

# Wear Resistant Tubing

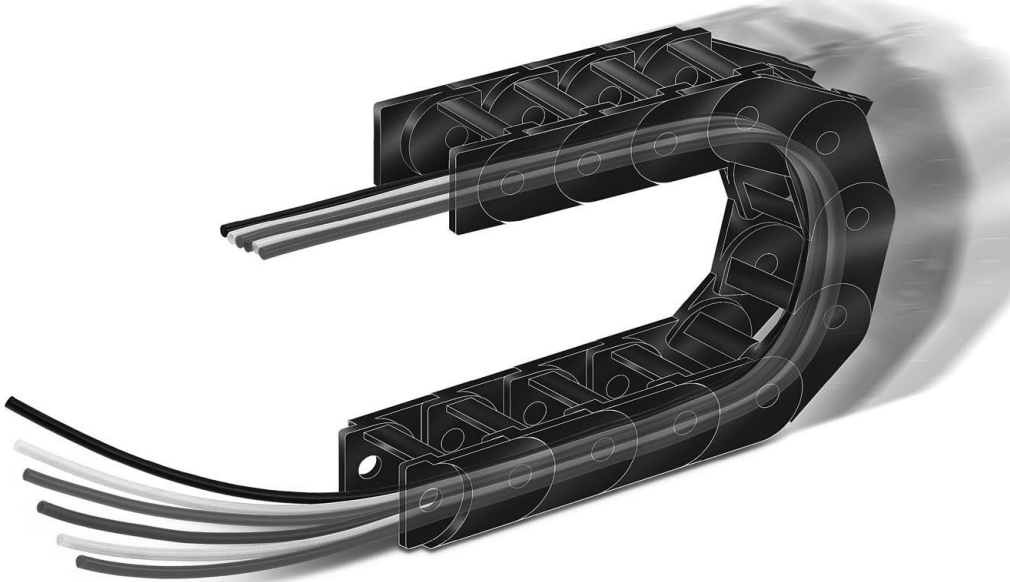
## TUZ/TIUZB Series

RoHS

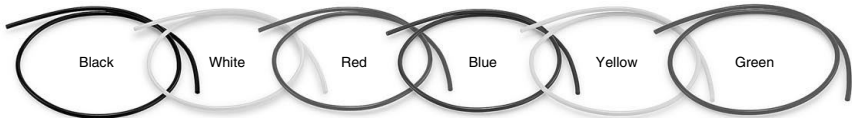
**Abrasion: Approx.  $\frac{1}{3}$**   
 (Compared with SMC polyurethane tubing TU series)

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

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

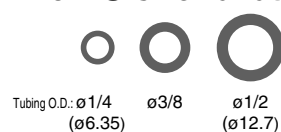


### 6-color variations



### Metric: 8-size variations

### Inch: 3-size variations



Tubing O.D.: ø2 ø3.2 ø4 ø6 ø8 ø10 ø12 ø16

Tubing O.D.: ø1/4 (ø6.35) ø3/8 ø1/2 (ø12.7)



- 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**
- IDK

# Wear Resistant Tubing TUZ/TIUZB Series

RoHS



## Model

Model	Tubing size										
	Metric size (TUZ series)							Inch size (TIUZB series)			
	TUZ0212	TUZ3220	TUZ0425	TUZ0604	TUZ0805	TUZ1065	TUZ1208	TUZ1610	TIUZB07	TIUZB11	TIUZB13
Tubing O.D. (mm)	2	3.2	4	6	8	10	12	16	6.35	9.53	12.7
Tubing I.D. (mm)	1.2	2	2.5	4	5	6.5	8	10	4.23	6.35	8.46

Color	TUZ0212	TUZ3220	TUZ0425	TUZ0604	TUZ0805	TUZ1065	TUZ1208	TUZ1610	TIUZB07	TIUZB11	TIUZB13
Black (B)	□	●	●	●	●	●	●	□	●	●	●
White (W)		●	●	●	●	●	●		●	●	●
Red (R)			●	●	●	●	●		●	●	●
Blue (BU)		●	●	●	●	●	●		●	●	●
Yellow (Y)			●	●	●	●	●		●	●	●
Green (G)			●	●	●	●	●		●	●	●

## Specifications

Fluid <sup>Note 1, 2)</sup>		Air/Water										
Applicable fittings		One-touch fittings KQ2 series, Insert fittings KF series, Stainless steel 316 insert fittings KFG2 series, Miniature fittings M/MS series (nose nipple type)										
Max. operating pressure (MPa)	20°C	0.8										
	40°C	0.6										
	60°C	0.4										
Operating vacuum pressure <sup>Note 3)</sup> (kPa)		-101.3										
Min. bending radius <sup>Note 4)</sup> (mm)		4	10	10	15	20	27	35	45	23	27	35
Operating temperature		-20 to +60°C (Water: 0 to 40°C) (No freezing)										
Material		Special polyurethane										

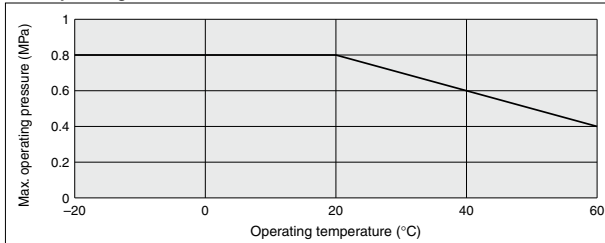
Note 1) Applicable for general industrial water. Please consult with SMC if using other kinds of fluid. Surge pressure must be under the max. operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes.

Note 2) Abnormal temperature rise caused by adiabatic compression may result in the tube bursting.

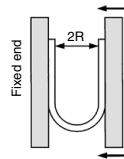
Note 3) As the operating vacuum pressure varies depending on the applicable fittings, be sure to check the fitting specifications beforehand.

Note 4) 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.

## Max. 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

Color

Length per roll

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

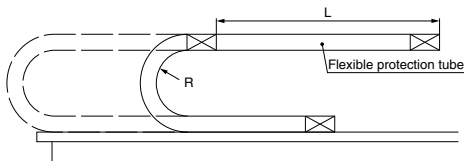
Symbol	Length
20	20 m roll
100	100 m roll

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



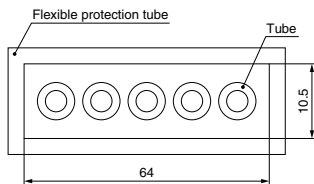
### Test Results

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 478 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**

**KQG2**

**KG**

**KFG2**

**MS**

**KKA**

**KP**

**LQ**

**MQR**

**T**

**IDK**

# Wear Resistant Flat Tubing

## Multi-core, Multi-color Specification

# TUZ Series



**Compact piping possible**  
**6 color variations**

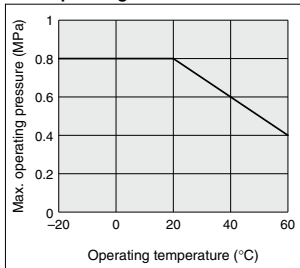
**Abrasion: Approx. 1/3**

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

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

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

### Max. Operating Pressure



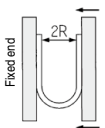
## Precautions

**Be sure to read this before handling the products.**  
**Refer to back page 50 for Safety Instructions and pages 13 to 17 for Fittings and Tubing Precautions.**

### ⚠ Caution

1. Please consult with SMC if using for any fluids other than air.
2. 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>	<b>2 cores</b>	X169 (Roll)			
	<b>3 cores</b>	X170 (Roll)			
	<b>4 cores</b>	X171 (Roll)			
	<b>5 cores</b>	X172 (Roll)			
	<b>6 cores</b>	X204 (Roll)			
<b>Fluid</b> <small>Note 1)</small>	Air				
<b>Max. operating pressure</b> MPa	<b>20°C</b>	0.8			
	<b>40°C</b>	0.6			
	<b>60°C</b>	0.4			
<b>Applicable fittings</b>	One-touch fitting, Insert fitting, Miniature fitting (Hose nipple type)				
<b>Operating vacuum pressure</b> <small>Note 2)</small> (kPa)	-101.3				
<b>Min. bending radius</b> <small>Note 3)</small> (mm)	10	15	20	27	35
<b>Operating temperature</b>	-20 to +60°C				
<b>Material</b>	Special polyurethane				

Note 1) Abnormal temperature rise caused by adiabatic compression may result in the tube bursting.

Note 2) As the operating vacuum pressure varies depending on the applicable fittings, be sure to check the fitting specifications beforehand.

Note 3) 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.

How to Order

Roll

Please contact SMC for delivery.

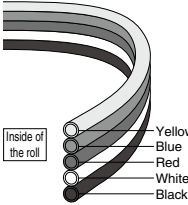
Tube length per roll: **1, 2, 3, 4, 5, 10, 20** m

**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		

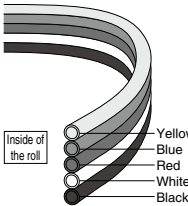
Tube length per roll: **50** m

**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	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

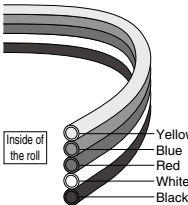
Tube length per roll: **100** m

**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

IDK



# TUZ/TIUZB Series

## Specific Product Precautions

Be sure to read this before handling the products.

Refer to back page 50 for Safety Instructions and pages 13 to 17 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.