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 **WARNING**

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

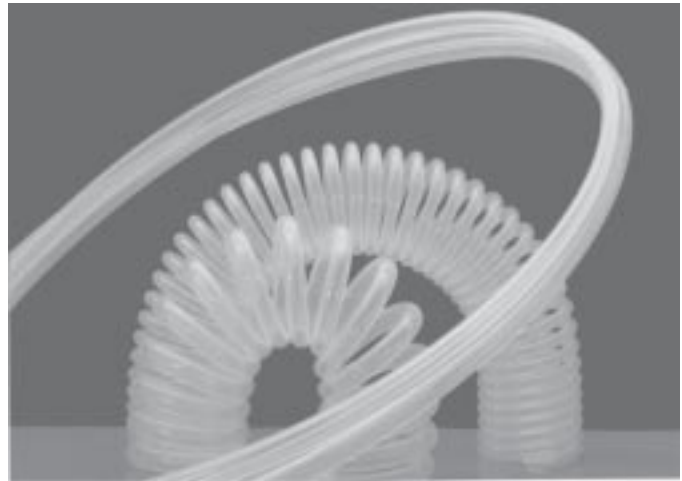
**Offer of Sale**

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the "Offer of Sale".

**Introduction, Part Number Matrix**

**Overview:**

Partek/Atlantic manufactures an extensive line of high quality Fluoropolymer tubing and pipe. A wide range of products are available in PTFE, FEP, PFA, High Purity PFA, PVDF, and ETFE. Other materials such as PEEK and MFA are also available on request. All tubing and pipe products are made from 100% virgin resins.



*Part Number Matrix*

# 105-0250062-N40025

	<p><b>Outside Diameter</b>  <i>Example:</i>                  0250 = .250 Inches                  0700 = 7 mm</p>	<p><b>Wall Thickness</b>  <i>Example:</i>                  062 = .062 Inches                  100 = 1 mm</p>		<p><b>Packaging</b>                  1 = HP Spool                  2 = Plastic Spool                  3 = Wood Spool                  4 = Coil                  5 = Straight                  6 = Cardboard Spool                  0 = Other</p>
<p><b>Product Family</b>                  1 = Fractional                  2 = Metric                  3 = Convoluted                  4 = Spiral Cut                  5 = Pipe                  6 = Melt Rod                  7 = Coiled Tubing                  8 = PTFE Beading                  9 = Custom                  A = Formed Part</p>	<p><b>Resin</b>                  01 = PTFE                  02 = PTFE, Hose                  03 = FEP                  04 = PFA                  05 = PFA, HP Generic                  06 = PFA, Teflon® 450HP                  07 = PFA, Teflon® 440HP                  08 = PFA, UHP                  09 = MFA                  10 = PVDF                  11 = PVDF, Superflex                  12 = ETFE                  13 = PEEK                  14 = PTFE, Opaque</p>	<p><b>Color</b>                  0 = Black                  1 = Brown                  2 = Red                  3 = Orange                  4 = Yellow                  5 = Green                  6 = Blue                  7 = Violet                  8 = Gray                  9 = White                  N = Natural</p>		<p><b>Length</b>                  1000 = 1,000 ft.                  0500 = 500 ft.                  0250 = 250 ft.                  0100 = 100 ft.                  0050 = 50 ft.                  0025 = 25 ft.                  0010 = 10 ft.                  0005 = 5 ft.                  0004 = 4 ft.                  R = Random                  C = Custom</p> <p>Add additional suffix for                  Spiral cut tubing:                  R = Right hand cut                  L = Left hand cut</p>

Teflon® is a registered trademark of DuPont.

Consult Price List for individual configuration pricing. For other configurations not listed on Price List, please consult factory.

## Introduction, HP PFA Tubing and Pipe

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### ***Product Overview:***

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High Purity PFA (Perfluoroalkoxy) tubing, made from 100% virgin resin, has the highest molecular weight available. It is manufactured for use in hostile environments where purity is critical. Testing has proven that these High Purity PFA products are able to withstand corrosive surfactants for longer periods of time than the standard products. High Purity PFA products are available in various sizes upon request.

### ***Features:***

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**100% virgin PFA resin used on all products.**

**Semiconductor and pharmaceutical specification conformance.**

**Translucent and flexible materials.**

**Chemically inert to nearly all industrial chemicals and solvents.**

**Smooth nonstick surface resulting in the lowest coefficient of friction.**

**Lowest levels of extractables.**

**Nonflammable materials.**

**FDA Compliant.**

### ***Benefits:***

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**No process contamination.**

**High Purity applications.**

**Excellent for flow monitoring systems.**

**Longer product life and less downtime.**

**Higher flow with no process contamination.**

**Excellent for high purity applications.**

**Safety.**

**Useful in food applications.**

### ***Specifications:***

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#### Materials:

Products in this catalog are manufactured using resins complying with ASTM D 3307 Type II Specification.

#### Flammability:

Listed VW-1 by the Underwriters' Laboratories, Inc. in their burning test classification for polymeric materials and passes the UL 83 vertical flame test. In a flame situation, High Purity PFA tubing resists combustion and does not promote flame spread.

#### FDA Compliance:

Most high purity resins qualify for use in contact with food in compliance with FDA regulation 21 CFR 177.1550, 175.300, 176.170, 176.180.

#### Pressure and Temperature Ranges:

-329° - 500° F (-200° -260° C) See pressure temperature chart for more information.

**HP PFA Tubing**

Part numbers below are for standard configurations. For complete part numbers and options for material, color, packaging, etc. refer to Part Number Matrix on page 2.

**Fractional Size Tubing**

O.D.	Part Number	O.D. X I.D. X Wall Thickness	Nominal O.D.	O.D. Tolerance	Wall Tolerance	Working Pressure PSIG (bar)	Burst Pressure PSIG (bar)
1/8"	105-0125031-XXXXXX	1/8" X 1/16" X .031	.125	+/- .004	+/- .003	369 (25.4)	1,859 (128.2)
3/16"	105-0188031-XXXXXX 105-0188062-XXXXXX	3/16" X 1/8" X .031 3/16" X 1/16" X .062	.188	+/- .005	+/- .003	249 (17.1) 492 (33.9)	1,253 (86.4) 2,478 (170.9)
1/4"	105-0250031-XXXXXX 105-0250047-XXXXXX 105-0250062-XXXXXX	1/4" X 3/16" X .031 1/4" X 5/32" X .047 1/4" X 1/8" X .062	.250	+/- .005	+/- .003	190 (13.1) 286 (19.7) 380 (26.2)	945 (65.2) 1,443 (99.5) 1,889 (130.2)
3/8"	105-0375031-XXXXXX 105-0375062-XXXXXX	3/8" X 5/16" X .031 3/8" X 1/4" X .062	.375	+/- .005	+/- .003	125 (8.6) 260 (17.9)	633 (43.6) 1,280 (88.3)
1/2"	105-0500031-XXXXXX 105-0500062-XXXXXX	1/2" X 7/16" X .031 1/2" X 3/8" X .062	.500	+/- .006 +/- .005	+/- .003	95 (6.6) 195 (13.4)	476 (32.8) 968 (66.7)
3/4"	105-0750031-XXXXXX 105-0750062-XXXXXX	3/4" X 11/16" X .031 3/4" X 5/8" X .062	.750	+/- .006	+/- .003	68 (4.7) 132 (9.1)	318 (21.9) 650 (44.8)
1"	105-1000062-XXXXXX	1" X 7/8" X .062	1.000	+/- .010	+/- .003	100 (6.9)	490 (33.8)
1-1/8"	105-1125062-XXXXXX	1-1/8" X 1" X .062	1.125	+/- .015	+/- .003	87 (6.0)	436 (30.1)
1-1/4"	105-1250075-XXXXXX	1-1/4" X 1.10 X .075	1.250	+/- .015	+/- .003	94 (6.5)	474 (32.7)

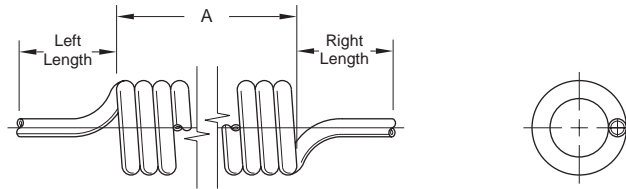
**Metric Size Tubing**

O.D.	Part Number	O.D. X I.D. mm	O.D. X I.D. Inch	O.D. / I.D. Tolerance mm	O.D. / I.D. Tolerance Inch
3	205-0300100-XXXXXX	3.0 X 1.0	.118 X .039	+/- .11	+/- .004
4	205-0400100-XXXXXX	4.0 X 2.0	.157 X .078	+/- .11	+/- .004
5	205-0500100-XXXXXX	5.0 X 3.0	.197 X .118	+/- .11	+/- .004
6	205-0600100-XXXXXX	6.0 X 4.0	.236 X .157	+/- .13	+/- .005
7	205-0700100-XXXXXX	7.0 X 5.0	.276 X .197	+/- .13	+/- .005
8	205-0800100-XXXXXX	8.0 X 6.0	.315 X .236	+/- .13	+/- .005
9	205-0900100-XXXXXX	9.0 X 7.0	.354 X .276	+/- .13	+/- .005
10	205-1000100-XXXXXX	10.0 X 8.0	.393 X .315	+/- .13	+/- .005
12	205-1200100-XXXXXX	12.0 X 10.0	.472 X .393	+/- .15	+/- .006
14	205-1400100-XXXXXX	14.0 X 12.0	.551 X .472	+/- .15	+/- .006
16	205-1600100-XXXXXX	16.0 X 14.0	.630 X .551	+/- .15	+/- .006

Working pressure calculated using a Safety Factor of 5. Please note that other manufacturers may use a Safety Factor of 4 when presenting their data. High Purity PFA Industrial Wall Tubing is supplied in 25 ft. increments up to 1000 ft. continuous for most sizes. Custom packaging and sizes are available upon request.

## HP PFA Retractable Coils and Pipe

### Retractable Coils



Part Number	Tubing O.D. X I.D.	Coil I.D. Inch (mm)	Retracted Length "A" Inch (mm)	Extended Length Inch (mm)
705-0188062-XX0003	3/16" X 1/16"	.750 (19.1)	3 (76)	12 (305)
705-0188062-XX0006	3/16" X 1/16"	.750 (19.1)	6 (152)	24 (610)
705-0188062-XX0012	3/16" X 1/16"	.750 (19.1)	12 (305)	48 (1219)
705-0188062-XX0018	3/16" X 1/16"	.750 (19.1)	18 (457)	72 (1829)
705-0250062-XX0003	1/4" X 1/8"	1.00 (25.4)	3 (76)	12 (305)
705-0250062-XX0006	1/4" X 1/8"	1.00 (25.4)	6 (152)	24 (610)
705-0250062-XX0012	1/4" X 1/8"	1.00 (25.4)	12 (305)	48 (1219)
705-0250062-XX0018	1/4" X 1/8"	1.00 (25.4)	18 (457)	72 (1829)
705-0313062-XX0003	5/16" X 3/16"	1.625 (41.3)	3 (76)	12 (305)
705-0313062-XX0006	5/16" X 3/16"	1.625 (41.3)	6 (152)	24 (610)
705-0313062-XX0012	5/16" X 3/16"	1.625 (41.3)	12 (305)	48 (1219)
705-0313062-XX0018	5/16" X 3/16"	1.625 (41.3)	18 (457)	72 (1829)
705-0375062-XX0003	3/8" X 1/4"	1.625 (41.3)	3 (76)	12 (305)
705-0375062-XX0006	3/8" X 1/4"	1.625 (41.3)	6 (152)	24 (610)
705-0375062-XX0012	3/8" X 1/4"	1.625 (41.3)	12 (305)	48 (1219)
705-0375062-XX0015	3/8" X 1/4"	1.625 (41.3)	15 (381)	60 (1524)
705-0375062-XX0018	3/8" X 1/4"	1.625 (41.3)	18 (457)	72 (1829)
705-0438062-XX0003	7/16" X 5/16"	3.00 (76.2)	3 (76)	12 (305)
705-0438062-XX0006	7/16" X 5/16"	3.00 (76.2)	6 (152)	24 (610)
705-0438062-XX0012	7/16" X 5/16"	3.00 (76.2)	12 (305)	48 (1219)
705-0500062-XX0003	1/2" X 3/8"	3.00 (76.2)	3 (76)	12 (305)
705-0500062-XX0006	1/2" X 3/8"	3.00 (76.2)	6 (152)	24 (610)
705-0500062-XX0012	1/2" X 3/8"	3.00 (76.2)	12 (305)	48 (1219)

Standard left/right tail length is 6 inches. Please consult factory for special tail lengths.

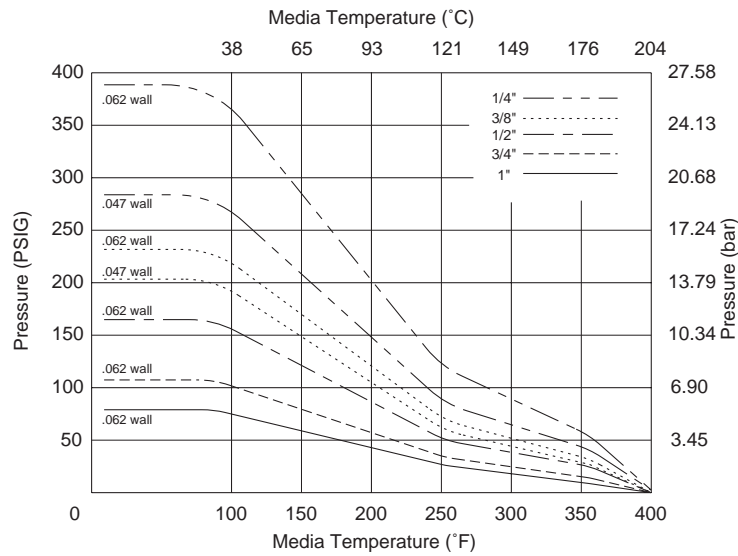
### Schedule 40 Pipe

Part Number	Nominal Inch Size	Actual O.D. Inch	Minimum Wall Inch	O.D. Tolerance Inch	Wall Tolerance Inch
507-0540088-XXXXXX	1/4"	.540	.088	+/- .010	+ .020 / -.00
507-0840109-XXXXXX	1/2"	.840	.109	+/- .010	+ .020 / -.00
507-1050113-XXXXXX	3/4"	1.050	.113	+/- .010	+ .020 / -.00
507-1315133-XXXXXX	1"	1.315	.133	+/- .015	+ .020 / -.00
507-2375154-XXXXXX	2"	2.375	.154	+/- .015	+ .020 / -.00

All pipe is supplied in 5 and 10 foot lengths as standard. Custom packaging, lengths, and schedule 80 pipe are available upon request. Please consult factory.

HP PFA General Information

Pressure vs. Temperature Chart  
Standard Wall High Purity PFA Tubing  
Fractional Size



High Purity PFA Tubing Bend Radius Chart

O.D.	I.D.	Wall Thickness	Minimum Bend Radius
1/8"	1/16"	.031	1/2"
1/4"	1/8"	.062	1/2"
1/4"	5/32"	.047	3/4"
1/4"	3/16"	.031	1"
3/8"	1/4"	.062	3/4"
3/8"	5/16"	.031	2-1/2"
1/2"	3/8"	.062	2-1/2"
1/2"	7/16"	.031	4"
5/8"	1/2"	.062	3"
5/8"	9/16"	.031	12"
3/4"	5/8"	.062	6"
3/4"	11/16"	.031	16"
7/8"	3/4"	.062	12"
1"	7/8"	.062	16"
1-1/4"	1.10	.075	16"

## Introduction, PFA Tubing and Pipe

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### ***Product Overview:***

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Partek/Atlantic's line of Fluoropolymer tubing is well suited for any corrosive or high purity application. PFA Tubing Products are available in several grades and sizes, and are offered in numerous lengths. PFA (Perfluoroalkoxy) is the material of choice in applications requiring excellent chemical resistance, high temperature exposure, clarity and long continuous lengths. Atlantic's resin is a standard grade with a high molecular weight and high resistance to stress cracking. The tubing can be used with flare or conventional fittings, and is available in a wide range of sizes. Schedule 40 Pipe is also available.

### ***Features:***

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**100% virgin PFA resin used on all products.**

**Translucent and flexible materials.**

**Chemically inert to nearly all industrial chemicals and solvents.**

**Smooth nonstick surface resulting in the lowest coefficient of friction.**

**Low permeability.**

**Nonflammable materials.**

**FDA Compliant.**

**Weather resistant.**

### ***Benefits:***

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**No process contamination.**

**Excellent for flow monitoring systems.**

**Longer product life and less downtime.**

**Higher flow with no process contamination.**

**Useful in severe chemical and gas service.**

**Safety.**

**Useful in food applications.**

**Excellent for outdoor use in extreme conditions.**

### ***Specifications:***

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#### Materials:

Products in this catalog are manufactured using resins complying with ASTM D 3307 Type II Specification.

#### Flammability:

Listed VW-1 by the Underwriters' Laboratories, Inc. in their burning test classification for polymeric materials and passes the UL 83 vertical flame test. In a flame situation, PFA tubing resists combustion and does not promote flame spread.

#### FDA Compliance:

Most PFA resins qualify for use in contact with food in compliance with FDA regulation 21 CFR 177.1550, 175.300, 176.170, 176.180.

#### Pressure and Temperature Ranges:

-329° - 500° F (-200° -260° C) See pressure temperature chart for more information.

**PFA Tubing**

Part numbers below are for standard configurations. For complete part numbers and options for material, color, packaging, etc. refer to Part Number Matrix on page 2.

**Fractional Size Tubing**

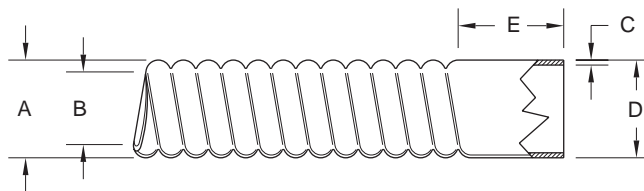
O.D.	Part Number	O.D. X I.D. X Wall Thickness	Nominal O.D.	O.D. Tolerance	Wall Tolerance	Working Pressure PSIG (bar)	Burst Pressure PSIG (bar)
3/32"	104-0094031-XXXXXX	3/32" X 1/32" X .031	.094	+/- .004	+/- .003	487 (33.6)	2,453 (169.1)
1/8"	104-0125031-XXXXXX	1/8" X 1/16" X .031	.125	+/- .004	+/- .003	369 (25.4)	1,859 (128.2)
5/32"	104-0156031-XXXXXX	5/32" X 3/32" X .031	.157	+/- .005	+/- .003	297 (20.5)	1,497 (103.2)
3/16"	104-0188031-XXXXXX 104-0188062-XXXXXX	3/16" X 1/8" X .031 3/16" X 1/16" X .062	.188	+/- .005	+/- .003	249 (17.1) 492 (33.9)	1,253 (86.4) 2,478 (170.9)
1/4"	104-0250031-XXXXXX 104-0250047-XXXXXX 104-0250062-XXXXXX	1/4" X 3/16" X .031 1/4" X 5/32" X .047 1/4" X 1/8" X .062	.250	+/- .005	+/- .003	190 (13.1) 286 (19.7) 380 (26.2)	945 (65.2) 1,443 (99.5) 1,889 (130.2)
5/16"	104-0313031-XXXXXX 104-0313062-XXXXXX	5/16" X 1/4" X .031 5/16" X 3/16" X .062	.313	+/- .005	+/- .003	150 (10.4) 303 (20.9)	758 (52.3) 1,525 (105.2)
3/8"	104-0375031-XXXXXX 104-0375062-XXXXXX	3/8" X 5/16" X .031 3/8" X 1/4" X .062	.375	+/- .005	+/- .003	125 (8.6) 260 (17.9)	633 (43.6) 1,280 (88.3)
7/16"	104-0438031-XXXXXX 104-0438062-XXXXXX	7/16" X 3/8" X .031 7/16" X 5/16" X .062	.438	+/- .005	+/- .003	108 (7.4) 219 (15.1)	543 (37.5) 1,102 (76.0)
1/2"	104-0500031-XXXXXX 104-0500062-XXXXXX	1/2" X 7/16" X .031 1/2" X 3/8" X .062	.500	+/- .006 +/- .005	+/- .003	95 (6.6) 195 (13.4)	476 (32.8) 968 (66.7)
9/16"	104-0562031-XXXXXX 104-0562062-XXXXXX	9/16" X 1/2" X .031 9/16" X 7/16" X .062	.562	+/- .006	+/- .003	84 (5.8) 171 (11.8)	424 (29.2) 862 (59.5)
5/8"	104-0625031-XXXXXX 104-0625062-XXXXXX	5/8" X 9/16" X .031 5/8" X 1/2" X .062	.625	+/- .006	+/- .003	75 (5.2) 160 (11.0)	381 (26.7) 778 (53.6)
11/16"	104-0688031-XXXXXX 104-0688062-XXXXXX	11/16" X 5/8" X .031 11/16" X 9/16" X .062	.688	+/- .006	+/- .003	69 (4.7) 141 (9.7)	347 (23.9) 708 (48.8)
3/4"	104-0750031-XXXXXX 104-0750062-XXXXXX	3/4" X 11/16" X .031 3/4" X 5/8" X .062	.750	+/- .006	+/- .003	68 (4.7) 132 (9.1)	318 (21.9) 650 (44.8)
.830	104-0830040-XXXXXX	.830 X 3/4" X .040	.830	+/- .006	+/- .003	76 (5.2)	381 (26.3)
7/8"	104-0875062-XXXXXX	7/8" X 3/4" X .062	.875	+/- .007	+/- .003	112 (7.7)	559 (38.5)
.965	104-0965045-XXXXXX	.965 X 7/8" X .045	.965	+/- .007	+/- .003	73 (5.1)	369 (25.5)
1"	104-1000062-XXXXXX	1" X 7/8" X .062	1.000	+/- .010	+/- .003	100 (6.9)	490 (33.8)
1.10	104-1100050-XXXXXX	1.10 X 1" X .050	1.100	+/- .007	+/- .004	58 (4.0)	294 (20.3)
1-1/8"	104-1125062-XXXXXX	1-1/8" X 1" X .062	1.125	+/- .015	+/- .004	87 (6.0)	436 (30.1)
1.205	104-1205040-XXXXXX	1.205 X 1-1/8" X .040	1.205	+/- .015	+/- .004	52 (3.6)	264 (18.2)
1-1/4"	104-1250062-XXXXXX	1-1/4" X 1-1/8" X .062	1.250	+/- .015	+/- .004	78 (5.4)	393 (27.1)
1.330	104-1330040-XXXXXX	1.330 X 1-1/4" X .040	1.330	+/- .015	+/- .004	47 (3.3)	239 (16.5)
1-3/8"	104-1375062-XXXXXX	1-3/8" X 1-1/4" X .062	1.375	+/- .015	+/- .004	71 (4.9)	357 (24.6)
1.580	104-1580040-XXXXXX	1.580 X 1-1/2" X .040	1.580	+/- .015	+/- .004	40 (2.8)	201 (13.9)
2-1/8"	104-2125062-XXXXXX	2-1/8" X 2" X .062	2.125	+/- .015	+/- .004	46 (3.2)	232 (16.0)

Working pressure calculated using a Safety Factor of 5. Please note that other manufacturers may use a Safety Factor of 4 when presenting their data. PFA Industrial Wall Tubing is supplied in 25 foot increments up to 1,000 feet continuous for most sizes. Custom packaging and sizes are available upon request.

## PFA Tubing and Convoluted Tubing

**Metric Size Tubing**

O.D.	Part Number	O.D. X I.D. mm	O.D. X I.D. Inch	O.D. / I.D. Tolerance mm	O.D. / I.D. Tolerance Inch
3	204-0300100-XXXXXX	3.0 X 1.0	.118 X .039	+/- .11	+/- .004
4	204-0400100-XXXXXX	4.0 X 2.0	.157 X .078	+/- .11	+/- .004
5	204-0500100-XXXXXX	5.0 X 3.0	.197 X .118	+/- .11	+/- .004
6	204-0600100-XXXXXX	6.0 X 4.0	.236 X .157	+/- .13	+/- .005
7	204-0700100-XXXXXX	7.0 X 5.0	.276 X .197	+/- .13	+/- .005
8	204-0800100-XXXXXX	8.0 X 6.0	.315 X .236	+/- .13	+/- .005
9	204-0900100-XXXXXX	9.0 X 7.0	.354 X .276	+/- .13	+/- .005
10	204-1000100-XXXXXX	10.0 X 8.0	.393 X .315	+/- .13	+/- .005
12	204-1200100-XXXXXX	12.0 X 10.0	.472 X .393	+/- .15	+/- .006
14	204-1400100-XXXXXX	14.0 X 12.0	.551 X .472	+/- .15	+/- .006
16	204-1600100-XXXXXX	16.0 X 14.0	.630 X .551	+/- .15	+/- .006

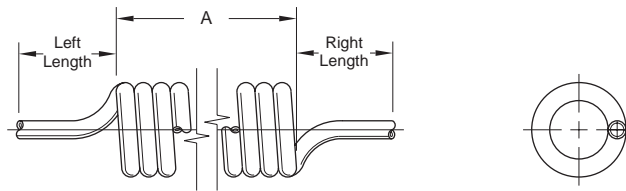
**Convoluted Tubing**

Part Number	Tubing O.D. X I.D. "A" X "B"	Wall Thickness "C"	Cuff O.D. "D"	Cuff Length "E"
304-0320015-XXXXXX	.320 X .181	.015	.280	3/4"
304-0414105-XXXXXX	.414 X .273	.105	.342	1"
304-0450020-XXXXXX	.450 X .303	.020	.415	1"
304-0590202-XXXXXX	.590 X .425	.202	.540	1"
304-0660025-XXXXXX	.660 X .485	.025	.675	1-1/4"
304-0780205-XXXXXX	.780 X .608	.205	.800	1-1/2"
304-1100030-XXXXXX	1.100 X .850	.030	1.060	2"

PFA Convoluted Tubing is made to order. Custom sizes, colors, packaging, and PTFE liners may also be available. Please consult factory.

## PFA Retractable Coils and Pipe

### Retractable Coils



Part Number	Tubing O.D. X I.D.	Coil I.D. Inch (mm)	Retracted Length "A" Inch (mm)	Extended Length Inch (mm)
704-0188062-XX0003	3/16" X 1/16"	.750 (19.1)	3 (76)	12 (305)
704-0188062-XX0006	3/16" X 1/16"	.750 (19.1)	6 (152)	24 (610)
704-0188062-XX0012	3/16" X 1/16"	.750 (19.1)	12 (305)	48 (1219)
704-0188062-XX0018	3/16" X 1/16"	.750 (19.1)	18 (457)	72 (1829)
704-0250062-XX0003	1/4" X 1/8"	1.00 (25.4)	3 (76)	12 (305)
704-0250062-XX0006	1/4" X 1/8"	1.00 (25.4)	6 (152)	24 (610)
704-0250062-XX0012	1/4" X 1/8"	1.00 (25.4)	12 (305)	48 (1219)
704-0250062-XX0018	1/4" X 1/8"	1.00 (25.4)	18 (457)	72 (1829)
704-0313062-XX0003	5/16" X 3/16"	1.625 (41.3)	3 (76)	12 (305)
704-0313062-XX0006	5/16" X 3/16"	1.625 (41.3)	6 (152)	24 (610)
704-0313062-XX0012	5/16" X 3/16"	1.625 (41.3)	12 (305)	48 (1219)
704-0313062-XX0018	5/16" X 3/16"	1.625 (41.3)	18 (457)	72 (1829)
704-0375062-XX0003	3/8" X 1/4"	1.625 (41.3)	3 (76)	12 (305)
704-0375062-XX0006	3/8" X 1/4"	1.625 (41.3)	6 (152)	24 (610)
704-0375062-XX0012	3/8" X 1/4"	1.625 (41.3)	12 (305)	48 (1219)
704-0375062-XX0015	3/8" X 1/4"	1.625 (41.3)	15 (381)	60 (1524)
704-0375062-XX0018	3/8" X 1/4"	1.625 (41.3)	18 (457)	72 (1829)
704-0438062-XX0003	7/16" X 5/16"	3.00 (76.2)	3 (76)	12 (305)
704-0438062-XX0006	7/16" X 5/16"	3.00 (76.2)	6 (152)	24 (610)
704-0438062-XX0012	7/16" X 5/16"	3.00 (76.2)	12 (305)	48 (1219)
704-0500062-XX0003	1/2" X 3/8"	3.00 (76.2)	3 (76)	12 (305)
704-0500062-XX0006	1/2" X 3/8"	3.00 (76.2)	6 (152)	24 (610)
704-0500062-XX0012	1/2" X 3/8"	3.00 (76.2)	12 (305)	(1219)

Standard left/right cuff length is 6 inches. Please consult factory for special cuff lengths.

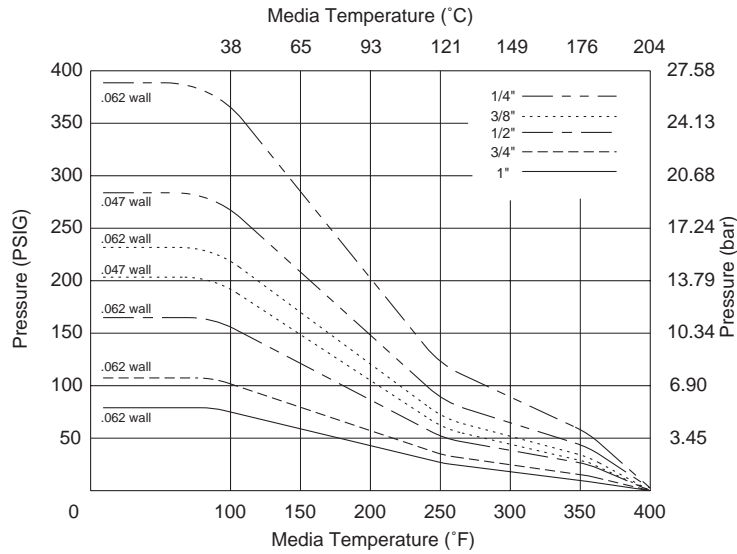
### Schedule 40 Pipe

Part Number	Nominal Inch Size	Actual O.D. Inch	Minimum Wall Inch	O.D. Tolerance Inch	Wall Tolerance Inch
504-0540088-XXXXXX	1/4"	.540	.088	+/- .010	+ .020 / -.00
504-0840109-XXXXXX	1/2"	.840	.109	+/- .010	+ .020 / -.00
504-1050113-XXXXXX	3/4"	1.050	.113	+/- .010	+ .020 / -.00
504-1315133-XXXXXX	1"	1.315	.133	+/- .015	+ .020 / -.00
504-2375154-XXXXXX	2"	2.375	.154	+/- .015	+ .020 / -.00

All pipe is supplied in 5 and 10 foot lengths as standard. Custom packaging, lengths, and schedule 80 pipe are available upon request. Please consult factory.

**PFA General Information**

**Pressure vs. Temperature Chart  
Standard Wall PFA Tubing  
Fractional Size**



**PFA Tubing Bend Radius Chart**

O.D.	I.D.	Wall Thickness	Minimum Bend Radius
1/8"	1/16"	.031	1/2"
1/4"	1/8"	.062	1/2"
1/4"	5/32"	.047	3/4"
1/4"	3/16"	.031	1"
5/16"	3/16"	.062	1/2"
5/16"	1/4"	.031	1-3/4"
3/8"	1/4"	.062	1"
3/8"	5/16"	.031	2-1/2"
1/2"	3/8"	.062	2"
1/2"	7/16"	.031	4"
5/8"	1/2"	.062	3"
5/8"	9/16"	.031	5-1/2"
3/4"	5/8"	.062	6"
3/4"	11/16"	.031	8"
7/8"	3/4"	.062	12"
1"	7/8"	.062	16"

## Introduction, FEP Tubing and Pipe

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### ***Product Overview:***

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Partek/Atlantic's line of FEP (Fluorinated Ethylene Propylene) tubing exhibits the highest clarity offered. This clarity makes this tubing ideal for flow monitoring applications. FEP also uses a high molecular weight resin that has the best stress crack resistance. It is also widely used in water purification systems due to its excellent transmission of UV light. FEP resin meets the FDA requirements for repeated food contact. The product is available in various sizes of tubing and pipe.

### ***Features:***

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**100% virgin FEP resin used on all products.**

**Most translucent Fluoropolymer available.**

**Chemically inert to nearly all industrial chemicals and solvents.**

**High abrasion resistance and thermal stability.**

**Low permeability.**

**Nonflammable materials.**

**FDA Compliant.**

### ***Benefits:***

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**Highest quality products.**

**Excellent for flow monitoring applications.**

**Longer product life and less downtime.**

**Useful in applications requiring thermal cycling.**

**Useful in severe chemical and gas service.**

**Safety.**

**Useful in food applications.**

### ***Specifications:***

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#### Materials:

FEP products in this catalog are manufactured using resins complying with ASTM D 3296-97 Specification.

Electrical insulation products conform to ASTM-D3295-97.

Round Beading conforms to ASTM-D1710.

FEP Heat Shrinkable Tubing conforms to Mil Spec DTL-23053/11.

#### Flammability:

Listed VW-1 by the Underwriters' Laboratories, Inc. in their burning test classification for polymeric materials and passes the UL 83 vertical flame test. In a flame situation, FEP tubing resists combustion and does not promote flame spread.

#### FDA Compliance:

Most FEP resins qualify for use in contact with food in compliance with FDA regulation 21 CFR 177.1500, 177.520, 177.2600, 176.180, 176.170, 175.300, 175.170, and 175.105.

#### Temperature Ranges:

-410° - 400° F (-246° -204° C)

**FEP Tubing**

Part numbers below are for standard configurations. For complete part numbers and options for material, color, packaging, etc. refer to Part Number Matrix on page 2.

**Fractional Size Tubing**

O.D.	Part Number	O.D. X I.D. X Wall Thickness	Nominal O.D.	O.D. Tolerance	Wall Tolerance	Working Pressure PSIG (bar)	Burst Pressure PSIG (bar)
3/32"	103-0094031-XXXXXX	3/32" X 1/32" X .031	.094	+/- .004	+/- .003	389 (26.8)	1,962 (135.3)
1/8"	103-0125031-XXXXXX	1/8" X 1/16" X .031	.125	+/- .004	+/- .003	295 (20.3)	1,487 (102.5)
5/32"	103-0156031-XXXXXX	5/32" X 3/32" X .031	.157	+/- .005	+/- .003	238 (16.4)	1,197 (82.6)
3/16"	103-0188031-XXXXXX 103-0188062-XXXXXX	3/16" X 1/8" X .031 3/16" X 1/16" X .062	.188	+/- .005	+/- .003	199 (13.7) 393 (27.1)	1,002 (69.1) 1,983 (136.7)
1/4"	103-0250031-XXXXXX 103-0250047-XXXXXX 103-0250062-XXXXXX	1/4" X 3/16" X .031 1/4" X 5/32" X .047 1/4" X 1/8" X .062	.250	+/- .005	+/- .003	150 (10.3) 229 (15.8) 300 (20.7)	756 (52.1) 1,154 (79.6) 1,511 (104.2)
5/16"	103-0313031-XXXXXX 103-0313062-XXXXXX	5/16" X 1/4" X .031 5/16" X 3/16" X .062	.313	+/- .005	+/- .003	120 (8.3) 242 (16.7)	606 (41.8) 1,220 (84.1)
3/8"	103-0375031-XXXXXX 103-0375062-XXXXXX	3/8" X 5/16" X .031 3/8" X 1/4" X .062	.375	+/- .005	+/- .003	100 (6.9) 210 (14.5)	506 (34.9) 1,024 (70.6)
7/16"	103-0438031-XXXXXX 103-0438062-XXXXXX	7/16" X 3/8" X .031 7/16" X 5/16" X .062	.438	+/- .005	+/- .003	86 (5.9) 175 (12.1)	435 (30.0) 882 (60.8)
1/2"	103-0500031-XXXXXX 103-0500062-XXXXXX	1/2" X 7/16" X .031 1/2" X 3/8" X .062	.500	+/- .006 +/- .005	+/- .003	75 (5.2) 160 (11.0)	381 (26.3) 774 (53.4)
9/16"	103-0562031-XXXXXX 103-0562062-XXXXXX	9/16" X 1/2" X .031 9/16" X 7/16" X .062	.562	+/- .006	+/- .003	67 (4.6) 137 (9.4)	339 (23.4) 690 (47.6)
5/8"	103-0625031-XXXXXX 103-0625062-XXXXXX	5/8" X 9/16" X .031 5/8" X 1/2" X .062	.625	+/- .006	+/- .003	60 (4.1) 125 (8.6)	305 (21.0) 622 (42.9)
11/16"	103-0688031-XXXXXX 103-0688062-XXXXXX	11/16" X 5/8" X .031 11/16" X 9/16" X .062	.688	+/- .006	+/- .003	55 (3.8) 112 (7.8)	278 (19.1) 567 (39.1)
3/4"	103-0750031-XXXXXX 103-0750062-XXXXXX	3/4" X 11/16" X .031 3/4" X 5/8" X .062	.750	+/- .006	+/- .003	54 (3.7) 105 (7.2)	255 (17.6) 520 (35.9)
.830	103-0830040-XXXXXX	.830 X 3/4" X .040	.830	+/- .006	+/- .003	61 (4.2)	305 (21.0)
7/8"	103-0875062-XXXXXX	7/8" X 3/4" X .062	.875	+/- .007	+/- .003	90 (6.2)	447 (30.8)
.965	103-0965045-XXXXXX	.965 X 7/8" X .045	.965	+/- .007	+/- .003	59 (4.0)	295 (20.4)
1"	103-1000062-XXXXXX	1" X 7/8" X .062	1.000	+/- .010	+/- .003	80 (5.5)	392 (27.0)
1.10	103-1100050-XXXXXX	1.10 X 1" X .050	1.100	+/- .010	+/- .004	47 (3.2)	235 (16.2)
1-1/8"	103-1125062-XXXXXX	1-1/8" X 1" X .062	1.125	+/- .015	+/- .003	69 (4.8)	349 (24.0)
1.205	103-1205040-XXXXXX	1.205 X 1-1/8" X .040	1.205	+/- .015	+/- .004	42 (2.9)	211 (14.5)
1-1/4"	103-1250062-XXXXXX	1-1/4" X 1-1/8" X .062	1.250	+/- .015	+/- .004	62 (4.3)	314 (21.7)
1.330	103-1330040-XXXXXX	1.330 X 1-1/4" X .040	1.330	+/- .015	+/- .004	38 (2.6)	191 (13.2)
1-3/8"	103-1375062-XXXXXX	1-3/8" X 1-1/4" X .062	1.375	+/- .015	+/- .004	57 (3.9)	286 (19.7)
2-1/8"	103-2125062-XXXXXX	2-1/8" X 2" X .062	2.125	+/- .015	+/- .004	37 (2.5)	186 (12.8)

Working pressure calculated using a Safety Factor of 5. Please note that other manufacturers may use a Safety Factor of 4 when presenting their data. FEP Tubing through 1" O.D. is supplied in random length coils, with a minimum coil length of 12 feet. Sizes over 1" O.D. are supplied in 5 or 10 foot straight lengths. Custom packaging and sizes are available upon request.

**Metric Size Tubing**

O.D.	Part Number	O.D. X I.D. mm	O.D. X I.D. Inch	O.D. / I.D. Tolerance mm	O.D. / I.D. Tolerance Inch
3	203-0300100-XXXXXX	3.0 X 1.0	.118 X .039	+/- .11	+/- .004
4	203-0400100-XXXXXX	4.0 X 2.0	.157 X .078	+/- .11	+/- .004
5	203-0500100-XXXXXX	5.0 X 3.0	.197 X .118	+/- .11	+/- .004
6	203-0600100-XXXXXX	6.0 X 4.0	.236 X .157	+/- .13	+/- .005
7	203-0700100-XXXXXX	7.0 X 5.0	.276 X .197	+/- .13	+/- .005
8	203-0800100-XXXXXX	8.0 X 6.0	.315 X .236	+/- .13	+/- .005
9	203-0900100-XXXXXX	9.0 X 7.0	.354 X .276	+/- .13	+/- .005
10	203-1000100-XXXXXX	10.0 X 8.0	.393 X .315	+/- .13	+/- .005
12	203-1200100-XXXXXX	12.0 X 10.0	.472 X .393	+/- .15	+/- .006
14	203-1400100-XXXXXX	14.0 X 12.0	.551 X .472	+/- .15	+/- .006
16	203-1600100-XXXXXX	16.0 X 14.0	.630 X .551	+/- .15	+/- .006

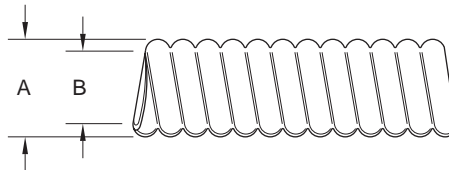
**AWG Spaghetti Tubing**

Size (AWG)	Nom. I.D.	Heavy Wall		Standard Wall		Thin Wall		Light Wall		Standard Packaging
		Part Number	Nom. Wall	Part Number	Nom. Wall	Part Number	Nom. Wall	Part Number	Nom. Wall	
24	.022	FPH 24	.016	FPS 24	.012	FPT 24	.010	FPL 24	.006	1,000 ft. spool
23	.026	FPH 23	.016	FPS 23	.012	FPT 23	.010	FPL 23	.006	1,000 ft. spool
22	.028	FPH 22	.016	FPS 22	.012	FPT 22	.010	FPL 22	.006	1,000 ft. spool
21	.032	FPH 21	.016	FPS 21	.012	FPT 21	.010	FPL 21	.006	1,000 ft. spool
20	.034	FPH 20	.018	FPS 20	.016	FPT 20	.012	FPL 20	.006	1,000 ft. spool
19	.038	FPH 19	.020	FPS 19	.016	FPT 19	.012	FPL 19	.006	1,000 ft. spool
18	.042	FPH 18	.020	FPS 18	.016	FPT 18	.012	FPL 18	.006	1,000 ft. spool
17	.048	FPH 17	.020	FPS 17	.016	FPT 17	.012	FPL 17	.006	1,000 ft. spool
16	.053	FPH 16	.020	FPS 16	.016	FPT 16	.012	FPL 16	.006	1000 ft. spool
15	.059	FPH 15	.020	FPS 15	.016	FPT 15	.012	FPL 15	.006	1000 ft. spool
14	.066	FPH 14	.020	FPS 14	.016	FPT 14	.012	FPL 14	.008	500 ft. spool
13	.076	FPH 13	.020	FPS 13	.016	FPT 13	.012	FPL 13	.008	500 ft. spool
12	.085	FPH 12	.020	FPS 12	.016	FPT 12	.012	FPL 12	.008	500 ft. spool
11	.095	FPH 11	.020	FPS 11	.016	FPT 11	.012	FPL 11	.008	500 ft. spool
10	.106	FPH 10	.025	FPS 10	.016	FPT 10	.012	FPL 10	.008	500 ft. spool
9	.118	FPH 9	.025	FPS 9	.020	FPT 9	.015	FPL 9	.008	500 ft. spool
8	.133	FPH 8	.030	FPS 8	.020	FPT 8	.015	FPL 8	.008	Random length coil
7	.148	FPH 7	.030	FPS 7	.020	FPT 7	.015	FPL 7	.008	Random length coil
6	.166	FPH 6	.030	FPS 6	.020	FPT 6	.015	FPL 6	.010	Random length coil

**FEP AWG Spaghetti, Convoluted, Shrink****AWG Spaghetti Tubing, cont.**

Size (AWG)	Nom. I.D.	Heavy Wall		Standard Wall		Thin Wall		Light Wall		Standard Packaging
		Part Number	Nom. Wall	Part Number	Nom. Wall	Part Number	Nom. Wall	Part Number	Nom. Wall	
5	.185	FPH 5	.032	FPS 5	.020	FPT 5	.015	FPL 5	.010	Random length coil
4	.208	FPH 4	.032	FPS 4	.020	FPT 4	.015	FPL 4	.010	Random length coil
3	.234	FPH 3	.032	FPS 3	.020	FPT 3	.015	FPL 3	.010	Random length coil
2	.263	FPH 2	.032	FPS 2	.020	FPT 2	.015	FPL 2	.010	Random length coil
1	.294	FPH 1	.032	FPS 1	.020	FPT 1	.015	FPL 1	.010	Random length coil
0	.330	FPH 0	.032	FPS 0	.020	FPT 0	.015	FPL 0	.012	Random length coil

FEP Spaghetti tubing is supplied in random length coils, with a minimum coil length of 12 feet. Custom packaging, lengths, and sizes are available upon request.

**Convoluted Tubing**

Part Number	Tubing O.D. X I.D. "A" X "B"	Wall Thickness	Pitch
303-0320015-XXXXXX	.320 X .181	.015	8
303-0414015-XXXXXX	.414 X .273	.015	8
303-0450020-XXXXXX	.450 X .303	.020	7
303-0590020-XXXXXX	.590 X .425	.020	6
303-0660025-XXXXXX	.660 X .485	.025	6
303-0780025-XXXXXX	.780 X .608	.025	6
303-1100030-XXXXXX	1.100 X .850	.030	4-1/2

**Fractional Heat Shrink Tubing (1.3:1)**

Size (inch)	Part Number	Minimum Expanded I.D.	Maximum Recovered I.D.	Wall Thickness Recovered	Wall Tolerance Recovered
3/8"	HS1.3FEP 3/8	.498	.383	.015	+/- .004
7/16"	HS1.3FEP 7/16	.580	.448	.020	+/- .004
1/2"	HS1.3FEP 1/2	.666	.510	.020	+/- .004
5/8"	HS1.3FEP 5/8	.830	.637	.025	+/- .004
3/4"	HS1.3FEP 3/4	1.000	.764	.030	+/- .004
7/8"	HS1.3FEP 7/8	1.170	.891	.035	+/- .004
1"	HS1.3FEP 1.00	1.330	1.020	.035	+/- .004

**FEP AWG Shrink, Pipe****AWG Heat Shrink Tubing (1.3:1)**

Size (inch)	Part Number	Minimum Expanded I.D.	Maximum Recovered I.D.	Wall Thickness Recovered	Wall Tolerance Recovered
24	HS1.3FEP 24	.031	.027	.008	+/- .002
22	HS1.3FEP 22	.036	.032	.008	+/- .002
20	HS1.3FEP 20	.045	.039	.008	+/- .002
18	HS1.3FEP 18	.060	.049	.008	+/- .002
16	HS1.3FEP 16	.075	.061	.009	+/- .002
14	HS1.3FEP 14	.092	.072	.009	+/- .002
12	HS1.3FEP 12	.115	.089	.009	+/- .002
10	HS1.3FEP 10	.141	.112	.010	+/- .003
9	HS1.3FEP 9	.158	.124	.010	+/- .003
8	HS1.3FEP 8	.180	.143	.010	+/- .003
7	HS1.3FEP 7	.197	.158	.011	+/- .004
6	HS1.3FEP 6	.225	.180	.011	+/- .004
5	HS1.3FEP 5	.248	.198	.011	+/- .004
4	HS1.3FEP 4	.290	.226	.011	+/- .004
3	HS1.3FEP 3	.310	.249	.011	+/- .004
2	HS1.3FEP 2	.365	.280	.012	+/- .004
1	HS1.3FEP 1	.400	.311	.012	+/- .004
0	HS1.3FEP 0	.440	.349	.012	+/- .004

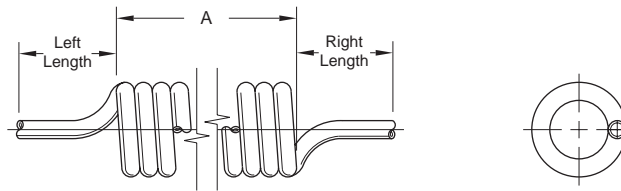
FEP Shrink Tubing is supplied in 4 foot lengths. Custom packaging, sizes, lengths, and colors are available upon request.

**Schedule 40 Pipe**

Part Number	Nominal Inch Size	Actual O.D. Inch	Minimum Wall Inch	O.D. Tolerance Inch	Wall Tolerance Inch
503-0540088-XXXXXX	1/4"	.540	.088	+/- .010	+ .020 / -.00
503-0840109-XXXXXX	1/2"	.840	.109	+/- .010	+ .020 / -.00
503-1050113-XXXXXX	3/4"	1.050	.113	+/- .010	+ .020 / -.00
503-1315133-XXXXXX	1"	1.315	.133	+/- .015	+ .020 / -.00
503-2375154-XXXXXX	2"	2.375	.154	+/- .015	+ .020 / -.00

All pipe is supplied in 5 and 10 foot lengths as standard. Custom packaging, lengths, and schedule 80 pipe are available upon request. Please consult factory.

## FEP Retractable Coils

**Retractable Coils**

Part Number	Tubing O.D. X I.D.	Coil I.D. Inch (mm)	Retracted Length "A" Inch (mm)	Extended Length Inch (mm)
703-0188062-XX0003	3/16" X 1/16"	.750 (19.1)	3 (76)	12 (305)
703-0188062-XX0006	3/16" X 1/16"	.750 (19.1)	6 (152)	24 (610)
703-0188062-XX0012	3/16" X 1/16"	.750 (19.1)	12 (305)	48 (1219)
703-0188062-XX0018	3/16" X 1/16"	.750 (19.1)	18 (457)	72 (1829)
703-0250062-XX0003	1/4" X 1/8"	1.00 (25.4)	3 (76)	12 (305)
703-0250062-XX0006	1/4" X 1/8"	1.00 (25.4)	6 (152)	24 (610)
703-0250062-XX0012	1/4" X 1/8"	1.00 (25.4)	12 (305)	48 (1219)
703-0250062-XX0018	1/4" X 1/8"	1.00 (25.4)	18 (457)	72 (1829)
703-0313062-XX0003	5/16" X 3/16"	1.625 (41.3)	3 (76)	12 (305)
703-0313062-XX0006	5/16" X 3/16"	1.625 (41.3)	6 (152)	24 (610)
703-0313062-XX0012	5/16" X 3/16"	1.625 (41.3)	12 (305)	48 (1219)
703-0313062-XX0018	5/16" X 3/16"	1.625 (41.3)	18 (457)	72 (1829)
703-0375062-XX0003	3/8" X 1/4"	1.625 (41.3)	3 (76)	12 (305)
703-0375062-XX0006	3/8" X 1/4"	1.625 (41.3)	6 (152)	24 (610)
703-0375062-XX0012	3/8" X 1/4"	1.625 (41.3)	12 (305)	48 (1219)
703-0375062-XX0015	3/8" X 1/4"	1.625 (41.3)	15 (381)	60 (1524)
703-0375062-XX0018	3/8" X 1/4"	1.625 (41.3)	18 (457)	72 (1829)
703-0438062-XX0003	7/16" X 5/16"	3.00 (76.2)	3 (76)	12 (305)
703-0438062-XX0006	7/16" X 5/16"	3.00 (76.2)	6 (152)	24 (610)
703-0438062-XX0012	7/16" X 5/16"	3.00 (76.2)	12 (305)	48 (1219)
703-0500062-XX0003	1/2" X 3/8"	3.00 (76.2)	3 (76)	12 (305)
703-0500062-XX0006	1/2" X 3/8"	3.00 (76.2)	6 (152)	24 (610)

Standard left/right tail length is 6 inches. Please consult factory for special length coils or tails.

**FEP General Information**


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*FEP Tubing Bend Radius Chart*

<i>O.D.</i>	<i>I.D.</i>	<i>Wall Thickness</i>	<i>Minimum Bend Radius</i>
1/8"	1/16"	.031	1/2"
1/4"	1/8"	.062	1/2"
1/4"	5/32"	.047	3/4"
1/4"	3/16"	.031	1"
5/16"	3/16"	.062	1/2"
5/16"	1/4"	.031	1-3/4"
3/8"	1/4"	.062	1"
3/8"	5/16"	.031	2-1/2"
1/2"	3/8"	.062	2"
1/2"	7/16"	.031	4"
5/8"	1/2"	.062	3"
5/8"	9/16"	.031	5-1/2"
3/4"	5/8"	.062	6"
3/4"	11/16"	.031	8"
7/8"	3/4"	.062	12"
1"	7/8"	.062	16"

## Introduction, PTFE Tubing

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### ***Product Overview:***

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Partek/Atlantic's line of PTFE (Polytetrafluoroethylene) tubing is the most flexible product offered. PTFE tubing resists corrosive liquids and gases, and has the broadest temperature range of all Fluoropolymer products. The tubing has a smooth non-stick surface with low permeability.

#### ***Features:***

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**100% virgin PTFE resin used on all products.**

**Most flexible Fluoropolymer available.**

**Chemically inert to nearly all industrial chemicals and solvents.**

**Smooth nonstick surface resulting in the lowest coefficient of friction.**

**Low permeability.**

**Nonflammable materials.**

**FDA Compliant.**

**Excellent electrical properties.**

#### ***Benefits:***

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**Highest quality products.**

**Longer lasting.**

**Longer product life and less downtime.**

**Higher abrasion resistance with no process contamination.**

**Useful in severe chemical and gas service.**

**Safety.**

**Useful in food applications.**

**Useful in insulation applications.**

#### ***Specifications:***

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##### Materials:

PTFE Products in this catalog are manufactured using resins complying with ASTM D 3295 Specification.

Electrical insulation products conform to ASTM-D3295-97.  
Round Beading conforms to ASTM-D1710.  
Spiral Cut Cable Wrap conforms to ASTM-D4895-98.

##### Flammability:

Listed VW-1 by the Underwriters' Laboratories, Inc. in their burning test classification for polymeric materials and passes the UL 83 vertical flame test. In a flame situation, PTFE tubing resists combustion and does not promote flame spread.

##### FDA Compliance:

Most PTFE resins qualify for use in contact with food in compliance with FDA regulation 21 CFR 177.1500, 177.520, 177.2600, 176.180, 176.170, 175.300, 175.170, and 175.105.

##### Temperature Ranges:

-410° - 500° F (-246° -260° C)

**PTFE Tubing**

Part numbers below are for standard configurations. For complete part numbers and options for material, color, packaging, etc. refer to Part Number Matrix on page 2.

**Fractional Size Tubing**

O.D.	Part Number	O.D. X I.D. X Wall Thickness	Nominal O.D.	O.D. Tolerance	Wall Tolerance	Working Pressure PSIG (bar)	Burst Pressure PSIG (bar)
3/32"	101-0094031-XXXXXX	3/32" X 1/32" X .031	.094	+/- .004	+/- .003	389 (26.8)	1,962 (135.3)
1/8"	101-0125031-XXXXXX	1/8" X 1/16" X .031	.125	+/- .004	+/- .003	295 (20.3)	1,487 (102.5)
5/32"	101-0156031-XXXXXX	5/32" X 3/32" X .031	.157	+/- .005	+/- .003	238 (16.4)	1,197 (82.6)
3/16"	101-0188031-XXXXXX 101-0188062-XXXXXX	3/16" X 1/8" X .031 3/16" X 1/16" X .062	.188	+/- .005	+/- .003	199 (13.7) 393 (27.1)	1,002 (69.1) 1,983 (136.7)
1/4"	101-0250031-XXXXXX 101-0250047-XXXXXX 101-0250062-XXXXXX	1/4" X 3/16" X .031 1/4" X 5/32" X .047 1/4" X 1/8" X .062	.250	+/- .005	+/- .003	150 (10.3) 229 (15.8) 300 (20.7)	756 (52.1) 1,154 (79.6) 1,511 (104.2)
5/16"	101-0313031-XXXXXX 101-0313062-XXXXXX	5/16" X 1/4" X .031 5/16" X 3/16" X .062	.313	+/- .005	+/- .003	120 (8.3) 242 (16.7)	606 (41.8) 1220 (84.1)
3/8"	101-0375031-XXXXXX 101-0375062-XXXXXX	3/8" X 5/16" X .031 3/8" X 1/4" X .062	.375	+/- .005	+/- .003	100 (6.9) 200 (13.8)	506 (34.9) 1,024 (70.6)
7/16"	101-0438031-XXXXXX 101-0438062-XXXXXX	7/16" X 3/8" X .031 7/16" X 5/16" X .062	.438	+/- .005	+/- .003	86 (5.9) 175 (12.1)	435 (30.0) 882 (60.8)
1/2"	101-0500031-XXXXXX 101-0500062-XXXXXX	1/2" X 7/16" X .031 1/2" X 3/8" X .062	.500	+/- .006 +/- .005	+/- .003	75 (5.2) 150 (10.3)	381 (26.3) 774 (53.4)
9/16"	101-0562031-XXXXXX 101-0562062-XXXXXX	9/16" X 1/2" X .031 9/16" X 7/16" X .062	.562	+/- .006	+/- .003	67 (4.6) 137 (9.4)	339 (23.4) 690 (47.6)
5/8"	101-0625031-XXXXXX 101-0625062-XXXXXX	5/8" X 9/16" X .031 5/8" X 1/2" X .062	.625	+/- .006	+/- .003	60 (4.1) 125 (8.6)	305 (21.0) 622 (42.9)
11/16"	101-0688031-XXXXXX 101-0688062-XXXXXX	11/16" X 5/8" X .031 11/16" X 9/16" X .062	.688	+/- .006	+/- .003	55 (3.8) 112 (7.8)	278 (19.1) 567 (39.1)
3/4"	101-0750031-XXXXXX 101-0750062-XXXXXX	3/4" X 11/16" X .031 3/4" X 5/8" X .062	.750	+/- .006	+/- .003	50 (3.4) 100 (6.9)	255 (17.6) 520 (35.9)
.830	101-0830040-XXXXXX	.830 X 3/4" X .040	.830	+/- .006	+/- .003	61 (4.2)	305 (21.7)
7/8"	101-0875062-XXXXXX	7/8" X 3/4" X .062	.875	+/- .007	+/- .003	90 (6.2)	447 (30.8)
.965	101-0965045-XXXXXX	.965 X 7/8" X .045	.965	+/- .007	+/- .003	59 (4.0)	295 (20.4)
1"	101-1000062-XXXXXX	1" X 7/8" X .062	1.000	+/- .010	+/- .003	80 (5.5)	392 (27.0)
1.10	101-1100050-XXXXXX	1.10 X 1" X .050	1.100	+/- .010	+/- .004	47 (3.2)	235 (16.7)
1.205	101-1205040-XXXXXX	1.205 X 1-1/8" X .040	1.205	+/- .015	+/- .004	42 (2.9)	211 (15.0)
1.330	101-1330040-XXXXXX	1.330 X 1-1/4" X .040	1.330	+/- .015	+/- .004	38 (2.6)	191 (13.2)
1.580	101-1580040-XXXXXX	1.580 X 1-1/2" X .040	1.580	+/- .015	+/- .004	32 (2.2)	161 (11.1)

Working pressure calculated using a Safety Factor of 5. Please note that other manufacturers may use a Safety Factor of 4 when presenting their data. PTFE Industrial Wall Tubing through 1" O.D. is supplied in random length coils, with a minimum coil length of 12 feet. Sizes over 1" O.D. are supplied in 5 or 10 foot straight lengths. Custom packaging and sizes are available upon request.

## PTFE Tubing

**Metric Size Tubing**

O.D.	Part Number	O.D. X I.D. mm	O.D. X I.D. Inch	O.D. / I.D. Tolerance mm	O.D. / I.D. Tolerance Inch
3	201-0300100-XXXXXX	3.0 X 1.0	.118 X .039	+/- .11	+/- .004
4	201-0400100-XXXXXX	4.0 X 2.0	.157 X .078	+/- .11	+/- .004
5	201-0500100-XXXXXX	5.0 X 3.0	.197 X 118	+/- .11	+/- .004
6	201-0600100-XXXXXX	6.0 X 4.0	.236 X .157	+/- .13	+/- .005
7	201-0700100-XXXXXX	7.0 X 5.0	.276 X .197	+/- .13	+/- .005
8	201-0800100-XXXXXX	8.0 X 6.0	.315 X .236	+/- .13	+/- .005
9	201-0900100-XXXXXX	9.0 X 7.0	.354 X .276	+/- .13	+/- .005
10	201-1000100-XXXXXX	10.0 X 8.0	.393 X .315	+/- .13	+/- .005
12	201-1200100-XXXXXX	12.0 X 10.0	.472 X .393	+/- .15	+/- .006
14	201-1400100-XXXXXX	14.0 X 12.0	.551 X .472	+/- .15	+/- .006
16	201-1600100-XXXXXX	16.0 X 14.0	.630 X .551	+/- .15	+/- .006

**Fractional Spaghetti Tubing**

Size (inch)	Nom. I.D.	Standard Wall		Thin Wall		Light Wall		Standard Packaging
		Part Number	Nom. Wall	Part Number	Nom. Wall	Part Number	Nom. Wall	
1/8"	.125	TFS 1/8	.020	TFT 1/8	.015	TFL 1/8	.008	Random length coil
3/16"	.188	TFS 3/16	.020	TFT 3/16	.015	TFL 3/16	.010	Random length coil
1/4"	.255	TFS 1/4	.020	TFT 1/4	.015	TFL 1/4	.010	Random length coil
5/16"	.318	TFS 5/16	.020	TFT 5/16	.015	TFL 5/16	.012	Random length coil
3/8"	.381	TFS 3/8	.025	TFT 3/8	.020	TFL 3/8	.015	Random length coil
7/16"	.444	TFS 7/16	.025	TFT 7/16	.020	TFL 7/16	.018	Random length coil
1/2"	.507	TFS 1/2	.025	TFT 1/2	.020	TFL 1/2	.018	Random length coil
5/8"	.632	TFS 5/8	.030	TFT 5/8	.025			Random length coil
3/4"	.760	TFS 3/4	.035	TFT 3/4	.030			Random length coil
7/8"	.885	TFS 7/8	.035					Random length coil
1"	1.010	TFS 100	.035					Straight 5' & 10' Length

PTFE Metric and Fractional Spaghetti Tubing except for 1" is supplied in random length coils, with a minimum coil length of 12 feet. 1" size is shipped in 5 and 10 foot lengths as standard. Custom packaging, sizes, and lengths are available upon request.

## PTFE Tubing

**AWG Spaghetti Tubing**

Size (AWG)	Nom. I.D.	Heavy Wall		Standard Wall		Thin Wall		Light Wall		Standard Packaging
		Part Number	Nom. Wall	Part Number	Nom. Wall	Part Number	Nom. Wall	Part Number	Nom. Wall	
32	.010					TFT 32	.007	TFL 32	.005	1,000 ft. spool
30	.012			TFS 30	.009	TFT 30	.009	TFL 30	.006	1,000 ft. spool
28	.015			TFS 28	.009	TFT 28	.009			1,000 ft. spool
26	.018			TFS 26	.010	TFT 26	.009	TFL 26	.006	1,000 ft. spool
24	.022	TFH 24	.016	TFS 24	.010	TFT 24	.010	TFL 24	.006	1,000 ft. spool
23	.026	TFH 23	.016	TFS 23	.010	TFT 23	.010	TFL 23	.006	1,000 ft. spool
22	.028	TFH 22	.016	TFS 22	.010	TFT 22	.010	TFL 22	.006	1,000 ft. spool
21	.032			TFS 21	.010	TFT 21	.010	TFL 21	.006	1,000 ft. spool
20	.034	TFH 20	.018	TFS 20	.012	TFT 20	.012	TFL 20	.006	1,000 ft. spool
19	.038	TFH 19	.020	TFS 19	.012	TFT 19	.012	TFL 19	.006	1,000 ft. spool
18	.042	TFH 18	.020	TFS 18	.012	TFT 18	.012	TFL 18	.006	1,000 ft. spool
17	.048	TFH 17	.020	TFS 17	.012	TFT 17	.012	TFL 17	.006	1,000 ft. spool
16	.053	TFH 16	.020	TFS 16	.012	TFT 16	.012	TFL 16	.006	1,000 ft. spool
15	.059	TFH 15	.020	TFS 15	.012	TFT 15	.012	TFL 15	.006	1,000 ft. spool
14	.066	TFH 14	.020	TFS 14	.012	TFT 14	.012	TFL 14	.008	500 ft. spool
13	.076	TFH 13	.020	TFS 13	.012	TFT 13	.012	TFL 13	.008	500 ft. spool
12	.085	TFH 12	.020	TFS 12	.012	TFT 12	.012	TFL 12	.008	500 ft. spool
11	.095	TFH 11	.020	TFS 11	.012	TFT 11	.012	TFL 11	.008	500 ft. spool
10	.106	TFH 10	.025	TFS 10	.012	TFT 10	.012	TFL 10	.008	500 ft. spool
9	.118	TFH 9	.025	TFS 9	.015	TFT 9	.015	TFL 9	.008	500 ft. spool
8	.133	TFH 8	.030	TFS 8	.015	TFT 8	.015	TFL 8	.008	Random length coil
7	.148	TFH 7	.030	TFS 7	.015	TFT 7	.015	TFL 7	.008	Random length coil
6	.166	TFH 6	.030	TFS 6	.015	TFT 6	.015	TFL 6	.010	Random length coil
5	.185	TFH 5	.032	TFS 5	.015	TFT 5	.015	TFL 5	.010	Random length coil
4	.208			TFS 4	.015	TFT 4	.015	TFL 4	.010	Random length coil
3	.234			TFS 3	.015	TFT 3	.015	TFL 3	.010	Random length coil
2	.263			TFS 2	.015	TFT 2	.015	TFL 2	.010	Random length coil
1	.294			TFS 1	.015	TFT 1	.015	TFL 1	.010	Random length coil
0	.330			TFS 0	.015	TFT 0	.015	TFL 0	.012	Random length coil

PTFE AWG Spaghetti Tubing is supplied in random length coils, with a minimum coil length of 12 feet. Custom packaging, sizes, lengths, and colors are available upon request.

**PTFE Heat Shrink Tubing****Fractional Heat Shrink Tubing (2:1), Industrial Wall**

Size (inch)	Part Number	Minimum Expanded I.D.	Maximum Recovered I.D.	Wall Thickness Recovered	Wall Tolerance Recovered
1/8"	HS2TFI 1/8	.166	.130	.030	+/- .005
3/16"	HS2TFI 3/16	.250	.193	.030	+/- .005
1/4"	HS2TFI 1/4	.333	.257	.030	+/- .005
5/16"	HS2TFI 5/16	.415	.320	.030	+/- .005
3/8"	HS2TFI 3/8	.498	.383	.030	+/- .005
7/16"	HS2TFI 7/16	.580	.448	.030	+/- .006
1/2"	HS2TFI 1/2	.666	.510	.030	+/- .006
9/16"	HS2TFI 9/16	.748	.572	.030	+/- .006
5/8"	HS2TFI 5/8	.830	.637	.030	+/- .006
11/16"	HS2TFI 11/16	.915	.700	.032	+/- .006
3/4"	HS2TFI 3/4	1.000	.764	.040	+/- .007
7/8"	HS2TFI 7/8	1.170	.891	.045	+/- .007
1"	HS2TFI 1.00	1.330	1.020	.050	+/- .008

**Fractional Heat Shrink Tubing (2:1), Standard Wall**

1/8"	HS2TFS 1/8	.215	.130	.020	+/- .004
1/4"	HS2TFS 1/4	.410	.260	.020	+/- .004
5/16"	HS2TFS 5/16	.470	.329	.020	+/- .004
3/8"	HS2TFS 3/8	.560	.399	.025	+/- .006
7/16"	HS2TFS 7/16	.655	.462	.025	+/- .006
1/2"	HS2TFS 1/2	.750	.524	.025	+/- .006
5/8"	HS2TFS 5/8	.930	.655	.030	+/- .006
3/4"	HS2TFS 3/4	1.125	.786	.035	+/- .008
7/8"	HS2TF 7/8	1.130	.911	.035	+/- .008
1"	HS2TFS 1.00	1.500	1.036	.035	+/- .008

**Fractional Heat Shrink Tubing (2:1), Thin Wall**

1/8"	HS2TFT 1/8	.215	.130	.015	+/- .003
1/4"	HS2TFT 1/4	.410	.260	.015	+/- .004
5/16"	HS2TFT 5/16	.470	.329	.015	+/- .004
3/8"	HS2TFT 3/8	.560	.399	.015	
7/16"	HS2TFT 7/16	.655	.462	.018	
1/2"	HS2TFT 1/2	.750	.524	.018	
5/8"	HS2TFT 5/8	.930	.655	.020	
3/4"	HS2TFT 3/4	1.125	.786	.025	
7/8"	HS2TFT 7/8	1.130	.911	.025	
1"	HS2TFT 1.00	1.500	1.036	.025	

**Fractional Heat Shrink Tubing (2:1), Light Wall**

1/8"	HS2TFL 1/8	.215	.130	.010	
1/4"	HS2TFL 1/4	.410	.260	.010	
5/16"	HS2TFL 5/16	.470	.329	.010	

PTFE Shrink Tubing is supplied in 4 foot lengths. Custom packaging, sizes, lengths, and colors are available upon request.

**PTFE Heat Shrink Tubing****AWG Heat Shrink Tubing (2:1), Standard Wall**

Size (inch)	Part Number	Minimum Expanded I.D.	Maximum Recovered I.D.	Wall Thickness Recovered	Wall Tolerance Recovered
30	HS2TFS 30	.034	.015	.009	+/- .002
28	HS2TFS 28	.038	.018	.009	+/- .002
26	HS2TFS 26	.046	.022	.009	+/- .002
24	HS2TFS 24	.050	.027	.012	+/- .002
22	HS2TFS 22	.055	.032	.012	+/- .002
20	HS2TFS 20	.060	.039	.016	+/- .003
19	HS2TFS 19	.065	.043	.016	+/- .003
18	HS2TFS 18	.076	.049	.016	+/- .003
17	HS2TFS 17	.085	.054	.016	+/- .003
16	HS2TFS 16	.093	.061	.016	+/- .003
15	HS2TFS 15	.110	.067	.016	+/- .003
14	HS2TFS 14	.120	.072	.016	+/- .003
13	HS2TFS 13	.140	.080	.016	+/- .003
12	HS2TFS 12	.150	.089	.016	+/- .003
11	HS2TFS 11	.170	.101	.016	+/- .003
10	HS2TFS 10	.191	.112	.016	+/- .003
9	HS2TFS 9	.205	.124	.020	+/- .004
8	HS2TFS 8	.240	.141	.020	+/- .004
7	HS2TFS 7	.270	.158	.020	+/- .004
6	HS2TFS 6	.302	.178	.020	+/- .004
5	HS2TFS 5	.320	.198	.020	+/- .004
4	HS2TFS 4	.370	.224	.020	+/- .004
3	HS2TFS 3	.390	.249	.020	+/- .004
2	HS2TFS 2	.430	.278	.020	+/- .004
1	HS2TFS 1	.450	.311	.020	+/- .004
0	HS2TFS 0	.470	.347	.020	+/- .004

**AWG Heat Shrink Tubing (2:1), Thin Wall**

30	HS2TFT 30	.034	.015	.009	+/- .002
28	HS2TFT 28	.038	.018	.009	+/- .002
26	HS2TFT 26	.046	.022	.009	+/- .003
24	HS2TFT 24	.050	.027	.010	+/- .002
22	HS2TFT 22	.055	.032	.010	+/- .003
20	HS2TFT 20	.060	.039	.012	+/- .003
19	HS2TFT 19	.065	.043	.012	+/- .003
18	HS2TFT 18	.076	.049	.012	+/- .003
17	HS2TFT 17	.085	.054	.012	+/- .003
16	HS2TFT 16	.093	.061	.012	+/- .003
15	HS2TF 15	.110	.067	.012	+/- .003
14	HS2TFT 14	.120	.072	.012	+/- .003
13	HS2TFT 13	.140	.080	.012	+/- .003

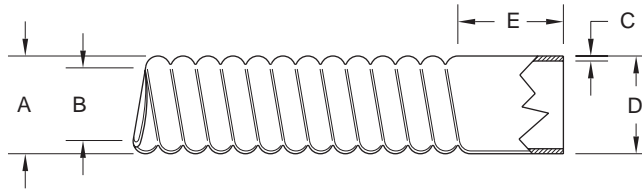
PTFE Shrink Tubing is supplied in 4 foot lengths. Custom packaging, sizes, lengths, and colors are available upon request.

**PTFE Heat Shrink Tubing****AWG Heat Shrink Tubing (2:1), Thin Wall, cont.**

Size (inch)	Part Number	Minimum Expanded I.D.	Maximum Recovered I.D.	Wall Thickness Recovered	Wall Tolerance Recovered
12	HS2TFT 12	.150	.089	.012	+/- .003
11	HS2TFT 11	.170	.101	.012	+/- .003
10	HS2TFT 10	.191	.112	.015	+/- .003
9	HS2TFT 9	.205	.124	.015	+/- .004
8	HS2TFT 8	.240	.141	.015	+/- .004
7	HS2TFT 7	.270	.158	.015	+/- .004
6	HS2TFT 6	.302	.178	.015	+/- .004
5	HS2TFT 5	.320	.198	.015	+/- .004
4	HS2TFT 4	.370	.224	.015	+/- .004
3	HS2TFT 3	.390	.249	.015	+/- .004
2	HS2TFT 2	.430	.278	.015	+/- .004
1	HS2TFT 1	.450	.311	.015	+/- .004
0	HS2TFT 0	.470	.347	.015	+/- .004

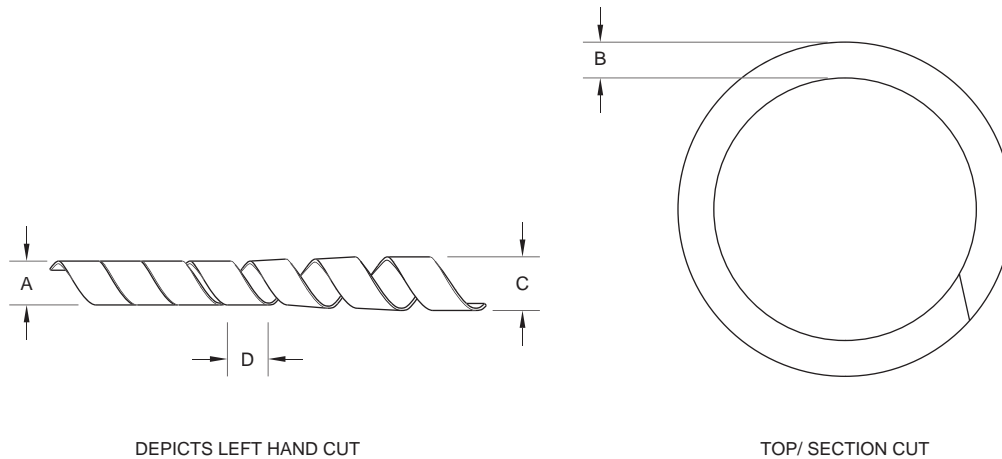
**AWG Heat Shrink Tubing (2:1), Light Wall**

30	HS2TFL 30	.034	.015	.006	+/- .002
28	HS2TFL 28	.038	.018	.006	+/- .002
26	HS2TFL 26	.046	.022	.006	+/- .002
24	HS2TFL 24	.050	.025	.006	+/- .002
22	HS2TFL 22	.055	.031	.006	+/- .002
20	HS2TFL 20	.060	.038	.006	+/- .002
19	HS2TFL 19	.065	.043	.006	+/- .002
18	HS2TFL 18	.076	.046	.006	+/- .002
17	HS2TFL 17	.085	.054	.006	+/- .002
16	HS2TFL 16	.093	.057	.006	+/- .002
15	HS2TFL 15	.110	.063	.006	+/- .002
14	HS2TFL 14	.120	.072	.008	+/- .002
13	HS2TFL 13	.140	.080	.008	+/- .002
12	HS2TFL 12	.150	.089	.008	+/- .002
11	HS2TFL 11	.170	.099	.008	+/- .002
10	HS2TFL 10	.191	.110	.008	+/- .002
9	HS2TFL 9	.205	.122	.008	+/- .002
8	HS2TFL 8	.240	.139	.008	+/- .002
7	HS2TFL 7	.270	.154	.010	+/- .003
6	HS2TFL 6	.302	.172	.010	+/- .003
5	HS2TFL 5	.320	.192	.010	+/- .003
4	HS2TFL 4	.370	.214	.010	+/- .003
3	HS2TFL 3	.390	.241	.010	+/- .003
2	HS2TFL 2	.430	.270	.010	+/- .003
1	HS2TFL 1	.450	.301	.010	+/- .003
0	HS2TFL 0	.470	.347	.012	+/- .003

**PTFE Heat Shrink & Convoluted Tubing*****Convoluted Tubing***

<i>Part Number</i>	<i>Tubing O.D. X I.D. "A" X "B"</i>	<i>Wall Thickness "C"</i>	<i>Cuff O.D. "D"</i>	<i>Cuff Length "E"</i>	<i>Pitch</i>
301-0320023-XXXXXX	.320 X .181	.023	.280	3/4"	8
301-0414027-XXXXXX	.414 X .273	.027	.342	1"	8
301-0450027-XXXXXX	.450 X .303	.027	.415	1"	8
301-0530029-XXXXXX	.530 X .364	.029	.477	1"	7
301-0590029-XXXXXX	.590 X .425	.029	.540	1"	7
301-0660029-XXXXXX	.660 X .485	.029	.675	1-1/4"	7
301-0780035-XXXXXX	.780 X .608	.035	.800	1-1/2"	7
301-0975035-XXXXXX	.975 X .730	.035	.925	1-1/2"	6
301-1100035-XXXXXX	1.100 X .850	.035	1.060	2"	6

PTFE Convoluted Tubing is made to order. Custom packaging, sizes, and colors are available upon request. Additional charges may apply for custom cuffs.

**PTFE Spiral Cut Cable Wrap & Beading****Spiral Cut Cable Wrap**

<i>Part Number</i>	<i>Size O.D. "A"</i>	<i>O.D. Tolerance</i>	<i>Wall Thickness "B"</i>	<i>Wall Tolerance</i>	<i>Pitch "D"</i>	<i>Pitch Tolerance</i>	<i>Maximum Bundle O.D. "C"</i>
401-0125020-XXXXXX	.125	+/- .005	.020	+/- .008	.212	+/- .015	1/2"
401-0188030-XXXXXX	.188	+/- .005	.030	+/- .008	.312	+/- .015	1"
401-0250030-XXXXXX	.250	+/- .005	.030	+/- .008	.375	+/- .015	2"
401-0375030-XXXXXX	.375	+/- .005	.030	+/- .008	.437	+/- .015	2-1/2"
401-0500030-XXXXXX	.500	+/- .006	.030	+/- .008	.562	+/- .015	3"
401-0750030-XXXXXX	.750	+/- .007	.032	+/- .008	.875	+/- .015	4"
401-1000040-XXXXXX	1.00	+/- .010	.040	+/- .008	1.000	+/- .015	6"

PTFE Spiral Cut Wrap is supplied in non-continuous spools. Drawing above depicts a left hand spiral cut. Product is available in left or right hand cut. Please specify with proper suffix at end of part number. Custom packaging, sizes, and colors are available upon request.

**Round Beading/Miniature Rod**

<i>Part Number</i>	<i>Diameter</i>	<i>Tolerance</i>	<i>Standard Packaging</i>
TFB 015	.015	+/- .002	1,000 ft. spool
TFB 020	.020	+/- .002	1,000 ft. spool
TFB 025	.025	+/- .002	1,000 ft. spool
TFB 028	.028	+/- .002	1,000 ft. spool
TFB 031	.031	+/- .002	1,000 ft. spool
TFB 035	.035	+/- .002	1,000 ft. spool
TFB 039	.039	+/- .002	1,000 ft. spool
TFB 043	.043	+/- .002	1,000 ft. spool
TFB 047	.047	+/- .002	1,000 ft. spool
TFB 050	.050	+/- .002	1,000 ft. spool

**PTFE Beading, General Information****Round Beading/Miniature Rod, cont.**

<i>Part Number</i>	<i>Diameter</i>	<i>Tolerance</i>	<i>Standard Packaging</i>
TFB 055	.055	+/- .003	1,000 ft. spool
TFB 060	.060	+/- .003	1,000 ft. spool
TFB 062	.062	+/- .003	1,000 ft. spool
TFB 070	.070	+/- .003	1,000 ft. spool
TFB 072	.072	+/- .003	1,000 ft. spool
TFB 078	.078	+/- .004	500 ft. spool
TFB 080	.080	+/- .004	500 ft. spool
TFB 084	.084	+/- .004	500 ft. spool
TFB 090	.090	+/- .004	500 ft. spool
TFB 094	.094	+/- .004	500 ft. spool
TFB 100	.100	+/- .004	500 ft. spool
TFB 109	.109	+/- .004	500 ft. spool
TFB 115	.115	+/- .004	500 ft. spool
TFB 125	.125	+/- .004	500 ft. spool
TFB 150	.150	+/- .004	500 ft. spool

PTFE Beading/Miniature Rod is supplied in non-continuous spool lengths as noted above. Custom packaging, sizes, and colors are available upon request.

<i>PTFE Tubing Bend Radius Chart</i>			
<i>O.D.</i>	<i>I.D.</i>	<i>Wall Thickness</i>	<i>Minimum Bend Radius</i>
1/8"	1/16"	.031	1/2"
1/4"	1/8"	.062	1/2"
1/4"	5/32"	.047	3/4"
1/4"	3/16"	.031	1"
5/16"	3/16"	.062	3/4"
5/16"	1/4"	.031	1-3/4"
3/8"	1/4"	.062	3/4"
3/8"	5/16"	.031	2-1/2"
1/2"	3/8"	.062	2-1/2"
1/2"	7/16"	.031	4"
5/8"	1/2"	.062	3"
5/8"	9/16"	.031	12"
3/4"	5/8"	.062	6"
3/4"	11/16"	.031	16"
7/8"	3/4"	.062	12"
1"	7/8"	.062	16"

## Introduction, MFA Tubing

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### ***Product Overview:***

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Partek/Atlantic's line of MFA (Polytetrafluoroethylene-perfluoromethylvinylether) tubing has the smoothest nonstick surface of all fluoropolymers offered. MFA is a semicrystalline thermoprocessable fluoropolymer ideal for high temperature and electrical insulation applications.

#### ***Features:***

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**100% virgin MFA resin used on all products.**

**Chemically inert to nearly all industrial chemicals and solvents.**

**Smoothest nonstick surface of all fluoropolymers available.**

**Low permeability.**

**Nonflammable materials.**

**Excellent electrical properties.**

#### ***Benefits:***

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**Highest quality products.**

**Longer product life and less downtime.**

**Provides fewer sites for bacterial growth and process contamination.**

**Useful in severe chemical and gas service.**

**Safety.**

**Useful in insulation applications.**

#### ***Specifications:***

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##### Materials:

MFA Products in this catalog are manufactured using resins complying with ASTM D 6314-98 Specification.

##### Flammability:

Listed VW-1 by the Underwriters' Laboratories, Inc. in their burning test classification for polymeric materials and passes the UL 83 vertical flame test. In a flame situation, PTFE tubing resists combustion and does not promote flame spread.

##### Temperature Ranges:

-329° - 482° F (-200° -250° C)

**MFA Tubing**

Part numbers below are for standard configurations. For complete part numbers and options for material, color, packaging, etc. refer to Part Number Matrix on page 2.

**MFA Size Tubing**

O.D.	Part Number	O.D. X I.D. X Wall Thickness	Nominal O.D.	O.D. Tolerance	Wall Tolerance	Working Pressure PSIG (bar)	Burst Pressure PSIG (bar)
1/8"	109-0125031-XXXXXX	1/8" X 1/16" X .031	.125	+/- .004	+/- .003	369 (25.4)	1,859 (128.2)
3/16"	109-0188031-XXXXXX 109-0188062-XXXXXX	3/16" X 1/8" X .031 3/16" X 1/16" X .062	.188	+/- .005	+/- .003	249 (17.1) 492 (33.9)	1,253 (86.4) 2,478 (170.9)
1/4"	109-0250031-XXXXXX 109-0250047-XXXXXX 109-0250062-XXXXXX	1/4" X 3/16" X .031 1/4" X 5/32" X .047 1/4" X 1/8" X .062	.250	+/- .005	+/- .003	190 (13.1) 286 (19.7) 380 (26.2)	945 (65.2) 1,443 (99.5) 1,889 (130.2)
5/16"	109-0313031-XXXXXX	5/16" X 1/4" X .031	.313	+/- .005	+/- .003	150 (10.4) 303 (20.9)	758 (52.3) 1,525 (105.2)
3/8"	109-0375031-XXXXXX 109-0375062-XXXXXX	3/8" X 5/16" X .031 3/8" X 1/4" X .062	.375	+/- .005	+/- .003	125 (8.6) 260 (17.9)	633 (43.6) 1,280 (88.3)
7/16"	109-0438031-XXXXXX	7/16" X 3/8" X .031	.438	+/- .005	+/- .003	108 (7.4) 219 (15.1)	543 (37.5) 1,102 (76.0)
1/2"	109-0500031-XXXXXX 109-0500062-XXXXXX	1/2" X 7/16" X .031 1/2" X 3/8" X .062	.500	+/- .006 +/- .005	+/- .003	95 (6.6) 195 (13.4)	476 (32.8) 968 (66.7)
9/16"	109-0562031-XXXXXX	9/16" X 1/2" X .031	.562	+/- .006	+/- .003	84 (5.8) 171 (11.8)	424 (29.2) 862 (59.5)
5/8"	109-0625031-XXXXXX	5/8" X 9/16" X .031	.625	+/- .006	+/- .003	75 (5.2) 160 (11.0)	381 (26.7) 778 (53.6)
11/16"	109-0688031-XXXXXX	11/16" X 5/8" X .031	.688	+/- .006	+/- .003	69 (4.7) 141 (9.7)	347 (23.9) 708 (48.8)
3/4"	109-0750031-XXXXXX 109-0750062-XXXXXX	3/4" X 11/16" X .031 3/4" X 5/8" X .062	.750	+/- .006	+/- .003	68 (4.7) 132 (9.1)	318 (21.9) 650 (44.8)
.830	109-0830040-XXXXXX	.830 X 3/4" X .040	.830	+/- .006	+/- .003	76 (5.2)	381 (26.3)
.965	109-0965045-XXXXXX	.965 X 7/8" X .045	.965	+/- .007	+/- .003	73 (5.1)	369 (25.5)
1"	109-1000062-XXXXXX	1" X 7/8" X .062	1.000	+/- .010	+/- .003	100 (6.9)	490 (33.8)
1.10	109-1100050-XXXXXX	1.10 X 1" X .050	1.100	+/- .010	+/- .004	58 (4.0)	294 (20.3)
1-1/8"	109-1125062-XXXXXX	1-1/8" X 1" X .062	1.125	+/- .015	+/- .003	87 (6.0)	436 (30.1)

Working pressure calculated using a Safety Factor of 5. Please note that other manufacturers may use a Safety Factor of 4 when presenting their data. MFA Industrial Wall Tubing is supplied in 25 foot increments up to 1,000 feet continuous for most sizes. Custom packaging and sizes are available upon request.

**MFA General Information***MFA Tubing Bend Radius Chart*

<i>O.D.</i>	<i>I.D.</i>	<i>Wall Thickness</i>	<i>Minimum Bend Radius</i>
1/8"	1/16"	.031	1/2"
1/4"	1/8"	.062	1/2"
1/4"	5/32"	.047	3/4"
1/4"	3/16"	.031	1"
5/16"	1/4"	.031	1-3/4"
3/8"	1/4"	.062	1"
3/8"	5/16"	.031	2-1/2"
1/2"	3/8"	.062	2"
1/2"	7/16"	.031	4"
5/8"	9/16"	.031	5-1/2"
3/4"	5/8"	.062	6"
3/4"	11/16"	.031	8"
1"	7/8"	.062	16"

**Introduction, ETFE Tubing**

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***Product Overview:***

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ETFE (Ethylene-tetrafluoroethylene) is a translucent Fluoropolymer resin. The low specific gravity of ETFE makes it ideal for aerospace and other applications where weight and durability are critical factors. ETFE will handle corrosive liquids or gases in applications where temperatures do not exceed 302°F. Partek/Atlantic manufactures tubing in a wide range of sizes.

***Features:***

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**Abrasion resistant.**

**100% virgin ETFE resin used on all products.**

**Good chemical resistance.**

**Low Permeability.**

**Weather resistant.**

**Low specific gravity with excellent durability.**

***Benefits:***

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**Excellent wear due to friction.**

**No process contamination.**

**Useful in most applications with long cycle life.**

**Useful in severe chemical and gas applications.**

**Excellent for outdoor use under extreme conditions.**

**Excellent for aerospace applications.**

***Specifications:***

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**Materials:**

Products in this catalog are manufactured using resins complying with ASTM-D-3159 Specification.

**Flammability:**

VO rated under Underwriters Laboratories Inc. burning test classification for polymeric materials and passes the UL 83 vertical flame test.

**FDA Compliance:**

ETFE resins are not FDA compliant. For compliant materials see PTFE, FEP, PFA, HP PFA, and PVDF sections in this catalog.

**Temperature Ranges:**

0° - 302° F (-18° -150° C)

**ETFE Tubing**

Part numbers below are for standard configurations. For complete part numbers and options for material, color, packaging, etc. refer to Part Number Matrix on page 2.

**Fractional Tubing**

O.D.	Part Number	O.D. X I.D. X Wall Thickness	Nominal O.D.	O.D. Tolerance	Wall Tolerance	Working Pressure PSIG (bar)	Burst Pressure PSIG (bar)
3/32"	112-0094031-XXXXXX	3/32" X 1/32" X .031	.094	+/- .004	+/- .003	912 (62.9)	4,599 (317.1)
1/8"	112-0125031-XXXXXX	1/8" X 1/16" X .031	.125	+/- .004	+/- .003	692 (47.7)	3,486 (240.3)
5/32"	112-0156031-XXXXXX	5/32" X 3/32" X .031	.157	+/- .005	+/- .003	557 (38.4)	2,806 (193.5)
3/16"	112-0188031-XXXXXX 112-0188062-XXXXXX	3/16" X 1/8" X .031 3/16" X 1/16" X .062	.188	+/- .005	+/- .003	466 (32.1) 922 (63.6)	2,349 (161.9) 4,647 (320.4)
1/4"	112-0250031-XXXXXX 112-0250047-XXXXXX 112-0250062-XXXXXX	1/4" X 3/16" X .031 1/4" X 5/32" X .047 1/4" X 1/8" X .062	.250	+/- .005	+/- .003	360 (24.8) 537 (37.0) 703 (48.4)	1,771 (122.1) 2,705 (186.5) 3,541 (244.1)
5/16"	112-0313031-XXXXXX 112-0313062-XXXXXX	5/16" X 1/4" X .031 5/16" X 3/16" X .062	.313	+/- .005	+/- .003	282 (19.4) 568 (39.1)	1,421 (98.0) 2,860 (197.2)
3/8"	112-0375031-XXXXXX 112-0375062-XXXXXX	3/8" X 5/16" X .031 3/8" X 1/4" X .062	.375	+/- .005	+/- .003	206 (14.1) 476 (32.8)	1,187 (81.8) 2,399 (165.4)
7/16"	112-0438031-XXXXXX	7/16" X 3/8" X .031	.438	+/- .005	+/- .003	202 (13.9)	1,019 (70.3)
1/2"	112-0500031-XXXXXX 112-0500062-XXXXXX	1/2" X 7/16" X .031 1/2" X 3/8" X .062	.500	+/- .006 +/- .005	+/- .003	155 (10.7) 360 (24.8)	893 (61.6) 1,814 (125.1)
9/16"	112-0562031-XXXXXX 112-0562062-XXXXXX	9/16" X 1/2" X .031 9/16" X 7/16" X .062	.562	+/- .006	+/- .003	158 (10.9) 321 (22.1)	794 (54.8) 1,617 (111.5)
5/8"	112-0625031-XXXXXX 112-0625062-XXXXXX	5/8" X 9/16" X .031 5/8" X 1/2" X .062	.625	+/- .006	+/- .003	142 (9.8) 253 (17.4)	715 (49.3) 1,459 (100.6)
11/16"	112-0688031-XXXXXX 112-0688062-XXXXXX	11/16" X 5/8" X .031 11/16" X 9/16" X .062	.688	+/- .006	+/- .003	129 (8.9) 264 (18.2)	651 (44.9) 1,328 (91.6)
3/4"	112-0750031-XXXXXX 112-0750062-XXXXXX	3/4" X 11/16" X .031 3/4" X 5/8" X .062	.750	+/- .006	+/- .003	110 (7.6) 242 (16.7)	597 (41.2) 1,219 (84.0)
.830	112-0830040-XXXXXX	.830 X 3/4" X .040	.830	+/- .006	+/- .003	142 (9.8)	715 (49.3)
7/8"	112-0875062-XXXXXX	7/8" X 3/4" X .062	.875	+/- .007	+/- .003	208 (14.3)	1,048 (72.3)
.965	112-0965045-XXXXXX	.965 X 7/8" X .045	.965	+/- .007	+/- .003	137 (9.5)	692 (47.7)
1"	112-1000062-XXXXXX	1" X 7/8" X .062	1.000	+/- .010	+/- .003	182 (12.6)	918 (63.3)
1.10	112-1100050-XXXXXX	1.10 X 1" X .050	1.100	+/- .010	+/- .004	109 (7.5)	551 (38.0)
1-1/8"	112-1125062-XXXXXX	1-1/8" X 1" X .062	1.125	+/- .015	+/- .004	162 (11.2)	817 (56.4)

Working pressure calculated using a Safety Factor of 5. Please note that other manufacturers may use a Safety Factor of 4 when presenting their data. ETFE Tubing is supplied in 25 foot increments up to 1000 feet continuous for most sizes. Custom packaging and sizes are available upon request.

**ETFE General Information**


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*ETFE Tubing Bend Radius Chart*

<i>O.D.</i>	<i>I.D.</i>	<i>Wall Thickness</i>	<i>Minimum Bend Radius</i>
1/8"	1/16"	.031	1/2"
1/4"	1/8"	.062	1/2"
1/4"	5/32"	.047	3/4"
1/4"	3/16"	.031	1"
5/16"	3/16"	.062	1/2"
5/16"	1/4"	.031	1-3/4"
3/8"	1/4"	.062	1-1/2"
3/8"	5/16"	.031	3-3/4"
1/2"	3/8"	.062	3"
1/2"	7/16"	.031	6"
5/8"	1/2"	.062	4-1/2"
5/8"	9/16"	.031	8-1/2"
3/4"	5/8"	.062	9"
3/4"	11/16"	.031	12"
7/8"	3/4"	.062	18"
1"	7/8"	.062	24"

## Introduction, PVDF Tubing and Pipe

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### ***Product Overview:***

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PVDF (Polyvinylidene Fluoride) is a tough engineering Fluoropolymer that offers a combination of properties beneficial for use in many critical applications requiring chemical resistance with low permeability. PVDF exhibits low extractable levels, while providing high mechanical strength, excellent abrasion resistance, and good resistance to many chemicals and solvents. Atlantic's PVDF tubing is excellent for use in ultra pure water systems and for ground water monitoring.

### ***Features:***

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**100% virgin PVDF resin used on all products.**

**Good chemical resistance.**

**Low permeability.**

**Weather resistant.**

**UV and radiation resistance.**

**High abrasion resistance and thermal stability.**

**FDA Compliant.**

### ***Benefits:***

---

**No process contamination.**

**Useful in most applications with long cycle life.**

**Useful in severe chemical and gas applications.**

**Excellent for outdoor use under extreme conditions.**

**Useful in severe applications.**

**Useful in thermal cycling applications.**

**Useful in food applications.**

### ***Specifications:***

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#### Materials:

Products in this catalog are manufactured using resins complying with ASTM D 3222 Specification.

#### Flammability:

Listed 94-VO rated by the Underwriters' Laboratories, Inc. in their burning test classification for polymeric materials and passes the UL 83 vertical flame test. In a flame situation, PVDF tubing resists combustion and does not promote flame spread.

#### FDA Compliance:

Most PVDF resins qualify for use in contact with food in compliance with FDA regulation 21 CFR 177.1500, 175.300, 176.170, 176.180, and 177.2610.

#### Temperature Ranges:

-20° - 250° F (-29° -121° C)

**PVDF Tubing**

Part numbers below are for standard configurations. For complete part numbers and options for material, color, packaging, etc. refer to Part Number Matrix on page 2.

**Fractional Tubing**

O.D.	Part Number	O.D. X I.D. X Wall Thickness	Nominal O.D.	O.D. Tolerance	Wall Tolerance	Working Pressure PSIG (bar)	Burst Pressure PSIG (bar)
1/8"	110-0125031-XXXXXX	1/8" X 1/16" X .031	.125	+/- .004	+/- .003	267 (18.4)	1,348 (92.9)
3/16"	110-0188031-XXXXXX	3/16" X 1/8" X .031	.188	+/- .005	+/- .003	180 (12.4)	908 (62.6)
1/4"	110-0250031-XXXXXX 110-0250047-XXXXXX 110-0250062-XXXXXX	1/4" X 3/16" X .031 1/4" X 5/32" X .047 1/4" X 1/8" X .062	.250	+/- .005	+/- .003	170 (11.7) 208 (14.3) 330 (22.7)	685 (47.2) 1,046 (72.1) 1,369 (94.4)
5/16"	110-0313031-XXXXXX 110-0313062-XXXXXX	5/16" X 1/4" X .031 5/16" X 3/16" X .062	.313	+/- .005	+/- .003	109 (7.5) 219 (15.1)	550 (37.9) 1,106 (76.3)
3/8"	110-0375031-XXXXXX 110-0375062-XXXXXX	3/8" X 5/16" X .031 3/8" X 1/4" X .062	.375	+/- .005	+/- .003	111 (7.6) 224 (15.4)	459 (31.6) 928 (64.0)
7/16"	110-0438031-XXXXXX	7/16" X 3/8" X .031	.438	+/- .005	+/- .003	78 (5.4)	394 (27.2)
1/2"	110-0500031-XXXXXX 110-0500062-XXXXXX	1/2" X 7/16" X .031 1/2" X 3/8" X .062	.500	+/- .006 +/- .005	+/- .003	83 (5.7) 169 (11.7)	345 (23.8) 701 (48.3)
9/16"	110-0562031-XXXXXX	9/16" X 1/2" X .031	.562	+/- .006	+/- .003	61 (4.2)	307 (21.2)
5/8"	110-0625062-XXXXXX	5/8" X 1/2" X .062	.625	+/- .006	+/- .003	136 (9.4)	564 (38.9)
3/4"	110-0750062-XXXXXX	3/4" X 5/8" X .062	.750	+/- .006	+/- .003	114 (7.9)	472 (32.5)
1"	110-1000062-XXXXXX	1" X 7/8" X .062	1.000	+/- .010	+/- .003	86 (5.9)	355 (24.5)
1-1/8"	110-1125062-XXXXXX	1-1/8" X 1" X .062	1.125	+/- .015	+/- .003	63 (4.3)	316 (21.8)

**Metric Tubing**

O.D.	Part Number	O.D. X I.D. mm	O.D. X I.D. Inch	O.D. / I.D. Tolerance mm	O.D. / I.D. Tolerance Inch
3	210-0300100-XXXXXX	3.0 X 1.0	.118 X .039	+/- .11	+/- .004
4	210-0400100-XXXXXX	4.0 X 2.0	.157 X .078	+/- .11	+/- .004
5	210-0500100-XXXXXX	5.0 X 3.0	.197 X .118	+/- .11	+/- .004
6	210-0600100-XXXXXX	6.0 X 4.0	.236 X .157	+/- .13	+/- .005
8	210-0800100-XXXXXX	8.0 X 6.0	.315 X .236	+/- .13	+/- .005
10	210-1000100-XXXXXX	10.0 X 8.0	.393 X .315	+/- .15	+/- .005
12	210-1200100-XXXXXX	12.0 X 10.0	.472 X .393	+/- .15	+/- .006
14	210-1400100-XXXXXX	14.0 X 12.0	.551 X .472	+/- .15	+/- .006

Working pressure calculated using a Safety Factor of 5. Please note that other manufacturers may use a Safety Factor of 4 when presenting their data. PVDF Tubing is supplied in 25 foot increments up to 1000 feet continuous for most sizes. Custom packaging and sizes are available upon request.

**PVDF Pipe, General Information****Schedule 40 Pipe**

<i>Part Number</i>	<i>Nominal Inch Size</i>	<i>Actual O.D. Inch</i>	<i>Minimum Wall Inch</i>	<i>O.D. Tolerance Inch</i>	<i>Wall Tolerance Inch</i>
510-0540088-XXXXXX	1/4"	.540	.088	+/- .004	+ .020 / -.00
510-0840109-XXXXXX	1/2"	.840	.109	+/- .004	+ .020 / -.00
510-1050113-XXXXXX	3/4"	1.050	.113	+/- .004	+ .020 / -.00
510-1315133-XXXXXX	1"	1.315	.133	+/- .005	+ .020 / -.00
510-2375154-XXXXXX	2"	2.375	.154	+/- .006	+ .020 / -.00

All pipe is supplied in 5 and 10 foot lengths as standard. Custom packaging, lengths, and schedule 80 pipe are available upon request. Please consult factory.

*PVDF Tubing Bend Radius Chart*

<i>O.D.</i>	<i>I.D.</i>	<i>Wall Thickness</i>	<i>Minimum Bend Radius</i>
1/8"	1/16"	.031	1/2"
1/4"	1/8"	.062	1/2"
1/4"	5/32"	.047	3/4"
1/4"	3/16"	.031	1"
5/16"	3/16"	.062	1/2"
5/16"	1/4"	.031	1-3/4"
3/8"	1/4"	.062	1-1/2"
3/8"	5/16"	.031	3-3/4"
1/2"	3/8"	.062	3"
1/2"	7/16"	.031	6"
5/8"	1/2"	.062	4-1/2"
3/4"	5/8"	.062	9"
3/4"	11/16"	.031	12"
1"	7/8"	.062	24"

## Offer of Sale

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**2. Payment:** Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

**3. Delivery:** Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

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**6. Changes, Reschedules and Cancellations:** Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

**7. Special Tooling:** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

**8. Buyer's Property:** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property, Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

**9. Taxes:** Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

**10. Indemnity For Infringement of Intellectual Property Rights:** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. Patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

**11. Force Majeure:** Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

**12. Entire Agreement/Governing Law:** The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

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