2</sup>**  
(Fluoropolymer Tubing)

\*2. Based on friction test of tubes

**Light weight** Weight reduced by approximately **44%\***

\*3. 2-Layer Soft Fluoropolymer Tubing (TQ): 26.5 g/m  
 Fluoropolymer Tubing (TL): 47 g/m (ø8 x ø6)

### Applications



### 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	●	●	●	●	●

QK2  
 QKB2  
 KS  
 KX  
 KM  
 KF  
 M  
 H/DL  
 L/LL  
 KC  
 KK  
 KK130  
 DM  
 KDM  
 KB  
 KR  
 KA  
 QKG2  
 KG  
 KFG2  
 MS  
 KKA  
 KP  
 LQ  
 MQR  
 T



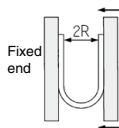
# 2-Layer Soft Fluoropolymer Tubing

## Series TQ

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

Length per roll

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

### 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)</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 435.)

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.

### 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	Outer layer	Chemical	Inner layer	Outer layer
	Special fluoropolymer	Special nylon resin		Special fluoropolymer	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.

### Max. Operating Pressure

Unit: MPa

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



# Series TQ Specific Product Precautions

Be sure to read before handling.

Refer to front matter 56 for Safety Instructions and pages 13 to 16 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.

#### 4. Countermeasures for static electricity

Since static electricity may be generated depending on the fluid being used, implement suitable countermeasures.

### ⚠ 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.

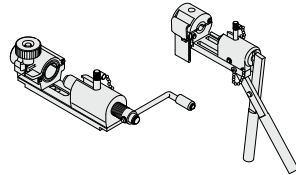
6. Do not apply unnecessary forces such as twisting, pulling, moment loads on fittings or tubing. It may cause leakage, the fitting to fracture or the tube to be crushed, burst or fall off.

## 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/Series LQ1, 2 Work Procedure Instructions" (M-E05-1) or "High Purity Fluoropolymer Fittings Hyper Fitting / Flare Type Series LQ3 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.

KQ2

KQB2

KS  
KX

KM

KF

M

H/DL  
L/LL

KC

KK

KK130

DM

KDM

KB

KR

KA

KQG2

KG

KFG2

MS

KKA

KP

LQ

MQR

T

# Antistatic Tubing Series TA

RoHS

Conductive tube prevents troubles caused by static electricity.

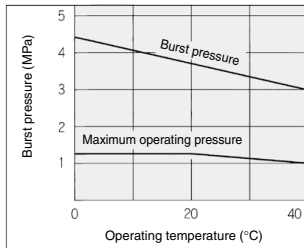
## Antistatic Soft Nylon Tubing: Series TAS

For pneumatic piping and applications which require the measures against antistatic electricity.

Flame resistant tubing (Equivalent to UL-94 standard V-0)



### Burst Pressure Characteristics Curve and Operating Pressure



### Precautions

Be sure to read before handling. Refer to front matter 56 for Safety Instructions and pages 13 to 16 for Fittings and Tubing Precautions.

### Caution

- The maximum operating pressure is the value at 20°C. Refer to the burst pressure characteristics curve for other temperatures. Avoid abnormal temperature rises caused by adiabatic compression.
- The value at temperature of 20°C and O.D. variable rate 10% max.
- Please exercise caution when using this item in a clean room. There is a possibility of plasticizer and other materials precipitating on the tube surface and detracting from the cleanliness level of the room.

### Model/Specifications

Model	TAS3222	TAS0425	TAS0604	TAS0805	TAS1065	TAS1208
Tubing O.D. (mm)	3.2	4	6	8	10	12
Tubing I.D. (mm)	2.2	2.5	4	5	6.5	8

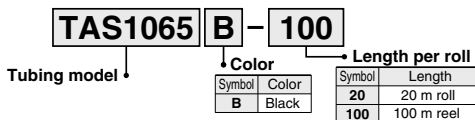
Black (B)	●	□	●	□	●	□	●	□	●	□
	●	□	●	□	●	□	●	□	●	□

Fluid	Air					
Max. operating pressure (at 20°C)	1.2 MPa					
Burst pressure	Refer to the burst pressure characteristics curve.					
Recommended fittings	Antistatic one-touch fittings: Series KA Miniature fittings: Series M and MS <sup>Note</sup>					
Minimum bending radius (mm)	12	12	15	19	27	32
Operating temperature	0 to 40°C					
Material	Conductive nylon + Flame resistant nylon (Equivalent to UL-94 standard V-0)					
Surface resistance	10 <sup>4</sup> to 10 <sup>7</sup> Ω					

Note) Miniature fittings: Only the following types are available for Series M and MS

Series M	Series MS
M-3AU-3, M-3AU-4, M-5AU-3, M-5AU-4 M-5AU-6, M-5H-4, M-5H-6	MS-5AU-3, MS-5AU-4, MS-5AU-6 MS-5H-4, MS-5H-6

### How to Order



### Made to Order

#### Coil Tubing

Please contact SMC for details.

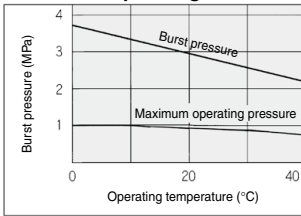
## Antistatic Polyurethane Tubing: Series TAU

For pneumatic piping and applications which require the measures against antistatic electricity.

Flexible tubing



### Burst Pressure Characteristics Curve and Operating Pressure

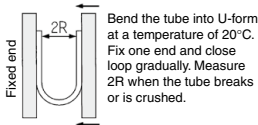


### ⚠️ Precautions

Be sure to read before handling. Refer to front matter 56 for Safety Instructions and pages 13 to 16 for Fittings and Tubing Precautions.

### ⚠️ Caution

- The maximum operating pressure is the value at 20°C. Refer to the burst pressure characteristics curve for other temperatures. Avoid abnormal temperature rises caused by adiabatic compression.
- The value of the minimum bending radius is measured at the temperature of 20°C as shown below.



- Because ester polyurethane is adopted, water cannot be used due to the occurrence of hydrolysis.

### Model/Specifications

Model	TAU3220	TAU0425	TAU0604	TAU0805	TAU1065	TAU1208
Tubing O.D. (mm)	3.2	4	6	8	10	12
Tubing I.D. (mm)	2	2.5	4	5	6.5	8
Black (B)	●	●	●	●	●	●

● — 20 m roll □ — 100 m reel

Fluid	Air
Max. operating pressure at 20°C	0.9 MPa
Burst pressure	Refer to the burst pressure characteristics curve.
Recommended fittings	Antistatic one-touch fittings: Series KA Miniature fittings: Series M and MS (Note)
Minimum bending radius (mm)	10 10 15 20 27 35
Operating temperature	0 to 40°C
Material	Conductive polyurethane
Surface resistance	10 <sup>9</sup> to 10 <sup>9</sup> Ω

Note) Miniature fittings: Only the following types are available for Series M and MS

Series M	Series MS
M-3AU-3, M-3AU-4, M-5AU-3, M-5AU-4 M-5AU-6, M-5H-4, M-5H-6	MS-5AU-3, MS-5AU-4, MS-5AU-6 MS-5H-4, MS-5H-6

### How to Order

**TAU1065 B - 100**

Tubing model

Color

Length per roll

Symbol	Color	Symbol	Length
20	Black	20	20 m roll
100	Black	100	100 m reel

### Made to Order

**Coil Tubing**

**Flat Tubing**

Please contact SMC for details.

**Color Tubing**

- 5 colors
- Surface resistance 10<sup>9</sup> Ω

### Specifications

Fluid	Air
Max. operating pressure at 20°C	0.8 MPa
Ambient and fluid temperature	0 to 40°C
Material	Antistatic polyurethane
Surface resistance	10 <sup>9</sup> Ω
Recommended fittings	Antistatic One-touch fittings: Series KA Miniature fittings: Series M and MS (Note)

Note) Miniature fittings: Only the following types are available for Series M and MS

Series M	Series MS
M-3AU-2, M-3AU-4 M-5AU-2, M-5AU-4 M-5AU-6, M-5H-4 M-5H-6	MS-5AU-4, MS-5AU-6 MS-5H-4, MS-5H-6

### How to Order

**TAU 0604 BU - 20 - X100**

Antistatic Polyurethane Tubing

Antistatic polyurethane color tubing

Tubing size

Symbol	O.D. x I.D.
0212	ø2 x ø1.2
0425	ø4 x ø2.5
0604	ø6 x ø4
0805	ø8 x ø5
1065	ø10 x ø6.5
1208	ø12 x ø8

Length per roll

Symbol	Length
20	20 m roll

Color

Symbol	Color	Symbol	Color
W	White	G	Green
BU	Blue	C	Clear
B	Black	—	—



# Fluoropolymer Tubing Variations

## Series TL/TIL/TLM/TILM/TH/THI/TD/TID



### High Purity Fluoropolymer Tubing

Series **TL/TIL** (Material) **Super PFA**

It is suitable for applications which require a highly smooth internal surface and small amount of elution of fluorine ions.

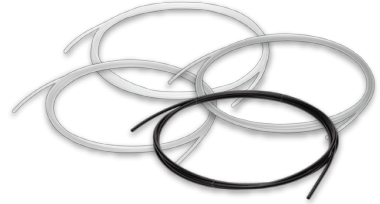
\* It has heat and chemical resistance equivalent to PFA. **P.440**



### Fluoropolymer Tubing (PFA)

Series **TLM/TILM** (Material) **PFA**

The material consists of a good chemical resistant fluoropolymer. This also has good heat resistance, and it is suitable for a wide range of applications. **P.441**



### FEP Tubing (Fluoropolymer)

Series **TH/THI** (Material) **FEP**

This has better resistance in chemical environments. **P.444**



### Soft Fluoropolymer Tubing

Series **TD/TID** (Material) **Modified PTFE**

Flexibility improved by approx. 20%  
(Compared with SMC TL/TIL Series)  
Suitable for applications which require flexibility. **P.446**



Series	TL/TIL	TLM/TILM	TH/THI	TD/TID
Material	Super PFA	PFA	FEP	Modified PTFE
Chemical resistance	○	○	○	○
Heat resistance	260°C	260°C	200°C	260°C
Flexibility	△	△	△	○
Ion elution	◎	○	○	○
Internal smoothness	○	△	◎	○
Fluid	Chemicals, Deionized water	Chemicals, Deionized water	Air, Water, Inert gas	
Tubing O.D.	Metric	ø2 to ø25	ø4 to ø12	ø4 to ø12
	Inch	1/8" to 1"	1/8" to 3/4"	1/8" to 1/2"
Color	Translucent	Translucent, Red, Blue, Black	Translucent, Red, Blue, Black	Translucent
Applicable fitting series	One-touch fittings	KQ2, KQG2, KP, KP□	KQ2, KQG2, KP, KP□	—
	Miniature fittings	M, MS (Hose nipple type)	M, MS (Hose nipple type)	M, MS (Hose nipple type)
	Insert fittings	—	KF, KFG2	KF, KFG2
	Fluoropolymer fittings	LQ1, LQ2, LQ3	LQ1, LQ2, LQ3	LQ1, LQ2, LQ3

◎: Very good ○: Good △: Moderate

The comparison table shown above was prepared based on a relative comparison taking the characteristics of each fluoropolymer tubing into consideration.



- KQ2
- KQ82
- KS  
KX
- KM
- KF
- M
- H/DL  
L/LL
- KC
- KK
- KK130
- DM
- KDM
- KB
- KR
- KA
- KQG2
- KG
- KFG2
- MS
- KKA
- KP
- LQ
- MQR
- T

# High Purity Fluoropolymer Tubing

# Series TL/TIL

Material: Super PFA

## Series and Specifications

		Metric sizes (Series TL)						Inch sizes (Series TIL)							
Tubing model		TL0403	TL0604	TL0806	TL1008	TL1210	TL1916	TIL01	TILB01	TIL05	TIL07	TIL11	TIL13	TIL19	TIL25
Nominal diameter		—	—	—	—	—	—	1/8"	1/8"	3/16"	1/4"	3/8"	1/2"	3/4"	1"
Tubing size		ø4 x ø3	ø6 x ø4	ø8 x ø6	ø10 x ø8	ø12 x ø10	ø19 x ø16	1/8" x 0.086"	1/8" x 1/16"	3/16" x 1/8"	1/4" x 5/32"	3/8" x 1/4"	1/2" x 3/8"	3/4" x 5/8"	1" x 7/8"
O.D. (mm)	Basic diameter	4	6	8	10	12	19	3.18	3.18	4.75	6.35	9.53	12.7	19.05	25.4
	Tolerance	±0.1				+0.2 -0.1		±0.1				+0.2 -0.1			
Thickness (mm)	Basic diameter	0.5	1				1.5	0.5	0.8	0.8	1.2	1.6			
	Tolerance	±0.05	±0.1				±0.15	±0.05	±0.08	±0.08	±0.12	±0.15			
Bundle	10 m	—	—	—	●	●	●	—	—	—	—	●	●	—	—
	20 m	●	●	●	●	●	●	—	—	●	●	●	●	●	●
	50 m	●	●	●	●	●	●	—	—	●	●	●	●	●	●
	100 m	●	●	●	●	●	●	—	—	●	●	●	●	●	—
	50 Ft (16 m)	—	—	—	—	—	—	50 Ft		—	—	—	—	—	—
	100 Ft (33 m)	—	—	—	—	—	—	100 Ft		—	—	—	—	—	—
Straight pipe	2 m	●	●	●	●	●	●	—	●	●	●	●	●	●	●
Color	Translucent (color of material)														
Applicable fluid	Refer to the applicable fluid in page 448.														
Max. operating pressure (at 20°C)	1 MPa		0.9 MPa		0.7 MPa	0.6 MPa	1 MPa					0.7 MPa		0.5 MPa	
Burst pressure (at 20°C)	4.9 MPa	6.9 MPa	4.7 MPa	3.6 MPa	2.9 MPa	2.6 MPa	6.4 MPa	9.9 MPa	6.7 MPa	7.9 MPa	6.7 MPa	4.6 MPa	2.8 MPa	2.0 MPa	
Min. bending radius (mm)	20		40		65	110	160	12	6	20			60	160	290
Max. operating temperature (Fixed use)	260°C														
Material	Super PFA														

Note 1) • The maximum operating pressure is the value at 20°C. For other temperatures, calculate from the burst pressure drop coefficient.

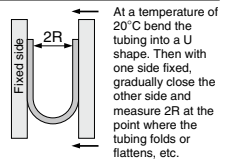
Furthermore, an abnormal temperature increase due to adiabatic compression can cause tubing to burst. To operate at a temperature other than 20°C, the operating pressure must be no more than the value calculated using the equation below: When the value (calculated using the formula below) exceeds 1 MPa, the Max. operating pressure is 1 MPa.  
**(Max. operating pressure) = 1/4 x (burst pressure drop coefficient) x (burst pressure at 20°C)**

• When using a fluid in liquid form, the surge pressure must be no more than the maximum operating pressure.

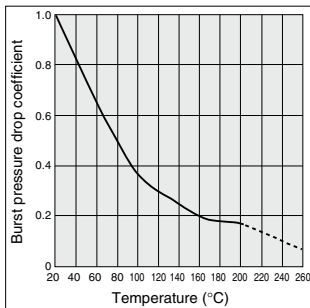
• A surge pressure higher than the maximum operating pressure can cause breakage of the fitting or bursting of the tubing.

Note 2) The minimum bending radius is measured using the method shown in the figure at the right.

Note 3) As for other commercial items, there are some cases it is not able to connect due to tolerance of dimensions.



## Burst pressure drop curve



## Eluting fluorine ion amount <sup>Note 4)</sup> (µg/g)

Type	Fluorine ion
Eluting amount	0.1 or less

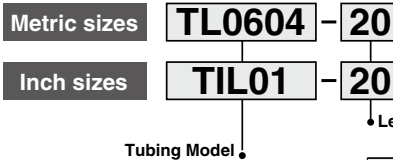
A 15 g piece of fluororesin tubing is cut off, washed in DI water (purer water) and immersed in 15 mL of 25% methyl alcohol extract at room temperature for 24 hours. Then the extract is diluted with DI water (purer water) to be subjected to a quantitative analysis of fluorine ions.

## Eluting metal ion amount <sup>Note 4)</sup> (ng/cm<sup>2</sup>)

Type	Al	Fe	Ni	Na	Ca
Eluting amount	4.5	0.3	0.2	7.1	1.3

The interior of the fluororesin tubing is washed with super deionized water. Approximately 20 g of super high purity hydrofluoric acid (48%) is measured and injected into the tubing. The interior wall of the tubing is immersed at normal temperature for one week with both ends of the tubing plugged. Then the extract was diluted with super deionized water to be subjected to a quantitative analysis on Al, Fe, Ni, Na and Ca by the stripping method.

## How to Order



Symbol	Type	Length
10	Roll	10 m
20		20 m
50		50 m
100		100 m
2S	Straight	2 m

## Length Applicable to inch size only

Symbol	Type	Length
16	Roll	50 Ft (16 m)
33		100 Ft (33 m)

Please refer to the "Series and Specifications" above, as the tubing length differs depending on each size.

Note 4) Figures shown in tables are representative values, not guaranteed values.

# Fluoropolymer Tubing PFA

## Series *TLM/TILM*

RoHS

# Max. operating temperature: 260°C

### 22 size variations

**Metric size**     $\varnothing 2$  to  $\varnothing 25$  (13 sizes)

**Length per roll**    10 m, 20 m, 50 m, 100 m

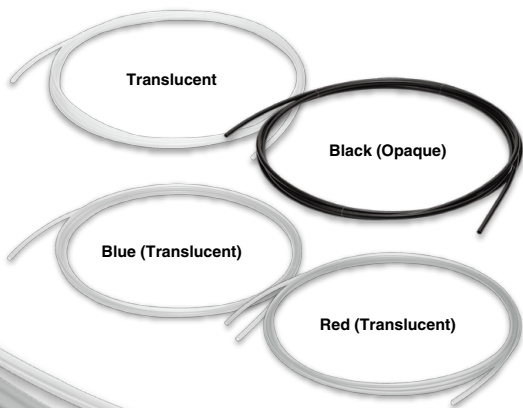
**Straight**    2 m

**Inch size**    1/8" to 1 1/4" (9 sizes)

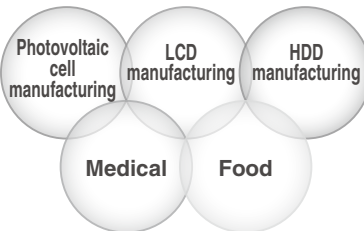
**Length per roll**    10 m, 20 m, 50 m, 100 m  
16 m (50 ft), 33 m (100 ft)

**Straight**    2 m

### 4 color variations

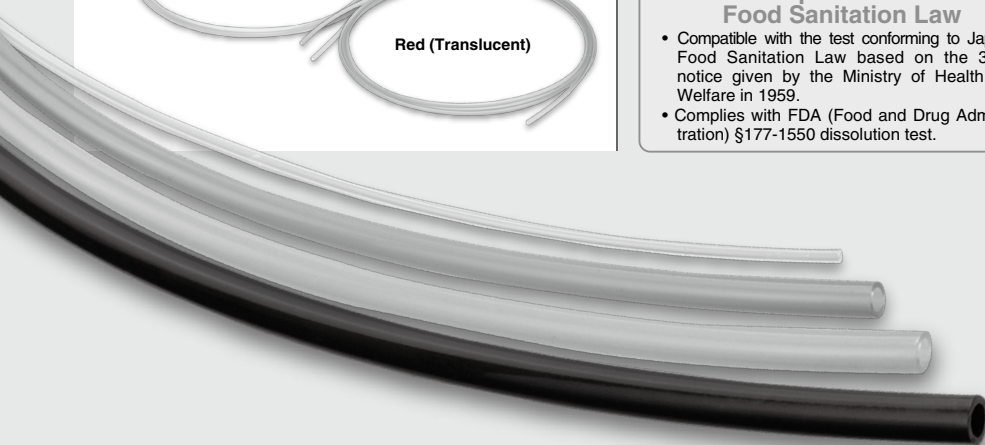


### Applications



### Compatible with Food Sanitation Law

- Compatible with the test conforming to Japan's Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959.
- Complies with FDA (Food and Drug Administration) §177-1550 dissolution test.



KQ2

KQB2

KS  
KX

KM

KF

M

H/DL  
L/LL

KC

KK

KK130

DM

KDM

KB

KR

KA

KQG2

KG

KFG2

MS

KKA

KP

LQ

MQR

T



# Fluoropolymer Tubing (PFA) Metric Size Series **TLM**



## Series

Size			Metric size													
Model			TLM0201	TLM0302	TLM0425	TLM0403	TLM0604	TLM0806	TLM1075	TLM1008	TLM1209	TLM1210	TLM1613	TLM1916	TLM2522	
Tubing size			ø2 x ø1	ø3 x ø2	ø4 x ø2.5	ø4 x ø3	ø6 x ø4	ø8 x ø6	ø10 x ø7.5	ø10 x ø8	ø10 x ø10	ø12 x ø9	ø12 x ø10	ø16 x ø13	ø19 x ø16	ø25 x ø22
O.D. (mm)			2	3	4	4	6	8	10	10	12	12	16	19	25	
I.D. (mm)			1	2	2.5	3	4	6	7.5	8	9	10	13	16	22	
Length per roll	Color	Symbol														
Roll	10 m	Translucent	N													
		Translucent	N	●	●	●	●	●	●	●	●	●	●	●	●	●
		Red (Translucent)	R	●	●	●	●	●	●	●	●	●	●	●	●	●
		Blue (Translucent)	BU	●	●	●	●	●	●	●	●	●	●	●	●	●
		Black (Opaque)	B	●	●	●	●	●	●	●	●	●	●	●	●	●
		50 m	Translucent	N	●	●	●	●	●	●	●	●	●	●	●	●
Straight	100 m	Translucent	N	●	●	●	●	●	●	●	●	●	●	●	●	
	2 m	Translucent	N	●	●	●	●	●	●	●	●	●	●	●	●	

Inch O.D. size  
5/32"

Inch O.D. size  
5/16"

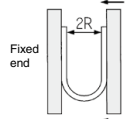
O.D. 3.2 mm is available in ø 1/8 inch (3.18 mm) tubing.  
For details, refer to the table "Series" on page 443.

## Specifications

<b>Fluid</b> (Note 1) 2) 3) and applicable fittings (Note 1) 2) 3)		Fluid: Refer to "Applicable Fluid List" on page 449. Fittings: Fluoropolymer fittings series LQ												
		Fluid: Air, Water, Inert gas Fittings: One-touch fittings KQ2, KQG2, Clean One-touch fittings KP, KP□ Insert fittings KF, KFG2, Miniature fittings M, MS (Hose nipple type)												
<b>Max. operating pressure (MPa)</b>		Refer to the max. operating pressure curve.												
<b>Min. bending radius (mm)</b> (Note 4)	<b>Recommended radius</b>	10	20	20	35	35	60	95	100	100	130	160	220	400
	<b>Tube close bend radius</b>	7	15	15	20	20	40	60	65	65	110	130	160	290
<b>Max. operating temperature</b>		260°C												
<b>Material</b>		PFA (Tetrafluoroethylene perfluoroalkoxy vinyl ether copolymer)												

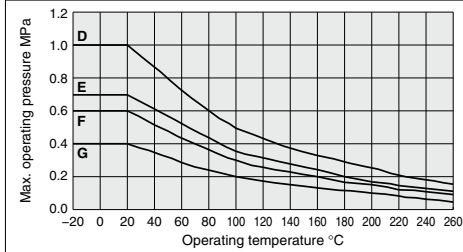
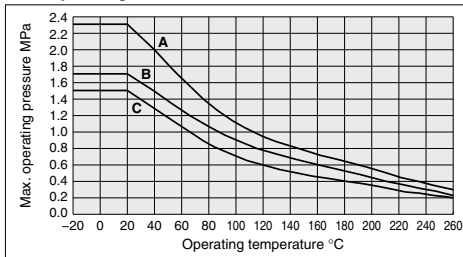
- Note 1) Fluid varies depending on the applicable fittings.  
 Note 2) When using a liquid fluid, the surge pressure must not exceed the maximum operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes. Furthermore, abnormal temperature rise caused by adiabatic compression may result in the tube bursting.  
 Note 3) 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 tubing 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 "Maintenance" of the tubing precautions on page 451.)  
 For other precautions, refer to "Fittings & Tubing Precautions" on pages 13 to 16. When using the fluoropolymer fittings, refer to the precautions on pages 395 and 396.  
 Note 4) Minimum bending radius is measured as shown left as representative values.
- 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 tube close bend radius and make sure that the tube is not bent or flattened.
  - Please note that the tube close bend radius is not warranted because of the value when 2R is measured by the method in the right figure if the tube is bent or flattened, etc.

### 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



Group	Model	Max. operating pressure (MPa)			
		20°C	100°C	200°C	260°C
A	TLM0201	2.3	1.1	0.55	0.3
	TLM0425	1.7	0.9	0.45	0.23
C	TLM0302	1.5	0.7	0.35	0.2
	TLM0604				
	TLM0403				
	TLM0806				
D	TLM1075	1	0.5	0.25	0.15
	TLM1209				
	TLM1008				
	TLM1613				
E	TLM1108	0.7	0.35	0.17	0.11
	TLM1210				
F	TLM1916	0.6	0.3	0.15	0.1
	TLM1210				
G	TLM2522	0.4	0.2	0.1	0.05

## How to Order

### Metric size

**TLM0425 N - 20**

Tubing designation

### Color indication

Symbol	Color
N	Translucent
R	Red (Translucent)
BU	Blue (Translucent)
B	Black (Opaque)

### Length per roll

Symbol	Type	Length
10	Roll	10 m
20		20 m
50		50 m
100		100 m
2S	Straight	2 m

Note) Refer to the table "Series" above, as the tubing length differs depending on each size.

# Fluoropolymer Tubing (PFA)

## Inch Size

# Series TILM



### Series

Size		Inch size									
Model		TILM01	TILMB01	TILM05	TILM07	TILM11	TILM13	TILM19	TILM25	TILM32	
Tubing size		1/8" x 0.086"	1/8" x 1/16"	3/16" x 1/8"	1/4" x 5/32"	3/8" x 1/4"	1/2" x 3/8"	3/4" x 5/8"	1" x 7/8"	1 1/4" x 1 1/16"	
O.D.	inch	1/8"	1/8"	3/16"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	
	mm	3.18		4.75	6.35	9.53	12.7	19.05	25.4	31.75	
I.D.	inch	0.086"	1/16"	1/8"	5/32"	1/4"	3/8"	5/8"	7/8"	1 1/16"	
	mm	2.18	1.58	3.15	3.95	6.33	9.5	15.85	22.2	27.95	

Length per roll	Color	Symbol									
10 m	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
	Red (Translucent)	R	●	●	●	●	●	●	●	●	●
	Blue (Translucent)	BU	●	●	●	●	●	●	●	●	●
	Black (Opaque)	B	●	●	●	●	●	●	●	●	●
20 m	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
50 m	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
100 m	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
16 m (50 ft)	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
33 m (100 ft)	Translucent	N	●	●	●	●	●	●	●	●	●
	Translucent	N	●	●	●	●	●	●	●	●	●
Straight	2 m	Translucent	N	●	●	●	●	●	●	●	●
		Translucent	N	●	●	●	●	●	●	●	●

Metric O.D. size
3.2

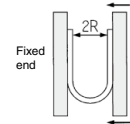
O.D. 5/32" is available in ø4 metric tubing, and O.D. 5/16" is available in ø8 metric tubing. For details, refer to the table "Series" on page 442.
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### Specifications

Fluid (Note 1) (2) (3) and applicable fittings (Note 1) (2) (3)	Fluid: Refer to "Applicable Fluid List" on page 449. Fittings: Fluoropolymer fittings series LQ
Max. operating pressure (MPa)	Fluid: Air, Water, Inert gas Fittings: One-touch fittings KQ2, KQG2, Insert fittings KFG2
Min. bending radius (mm) (Note 4)	Refer to the max. operating pressure curve.
Max. operating temperature	260°C
Material	PFA (Tetrafluoroethylene perfluoroalkoxy vinyl ether copolymer)

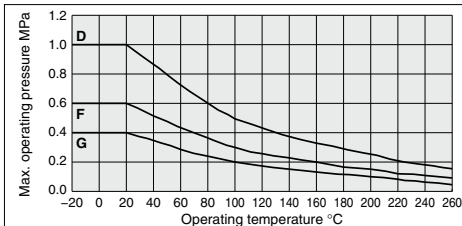
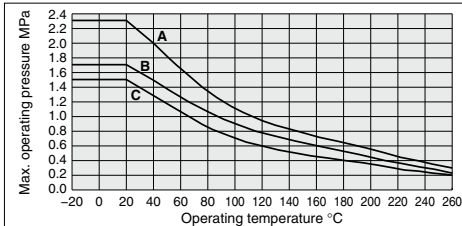
- Note 1) Fluid varies depending on the applicable fittings.  
 Note 2) When using a liquid fluid, the surge pressure must not exceed the maximum operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes. Furthermore, abnormal temperature rise caused by adiabatic compression may result in the tube bursting.  
 Note 3) 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 "Maintenance" of the tubing precautions on page 451.)  
 For other precautions, refer to "Fittings & Tubing Precautions" on pages 13 to 16. When using the fluoropolymer fittings, refer to the precautions on pages 395 and 396.  
 Note 4) Minimum bending radius is measured as shown left as representative values.  
 • 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 tube close bend radius and make sure that the tube is not bent or flattened.  
 • Please note that the tube close bend radius is not warranted because of the value when 2R is measured by the method in the right figure if the tube is bent or flattened, etc.

### 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



Group	Model	Max. operating pressure (MPa)			
		20°C	100°C	200°C	260°C
A	TILMB01	2.3	1.1	0.55	0.3
B	TILM07	1.7	0.9	0.45	0.23
C	TILM05 TILM11	1.5	0.7	0.35	0.2
D	TILM01 TILM13	1	0.5	0.25	0.15
F	TILM19	0.6	0.3	0.15	0.1
G	TILM25 TILM32	0.4	0.2	0.1	0.05

### How to Order

#### Inch size

**TILM01 N - 20**

Tubing designation

#### Color indication

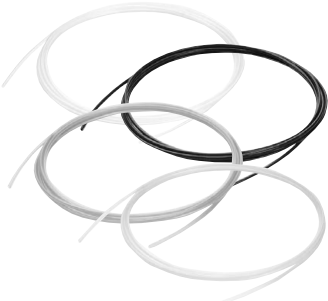
Symbol	Color
N	Translucent
R	Red (Translucent)
BU	Blue (Translucent)
B	Black (Opaque)

#### Length per roll

Symbol	Type	Length
10	Roll	10 m
20		20 m
50		50 m
100		100 m
16		16 m (50 ft)
33	33 m (100 ft)	
2S	Straight	2 m

(Note) Refer to the table "Series" above, as the tubing length differs depending on each size.

# FEP Tubing (Fluoropolymer) Metric Size Series TH

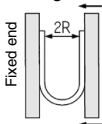


**Operating Temperature: Max. 200°C**  
It varies depending on the operating pressure. Refer to the graph for the maximum operating pressure.

### Compatible with the Food Sanitation Law

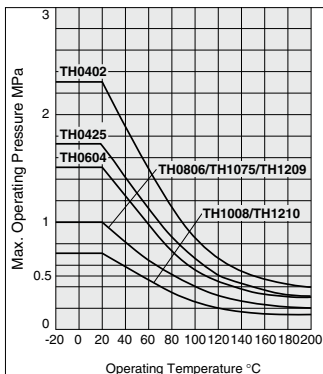
- Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959.
- Complies with FDA (Food and Drug Administration) §177-1550 dissolution test.

**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) The maximum operating pressure varies dependant on the I.D. bore size even if the O.D. is the same.

### Series

●-20 m roll □-100 m roll

		Metric size								
Model		TH0402	TH0425	TH0604	TH0806	TH1075	TH1008	TH1209	TH1210	
Tubing O.D. (mm)		4	4	6	8	10	10	12	12	
Tubing I.D. (mm)		2	2.5	4	6	7.5	8	9	10	
Color	Symbol									
Translucent	N	●	●	●	●	●	●	●	●	
Red (Translucent)	R	●	●	●	●	●	●	●	●	
Blue (Translucent)	BU	●	●	●	●	●	●	●	●	
Black (Opaque)	B	●	●	●	●	●	●	●	●	
		Inch nominal size 5/32"			Inch nominal size 5/16"					

### Specifications

Fluid	Air, Water <sup>Note 1)</sup> , Inert gas							
Applicable fittings <sup>Note 2)</sup>	One-touch fittings, Insert fittings Fluoropolymer fittings: Series LQ <sup>Note 3)</sup> Miniature fittings: Series M, MS (Hose nipple type)							
Max. operating pressure (MPa)	20°C	2.3	1.7	1.5	1	0.7	1	0.7
	100°C	0.85	0.6	0.55	0.4	0.25	0.4	0.25
	200°C	0.4	0.3	0.3	0.2	0.1	0.2	0.1
Refer to below "Max. Operating Pressure."								
Min. bending radius (mm) <sup>Note 4)</sup>	Recommended radius	15	20	35	60	95	100	130
	Tube close bend radius	10	15	20	40	60	65	110
Operating temperature	Air, Inert gas: -20 to 200°C Water: 0 to 100°C (No freezing)							
Material	FEP (Fluorinated Ethylene Propylene Resin)							

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.

When the insert and miniature fittings are used over extended periods of time, it may cause leakage due to the material deterioration of age. In such a case, give an additional tightening to the tube connection part. If leakage still occurs after giving an additional tightening, replace the fitting with a new product. For other precautions, refer to "Fittings & Tubing Precautions". When using the fluoropolymer fittings, refer to the precautions on pages 395 and 396. Select the size after confirming O.D. and I.D.

Note 3) TH0402, TH0425, TH1075 and TH1209 are not available because of different internal diameters.

Note 4) The minimum bending radius is the representative value measured as shown in the left figure.

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

### How to Order

Metric size

**TH0604 N - 20**

Indication of tubing model

Color indication

Length per roll

Symbol	Color
N	Translucent
R	Red (Translucent)
BU	Blue (Translucent)
B	Black (Opaque)

Symbol	Roll size
20	20 m roll
100 <sup>Note)</sup>	100 m roll

Note) 100 m roll is available with translucent (color indication: N) only.

**Made to Order**

(Please contact SMC for specifications in detail, dimensions, delivery and specifications other than those mentioned above.)

Reinforced corrugated  
cardboard specification  
longer length reel

ø6, Translucent only: Suffix "-X64" to the end of part number. Ex.) TH0604N-500-X64

**Made to Order Availability**

Part no.	Model		Color
	Length	TH0604N	
X64	250 m reel	<input type="radio"/>	Translucent
	500 m reel	<input type="radio"/>	



# FEP Tubing (Fluoropolymer) Inch Size Series *TIH*



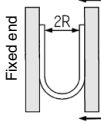
## Operating Temperature: Max. 200°C

It varies depending on the operating pressure. Refer to the graph for the maximum operating pressure.

## Compatible with the Food Sanitation Law

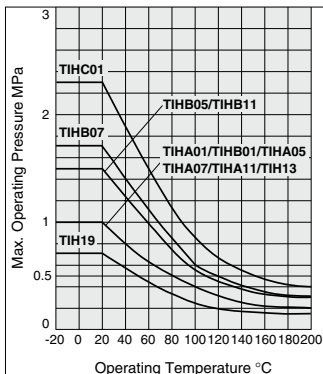
- Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959.
- Complies with FDA (Food and Drug Administration) § 177-1550 dissolution test.

### 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) The maximum operating pressure varies dependant on the I.D. bore size even if the O.D. is the same.

## Series

● -50 ft (16 m) roll □ -100 ft (33 m) roll

Model		Inch size										
Model		TIHA01	TIHB01	TIHC01	TIHA05	TIHB05	TIHA07	TIHB07	TIHA11	TIHB11	TIH13	TIH19
Tubing O.D.	inch	1/8"			3/16"		1/4"		3/8"		1/2"	3/4"
	mm	3.18			4.75		6.35		9.53		12.7	19.05
Tubing I.D.	inch	0.093"	0.086"	0.065"	0.137"	0.124" (1/8")	0.18"	0.156" (5/32")	0.275" (1/4")	0.25" (3/8")	0.374" (5/8")	0.624" (5/8")
	mm	2.36	2.18	1.65	3.48	3.15	4.57	3.95	6.99	6.33	9.5	15.85

Color	Symbol	TIHA01	TIHB01	TIHC01	TIHA05	TIHB05	TIHA07	TIHB07	TIHA11	TIHB11	TIH13	TIH19
Translucent	N	●	●	●	●	●	●	●	●	●	●	●
Red (Translucent)	R	●	●	●	●	●	●	●	●	●	●	●
Blue (Translucent)	BU	●	●	●	●	●	●	●	●	●	●	●
Black (Opaque)	B	●	●	●	●	●	●	●	●	●	●	●

## Specifications

Fluid	Air, Water <sup>Note 1)</sup> , Inert gas											
Applicable fittings <sup>Note 2)</sup>	One-touch fittings, Fluoropolymer fittings: Series LQ <sup>Note 3)</sup>											
Max. operating pressure (MPa)	20°C	1	2.3	1	1.5	1	1.7	1	1.5	1	0.7	
	100°C	0.4	0.85	0.4	0.55	0.4	0.6	0.4	0.55	0.4	0.25	
	200°C	0.2	0.4	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.1	
Refer to below "Max. Operating Pressure."												
Min. bending radius (mm) <sup>Note 4)</sup>	Recommended radius	25	20	10	35	25	55	35	85	60	95	220
	Tube close bend radius	20	12	7	25	20	35	20	55	30	60	160
Operating temperature	Air, Inert gas: -20 to 200°C Water: 0 to 100°C (No freezing)											
Material	FEP (Fluorinated Ethylene Propylene Resin)											

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. When the insert and miniature fittings are used over extended periods of time, it may cause leakage due to the material deterioration of age. In such a case, give an additional tightening to the tube connection part. If leakage still occurs after giving an additional tightening, replace the fitting with a new product. For other precautions, refer to "Fittings & Tubing Precautions". When using the fluoropolymer fittings, refer to the precautions on pages 395 and 396. Select the size after confirming O.D. and I.D.

Note 3) TIHA01, TIHC01, TIHA05, TIHA07 and TIHA11 are not available because of different internal diameters.

Note 4) The minimum bending radius is the representative value measured as shown in the left figure.

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

## How to Order

Inch size  
**TIHA01 N - 16**

Indication of tubing model • Color indication • Length per roll

Symbol	Color
N	Translucent
R	Red (Translucent)
BU	Blue (Translucent)
B	Black (Opaque)

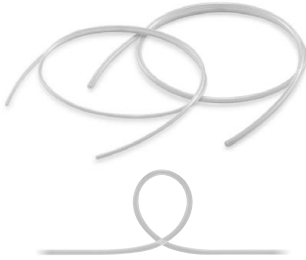
Symbol	Roll size
16	50 ft (16 m) roll
33 <sup>Note)</sup>	100 ft (33 m) roll

Note) 100 ft (33 m) roll is available with translucent (color indication: N) only.

# Soft Fluoropolymer Tubing

## Metric Size

# Series TD



### Flexibility: Improved by approx. 20%

\* SMC comparison (Fluoropolymer tubing, Series TL/TIL)

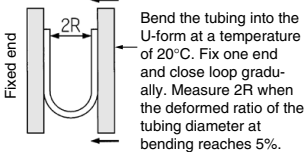
### Compatible with the Food Sanitation Law

- Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959.
- Complies with FDA (Food and Drug Administration) §177-1550 dissolution test.

### Operating Temperature: Max. 260°C

It varies depending on the operating pressure. Refer to the graph for the maximum operating pressure.

#### How to measure the minimum bending radius



### 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 color)					
Applicable fluid	Refer to the applicable fluid in page 448.					
Fluid <sup>Note 1)</sup>	Air, Water <sup>Note 1)</sup> , Inert gas					
Applicable fittings <sup>Note 2)</sup>	Insert Fittings KF series Stainless Steel 316 Insert Fittings KFG series Miniature fittings M, MS series (Hose nipple type) Fluoropolymer fitting series LQ					
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) <sup>Note 3)</sup>	Recommended radius	15	25	45	55	75
	Tube close bend radius	8	16	31	35	41
Max. operating temperature (fixed usage)	260°C					
Material	Modified PTFE (Polytetrafluoroethylene resin)					

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 tubing. Furthermore, abnormal temperature rise caused by adiabatic compression may result in the tubing bursting.

Note 2) Do not use this product in a manner in which the tubing is not fixed. Observe the lesser value of the maximum operating pressure between the tubing and fittings. 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.

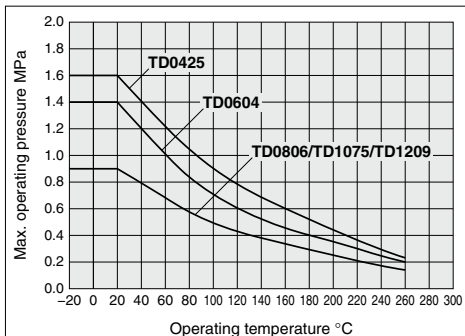
(Refer to "Maintenance" of the tubing precautions on page 451.)

For other precautions, refer to "Fittings & Tubing Precautions" on pages 13 to 16. When using the fluoropolymer fittings, refer to the precautions on pages 395 and 396.

Note 3) The minimum bending radius is the representative value measured as shown in the left figure.

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



**Flexibility: Improved by approx. 20%**

\* SMC comparison (Fluoropolymer tubing, Series TL/TIL)

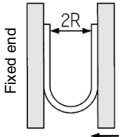
### Compatible with the Food Sanitation Law

- Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959.
- Complies with FDA (Food and Drug Administration) §177-1550 dissolution test.

### Operating Temperature: Max. 260°C

It varies depending on the operating pressure. Refer to the graph for the maximum operating pressure.

**How to measure the minimum bending radius**



Bend the tubing 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 tubing diameter at bending reaches 5%.

### 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 color)				
Applicable fluid		Refer to the applicable fluid in page 448.				
Fluid <sup>Note 1)</sup>		Air, Water <sup>Note 1)</sup> , Inert gas				
Applicable fittings <sup>Note 2)</sup>		Fluoropolymer fitting series LQ				
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)	Recommended radius	15	20	25	40	75
	Tube close bend radius <sup>Note 3)</sup>	9	10	15	23	42
Max. operating temperature (fixed usage)		260°C				
Material		Modified PTFE (Polytetrafluoroethylene resin)				

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 tubing. Furthermore, abnormal temperature rise caused by adiabatic compression may result in the tubing bursting.

Note 2) Do not use this product in a matter in which the modified PTFE tubing is not fixed. Observe the lesser value of the maximum operating pressure between the tubing and fittings. 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.

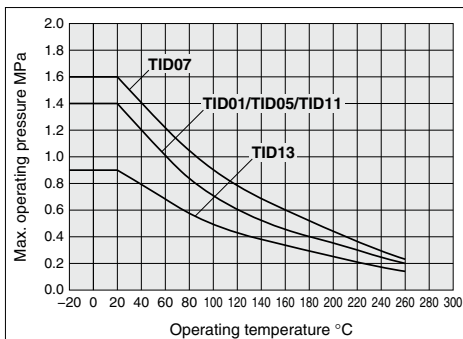
(Refer to "Maintenance" of the tubing precautions on page 451.)

For other precautions, refer to "Fittings & Tubing Precautions" on pages 13 to 16. When using the fluoropolymer fittings, refer to the precautions on pages 395 and 396.

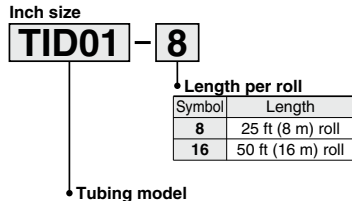
Note 3) The minimum bending radius is the representative value measured as shown in the left figure.

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

### Maximum Operating Pressure



### How to Order



- KQ2
- KQB2
- KS
- KX
- KM
- KF
- M
- H/DL
- L/LL
- KC
- KK
- KK130
- DM
- KDM
- KB
- KR
- KA
- KQG2
- KG
- KFG2
- MS
- KKA
- KP
- LQ
- MQR
- T





## Series TL/TIL/TD/TID

# Applicable Fluid List

## Chemical resistance of Fluoropolymer Super PFA, modified PTFE material

Chemicals in the list below are chemically inert <sup>Note)</sup> to Super PFA, modified PTFE material. Possible physical effects may occur such as penetration and swelling due to temperature, pressure and chemical concentration. To use Super PFA, 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	DI water (Pure 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 TLM/TILM

# Applicable Fluid List

## Chemical resistance of Fluoropolymer PFA material

Chemicals in the list below are chemically inert<sup>(Note)</sup>, to PFA material. Possible physical effects may occur such as penetration and swelling due to temperature, pressure and chemical concentration.

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

Acetate	Butyl stearate	Ethylene dichloride	Malic acid	Salicylic acid
Acetic anhydride	Calcium acetate	Ethylene glycol	Mercaptan	Silicate ester
Acetone	Calcium bisulfite	Ethylene oxide	Mercuric chloride	Silicone grease
Acetylene	Calcium chloride	Ethylenediamine	Mercury	Silicone oil
Acrylonitrile	Calcium hydroxide	Fatty acid	Methyl acetate	Silver nitrate
Aluminum acetate	Calcium hypochlorite	Ferric chloride	Methyl alcohol	Sodium bicarbonate
Aluminum nitrate	Calcium nitrate	Ferric nitrate	Methyl chloride	Sodium bisulfate
Aluminum bromide	Calcium sulfide	Ferric sulfate	Methyl ethyl ketone	Sodium bisulfite
Aluminum chloride	Carbon dioxide	Fluoroboric acid	Methyl isobutyl ketone	Sodium hypochlorite (5%)
Aluminum fluoride	Carbon disulfide	Fluorobenzene	Methyl methacrylate	Sodium metaphosphate
Aluminum sulfate	Carbonic acid	Fluosilicic acid	Methylene dichloride	Sodium nitrate
Ammonia gas	Castor oil	Formaldehyde	Mineral oil	Sodium perborate
Ammonium carbonate	Caustic soda (30%)	Formic acid	Monochloroacetic acid	Sodium phosphate
Ammonium chloride	Cellosolve	Furfural	Monochlorobenzene	Sodium sulfite
Ammonium hydroxide	Chlorosulfonic acid	Gasoline	Monoethanolamine	Sodium thiosulfate
Ammonium nitrate	Chlorotoluene	Gelatine	Naphtha	Soybean oil
Ammonium nitrite	Chromic acid	Glauber's salt	Naphthalene	Stannic chloride
Ammonium persulfate	Citric acid	Glucose	Naphthenic acid	Stearic acid
Ammonium phosphate	Coconut oil	Glue	Sodium peroxide	Styrene
Ammonium sulfate	Copper cyanide	Glycerine	Natural gas	Sucrose solution
Amyl acetate	Copper sulfate	Grease	Nickel acetate	Sulfur
Amyl alcohol	Corn oil	Hexaldehyde	Nickel chloride	Sulfur chloride
Amyl borate	Cottonseed oil	Hexane	Nickel sulfate	Sulfuric acid (98%)
Amyl naphthalene	Creosote oil	Hexyl alcohol	Nitric acid (60%)	Sulfurous acid gas
Aniline	Cresol	Hydrobromic acid	Nitrobenzene	Tannic acid
Aniline dye	Cupric chloride	Hydrochloric acid	Nitroethane	Tartaric acid
Animal oil (Lard oil)	Cyclohexane	Hydrocyanic acid	Nitromethane	Terpineol
Aqua regia	Cyclohexanol	Hydrofluoric acid (49%)	Nitropropane	Tetrachloroethane
Arsenic acid	Cyclohexanone (Anon)	Hydrofluoric acid anhydrous	Octyl alcohol	Tetraethyl lead
Asphalt	Dibutyl phthalate	Hydrogen peroxide (30%)	Oxalic acid	Tetrahydrofuran
Barium chloride	Dichlorobenzene	Hydrogen sulfide	Oxygen	Tetralin
Barium hydroxide	Diethyl sebacate	Hydroquinone	Ozone	Thionyl chloride
Barium sulfate	Diethylene glycol	Hypochlorous acid	Palmitic acid	Triacetin
Barium sulfide	Diisopropyl keton	Isobutyl alcohol	Perchlorate	Tributoxy ethyl phosphate
Beer	Diocetyl phthalate	Isooctane	Perchloroethylene	Tributyl phosphate
Beet sugar liquors	Diocetyl sebacate	Isopropyl acetate	Petroleum	Trichloroethylene
Benzaldehyde	Dipentene (Limonene)	Isopropyl alcohol	Phenol	Tricresyl phosphate
Benzene	Diphenyl	Isopropyl ether	Phosphoric acid (75%)	Triethanolamine
Benzene (Benzol)	Diphenyl oxide	Kerosene	Picric acid	Tung oil
Benzyl alcohol	Epichlorohydrin	Lead acetate	Piperidine	Turpentine oil
Benzyl benzoate	Ethanolamine	Lead nitrate	Potassium chloride	Vegetable oil
Benzyl chloride	Ethyl acetate	Lead sulfamate	Potassium dichromate	Vinegar
Borax	Ethyl acetoacetate	Linolenic acid	Potassium hydroxide	Water
Boric acid	Ethyl acrylate	Linseed oil	Potassium nitrate	Whiskey
Bromine	Ethyl alcohol	Liquid ammonia	Potassium permanganate	Xylene
Bunker oil	Ethyl benzene	LPG (Liquefied petroleum gas)	Potassium sulfate	Zeolite
Butane	Ethyl cellulose	Lubricating oil	Propyl acetate	Zinc acetate
Butter	Ethyl chloride	Magnesium chloride	Propyl alcohol	Zinc chloride
Butyl acetate	Ethyl oxalate	Magnesium hydroxide	Propylene	Zinc sulfide
Butyl acrylate	Ethyl silicate	Magnesium sulfate	Pyridine	
Butyl alcohol (Butanol)	Ethylene chlorohydrin	Maleic acid	Pyrrrole	

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

**QJ2**  
**QJ82**  
**KS**  
**KX**  
**KM**  
**KF**  
**M**  
**H/DL**  
**L/LL**  
**KC**  
**KK**  
**KK130**  
**DM**  
**KDM**  
**KB**  
**KR**  
**KA**  
**QJG2**  
**KG**  
**KFG2**  
**MS**  
**KKA**  
**KP**  
**LQ**  
**MQR**  
**T**



Series TH/TH

# Applicable Fluid List

## Chemical Resistance of Fluoropolymer FEP Material

Chemicals in the list below are chemically inert <sup>Note)</sup> to FEP material, 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.

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

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

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

Teflon® is a registered trademark for the fluoropolymer produced by E.I du Pont de Nemours & Company (Inc.) and Du Pont-Mitsui Fluorochemicals Co., Ltd.



# Series TL/TIL/TLM/TILM/TD/TID/TH/THI Tubing/Precautions

Be sure to read before handling.

## Selection

### ⚠ Warning

#### 1. Confirm the specifications.

Products represented in this catalog 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.

[TLM/TILM]

The TLM and TILM series do not have the model number displayed on the product due to the resin material used. If tubing without a model label is mixed with other tubing which also does not have a model label, it is impossible to identify the model. Please avoid mixing the products with other models while it is being used and/or stored.

#### 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 of 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 SMC's "Air Cleaning Equipment" catalog.

## 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.

KQ2

KQB2

KS  
KX

KM

KF

M

H/DL  
L/LL

KC

KK

KK130

DM

KDM

KB

KR

KA

KQG2

KG

KFG2

MS

KKA

KP

LQ

MQR

T

# Clean Series Tubing

## Polyurethane Tubing: Series 10-TU

Refer to CAT. E02-23, "SMC Pneumatic Clean Series" for details.

10 - TU0425 BU - 20

Clean series

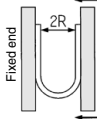
Tubing model

Color	
B	Black
W	White
R	Red
BU	Blue
Y	Yellow
G	Green
C	Clear
YR	Orange

Length per roll

20	20 m roll
----	-----------

Minimum bending radius measuring method



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

### Model/Specifications

● — 20 m roll

Model	Tubing size						
	Inch size (Series TUB)	Metric size (Series TU)					
Tubing O.D. (mm)	3.2	2	4	6	8	10	12
Tubing I.D. (mm)	2	1.2	2.5	4	5	6.5	8

	Black (B)	White (W)	Red (R)	Blue (BU)	Yellow (Y)	Green (G)	Clear (C)	Orange (YR)
Black (B)	●	●	●	●	●	●	●	●
White (W)	●	●	●	●	●	●	●	●
Red (R)	●	●	●	●	●	●	●	●
Blue (BU)	●	●	●	●	●	●	●	●
Yellow (Y)	●	●	●	●	●	●	●	●
Green (G)	●	●	●	●	●	●	●	●
Clear (C)	●	●	●	●	●	●	●	●
Orange (YR)	●	●	●	●	●	●	●	●

Fluid	Air/Water
Max. operating pressure (at 20°C)	0.8 MPa
Burst pressure	Refer to the burst pressure characteristics curve.
Recommended fittings	Fittings for clean series (10-KJ, 10-KQ, 10-KF, 10-KDM, 10-KG, 10-M, 10-MS)
Min. bending radius (mm) <sup>(Note)</sup>	10    4    10    15    20    27    35
Operating temperature	Air: -20 to 60°C, Water: to 40°C (No freezing)
Material	Polyurethane

(Note) The value of the minimum bending radius is measured at the temperature of 20°C as shown at the left.

## Polyurethane Coil Tubing: Series 10-TCU

Refer to CAT. E02-23, "SMC Pneumatic Clean Series" for details.



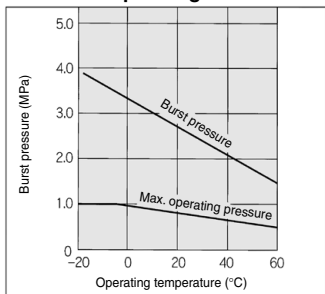
### Specifications

Model	10-TCU 0425B-1	10-TCU 0425B-2	10-TCU 0425B-3	10-TCU 0604B-1	10-TCU 0604B-2	10-TCU 0604B-3	10-TCU 0805B-1
No. of cores	1 core	2 cores	3 cores	1 core	2 cores	3 cores	1 core
Tubing O.D. (mm)	4	4	4	6	6	8	8
Tubing I.D. (mm)	2.5	2.5	2.5	4	4	5	5
Fluid	Air						
Max. operating pressure (at 20°C)	0.8 MPa						
Burst pressure	Refer to the burst pressure characteristics curve.						
Recommended fittings	Fittings for clean series (10-KJ, 10-KQ, 10-KF, 10-KDM, 10-KG, 10-M, 10-MS)						
Operating temperature	-20 to 60°C						
Material	Polyurethane						
Color	Black						

## Polyurethane Flat Tubing: Series 10-TFU

Refer to CAT. E02-23, "SMC Pneumatic Clean Series" for details.

### Burst Pressure Characteristics Curve and Operating Pressure



### Specifications

Model	10-TFU 0425B-2	10-TFU 0425B-3	10-TFU 0604B-2	10-TFU 0604B-3	10-TFU 0805B-2	10-TFU 0805B-3
No. of cores	2 cores	3 cores	2 cores	3 cores	2 cores	3 cores
Tubing O.D. (mm)	4	4	6	6	8	8
Tubing I.D. (mm)	2.5	2.5	4	4	5	5
Fluid	Air					
Max. operating pressure (at 20°C)	0.8 MPa					
Burst pressure	Refer to the burst pressure characteristics curve.					
Recommended fittings	Fittings for clean series (10-KJ, 10-KQ, 10-KF, 10-KDM, 10-KG, 10-M, 10-MS)					
Operating temperature	-20 to 60°C					
Material	Polyurethane					
Color	Black					
Min. bending radius (mm)	10	10	15	15	20	20
Tubing roll length (m)	10					

(Note) The value of the minimum bending radius is measured at the temperature of 20°C as shown at the left.

# Clean Tubing: Polyolefin Tubing Series *TPH*

RoHS



## Model/Specifications

● — 20 m roll □ — 100 m reel

Model	TPH0425	TPH0604	TPH0806	TPH1075	TPH1209
O.D. (mm)	4	6	8	10	12
I.D. (mm)	2.5	4	6	7.5	9

White (W)	●	□	●	●	●
Black (B)	●	●	●	●	●
Red (R)	●	●	●	●	●
Blue (BU)	●	●	●	●	●
Yellow (Y)	●	●	●	●	●
Green (G)	●	●	●	●	●

Fluid	Air/Nitrogen gas/Water (Pure water) <sup>(1)</sup>				
Max. operating pressure (at 20°C)	1.0 MPa <sup>(2)</sup>		0.7 MPa <sup>(2)</sup>		
Min. bending radius (mm)	15	25	35	45	55
Burst pressure	Refer to the burst pressure characteristics curve.				
Applicable fittings	Clean one-touch fittings One-touch fittings, Metal: Series KQB2 One-touch fittings, Stainless steel 316: Series KQG2 Insert fittings				
Operating temperature	- 20 to 80°C, For water 5 to 80°C				
Material	Polyolefin resin				

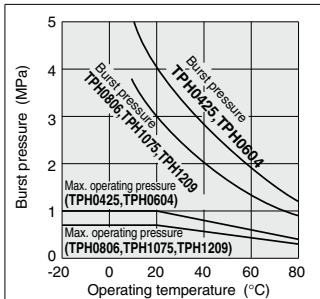
Note 1) Please consult with SMC regarding other fluids.

Note 2) The maximum operating pressure is the value at 20°C. Refer to the burst pressure characteristics curve for other temperatures. Furthermore, an abnormal temperature rise due to adiabatic compression can cause tubing to burst.

Note 3) The minimum bending radius indicates the value at a temperature of 20°C with an outside diameter rate of change of 10% or less. At higher temperatures the outside diameter rate of change may exceed 10% within the minimum bending radius.

Note 4) Polyolefin resin is not suitable for regular pneumatic equipment piping because it is not resistant to mineral oil.

## Burst Pressure Characteristics Curve and Operating Pressure



## How to Order

TPH0604 B - 20

Tubing model

Color

Symbol	Color
W	White
B	Black
R	Red
BU	Blue
Y	Yellow
G	Green

Length per roll

Symbol	Length
20	20 m roll
100	100 m reel

KQ2

KQB2

KS  
KX

KM

KF

M

H/DL  
L/LL

KC

KK

KK130

DM

KDM

KB

KR

KA

KQG2

KG

KFG2

MS

KKA

KP

LQ

MQR

T

# Clean Tubing: Soft Polyolefin Tubing Series *TPS*

RoHS



## Model/Specifications

● — 20 m roll □ — 100 m reel

Model	TPS0425	TPS0604	TPS0805	TPS1065	TPS1208
O.D. (mm)	4	6	8	10	12
I.D. (mm)	2.5	4	5	6.5	8

White (W)	●	□	●	□	●
Black (B)	●	●	●	●	●
Red (R)	●	●	●	●	●
Blue (BU)	●	●	●	●	●
Yellow (Y)	●	●	●	●	●
Green (G)	●	●	●	●	●

Fluid	Air/Nitrogen gas/Water (Pure water) <sup>(1)</sup>				
Max. operating pressure (at 20°C)	0.7 MPa <sup>(2)</sup>				
Min. bending radius (mm)	10	20	25	30	40
Burst pressure	Refer to the burst pressure characteristics curve.				
Applicable fittings	Clean one-touch fittings One-touch fittings, Metal: Series KQB2 One-touch fittings, Stainless steel 316: Series KQG2 Insert fittings				
Operating temperature	- 20 to 80°C, For water 5 to 80°C				
Material	Polyolefin resin				

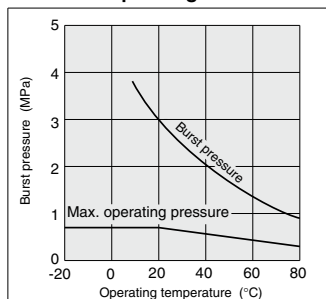
Note 1) Please consult with SMC regarding other fluids.

Note 2) The maximum operating pressure is the value at 20°C. Refer to the burst pressure characteristics curve for other temperatures. Furthermore, an abnormal temperature rise due to adiabatic compression can cause tubing to burst.

Note 3) The minimum bending radius indicates the value at a temperature of 20°C with an outside diameter rate of change of 10% or less. At higher temperatures the outside diameter rate of change may exceed 10% within the minimum bending radius.

Note 4) Polyolefin resin is not suitable for regular pneumatic equipment piping because it is not resistant to mineral oil.

## Burst Pressure Characteristics Curve and Operating Pressure



## How to Order

**TPS0604 B - 20**

Tubing model

Color

Symbol	Color
W	White
B	Black
R	Red
BU	Blue
Y	Yellow
G	Green

Length per roll

Symbol	Length
20	20 m roll
100	100 m reel