

# Pressure and Force Sensors

## 40PC Hose and Tubing Recommendations – Note #4

### HOSE APPLICATIONS

An alternative to manifold mounting the 40PC pressure sensor is to use a hose in fuel pressure applications. Using a hose to make the pressure connection permits the sensor to be mounted away from the actual sensing location that might be hazardous and difficult to access. Many types of hoses with differing media compatibilities, material compositions, wall thicknesses, working temperatures, working pressures and hose flexibility are available. A 1/16" ID or 3/32" ID flexible hose can be used with the 40PC sensor. If a hose that is less flexible such as FEP is used,

3/32" ID may be more appropriate. Contact the hose manufacturer regarding the suitability of a particular hose for an application.

Clamps, as noted below, are recommended with specific tubing. It is up to the user to determine if the application warrants their usage. Many types of hose/tubing are available, including Silicone, Tygon, Urethane, Nylon, FEP, and Vinyl.

### HOSE AND TUBING SPECIFICATIONS

**Vinyl** hose, which is typically used as a general purpose lab hose, is very flexible and inexpensive. Vinyl tubing is best at room temperatures and under 40 psig. The specifications for vinyl hose from Cole-Parmer are:

Hose	Wall Thickness/ID	Max. Press. @ 21°C (70°F)	Max. Temp (°C/°F)
Vinyl (Cole-Parmer Cat. # E-06405-01)	1/32" by 1/16"	40 psi	82/180

**Silicone** tubing is flexible and suitable for general purpose use. Silicone tubing offers better temperature and chemical resistance than vinyl in most environments. Silicone tubing is recommended at pressures less than 15 psig. The specifications for silicone tubing from Cole-Parmer are:

Tubing	Wall Thickness/ID	Max. Press. @ 21°C (70°F)	Max. Temp (°C/°F)
Silicone (Cole-Parmer Cat. # E-06411-62)	1/32" by 1/16"	15 psi	238/460

**Tygon** tubing, recommended for pressures less than 50 psig, is a more durable general purpose tubing. It is slightly more expensive than vinyl. The specifications for Tygon tubing from Cole-Parmer are:

Tubing	Wall Thickness/ID	Max. Press. @ 21°C (70°F)	Max. Temp (°C/°F)
Tygon (Cole-Parmer Cat. # E-06408-62)	1/32" by 1/16"	50 psi	74/165
Tygon (Cole-Parmer Cat. # E-06408-63)	1/32" by 3/32"	40 psi	74/165

**Urethane** tubing can be used at higher temperatures and pressures but it is more expensive than vinyl, silicone or Tygon. Urethane tubing is flexible and strong. Specifications for Urethane "Superthane" tubing, available from Newage Industries, are:

Tubing	Wall Thickness/ID	Max. Press. @ 21°C (70°F)	Max. Temp (°C/°F)
Superthane (Part # 210 0070-100)	1/32" by 1/16"	134 psi	93/200

**FEP** (Fluoropolymer) is a semi-flexible tubing that offers excellent temperature, pressure and chemical resistance. However, this tubing is "semi-flexible," and much more rigid than Tygon, or vinyl. When used for applications as described in this note, it is recommended that FEP 3/32" ID tubing be used with a clamp. Specifications for FEP tubing, available from Cole-Parmer, are:

Tubing	Wall Thickness/ID	Max. Press. @ 21°C (70°F)	Max. Temp (°C/°F)
FEP (Cole-Parmer Cat. # E-06406-63)	1/32" by 1/16"	350 psi	205/400

**Nylon 11** tubing (flexible grade) has excellent strength and chemical resistance. This tubing is not as flexible as Tygon, or vinyl, and is more expensive. When used for applications as described in this note, it is recommended that Nylon 11 3/32" ID tubing be used with a clamp. The specifications for Nylon 11 tubing, available from Freelin-Wade, are:

Tubing	Tubing ID	Max. Press. @ 24°C (75°F)	Max. Temp (°C/°F)
Nylon 11 (1J-200-)	3/32"	225 psi	93/200

**Pressure and Force Sensors****40PC Hose and Tubing Recommendations – Note #4****HOSE CLAMPS**

Hose clamps are recommended for use with all of the hoses listed. In addition to helping prevent leakage and loosening, hose clamps provide a stronger connection to the sensor port. Clamps that are recommended for use in applications described in this paper are the Oetiker Two-Ear Clamp and the Oetiker One-Ear Special Clamp from Newage Industries.

<b>Clamp</b>	<b>Nom. OD (In.)</b>	<b>Inches Open-Closed</b>
Oetiker Two Ear Clamp (Oetiker Part # 0041R) (Newage Ind. Part # 582 2670)	5/32	.161-.122
Oetiker One Ear Special Clamp (Oetiker Part # 4.1R) (Newage Ind. Part # 582 0920)	5/32	.161-.130

**SUPPLIER LIST**

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