Multi-Purpose/Chemical Resistant Hose | Single-layer teflon tubing is hard and easy to break. Our Flexible Fluorine (PVDF) Resin Tubing is an alternative tubing for a teflon tubing.

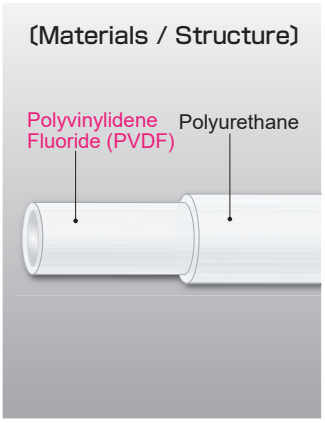
Flexible Fluorine (PVDF) Resin Tubing Clear

[Model Number: E-PD-(I.D. × O.D.)]

Applications • Fluids

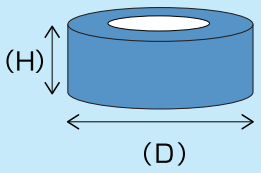
Chemical | Ink | Food | Beverage | Flavor・Cosmetics | Alcohol | Oil | Water | Powder

〔Materials / Structure〕



- For Industrial Water-based Ink-Jet Printers (For Ink-Supplying Pipes)
- For Transferring Chemicals used in Laboratory Equipment
- For Transferring Chemicals used in Semiconductor-Related Devices and Flat-Panel Display (FPD) Manufacturing Devices
- For Transferring Beverage and Food
- For Transferring Alcohol, Cosmetics, and Chemicals
- For Transferring Chemicals used in Medical Equipment, Endoscope, and so on
- For Transferring Chemicals used in Manufacturing Fuel Cell and Pure Water
- For Transferring Air at Clean Room

〔Packing Dimension〕



Standard • Packing Information

Model Number	Inch (Inside Diamater) (*1)	I.D. × O.D.	Working Pressure MPa		Minimum Bend Radius at 20℃	Temperature Range	Standard Length	Product Weight	Color	Packing Dimension(*2)			
										Packing	Diameter (D)	Height (H)	Weight/roll
		mm	at 20℃	at 80℃	mm	℃	m	kg/roll			cm	cm	kg/roll
E-PD-2×4	5/64	2×4	0～0.6		15		20	0.24		Plastic Bag	23.5	5	0.24
							100	1.21		Cardboard Box	38.5	15	1.73
E-PD-4×6	5/32	4×6			25		20	0.41		Plastic Bag	26	5	0.41
							100	2.03		Cardboard Box	38.5	15	2.55
E-PD-6×8	1/4	6×8	0～0.4	0～0.2	50	−20～80	20	0.57	Clear	Plastic Bag	30	5.5	0.57
							100	2.86		Paper Bobbin	38.5	15	3.78
E-PD-6×9	1/4	6×9	0～0.6		35		20	0.89		Plastic Bag	33	5.5	0.89
							100	4.43		Paper Bobbin	38.5	15	5.35
E-PD-8×12	5/16	8×12			50		20	1.55		Plastic Bag	35.5	8	1.55
							100	7.74		Paper Bobbin	46	16	8.92

*1: Please note that inch size is approximate, which is not equal to milliunit.

*2: "Diameter (D)" × "Height (H)" means "External Dimensions of Cardboard Box (D)" × "Height (H)."

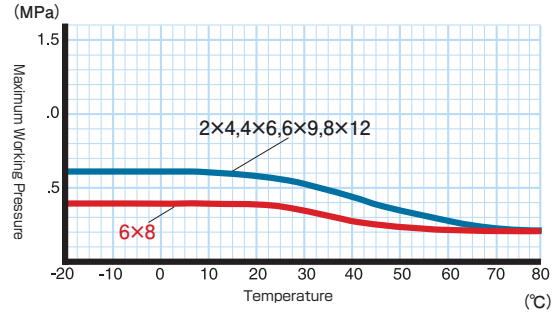
Characteristics and Functions

Non-PVC | Non-Adhesiveness | Gas Barrier | Chemical Resistance | Low Elution | Food-Sanitation | Flexibility | Oil-Proof | Alcohol Resistant | Cold Resistance

- **Chemical Resistance**···Since the inner layer is made of PVDF fluorine resin, E-PD is resistant to most of the chemical substances. (Please note that E-PD does not stand proof against organic solvents such as Amine and Ketones, so we recommend you to use E-SJ.) For more information, please refer to chemical resistance data.
- **Flexibility**···Due to the laminated structure, compared with the conventional single-layer fluorine tubing, E-PD is superior in flexibility. This improves your work efficiency.
- **Gas Barrier**···The inner layer of fluorine (PVDF) has a higher level of gas barrier property, which is suitable for the fuild with high volatility.
- **Hard to Break**···Unlike the conventional single-layer fluorine tubing, E-PD is hard to break. (Even if it breaks, you can restore its shape to some extent.)
- **Non-Adhesiveness**···Since fluorine resin is superior in water-proof and non-adhesiveness, you can wash out the fluids very easily.
- **Plasticizer-Free**···E-PD does not contain plasticizer (an elution material) at all. E-PD is an oil-free tubing.
- **Non-PVC**···E-PD is made of a non-PVC material.
- **Low Elution and Low Odor**···Since this tubing contains very low levels of elution and odor, it is recommended for use in transfers of food, beverage, and cosmetics.
- **High Purity**···Fluorine resin does not contain any additives such as plasticizer, so E-PD is suitable for transferring high purity chemical fluids.
- **Easy to Cut**···Since we print the cut mark on the tubing every meter, it is easy to cut the length you would like to.
- **Transparency**···E-PD enables you to check the fluid very easily.
- **Green Procurement**···E-PD is compliant with RoHS2 requirements (directive 2011/65/EU:RoHS2). (RoHS 2 free products mean that they do not contain or below the threshold of 10 substances.)
- **Original Fittings**···By using our original fittings, you can avoid accidents which are caused by incorrect choices of hose and fittings.
- **Food Sanitation Law Certified**···E-PD conforms to the Food Sanitation Standard No.370 (The Ministry of Health and Welfare for Food Sanitation, No.370, 1959). (Confomity to N-Heptane). Please contact us regarding the conformity of "Partial Revision of the Food Sanitation Law" (Effective on June 1, 2020) and Positive List System (PL).

Technical Information

E-PD: Relationship between Working Temperature and Maximum Working Pressure

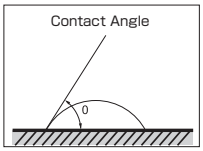


※ The above graph is the value when our original E-FTS fittings are used.

Non-Adhesiveness Comparison Data

Non-adhesiveness and smoothness, which are peculiar to fluorine resin, make it easier to wash out the fluid.
You can check the data about critical surface tension and contact angle against water.

Resins	Critical Surface Tension (dyne/cm)	Contact Angle for Water (θ)
Ethylene-Tetrafluoroethylene (ETFE)	22	96
Polyvinylidene Fluoride (PVDF)	25	82
High Density Polyethylene	31	73
Hard Vinyl Chloride	39	68
PET	43	-
Nylon	46	54



[Critical Surface]
The surface Tension of the assumed liquid which has the contact angle of zero against solid.

Comparative Data on Gas Barrier Property

Type of Gas	Transmission Coefficient (cc/mm/sec · cm² · cmHg)	
	Polyvinylidene Fluoride	Polyethylene
Oxygen	24×10^{-12}	$5{,}900 \times 10^{-12}$
Nitrogen	5.5×10^{-12}	330×10^{-12}
Carbonic Acid Gas	9×10^{-12}	$28{,}000 \times 10^{-12}$

(Flexibility Comparative Data)

(Test Temperature:20℃)

- This is one indication of flexibility. Flexibility varies depending on hose (tubing).
- The larger the amount of deflection is, the more flexible the hose (tubing) is.

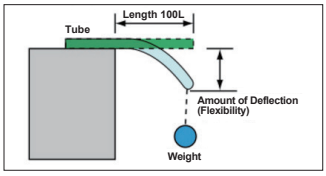
※The lower the minimum bend radius value is, the harder the hose (tubing) is.

Test Sample	Minimum Bend Radius (mm)	Amount of Deflection (mm)
① E-PD-4 × 6	23 (Catalog Value : 25)	28
② E-SJ-4 × 6	23 (Catalog Value : 25)	31
③ PTFE Tubing (4 × 6)	20	7
④ PFA Tubing (4 × 6)	23	6

Test Method for Amount of Deflection (Flexiblity)

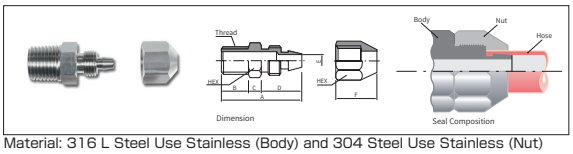
Add a 50 gram weight to the end of the tubing for one minute. Then, measure the amount of deflection. (The test piece goes through the annealing step in advance to make it straight.)

※③ PTFE Tubing and ④ PFA Tubing are not our products.



HAKKO Original Fittings

Model Number	Body							Nut		Weight	Applicable Hose
	A	B	C	D	E	Thread	HEX	F	HEX	Gram/Piece	
E-FTS-2×4-R1/8	24.5	10	4	10.5	1.7	R1/8	10	10.5	10	13	E-PD-2×4
E-FTS-4×6-R1/4	31	12	5	14	3.5	R1/4	14	14	14	29	E-PD-4×6
E-FTS-6×8-R1/4	33	12	5	16	5.5	R1/4	17	16	14	32	E-PD-6×8
E-FTS-6×9-R1/4	35.5	12	5	18.5	5.5	R1/4	17	18.5	17	41	E-PD-6×9
E-FTS-8×12-R3/8	41	13	7	21	7	R3/8	19	21	19	61	E-PD-8×12



Material: 316 L Steel Use Stainless (Body) and 304 Steel Use Stainless (Nut)

⚠ *Due to the laminated structure tubing, please use the joints to seal an inner surface of the hose.
*Please do not use the joints to seal an outer surface of the hose. This may result in the bursting or coming off from the hose.
*When you use our products, please refer to "Precautions for Use" available on our webpage and product catalog.
*In terms of chemical resistance, please refer to "Chemical Resistance Data" available on our webpage and product catalog.
*Although the inner layer is made of fluorine, please make sure whether or not E-PD is usable for high purity fluids before you use.
*Although the inner layer is resistance to fluids, but depending on working environments, the fluids would be permeated through the inner layer, resulting in the danger of swelling and degradation of the middle or outer layer.

Contact us if you have any inquiries about HAKKO products.

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