DOT/J844 Nylon Tubing

TIV_ _ _-_ _

- For Use in Air Brake Systems on Heavy Duty Vehicles
- All Colors are Available in All Tube Sizes
- Cold and Heat Stabilized
- UV Resistant

Specifications

Recommended Operating Fluid	Air								
Maximum Operating Pressure	145psi (1.0MPa)								
Recommended Operating Temperature*	-40˚F to 140˚F (-40˚C to 60˚C)								
Specifications	FMVSS 571.106								
	Performance requirements of SAE J2494-3, and SAE J844 (Type A or B)								
Tube O.D.	1/8”	5/32”	3/16”	1/4”	5/16”	3/8”	1/2”	5/8”	3/4”
Minimum Bending Radius (mm)	9.4	12.7	19.1	25.4	31.8	38.1	50.8	63.5	76.2
Minimum Burst Pressure (psi) at 24˚C (75˚F)	1000	1200	1200	1200	1000	1000	950	900	800
Material	Nylon 12 (Polyamide)								

*Note: Recommended operating fluid and temperature range provides best performance and longest life.
Products are tested from -40˚F to 200˚F (-40˚C to 93˚C) per FMVSS 49CFR571.106.

How to Order

TIV — 07 — B — 33

Tube Model

Tube Size

01	1/8”
03	5/32”
05	3/16”
07	1/4”
09	5/16”
11	3/8”
13	1/2”
15	5/8”
19	3/4”

Color Indication

Symbol	Color
B	Black
R	Red
G	Green
BU	Blue
W	White
Y	Yellow
YR	Orange
N	Natural
S	Silver
PU	Purple
BR	Brown
GD	Dk. Green
GR	Gray
T	Tan

Length per Roll

Meters
33
77
153
305

See Packaging Table below. Not Available in all sizes and all colors.

Conversion

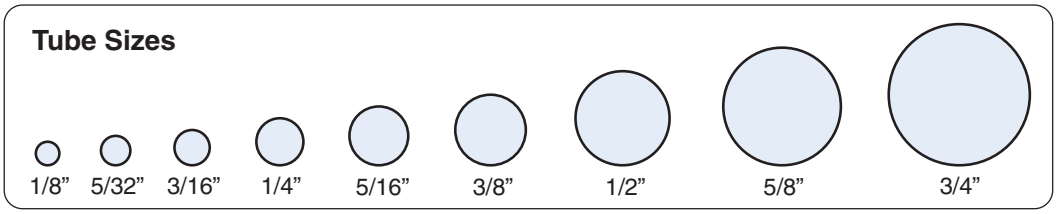
33	Meters	= 108	Feet
77	Meters	= 252	Feet
153	Meters	= 500	Feet
305	Meters	= 1000	Feet

Packaging Table

Tube Size	Type “A” (Monowall)																Type “B” (Reinforced)															
	TIV01				TIV03				TIV05				TIV07				TIV09				TIV11				TIV13				TIV15				TIV19			
	1/8”				5/32”				3/16”				1/4”				5/16”				3/8”				1/2”				5/8”				3/4”			
Length (Meters)	33	77	153	305	33	77	153	305	33	77	153	305	33	77	153	305	33	77	153	305	33	77	153	305	33	77	153	305	33	77	153	305	33	77	153	305
Color B Black				S				S	S			S	S			S				S	S		S		S		S			S			S			
Color R Red				S				S	S				S			S				S	S		S		S		S			S			S			
Color G Green				S				S	S				S			S					S		S		S		S			S			S			
Color BU Blue				S				S					S			S					S		S		S		S			S						
Color W White				S				S	S				S			S					S		S				S			S						
Color Y Yellow				S				S					S			S							S		S		S			S						
Color YR Orange												S				S							S				S			S						
Color N Natural				S									S			S									S					S						
Color S Silver								S								S							S				S			S						
Color PU Purple																S							S				S			S						
Color BR Brown																S							S				S			S						
Color GD Dk. Green																S							S				S									
Color GR Gray																S																				
Color T Tan																S																				

S = Standard, all other length color combinations are available by special order

Tube Sizes



Installation

Insert the KV2 series fitting into port and rotate until hand tight.

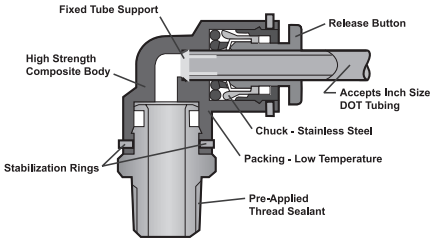
Using approved assembly method, tighten KV2 fitting to SMC recommended torque specifications. (see below)

Rotate KV2 series fitting to desired location.

Insert DOT approved tubing into the KV2 series fitting until the tube bottoms out.

Gently pull back on tubing to engage the gripping teeth into the tube.

Features

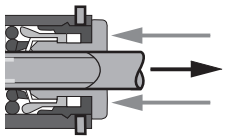


Removal

Caution

Release system air pressure from air tanks prior to removing any KV2 fittings or DOT tubing.

Push in guide to remove tube from KV2 series fitting.



Depress and hold the release button against the fitting body, then remove tubing.

Remove KV2 series fitting from the fitting port with approved wrench.

KV2 Torque Specifications

Thread NPT	Standard Thread Torque (in-lbs)
1/8”	62 to 80
1/4”	106 to 124
3/8”	195 to 212
1/2”	248 to 266
3/4”	248 to 266
Stud end into metallic ports	

Metallic: Aluminum, zinc, stainless steel, and brass

Important Information

DOs

1 Tighten fitting by hand. Apply final torque with a torque wrench at the hex.

2 Cut tubing square with a clean 90° edge

3 Use SMC Tube Cutters, TK-4 is shown.

4 Allow adequate bend radius of tube

5 Use a *push-push* action until the tube bottoms out. Use a *pull* action to set the chuck into the tube.

DON'Ts

1 Don't use a wrench on the fitting plastic body.

2 Don't use an excessive tube angle cut which can lead to leakage or breaking.

3 Don't use dikes, a knife, a saw or a dull tool to cut the tubing. Avoid burrs, dirt, and anything that can lead to leakage or breaking.

4 Don't kink the tubing or apply excessive side load which can cause leaks.

5 Don't allow contaminants to enter fittings, cartridges, or tube.

6 Don't attempt to disassemble tubing from fitting with the vehicle air system under pressure.

Specific Precautions for Fittings on Vehicles

Be sure to read and understand this publication carefully before using product.
Please refer to instructions and precautions.

Introduction

The products specified in this catalog are unlike other SMC products and developed specifically for mounting on vehicles and require reading and understanding of the "Safety Instructions," "Common Precautions" and "Warnings".

These instructions indicate the level of potential hazard with the labels of "Caution", "Warning" or "Danger". They are all important notes for safety and must be followed in addition to the regulations published by the U.S. Department of Transportation (D.O.T.)

Definitions

Caution:	Operator error could result in injury or equipment damage.
Warning:	Operator error could result in serious injury or loss of life.
Danger:	In extreme conditions, there is a possibility of serious injury or loss of life.

⚠ Warning:

The compatibility of the product is the responsibility of the original equipment manufacturer (OEM). Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the OEM who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the OEM who has determined its compatibility with the product.
The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling objects and prevention of any runaway of driven objects have been confirmed.

⚠ Caution:

The Product is provided for use in vehicle manufacturing industries.
If considering using the product in other industries or applications outside vehicle manufacturing please consult with SMC before specifying and using the product.

Design and Selection

⚠ Warning:

1. Confirm specifications.
The product is designed for use in compressed air applications. Do not use the product at pressures and temperatures outside the specified range, which can cause breakage or operational failure of the product. Any damage due to using the product outside the specified range will not be warranted or guaranteed.
2. Do not use the product for the connection between a driveshaft and chassis and/or between a truck and trailer.
3. Do not use the product in applications in which the tube is swiveled or turned. Such application can damage the fitting.
4. Installation of a tube at less than the minimum listed bending radius may give a mechanical load to the product and significantly reduce the tube life or cause failure. When establishing a proper tube length, motion adsorption, pressure effect, machine tolerance, gravity direction and movement must be considered. Minimum tube bending radius is defined by 49CFR571.106.
5. Installation of a tube at less than the recommended bending radius may significantly reduce the product's life. Particular attention must be given to prevention of sharp bending of the tube to the fitting juncture. Any bending during installation at less than the minimum bending radius must be avoided.
If a tube is kinked during installation, the tube must be discarded. Any tube that has been kinked or bent to a radius smaller than the minimum bending radius must be discarded.
6. Ensure tube is restrained, protected or guided properly. A tube of a longer length should be restrained, protected or guided to protect it from damage by unnecessary flexing, contact with other equipment, excessive load to a fitting to avoid personal injury or property damage that will be caused if a failure causes the tube to explode or dislodge. Care must be taken to insure such restraints do not introduce additional stress or wear points.
7. The product is designed for static piping. If it is used with moving tubing such as a cable bare, care must be taken with the tube for possible sliding abrasion, elongation or breakage due to tensile force and disconnection from fitting.
8. Confirm PTFE acceptable
The product contains PTFE (poly tetra ethylene resin) powder into the seal of the threads. Confirm there will not be a compatibility problem with the PTFE material.

⚠ Caution

1. Before Piping, make sure all debris, cutting oil, dust, etc. are removed from piping.
2. Prior to assembly, a careful examination of the product regarding the following items must be performed:
   a) Do not use any product that displays signs of nonconformance.
   b) Correct size
   c) No presence of dirt, obstructions, scratches, blisters, looseness, cracks and other visible defects
   d) No presence of burrs, cracks, corrosion and other defects on the sealing surface.
3. Tighten with an appropriate wrench, using hexagonal face of the body of the product. Position the wrench as close to the thread as possible. Tightening with a wrench of the wrong size, or too close to the tube side may cause damage or deformation of a fitting. After mounting check that the fitting is not damaged or deformed.
4. When connecting a tube consider factors such as changes in tube length due to pressure and allow sufficient margin. Otherwise this can cause damage to the fitting and disconnection of the tube from the fitting.
5. Do not bend tube over the minimum bending radius during installation. Any tube that has been kinked or bent to a radius smaller than recommended minimum bending radius must be discarded.
6. Mount the product such that a fitting and tube are not subjected to twisting, pulling or moment loads. This can cause damage to the fitting and crushing, bursting or disconnection of the tube.

Air Supply

⚠ Warning

1. Operating fluid - Compressed air only.
2. Quality of Air - Under the following conditions, the product could break or cause operation failure. Customer is responsible to test and analyze the product to ensure it is compatible chemically with condensate contained in the air to be supplied through the product. If this is not possible the product should not be used:
- Compressed air is contaminated with chemicals, synthetic materials containing organic solvents, salts and corrosive gases.
- Condensate that include oil, moisture or other chemicals drained from air compressor and intermediate equipment cannot be removed.

Specific Precautions for Fittings on Vehicles (Continued)

Be sure to read and understand this publication carefully before using product.
Please refer to instructions and precautions.

Selection

⚠ Warning

1. Tube, tube assemblies and fittings (hereinafter referred to as the "product") can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode so that failure of the product will not endanger persons or property. Do not use the product in the system or equipment without a fail-safe mode.
2. Do not use the product for the connection between a car shaft and chassis and between a truck and trailer. Such use is illegal to FMVSS (DOT) 106, the regulation published by the Department of Transportation in the US.

⚠ Caution

1. Do not select or use the product without thoroughly reading and understanding this catalog.
2. Due to the wide variety of operating conditions and applications for the product, SMC and its distributors do not represent or warrant that any particular product is suitable for any specific end use system. The user, through its own analysis and testing, is solely responsible for final selection of the product according to the following requirements.
   - Assuring that the user's requirements are met and the application presents no health or safety hazards.
   - Providing all appropriate health and safety warnings on the equipment on which the product is used.
   - Assuring compliance with all applicable government and industry standards.
3. Consult with SMC for any question and additional information.

Mounting and Piping

⚠ Caution

1. Prior to assembly, a careful examination of the product about the following items must be performed. Do not use any product that displays any signs of nonconformance.
   - Correct size and dimensions
   - No presence of dirt, obstructions, scratches, blisters, looseness, cracks and other visible defects
   - No presence of burrs, cracks, corrosion and other defects on the sealing surface
2. Do not assemble the product on another manufacturer product except the following cases.
   - When SMC approves the assembly in writing.
   - When the user verifies the assembly or application through analysis and testing.

(The user is solely responsible for the selection of the assembly.)
3. Installation of tubing at bending less than required by 49CFR571.106 may give a mechanical load to a fitting and significantly reduce the tube life or cause a failure. When establishing a proper tube length, motion absorption, pressure effect, machine tolerance, gravity direction and movement must be considered.
4. Installation of tubing at bending less than required by 49CFR571.106 may significantly reduce the product life. Particular attention must be given to preclude sharp bending at the tube to fitting juncture. Any bending during installation at less than the minimum bending radius must be avoided. If any tube is kinked during installation, the tube must be discarded. Any tube that has been kinked or bent to a radius smaller than the minimum bending radius must be discarded.
5. A tube of a longer length should be restrained, protected or guided to protect it from damage by unnecessary flexing, contact with other equipment, excessive load to a fitting, and to avoid personal injury or property damage that will be caused if a failure causes the tube to explode or break loose. Care must be taken to insure such restraints do not introduce additional stress or wear points.
6. After the product is mounted and a system is completed, operate the system at maximum operating pressure and check for possible malfunctions and leaks. Personnel must avoid potential hazardous areas while testing and using the system.

Operating Environment

⚠ Caution

1. The recommended fluid and ambient temperature is -40°F to 140°F. Use above or below the recommended limit can damage a fitting or tear a tube, or cause the tube to come off from the fitting, and finally degrade them to a point where the fluid may be released. Properly insulate and protect the product when they are exposed to temperatures above or below recommended range.
2. When the product is routed near heat sources (such as a high temperature manifold or melted metal), it can become overheated and break without direct contact to the heat source. This can occur even if there is cool air around the product. This is generally called radiation heat. If there is potential exposure to radiative heat, the product must be properly insulated and protected.
3. Care must be taken to insure that the product is either compatible with or protected from the environment (that is, surrounding conditions) to which it is exposed. Environmental conditions (including but not limited to ultraviolet radiation, sunlight, heat, ozone, moisture, water, salt water, chemicals and air pollutants) can cause degradation and premature failure.
4. Care must be taken to protect the product from mechanical loads (external forces). External forces can significantly reduce its life or cause a failure. Mechanical loads which must be considered include excessive flexing, improper tube length (too short or too long), twist, tensile or side loads, bend radius, vibration and swiveling (relative motion of components).
5. Condensates contain oil, moisture and other chemicals drained from air compressors and intermediate equipment. The user is solely responsible for insuring that the product is chemically compliant with the condensates by analysis and testing, and taking measures. Page 26 shows a reference to check the compliance.

Maintenance

⚠ Caution

1. Even with proper selection, mounting and installation, the product life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a possible product failure, and experience with any product failures in the application or in similar applications should determine the frequency of the inspection and the replacement for the products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and , at minimum, must include the following 2 through 5 items.
2. Any of the following conditions require immediate shut down and replacement of the product.
   - Abraded and cut tube
   - Hard, stiff, heat cracked or charred tube
   - Heat cracked or charred plastic parts used on fitting
   - Cracked, damaged or badly corroded fitting
   - Leaks at fitting or in tube
   - Crushed or flattened fitting
   - Crushed or flattened tube
3. The following items must be tightened, repaired, corrected or replaced as required.
   - Leaks at the connected part of fitting with a port
   - Excess dirt build-up
   - Worn clamps, guards or shields
4. Operate the system at maximum operating pressure of the SMC product and check for possible malfunctions and leaks. Personnel must avoid potential hazardous areas while testing and using the system.
5. Plastic or elastomeric components used on the product will eventually age, harden, wear and deteriorate under thermal cycling and compression set. These parts should be inspected and replaced at specific replacement intervals, based on previous service life, government or industry recommendations, or when failures could result in unacceptable downtime, damage or injury risk.