Fluoropolymer Tubing

There are several varieties of fluoropolymers; PFA, PTFE, and FEP are the most common choices for tubing. Fluoropolymers are chosen because they are essentially chemically inert. They are an ideal transport medium for highly volatile chemical compounds and exotic fluids.

There are very few chemicals, such as fluorine, chlorine trifluoride, and oxygen difluoride that are known to react with fluoropolymers. To a lesser degree, fluoropolymer tubing may absorb halogenated organic chemicals. This causes swelling and change in weight.

Permeability is a major consideration with fluoropolymer tubing. Permeation depends upon several factors; the porosity of the tube material, the tube thickness, the molecular size of the permanent, and the relative concentration of the permanent inside and outside the tube. Increasing the temperature always raises the permeation rate. Increasing the wall thickness always reduces the permeation rate.

Pressure rating at operating temperature must be considered. The allowable pressure rating for fluoropolymer tubes decreases very rapidly with increasing temperature. However, many analyzer applications using fluoropolymer tubing are under a slight vacuum.

Fluoropolymer tubing is widely used for CEM applications because it is inert to most compounds found in stack gas. Permeation is a known problem with fluoropolymer tubing but specifying a thicker wall can reduce its effect.

Maximum Working Pressure (psig) at Given Operating Temperatures for Fluoropolymer Tubes:

Material	OD	Wall	Max Temp	@ 72°F	@ 200°F	@ 400°F
PFA	1/4″	0.030	500°F	155	130	50
PFA	1/4″	0.040	500°F	205	170	60
PFA	1/4″	0.047	500°F	270	230	85
PFA	1/4″	0.062	500°F	455	385	145
PFA	3/8″	0.030	500°F	95	80	30
PFA	3/8″	0.062	500°F	230	195	75
PFA	1/2″	0.030	500°F	65	55	20
PFA	1/2″	0.062	500°F	155	130	50
FEP	1/4″	0.030	400°F	155	105	30
FEP	1/4″	0.040	400°F	205	140	40
FEP	1/4″	0.047	400°F	270	185	55
FEP	1/4″	0.062	400°F	455	315	95
FEP	3/8″	0.030	400°F	95	65	20
FEP	3/8″	0.062	400°F	23	155	50
FEP	1/2″	0.030	400°F	65	45	15
FEP	1/2″	0.062	400°F	155	105	35
PTFE	1/4″	0.030	500°F	155	115	40
PTFE	1/4″	0.040	500°F	205	150	50
PTFE	1/4″	0.047	500°F	270	200	70
PTFE	1/4″	0.062	500°F	455	385	145
PTFE	3/8″	0.030	500°F	95	80	30
PTFE	3/8″	0.062	500°F	230	195	75
PTFE	1/2″	0.030	500°F	65	55	20
PTFE	1/2″	0.062	500°F	155	130	50

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