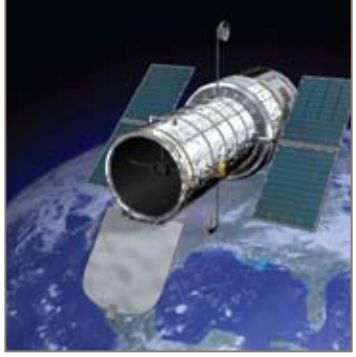
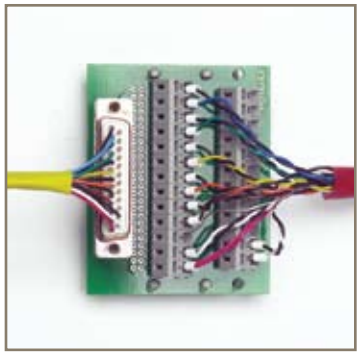


aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Fluoropolymer Extrusions

Electrical Insulation Products

Parker

TexLoc™

ENGINEERING YOUR SUCCESS.

Table of Contents

General Information

The Parflex Division, located in the combined operations of TexLoc and Atlantic Tubing, specializes in the development and extrusion of fluoroplastic tubing and heat shrink products (for fluid handling and electrical insulation applications). These products operate in applications from high temperatures up to 500°F (260°C) to cryogenic temperatures as low as -100°F (-75°C). Our extrusions are resistant to UV radiation and moisture and offer the lowest coefficient of friction of any material available. In fact, the quality engineered into our products makes them suitable for critical applications in the medical, instrumentation and semiconductor markets.

Some of the products in this catalog may require minimum quantities at time of order. However, any products can be custom engineered to fit your exact application. In addition, special sizes, profiles, cut lengths and minimum continuous lengths are also available upon request.

Additionally, all of our tubing products are made from resins and colors that are certified to be free of mercury, heavy metals and other materials that are restricted in accordance with the RoHS directive.

It is our business to serve your needs.

Parflex Division
Ravenna, Ohio

TexLoc Facility
Fort Worth, Texas

Smoothbore Tubing

Fluoropolymer tubing is ideal for insulation sleeving applications that require high-temperature resistance (withstands soldering), chemical and abrasion resistance, and UL or CSA recognition. Standard sizes are manufactured in natural and ten colors (per MIL-STD-104). All colors require minimum run quantities. Precision cutting is available at a minimum charge. High-speed rotary equipment yields excellent cut-length tolerances with clean, square ends. PTFE-cutpieces can be used as spacers, insulation for wire leads, or a protective outer layer in harsh chemical environments.




PTFE Fractional Tubing

Size (inch)	Nom ID	Standard Wall		Thin Wall		Light Wall		Standard Packaging
		Part Number	Nom Wall	Part Number	Nom Wall	Part Number	Nom Wall	
1/8"	.125	TFS1/8	.020	TFT1/8	.015	TFL1/8	.008	Random Length Coil
3/16"	.188	TFS3/16	.020	TFT3/16	.015	TFL3/16	.010	Random Length Coil
1/4"	.250	TFS1/4	.020	TFT1/4	.015	TFL1/4	.010	Random Length Coil
5/16"	.318	TFS5/16	.020	TFT5/16	.015	TFL5/16	.012	Random Length Coil
3/8"	.381	TFS3/8	.025	TFT3/8	.015	TFL3/8	.015	Random Length Coil
7/16"	.444	TFS7/16	.025	TFT7/16	.018	TFL7/16	.018	Random Length Coil
1/2"	.507	TFS1/2	.025	TFT1/2	.018	TFL1/2	.018	Random Length Coil
5/8"	.632	TFS5/8	.025	TFT5/8	.020			Random Length Coil
3/4"	.760	TFS3/4	.030	TFT3/4	.035			Random Length Coil
7/8"	.885	TFS7/8	.035					Random Length Coil
1"	1.010	TFS1.00	.035					Random Length Coil

Fractional tubing is supplied in random length coils, with a minimum coil length of 15 feet. Custom packaging, sizes and lengths are quoted upon request.

Specifications: Light Wall – ASTM D 3295, Class 1, AMS 3654; Thin Wall – ASTM D 3295, Class 2, AMS 3655; Standard Wall – ASTM D 3295, Class 3, AMS 3653

Parker TexLoc also offers Colortrax™ tubing for identification purposes. Colortrax™ offers positive identification of media lines without obstructing view and is available in sizes up to 1" O.D. with up to ten striping colors.

PTFE AWG Spaghetti Tubing

PTFE AWG Heavy Wall

Size (AWG)	Nom ID	Min ID	Max ID	Heavy Wall		Standard Packaging
				Part Number	Nom Wall	
24	.022	.020	.026	TFH24	.016 ± .003	1,000 ft. Spool
23	.026	.023	.029	TFH23	.016 ± .003	1,000 ft. Spool
22	.028	.025	.032	TFH22	.016 ± .003	1,000 ft. Spool
21	.032	.029	.035	TFH21	.016 ± .003	1,000 ft. Spool
20	.034	.032	.040	TFH20	.018 ± .003	1,000 ft. Spool
19	.038	.036	.044	TFH19	.020 ± .004	1,000 ft. Spool
18	.042	.040	.049	TFH18	.020 ± .004	1,000 ft. Spool
17	.048	.045	.054	TFH17	.020 ± .004	1,000 ft. Spool
16	.053	.051	.061	TFH16	.020 ± .004	1,000 ft. Spool
15	.059	.057	.067	TFH15	.020 ± .004	1,000 ft. Spool
14	.066	.064	.074	TFH14	.020 ± .004	500 ft. Spool
13	.076	.072	.082	TFH13	.020 ± .004	500 ft. Spool
12	.085	.081	.091	TFH12	.020 ± .004	500 ft. Spool
11	.095	.091	.101	TFH11	.020 ± .004	500 ft. Spool
10	.106	.102	.112	TFH10	.025 ± .005	500 ft. Spool
9	.118	.114	.124	TFH09	.025 ± .005	500 ft. Spool
8	.133	.129	.141	TFH08	.030 ± .005	Random Length Coil
7	.148	.144	.158	TFH07	.030 ± .005	Random Length Coil
6	.166	.162	.178	TFH06	.030 ± .005	Random Length Coil
5	.185	.182	.196	TFH05	.032 ± .005	Random Length Coil

Spaghetti tubing is supplied in random lengths with a minimum length of 25 feet. Continuous lengths and colors quoted upon request. AWG spaghetti tubing is also available in FEP and PFA. Consult factory for pricing and minimum lengths.

Specification: Heavy Wall – ASTM D 3295, Class 4

PTFE AWG Standard Wall

Size (AWG)	Nom ID	Min ID	Max ID	Standard Wall		Standard Packaging
				Part Number	Nom Wall	
30	.012	.010	.015	TFS30	.009 ± .002	1,000 ft. Spool
28	.015	.013	.018	TFS28	.009 ± .002	1,000 ft. Spool
26	.018	.016	.022	TFS26	.009 ± .002	1,000 ft. Spool
24	.022	.020	.026	TFS24	.012 ± .003	1,000 ft. Spool
23	.026	.023	.029	TFS23	.012 ± .003	1,000 ft. Spool
22	.028	.025	.032	TFS22	.012 ± .003	1,000 ft. Spool
21	.032	.029	.035	TFS21	.012 ± .003	1,000 ft. Spool
20	.034	.032	.040	TFS20	.016 ± .003	1,000 ft. Spool
19	.038	.036	.044	TFS19	.016 ± .003	1,000 ft. Spool
18	.042	.040	.049	TFS18	.016 ± .003	1,000 ft. Spool
17	.048	.045	.054	TFS17	.016 ± .003	1,000 ft. Spool
16	.053	.051	.061	TFS16	.016 ± .003	1,000 ft. Spool
15	.059	.057	.067	TFS15	.016 ± .003	1,000 ft. Spool
14	.066	.064	.074	TFS14	.016 ± .003	500 ft. Spool
13	.076	.072	.082	TFS13	.016 ± .003	500 ft. Spool
12	.085	.081	.091	TFS12	.016 ± .003	500 ft. Spool
11	.095	.091	.101	TFS11	.016 ± .003	500 ft. Spool
10	.106	.102	.112	TFS10	.016 ± .003	500 ft. Spool
9	.118	.114	.124	TFS09	.020 ± .004	500 ft. Spool
8	.133	.129	.141	TFS08	.020 ± .004	Random Length Coil
7	.148	.144	.158	TFS07	.020 ± .004	Random Length Coil
6	.166	.162	.178	TFS06	.020 ± .004	Random Length Coil
5	.185	.182	.196	TFS05	.020 ± .004	Random Length Coil
4	.208	.204	.224	TFS04	.020 ± .004	Random Length Coil
3	.234	.229	.249	TFS03	.020 ± .004	Random Length Coil
2	.263	.258	.278	TFS02	.020 ± .004	Random Length Coil
1	.294	.289	.311	TFS01	.020 ± .004	Random Length Coil
0	.330	.325	.347	TFS00	.020 ± .004	Random Length Coil

Spaghetti tubing is supplied in random lengths with a minimum length of 25 feet. Continuous lengths and colors quoted upon request. AWG spaghetti tubing is also available in FEP and PFA. Consult factory for pricing and minimum lengths.

Specifications: Standard Wall – ASTM D 3295, Class 3, AMS 3653, MIL-I-22129, UL-224 600V 200°C, CSA 9032-01 600V

PTFE AWG Thin Wall

Size (AWG)	Nom ID	Min ID	Max ID	Thin Wall		Standard Packaging
				Part Number	Nom Wall	
32	.010	.008	.012	TFT32	.007 ± .002	1,000 ft. Spool Only
30	.012	.010	.015	TFT30	.009 ± .002	1,000 ft. Spool
28	.015	.013	.018	TFT28	.009 ± .002	1,000 ft. Spool
26	.018	.016	.022	TFT26	.009 ± .002	1,000 ft. Spool
24	.022	.020	.026	TFT24	.010 ± .003	1,000 ft. Spool
23	.026	.023	.029	TFT23	.010 ± .003	1,000 ft. Spool
22	.028	.025	.032	TFT22	.010 ± .003	1,000 ft. Spool
21	.032	.029	.035	TFT21	.010 ± .003	1,000 ft. Spool
20	.034	.032	.040	TFT20	.012 ± .003	1,000 ft. Spool
19	.038	.036	.044	TFT19	.012 ± .003	1,000 ft. Spool
18	.042	.040	.049	TFT18	.012 ± .003	1,000 ft. Spool
17	.048	.045	.054	TFT17	.012 ± .003	1,000 ft. Spool
16	.053	.051	.061	TFT16	.012 ± .003	1,000 ft. Spool
15	.059	.057	.067	TFT15	.012 ± .003	1,000 ft. Spool
14	.066	.064	.074	TFT14	.012 ± .003	500 ft. Spool
13	.076	.072	.082	TFT13	.012 ± .003	500 ft. Spool
12	.085	.081	.091	TFT12	.012 ± .003	500 ft. Spool
11	.095	.091	.101	TFT11	.012 ± .003	500 ft. Spool
10	.106	.102	.112	TFT10	.012 ± .003	500 ft. Spool
9	.118	.114	.124	TFT09	.015 ± .003	500 ft. Spool
8	.133	.129	.141	TFT08	.015 ± .003	Random Length Coil
7	.148	.144	.158	TFT07	.015 ± .003	Random Length Coil
6	.166	.162	.178	TFT06	.015 ± .003	Random Length Coil
5	.185	.182	.196	TFT05	.015 ± .003	Random Length Coil
4	.208	.204	.224	TFT04	.015 ± .003	Random Length Coil
3	.234	.229	.249	TFT03	.015 ± .003	Random Length Coil
2	.263	.258	.278	TFT02	.015 ± .003	Random Length Coil
1	.294	.289	.311	TFT01	.015 ± .003	Random Length Coil
0	.330	.325	.347	TFT00	.015 ± .003	Random Length Coil

Spaghetti tubing is supplied in random lengths with a minimum length of 25 feet. Continuous lengths and colors quoted upon request. AWG spaghetti tubing is also available in FEP and PFA. Consult factory for pricing and minimum lengths.

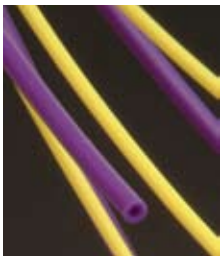
Specifications: Thin Wall – ASTM D 3295, Class 2, AMS 3655, UL-224 300V 200°C, CSA 9032-01 300V

PTFE AWG Light Wall

Size (AWG)	Nom ID	Min ID	Max ID	Light Wall		Standard Packaging
				Part Number	Nom Wall	
32	.010	.008	.012	TFL32	.005 ± .002	1,000 ft. Spool Only
30	.012	.010	.015	TFL30	.006 ± .002	1,000 ft. Spool
28	.015	.013	.018	TFL28	.006 ± .002	1,000 ft. Spool
26	.018	.016	.022	TFL26	.006 ± .002	1,000 ft. Spool
24	.022	.020	.026	TFL24	.006 ± .002	1,000 ft. Spool
23	.026	.023	.029	TFL23	.006 ± .002	1,000 ft. Spool
22	.028	.025	.032	TFL22	.006 ± .002	1,000 ft. Spool
21	.032	.029	.035	TFL21	.006 ± .002	1,000 ft. Spool
20	.034	.032	.040	TFL20	.006 ± .002	1,000 ft. Spool
19	.038	.036	.044	TFL19	.006 ± .002	1,000 ft. Spool
18	.042	.040	.049	TFL18	.006 ± .002	1,000 ft. Spool
17	.048	.045	.054	TFL17	.006 ± .002	1,000 ft. Spool
16	.053	.051	.061	TFL16	.006 ± .002	1,000 ft. Spool
15	.059	.057	.067	TFL15	.008 ± .002	1,000 ft. Spool
14	.066	.064	.074	TFL14	.008 ± .002	500 ft. Spool
13	.076	.072	.082	TFL13	.008 ± .002	500 ft. Spool
12	.085	.081	.091	TFL12	.008 ± .002	500 ft. Spool
11	.095	.091	.101	TFL11	.008 ± .002	500 ft. Spool
10	.106	.102	.112	TFL10	.008 ± .002	500 ft. Spool
9	.118	.114	.124	TFL09	.008 ± .002	500 ft. Spool
8	.133	.129	.141	TFL08	.008 ± .002	Random Length Coil
7	.148	.144	.158	TFL07	.008 ± .002	Random Length Coil
6	.166	.162	.178	TFL06	.010 ± .003	Random Length Coil
5	.185	.182	.196	TFL05	.010 ± .003	Random Length Coil
4	.208	.204	.224	TFL04	.010 ± .003	Random Length Coil
3	.234	.229	.249	TFL03	.010 ± .003	Random Length Coil
2	.263	.258	.278	TFL02	.010 ± .003	Random Length Coil
1	.294	.289	.311	TFL01	.012 ± .003	Random Length Coil
0	.330	.325	.347	TFL00	.012 ± .003	Random Length Coil

Spaghetti tubing is supplied in random lengths with a minimum length of 25 feet. Continuous lengths and colors quoted upon request. AWG spaghetti tubing is also available in FEP and PFA. Consult factory for pricing and minimum lengths.

Specifications: Light Wall – ASTM D 3295, Class 1, AMS 3654, UL-224, 150V 200°C



PTFE Round Beading/Miniature Rod

PTFE round beading/miniature rod is excellent as a filler in loose bundles of cables, as a pull cord, as o-ring seals, or cut into pieces as bearings and spacers. The smoother finish, greater flexibility, and longer lengths outperform "granular" extrusions.

PTFE Beading is a standard item but FEP or PFA extrusions are available. When supplied in FEP and PFA, this product works as a bonding agent, i.e. welding rod.

PTFE Round Beading/Miniature Rod

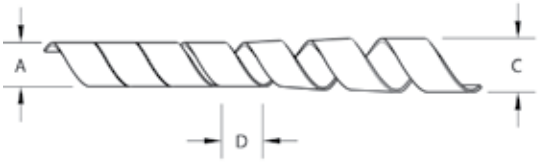
Part Number	Diameter	Tolerance	Standard Packaging
TFB015	.015	± .002	1,000 ft. Spool
TFB020	.020	± .002	1,000 ft. Spool
TFB025	.025	± .002	1,000 ft. Spool
TFB028	.028	± .002	1,000 ft. Spool
TFB031	.031	± .002	1,000 ft. Spool
TFB035	.035	± .002	1,000 ft. Spool
TFB039	.039	± .002	1,000 ft. Spool
TFB043	.043	± .002	1,000 ft. Spool
TFB047	.047	± .002	1,000 ft. Spool
TFB050	.050	± .002	1,000 ft. Spool
TFB055	.055	± .003	1,000 ft. Spool
TFB060	.060	± .003	1,000 ft. Spool
TFB062	.062	± .003	1,000 ft. Spool
TFB070	.070	± .003	1,000 ft. Spool
TFB072	.072	± .003	1,000 ft. Spool
TFB078	.078	± .004	500 ft. Spool
TFB080	.080	± .004	500 ft. Spool
TFB084	.084	± .004	500 ft. Spool
TFB090	.090	± .004	500 ft. Spool
TFB094	.094	± .004	500 ft. Spool
TFB100	.100	± .004	500 ft. Spool
TFB109	.109	± .004	500 ft. Spool
TFB115	.115	± .004	500 ft. Spool
TFB125	.125	± .004	Random Length
TFB150	.150	± .004	Random Length
TFB188	.188	± .004	Random Length

Round beading/miniature rod is supplied in non-continuous spool lengths as noted above. Custom packaging, sizes, and colors are quoted upon request.

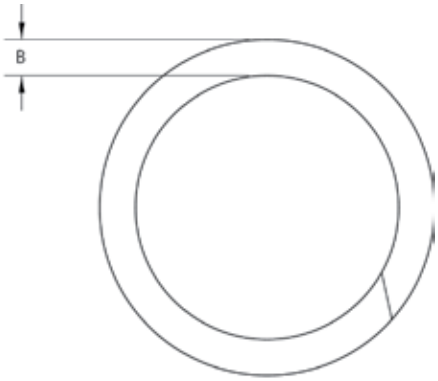
Specification: ASTM D1710, Type 1, Grade 1, Class B

PTFE Spiral Cut Cable Wrap

Fluoropolymer spiral cut cable wrap provides harnessing for wires and cable, while allowing for leads at various points. Ideal applications include cable harnessing, wiring closets, station wiring, fibre optic cabling, aerospace and automotive end uses. This product has a "VO" flammability rating and is excellent for bundling cables in plenum areas. It is also durable, flexible and has outstanding electrical properties. Spiral wrap is offered in both left- and right-hand cut, and natural/ten colors, which allows for color coding and identification.



DEPICTS RIGHT HAND CUT

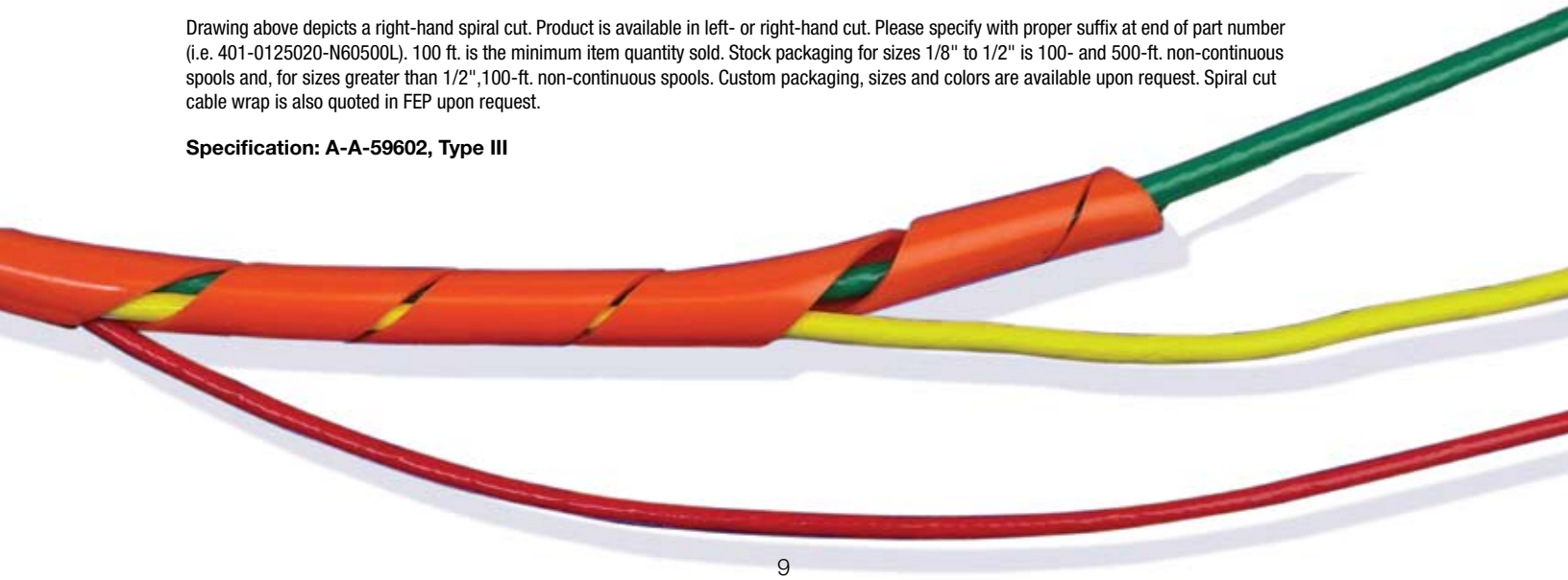


TOP SECTION CUT

Part Number	Size OD "A"	OD Tolerance	Wall "B"	Wall Tolerance	Pitch "D"	Pitch Tolerance	Max Bundle OD "C"
TSWTF-1/8-NT	.125	± .005	.020	± .008	.212	± .015	1/2"
TSWTF-3/16-NT	.188	± .005	.030	± .008	.312	± .015	1"
TSWTF-1/4-NT	.250	± .005	.030	± .008	.375	± .015	2"
TSWTF-3/8-NT	.375	± .005	.030	± .008	.437	± .015	2 1/2"
TSWTF-1/2-NT	.500	± .006	.030	± .008	.562	± .015	3"
TSWTF-3/4-NT	.750	± .007	.040	± .008	.875	± .015	4"
TSWTF-1.00-NT	1.000	± .010	.040	± .008	1.000	± .015	6"

Drawing above depicts a right-hand spiral cut. Product is available in left- or right-hand cut. Please specify with proper suffix at end of part number (i.e. 401-0125020-N60500L). 100 ft. is the minimum item quantity sold. Stock packaging for sizes 1/8" to 1/2" is 100- and 500-ft. non-continuous spools and, for sizes greater than 1/2",100-ft. non-continuous spools. Custom packaging, sizes and colors are available upon request. Spiral cut cable wrap is also quoted in FEP upon request.

Specification: A-A-59602, Type III



Heat Shrink Tubing

Fluoropolymer heat shrink products are excellent in corrosive environments. They are abrasive and shock resistant, flexible, and non-flammable. PTFE will withstand long-term exposure to temperatures in excess of 500°F. It is available in a 2:1 and 4:1 ratio, while FEP is available in a 1.3:1 and 1.6:1 ratio. However, FEP only operates in temperatures up to 400°F. All of the these products meet the industry standard AMS-DTL-23053 for the specified material, sizes and shrink ratio.

In addition, Parker TexLoc offers ETFE heat shrink with a shrink ratio of 1.5:1. This product is a non-standard and may require a minimum run quantity if not available from stock. However, it also meets the industry standard AMS-DTL-23053.

Other heat shrinkable products offered by Parker TexLoc are FEP large diameter Roll Covers, Double Shrink tubing and PFA heat shrink tubing. PFA heat shrink is a non-standard item.

FEP roll covers are available with a ratio of 1.25:1 and in sizes from 1/2" to 8" expanded ID.

Double Shrink tubing is used to protect cable assemblies from moisture. This product consists of an outer layer of PTFE Heat Shrink with an inner layer of FEP tubing that melts when heated. The FEP encapsulates wires and assemblies, thus creating a moisture barrier.

PFA heat shrink is used when you need the temperature range of PTFE and the clarity of FEP. PFA heat shrink is available with a 1.3/1 or 1.67/1 shrink ratio.

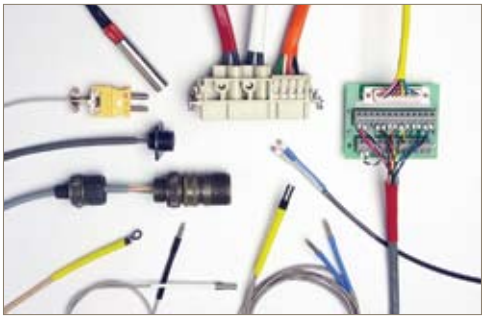
Standard Heat Shrink Products	Continuous Use Temperature	Shrink Temperature
PTFE H.S., 4:1 Shrink PTFE 2:1 H.S., Standard Wall – Insulation PTFE 2:1 H.S., Thin Wall – Insulation PTFE 2:1 H.S., Light Wall – Insulation PTFE 2:1 H.S., Fractional Insulation, SW & TW	-100 to 500°F/-75 to 260°C	662°F/350°C for 10/minutes
FEP H.S., 1.3:1 Shrink FEP H.S., 1.6:1 Shrink	-100 to 400°F/-75 to 231°C	1" Dia. and below – 410°F/210°C Over 1" Dia. – 430°F/221°C
FEP Roll Cover	-100 to 400°F/-75 to 231°C	347°F/175°C for 10/minutes
PTFE/FEP Double Shrink, (PTFE Outside-FEP Inside)	-100 to 450°F/-75 to 231°C	680°F/360°C
Custom H.S. Products	**Continuous Use Temperature**	**Shrink Temperature**
PTFE 2:1 H.S., Heavy Wall, Quoted on Request	-100 to 500°F/-75 to 260°C	662°F/350°C for 10/minutes
ETFE H.S., 1.5:1 Shrink, Quoted on Request	-100 to 302°F/-73 to 150°C	347°F/175°C for 10/minutes
PFA Heat Shrink, Quoted on Request	-100 to 500°F/-75 to 260°C	400°F/204°C for 10/minutes

PTFE Fractional Heat Shrink Tubing (2:1)

Size (Inch)	Min Expanded ID	Max Recovered ID	Standard Wall			Thin Wall			Light Wall		
			Mil Spec*	Part Number	Nom Rec. Wall	Mil Spec*	Part Number	Nom. Rec. Wall	Mil Spec*	Part Number	Nom. Rec. Wall
1/8"	.215	.130	-215	HS2TFS1/8	.020 ± .004	-319	HS2TFT1/8	.015 ± .003	-415	HS2TFL1/8	.008 ± .002
1/4"	.410	.260	-222	HS2TFS1/4	.020 ± .004	-326	HS2TFT1/4	.015 ± .004	-422	HS2TFL1/4	.010 ± .003
5/16"	.470	.329	-225	HS2TFS5/16	.020 ± .004	-329	HS2TFT5/16	.015 ± .004	-425	HS2TFL5/16	.012 ± .003
3/8"	.560	.399	-228	HS2TFS3/8	.025 ± .006		HS2TF 3/8	.015 ± .004			
7/16"	.655	.462	-229	HS2TFS7/16	.025 ± .006		HS2TFT7/16	.018 ± .004			
1/2"	.750	.524	-230	HS2TFS1/2	.025 ± .006		HS2TFT1/2	.018 ± .004			
5/8"	.930	.655	-231	HS2TFS5/8	.030 ± .006		HS2TF 5/8	.020 ± .004			
3/4"	1.125	.786	-232	HS2TFS3/4	.035 ± .008		HS2TFT3/4	.025 ± .004			
7/8"	1.130	.911	-233	HS2TFS7/8	.035 ± .008		HS2TFT7/8	.025 ± .004			
1"	.1.500	1.036	-234	HS2TFS1.00	.035 ± .008		HS2TFT1.00	.025 ± .004			

Continuous Operating Temperature: -100 to 500˚F/-75 to 260˚C. Dielectric Strength: ≥ 1,400 V/M*. PTFE Fractional Heat Shrink tubing is available in stock packaging of 4-ft. straight lengths. Minimum quantities may apply. Custom packaging, sizes, lengths and colors are quoted upon request.

Specifications: Standard Wall – AMS-DTL-23053/12, Class 2; Thin Wall – AMS-DTL-23053/12, Class 3; Light Wall – AMS-DTL-23053/12, Class 4



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

Size (inch)	Mil Spec*	Part Number	Minimum Expanded ID	Maximum Recovered ID	Nom. Recovered Wall	Wall Tolerance Recovered
1/8"	-101	HS2TFI1/8	.166	.130	.030	± .005
3/16"	-102	HS2TFI3/16	.250	.193	.030	± .005
1/4"	-103	HS2TFI1/4	.333	.257	.030	± .005
5/16"	-104	HS2TFI5/16	.415	.320	.030	± .005
3/8"	-105	HS2TFI3/8	.498	.383	.030	± .005
7/16"	-106	HS2TFI7/16	.580	.448	.030	± .006
1/2"	-107	HS2TFI1/2	.666	.510	.030	± .006
9/16"	-108	HS2TFI9/16	.748	.572	.030	± .006
5/8"	-109	HS2TFI5/8	.830	.637	.030	± .006
11/16"	-110	HS2TFI11/16	.915	.700	.032	± .006
3/4"	-111	HS2TFI3/4	1.000	.764	.040	± .007
7/8"	-112	HS2TFI7/8	1.170	.891	.045	± .007
1"	-113	HS2TFI1.00	1.330	1.020	.050	± .008

Continuous Operating Temperature: -100 to 500˚F/-75 to 260˚C. Dielectric Strength: ≥ 1,400 V/M*. PTFE Fractional Heat Shrink tubing is available in stock packaging of 4-ft. straight lengths. Minimum quantities may apply. Custom packaging, sizes, lengths and colors are quoted upon request.

Specification: AMS-DTL-23053/12, Class 1

*Per ASTM D 149 Short Term Test of 10 Mil Thickness (Volts/Mil)

PTFE AWG Heat Shrink Tubing

Standard Wall (2:1)

Size (AWG)	Min Exp ID	Max Rec ID	Standard Wall		
			Mil Spec*	Part Number	Nom. Rec. Wall
24	.050	.027	-201	HS2TFS24	.012 ± .002
22	.055	.032	-202	HS2TFS22	.012 ± .002
20	.060	.039	-203	HS2TFS20	.016 ± .003
19	.065	.043	-204	HS2TFS19	.016 ± .003
18	.076	.049	-205	HS2TFS18	.016 ± .003
17	.085	.054	-206	HS2TFS17	.016 ± .003
16	.093	.061		HS2TFS16	.016 ± .003
15	.110	.067	-207	HS2TFS15	.016 ± .003
14	.120	.072	-208	HS2TFS14	.016 ± .003
13	.140	.080	-210	HS2TFS13	.016 ± .003
12	.150	.089	-211	HS2TFS12	.016 ± .003
11	.170	.101	-212	HS2TFS11	.016 ± .003
10	.191	.112	-213	HS2TFS10	.016 ± .003
9	.205	.124	-214	HS2TFS09	.020 ± .004
8	.240	.141	-216	HS2TFS08	.020 ± .004
7	.270	.158	-217	HS2TFS07	.020 ± .004
6	.302	.178	-218	HS2TFS06	.020 ± .004
5	.320	.198	-219	HS2TFS05	.020 ± .004
4	.370	.224	-220	HS2TFS04	.020 ± .004
3	.390	.249	-221	HS2TFS03	.020 ± .004
2	.430	.278	-223	HS2TFS02	.020 ± .004
1	.450	.311	-224	HS2TFS01	.020 ± .004
0	.470	.347	-226	HS2TFS00	.020 ± .004

Continuous Operating Temperature: -100 to 500˚F/-75 to 260˚C. Dielectric Strength: ≥ 1,400 V/M*. Minimum quantities may apply. Custom packaging, sizes, lengths, and colors are quoted upon request.

Specifications: Standard Wall – AMS-DTL-23053/12, Class 2

Thin Wall (2:1)

Size (AWG)	Min Exp ID	Max Rec ID	Thin Wall		
			Mil Spec*	Part Number	Nom. Rec. Wall
30	.034	.015	-301	HS2TFT30	.009 ± .002
28	.038	.018	-302	HS2TFT28	.009 ± .002
26	.046	.022	-303	HS2TFT26	.010 ± .003
24	.050	.027	-304	HS2TFT24	.010 ± .002
22	.055	.032	-305	HS2TFT22	.012 ± .003
20	.060	.039	-306	HS2TFT20	.012 ± .003
19	.065	.043	-307	HS2TFT19	.012 ± .003
18	.076	.049	-308	HS2TFT18	.012 ± .003
17	.085	.054	-309-	HS2TFT17	.012 ± .003
16	.093	.061	310	HS2TFT16	.012 ± .003
15	.110	.067	-311	HS2TFT15	.012 ± .003
14	.120	.072	-312	HS2TFT14	.012 ± .003
13	.140	.080	-313	HS2TFT13	.012 ± .003
12	.150	.089	-314	HS2TFT12	.012 ± .003
11	.170	.101	-316	HS2TFT11	.012 ± .003
10	.191	.112	-317	HS2TFT10	.012 ± .003
9	.205	.124	-318	HS2TFT09	.015 ± .004
8	.240	.141	-320	HS2TFT08	.015 ± .004
7	.270	.158	-321	HS2TFT07	.015 ± .004
6	.302	.178	-322	HS2TFT06	.015 ± .004
5	.320	.198	-323	HS2TFT05	.015 ± .004
4	.370	.224	-324	HS2TFT04	.015 ± .004
3	.390	.249	-325	HS2TFT03	.015 ± .004
2	.430	.278	-327	HS2TFT02	.015 ± .004
1	.450	.311	-328	HS2TFT01	.015 ± .004
0	.470	.347	-330	HS2TFT00	.015 ± .004

Specifications: Standard Wall – AMS-DTL-23053/12, Class 3

Light Wall (2:1)

Size (AWG)	Min Exp ID	Max Rec ID	Light Wall		
			Mil Spec*	Part Number	Nom. Rec. Wall
24	.050	.025	-401	HS2TFL24	.006 ± .002
22	.055	.031	-402	HS2TFL22	.006 ± .002
20	.060	.038	-403	HS2TFL20	.006 ± .002
19	.065	.043	-404	HS2TFL19	.006 ± .002
18	.076	.046	-405	HS2TFL18	.006 ± .002
17	.085	.054	-406	HS2TFL17	.006 ± .002
16	.093	.057	-407	HS2TFL16	.006 ± .002
15	.110	.063	-408	HS2TFL15	.006 ± .002
14	.120	.072	-409	HS2TFL14	.008 ± .002
13	.140	.080	-410	HS2TFL13	.008 ± .002
12	.150	.089	-411	HS2TFL12	.008 ± .002
11	.170	.099	-412	HS2TFL11	.008 ± .002
10	.191	.110	-413	HS2TFL10	.008 ± .002
9	.205	.122	-414	HS2TFL09	.008 ± .002
8	.240	.139	-416	HS2TFL08	.008 ± .002
7	.270	.154	-417	HS2TFL07	.008 ± .002
6	.302	.172	-418	HS2TFL06	.010 ± .003
5	.320	.192	-419	HS2TFL05	.010 ± .003
4	.370	.214	-420	HS2TFL04	.010 ± .003
3	.390	.241	-421	HS2TFL03	.010 ± .003
2	.430	.270	-423	HS2TFL02	.010 ± .003
1	.450	.301	-424	HS2TFL01	.010 ± .003
0	.470	.347	-426	HS2TFL00	.012 ± .003

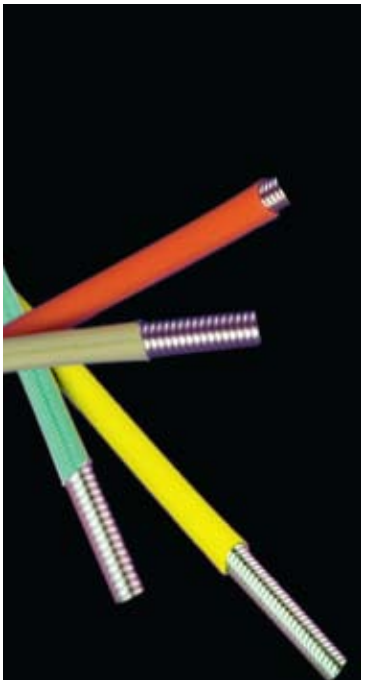
Specifications: Light Wall – AMS-DTL-23053/12, Class 4

PTFE Industrial Wall Heat Shrink Tubing (4:1)

Size (inch)	Mil Spec*	Part Number	Minimum Expanded ID	Maximum Recovered ID	Nom. Recovered Wall	Wall Tolerance Recovered
5/64"	-501	HS4TFI5/64	.078	.025	.009	± .002
1/8"	-502	HS4TFI1/8	.125	.037	.012	± .002
3/16"	-503	HS4TFI3/16	.187	.050	.012	± .002
1/4"	-504	HS4TFI1/4	.250	.063	.012	± .002
5/16"	-505	HS4TFI5/16	.312	.078	.012	± .002
3/8"	-506	HS4TFI3/8	.375	.096	.012	± .002
7/16"	-507	HS4TFI7/16	.438	.112	.012	± .002
1/2"	-508	HS4TFI1/2	.500	.144	.015	± .004
5/8"	-510	HS4TFI5/8	.625	.178	.015	± .004
3/4"	-512	HS4TFI3/4	.750	.224	.015	± .004
7/8"	-513	HS4TFI7/8	.875	.244	.015	± .004
1"	-514	HS4TFI1.00	1.000	.278	.015	± .004
1 1/4"	-515	HS4TFI1.25	1.250	.347	.015	± .004

Continuous Operating Temperature: -100 to 500˚F/-75 to 260˚C. Dielectric Strength: ≥ 1,400 V/M*. Heat Shrink tubing is supplied in 4-ft. straight lengths. Minimum quantities may apply. Custom packaging, sizes, lengths and colors are quoted upon request.

*Per ASTM D 149 Short Term Test of 10 Mil Thickness (Volts/Mil)



FEP AWG Heat Shrink Tubing (1.3:1)

Size (AWG)	Mil Spec*	Part Number	Minimum Expanded ID	Maximum Recovered ID	Nom. Recovered Wall	Wall Tolerance Recovered
24	-101	HS1.3FEP24	.031	.027	.008	± .002
22	-102	HS1.3FEP22	.036	.032	.008	± .002
20	-103	HS1.3FEP20	.045	.039	.008	± .002
18	-104	HS1.3FEP18	.060	.049	.008	± .002
16	-105	HS1.3FEP16	.075	.061	.009	± .002
14	-106	HS1.3FEP14	.092	.072	.009	± .002
12	-107	HS1.3FEP12	.115	.089	.009	± .002
10	-108	HS1.3FEP10	.141	.114	.010	± .003
9	-109	HS1.3FEP09	.158	.124	.010	± .003
8	-110	HS1.3FEP08	.180	.143	.010	± .003
7	-111	HS1.3FEP07	.197	.158	.011	± .004
6	-112	HS1.3FEP06	.225	.180	.011	± .004
5	-113	HS1.3FEP05	.248	.198	.011	± .004
4	-114	HS1.3FEP04	.290	.226	.011	± .004
3	-115	HS1.3FEP03	.310	.249	.011	± .003
2	-116	HS1.3FEP02	.365	.280	.012	± .004
1	-117	HS1.3FEP01	.400	.311	.012	± .004
0	-118	HS1.3FEP00	.440	.349	.012	± .004

Continuous Operating Temperature: -100 to 400˚F/-75 to 200˚C. Dielectric Strength: >2,000 V/M*. Heat Shrink tubing is supplied in 4-ft. straight lengths. Minimum quantities may apply. Custom packaging, sizes, lengths and colors are quoted upon request.

Specifications: AMS-DTL-23053/11, Class 1, also meets ASTM D2902 Type II

FEP Heat Shrink is easier to shrink than PTFE because of the lower shrinking temperature. However, FEP also has a lower operating temperature.

FEP Fractional Heat Shrink Tubing (1.3:1)

Size (inch)	Mil Spec*	Part Number	Minimum Expanded ID	Maximum Recovered ID	Nom. Recovered Wall	Wall Tolerance Recovered
3/8"	-119	HS1.3FEP3/8	.500	.383	.015	± .004
7/16"	-120	HS1.3FEP7/16	.580	.448	.020	± .004
1/2"	-121	HS1.3FEP1/2	.666	.510	.020	± .004
5/8"	-122	HS1.3FEP5/8	.830	.637	.025	± .004
3/4"	-123	HS1.3FEP3/4	1.000	.764	.030	± .004
7/8"	-124	HS1.3FEP7/8	1.170	.891	.035	± .004
1"	-126	HS1.3FEP1.00	1.330	1.020	.035	± .004
1-1/8"	-133	HS1.3FEP1.13	1.500	1.145	0.035	± .004
1-1/4"	-134	HS1.3FEP1.25	1.666	1.270	0.035	± .004
1-3/8"	-135	HS1.3FEP1.38	1.833	1.390	0.035	± .004
1-1/2"	-136	HS1.3FEP1.50	2.000	1.520	0.035	± .004

Continuous Operating Temperature: -100 to 400˚F/-75 to 200˚C, Dielectric Strength: ≥2,000 V/M*. Heat Shrink tubing is supplied in 4-ft. straight lengths. Minimum quantities may apply. Custom packaging, sizes, lengths and colors are quoted upon request.

Specifications: AMS-DTL-23053/11, Class1, also meets ASTM D2902 Type II

*Per ASTM D 149 Short Term Test of 10 Mil Thickness (Volts/Mil)

FEP Fractional Heat Shrink Tubing (1.6:1)

Size (inch)	Mil Spec*	Part Number	Minimum Expanded ID	Maximum Recovered ID	Nom. Recovered Wall	Wall Tolerance Recovered
3/32"	-201	HS1.6FEP3/32	.093	.056	.008	± .003
1/8"	-202	HS1.6FEP1/8	.125	.075	.010	± .003
3/16"	-203	HS1.6FEP3/16	.188	.115	.010	± .003
1/4"	-204	HS1.6FEP1/4	.250	.150	.010	± .003
3/8"	-205	HS1.6FEP3/8	.375	.225	.012	± .003
1/2"	-206	HS1.6FEP1/2	.500	.300	.015	± .004
3/4"	-207	HS1.6FEP3/4	.750	.450	.020	± .004
1"	-208	HS1.6FEP1.00	1.000	.600	.025	± .005
1 1/2"	-209	HS1.6FEP1.25	1.500	.900	.030	± .005
2"	-210	HS1.6FEP1.50	2.000	1.200	.030	± .005

Custom sizes and colors quoted upon request.

Continuous Operating Temperature: -100 to 400˚F/-75 to 200˚C. Dielectric Strength: ≥2,000 V/M*. Heat Shrink tubing is supplied in 4-ft. straight lengths. Minimum quantities may apply. Custom packaging, sizes, lengths and colors are quoted upon request.

Specification: AMS-DTL-23053/11, Class 2

FEP Roll Cover Heat Shrink (1.25:1)

Size (inch)	Part Number	Minimum Expanded ID	Maximum Recovered ID	Nom. Recovered Wall	Wall Tolerance Recovered
1/2"	HS1.25FEP1/2	.550	.440	.020	± .004
5/8"	HS1.25FEP5/8	.700	.540	.020	± .004
3/4"	HS1.25FEP3/4	.800	.640	.020	± .004
7.8"	HS1.25FEP7/8	.950	.760	.020	± .004
1"	HS1.25FEP1.00	1.100	.880	.020	± .004
1 1/4"	HS1.25FEP1.25	1.300	1.000	.020	± .004
1-1/2"	HS1.25FEP1.50	1.700	1.300	.020	± .004
2"	HS1.25FEP2.00	2.100	1.700	.020	± .004
2-1/4"	HS1.25FEP2.25	2.260	2.000	.020	± .004
2-1/2"	HS1.25FEP2.50	2.600	2.100	.020	± .004
3"	HS1.25FEP3.00	3.100	2.600	.020	± .004
3-1/2"	HS1.25FEP3.50	3.500	3.100	.020	± .004
4"	HS1.25FEP4.00	4.300	3.500	.020	± .004
5"	HS1.25FEP5.00	5.200	4.300	.020	± .004
6"	HS1.25FEP6.00	6.200	5.200	.020	± .004
7"	HS1.25FEP7.00	7.200	6.200	.020	± .004
8"	HS1.25FEP8.00	8.300	7.200	.020	± .004

Continuous Operating Temperature: -100 to 400˚F/-75 to 200˚C. Dielectric Strength: ≥ 2,000 V/M*. Roll Cover is supplied in 1- to 10-ft. straight lengths. Minimum quantities may apply. Custom packaging, sizes, lengths and colors are quoted upon request.

Specification: ASTM D2902 TYPE II

*Per ASTM D 149 Short Term Test of 10 Mil Thickness (Volts/Mil)

PTFE/FEP Double Shrink Tubing

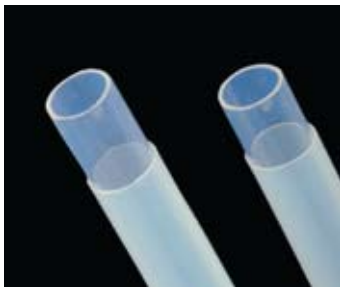
Part Number	Minimum Expanded ID	Maximum Recovered ID	Expanded Nominal Recovered Wall
Standard Wall			
TSSS036	.036	.000	.023
TSSS060	.060	.000	.028
TSSS130	.130	.000	.032
TSSS160	.160	.000	.032
TSSS190	.190	.061	.035
TSSS250	.250	.125	.035
TSSS350	.350	.190	.035
TSSS450	.450	.312	.055
TSSS700	.700	.440	.055
TSSS950	.950	.680	.065
Light Wall			
TSSL065	.065	.000	.015
TSSL115	.115	.045	.015
TSSL130	.130	.060	.015
TSSL180	.180	.065	.015
TSSL190	.190	.070	.015
TSSL240	.240	.150	.020
TSSL350	.350	.210	.025
TSSL480	.480	.315	.032
TSSL700	.700	.500	.040
TSSL1000	1.000	.700	.045

Continuous Operating Temperature: -100 to 450˚F/-75 to 231˚C. Heat Shrink tubing is supplied in 4-ft. straight lengths. Minimum quantities may apply. Custom packaging, sizes, lengths and colors are quoted upon request.

Double Shrink consists of an outer layer of PTFE Heat Shrink with an inner layer of FEP tubing. Double Shrink is especially effective for protecting cable assemblies from moisture.

Key Benefits:

- Protects cables, tubes and other objects
- Increases lubricity for easy sliding
- Almost universal chemical resistance
- Very low moisture absorption
- Good anti-stick/release surface possible



ETFE Heat Shrink offers increased abrasion resistance.

ETFE Industrial Wall Heat Shrink Tubing (1.5:1)

Size (inch)	Mil Spec*	Part Number	Minimum Expanded ID	Maximum Recovered ID	Nom. Recovered Wall	Wall Tolerance Recovered
3/32"	-001	HS1.5ETFE3/32	.093	.062	.010	± .003
1/8"	-002	HS1.5ETFE1/8	.125	.083	.010	± .002
3/16"	-003	HS1.5ETFE3/16	.188	.125	.011	± .003
1/4"	-004	HS1.5ETFE1/4	.250	.166	.013	± .003
3/8"	-005	HS1.5ETFE3/8	.375	.250	.013	± .003
1/2"	-006	HS1.5ETFE1/2	.500	.345	.013	± .003
3/4"	-007	HS1.5ETFE3/4	.750	.500	.018	± .004
1"	-008	HS1.5ETFE1.00	1.000	.665	.022	± .004
1 1/4"	-009	HS1.5ETFE1.25	1.250	.835	.030	± .004
1 1/2"	-010	HS1.5ETFE1.50	1.500	1.000	.030	± .004

Continuous Operating Temperature: -100 to 302˚F/-73 to 150˚C. Dielectric Strength: ≥1,400 V/M*. Heat Shrink tubing is supplied in 4-ft. straight lengths. Minimum quantities may apply. Custom packaging, sizes, lengths and colors are quoted upon request.

Specification: AMS-DTL-23053/14, Class 1

*Per ASTM D 149 Short Term Test of 10 Mil Thickness (Volts/Mil)

Convoluted Tubing

Convoluted tubing allows for insulation of wire bundles where sharp bends are required. Convoluted tubing is made to order. Custom sizes, colors, packaging, and PFA and ETFE convoluted tubing are quoted upon request. Parker TexLoc offers a wide variety of convoluted tubing such as Low Profile which offers larger ID to promote

additional flow or Heavy Wall Convoluted to aid in flaring or the attachment of fittings. The convoluted tubing on this page is normally used for Electrical Insulation applications where as some of the other convoluted tubing products may be more suited for Fluid Handling applications.

Convoluted Products	Continuous Use Temperature	Standard Color	Comment
AMS-DTL-81914/1 AMS-DTL-81914/2	-100° to 500°F/-75° to 260°C	Black/ Natural	PTFE - /1 is standard convolutions, /2 is close convolution.
AMS-DTL-81914/3 AMS-DTL-81914/4	-100° to 400˚F/-75° to 200˚C	Natural/ Clear	FEP /3 is standard convolutions, /4 is close convolution.
AMS-DTL-81914/5 AMS-DTL-81914/6	-148° to 348˚F/-100° to 176˚C	Natural/ Clear	ETFE - /6 is standard convolutions, /5 is close convolution.

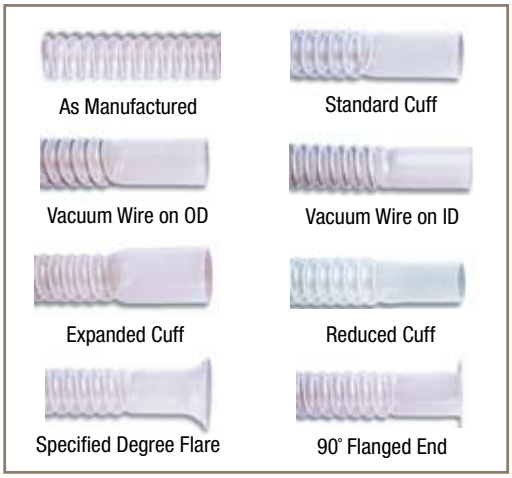
Convoluted product styles can be manufactured in PTFE, FEP, PFA, MFA and ETFE. All of these products are available with wire reinforcement on the inside or outside diameter.

PTFE convoluted can also be supplied as a fully conductive tube or with a conductive liner to dissipate static build up and reduce the risk of discharge or explosion. Colors are available on request.

Convoluted tubing is also available with a cuff on the end.

Additional Options

Close Convolutions
Reverse Convolutions
Custom Convolutions
Forming
Tube Slitting
Wire Reinforcement



Fluid Handling Convoluted **

Convo-Tex
Low Profile
Heavy Wall
Convo-Flex
Convo-Flon

** Located in Catalog 4150

PTFE Convoluted Tubing (AMS-DTL-81914/1)

(Standard tubing is black)

Part Number	MIL Spec*	Maximum Inside Diameter		Minimum Inside Diameter		Maximum Outside Diameter		Maximum Wall Thickness		Minimum Bend Radius		Pitch	Weight p/100 ft.	
		Inch	MM	Inch	MM	Inch	MM	Inch	MM	Inch	MM	±1	Lb.	Kg.
81914/1-1001-0TC	-01	.188	4.78	.181	4.60	.320	8.13	.023	.584	.500	13	8	2.0	2.98
81914/1-1002-0TC	-02	.281	7.14	.273	6.93	.414	10.5	.027	.686	.750	19	7.5	2.9	4.31
81914/1-1003-0TC	-03	.312	7.93	.303	7.70	.450	11.4	.027	.686	.875	22	7	3.6	5.36
81914/1-1004-0TC	-04	.375	9.53	.364	9.25	.530	13.5	.029	.737	1.00	25	7	4.2	6.25
81914/1-1005-0TC	-05	.437	11.1	.425	10.8	.590	15.0	.029	.737	1.25	32	7	4.9	7.29
81914/1-1006-0TC	-06	.500	12.7	.485	12.3	.660	16.8	.029	.737	1.50	38	7	5.2	7.74
81914/1-1007-0TC	-07	.625	15.9	.608	15.4	.780	19.9	.035	.889	1.75	44	7	6.9	10.3
81914/1-1008-0TC	-08	.750	19.1	.730	18.5	.975	24.8	.035	.889	1.88	48	6	10.4	15.5
81914/1-1009-0TC	--09	.875	22.2	.850	21.6	1.100	27.9	.035	.889	2.25	57	6	11.3	16.8
81914/1-1010-0TC	-10	1.000	25.4	.975	24.8	1.260	32.0	.035	.889	2.50	64	4.5	12.6	18.8
81914/1-1011-0TC	-11	1.125	28.6	1.10	27.9	1.390	35.3	.035	.889	2.75	70	4.5	13.8	20.5
81914/1-1012-0TC	-12	1.250	31.8	1.21	30.7	.539	39.1	.035	.889	3.00	76	4	15.5	23.1
81914/1-1013-0TC	-13	1.500	38.1	1.44	36.6	1.850	47.0	.040	1.02	3.75	95	4	21.7	32.3
81914/1-1014-0TC	-14	1.750	44.5	1.69	42.9	2.100	53.3	.045	1.14	4.25	108	4	25.3	37.6
81914/1-1015-0TC	-15	2.000	50.8	1.94	49.3	2.350	59.7	.045	1.14	4.75	121	4	29.0	43.2

Continuous Operating Temperature: -100 to 500˚F/-75 to 260˚C. PTFE convoluted tubing is provided in BLACK without cuffs direct from inventory. Natural and/or custom cuffs are quoted upon request. Natural part numbers are designated with “NT” after the Mil Spec number (i.e. 81914/1-1014-NT). Stock packaging is random coils.

Specifications: AMS-DTL-81914/1; additional sizes, including /2, are also available.

PTFE Convoluted is available as a Static-Dissipative Tubing. Contact Customer Service for more information.

FEP Convoluted Tubing (AMS-DTL-81914/3)

(Standard tubing is natural)

Part Number	MIL Spec*	Maximum Inside Diameter		Minimum Inside Diameter		Maximum Outside Diameter		Maximum Wall Thickness		Minimum Bend Radius		Pitch	Weight p/100 ft.	
		Inch	MM	Inch	MM	Inch	MM	Inch	MM	Inch	MM	±1	Lb.	Kg.
81914/3-1001-NT	-01	.187	4.75	.181	4.60	.320	8.13	.018	.457	.500	13	8	1.5	2.23
81914/3-1002-NT	-02	.281	7.14	.273	6.93	.414	10.5	.018	.457	.750	19	8	1.7	2.53
81914/3-1003-NT	-03	.312	7.93	.306	7.77	.450	11.4	.018	.457	.750	19	8	1.9	2.83
81914/3-1004-NT	-04	.375	9.53	.364	9.25	.510	13.0	.018	.457	.875	22	8	2.2	3.27
81914/3-1005-NT	-05	.437	11.1	.427	10.9	.571	14.5	.018	.457	.875	22	8	3.1	4.61
81914/3-1006-NT	-06	.500	12.7	.485	12.3	.650	16.5	.023	.584	1.25	32	7	4.0	5.95
81914/3-1007-NT	-07	.625	15.9	.608	15.4	.770	19.6	.023	.584	1.50	38	7	4.8	7.14
81914/3-1008-NT	-08	.750	19.1	.730	18.5	.930	23.6	.023	.584	1.75	44	6	6.1	9.07
81914/3-1009-NT	--09	.875	22.2	.860	21.8	1.073	27.3	.023	.584	2.00	51	5	7.0	10.4
81914/3-1010-NT	-10	1.000	25.4	.975	24.8	1.226	31.1	.023	.584	2.37	60	5	8.5	12.7
81914/3-1011-NT	-11	1.125	28.6	1.105	28.1	1.390	35.3	.023	.584	2.37	60	5	9.3	13.8
81914/3-1012-NT	-12	1.250	31.8	1.210	30.7	1.539	39.1	.023	.584	2.75	70	4	10.9	16.2
81914/3-1013-NT	-13	1.500	38.1	1.437	36.5	1.832	46.5	.023	.584	3.38	86	4	12.6	18.8
81914/3-1014-NT	-14	1.750	44.5	1.688	42.9	2.082	52.9	.023	.584	3.88	98	4	14.8	22.0
81914/3-1015-NT	-15	2.000	50.8	1.937	49.2	2.332	59.2	.023	.584	4.25	108	4	16.8	25.0

Continuous Operating Temperature: -100 to 400˚F/-75 to 200˚C, FEP convoluted tubing is provided in NATURAL without cuffs direct from inventory. Colors and/or custom cuffs are quoted upon request. Stock packaging is random coils.

Specifications: AMS-DTL-81914/3; additional sizes, including /4, are also available.

ETFE Convoluted Tubing (AMS-DTL-81914/5)

(Standard tubing is natural)

Part Number	MIL Spec*	Maximum Inside Diameter		Minimum Inside Diameter		Maximum Outside Diameter		Maximum Wall Thickness		Minimum Bend Radius		Pitch ±1		Weight p/100 ft.	
		Inch	MM	Inch	MM	Inch	MM	Inch	MM	Inch	MM	Class 1	Class 2	Lb.	Kg.
81914/5-1001-NT	-01	.188	4.77	.181	4.60	.320	8.13	.018	.457	.310	8	10	11	1.2	1.79
81914/5-1002-NT	-02	.281	7.14	.273	6.93	.414	10.5	.018	.457	.410	10	10	11	1.4	2.08
81914/5-1003-NT	-03	.312	7.93	.306	7.77	.450	11.4	.018	.457	.410	10	10	11	1.5	2.23
81914/5-1004-NT	-04	.375	9.53	.359	9.12	.510	13.0	.018	.457	.500	13	10	11	1.8	2.68
81914/5-1005-NT	-05	.437	11.1	.427	10.9	.571	14.5	.018	.457	.500	13	10	11	2.5	3.72
81914/5-1006-NT	-06	.500	12.7	.480	12.2	.650	16.5	.023	.584	.750	19	9	10	3.2	4.76
81914/5-1007-NT	-07	.625	15.9	.603	15.3	.770	19.6	.023	.584	.750	19	9	10	3.9	5.80
81914/5-1008-NT	-08	.750	19.1	.725	18.4	.930	23.6	.023	.584	.930	24	8	9	4.9	7.29
81914/5-1009-NT	--09	.875	22.2	.860	21.8	1.073	27.3	.023	.584	1.25	32	7	8	5.6	8.33
81914/5-1010-NT	-10	1.000	25.4	.970	24.6	1.226	31.1	.023	.584	1.25	32	7	8	6.8	10.12
81914/5-1011-NT	-11	1.125	28.6	1.105	28.1	1.390	35.3	.023	.584	1.43	36	7	8	7.5	11.16
81914/5-1012-NT	-12	1.250	31.8	1.205	30.6	1.539	39.1	.023	.584	1.43	36	6	7	8.8	13.09
81914/5-1013-NT	-13	1.500	38.1	1.437	36.5	1.832	46.5	.023	.584	1.75	44	5	6	10.2	15.18
81914/5-1014-NT	-14	1.750	44.5	1.688	42.9	2.082	52.9	.023	.584	2.00	51	5	6	11.9	17.71
81914/5-1015-NT	-15	2.000	50.8	1.937	49.2	2.332	59.2	.023	.584	2.25	57	5	6	13.5	20.01

Continuous Operating Temperature: -148 to 348˚F/-100 to 176˚C. ETFE convoluted tubing is provided in NATURAL without cuffs direct from inventory. Natural and/or custom cuffs are quoted upon request. Stock packaging is random coils.

Specifications: AMS-DTL-81914/5; additional sizes, including /6, are also available.

Property Comparison of Convoluted Tubing

Properties	PTFE	FEP	PFA	ETFE
Shore D Durometer Hardness	D50-65	D55	D55-D60	D75
Specific Gravity	2.17	2.15	2.15	1.70
Tensile Strength at Break (PSI)	3500	3400	3600	6200
Elongation at Break (%)	200-400	250-325	280-300	225-300
Min/Max Continuous Operating Temperature	-450° to 500°F/-235° to 260°C	-100° to 400°F/-75° to 205°C	-450° to 500°F/-235° to 260°C	-88° to 302°F/-67° to 150°C
Vacuum at Room Temp. – Every 2° rise in temperature [vacuum drops 1%]	*27" Hg at 72°F	*27" Hg at 72°F	*27" Hg at 72°F	*27" Hg at 72°F
Flammability	Non-flammable	Non-flammable	Non-flammable	Non-flammable

* Size 1/4" - 2"

Convoluted Tubing is available in colors.

Chemical Resistance Guidelines

Within normal use temperatures, fluoroplastics are attacked by so few chemicals that it is easier to describe the exceptions rather than list the chemicals with which TEXfluor® is compatible.

DO NOT USE FLUOROPLASTICS WITH THE FOLLOWING:

- Alkali metals such as elemental sodium, potassium, lithium, etc. The alkali metals remove fluorine from the polymer molecule.
- Extremely potent oxidizers, fluorine (F2) and related compounds (e.g., chlorine trifluoride, CIF3). These can be handled by TEXfluor®, but only with great care, as fluorine is absorbed into the resins, and the mixture becomes sensitive to a source of ignition such as impact.
- 80% NaOH (Sodium Hydroxide) or KOH (Potassium Hydroxide), metal hydrides such as Borances (e.g., B2H6), Aluminum Chloride, Ammonia (NH3), certain Amines (R-NH2) and imines (R=NH) and 70% Nitric Acid at temperatures near the suggested service limit.

Summary of Properties

The table below lists a generally accepted summary of properties that we believe to be reliable. Please note that many of these resins are produced in several varieties and property characteristics may vary. Therefore determination of resin is dependent on the application and this table is only meant to serve as a general guideline.

Property Comparison of Fluoropolymer Resins

Properties	ASTM or Unit	PTFE	FEP	PFA	ETFE
MECHANICAL PROPERTIES					
Specific Gravity	D792	2.13-2.20	2.12-2.17	2.12-2.17	1.70-1.76
Elongation %	D638	200-450	250-330	280-400	420-460
Tensile Strength (psi)	D638	2000-4500	2800-5000	4000-4500	6100-6800
Flexural Strength (psi)	D790	no break	no break	no break	5500
Compressive Strength (psi)	D695	3500	2200		2500
Tensile Elastic Modulus (Young's Modulus) (psi)	D638	57,000	50,000	72,500 87,000	85,000 95,000
Flexural Modulus (psi)	D790	71,000-85,000	78,000-92,000	94,000-99,000	128,000-171,000
Flexural Modulus 103MPa (103kgf/cm2)	D790	0.5-0.6 (5.0-6.0	0.5-0.6 5.5-6.5)	0.6-0.7 (6.6-7.0)	0.9-1.4 (9.0-14.0)
Flex Life MIT cycles)	D2176	>1,000,000	5,000- 80,000	10,000- 500,000	10,000- 27,000
Hardness Durometer Shore D	D636	50-65	55	55-60	75
Coefficient of Friction	(on steel)	0.02	0.05	0.2	0.06
Abrasion Resistance 1000 revs.	Taber	12	14-20	17-Sep	na
Impact Strength IZOD 73°F/23°C notched ft/lbs/in	D256	3	no break	no break	no break
THERMAL PROPERTIES					
Melting Point	°C	327	260	305	267
	(°F)	-621	-500	582)	-512
Upper Service Temperature(20000h)	°C	260	204	260	176
	(°F)	-500	-400	-500	-348
Flammability	UL 94	V-0	V-0	V-0	V-0
Thermal Conductivity BTU/hr/sq ft/deg F in		1.7	1.4	1.3	1.65
Thermal Conductivity Cal-cm/s-cm2, ºC		6 x 10-4	6 x 10-4	6 x 10-6	5.7 x 10-4
Linear Coefficient of Thermal Expansion	D696 10-5 ºC	>11.6	8.3-10.5	13	13
Heat of Fusion	BTU/LB	29-37	11	13	20
Heat of Combustion	BTU/LB	2200	2200	2300	8100
Low Temperature Embrittlement	°C	-268	-268	-268	-100
	(°F)	-450	-450	-450	-148
ELECTRICAL PROPERTIES					
Dielectric Constant	D150/103Hz	2.1	2.1	2.1	2.6
	D150/106Hz	2.1	2.1	2.1	2.6
Dielectric Strength	D149/125 MIL	500	500	500	na
	D149/10 MIL	>1400	>1400	>1400	1600
Volume Resistivity	D257/ohm-cm	>1018	>1018	>1018	>1016
Surface Resistivity	D257/ohm-cm	>1017	>1017	>1017	>1015
GENERAL PROPERTIES					
Chemical/Solvent Resistance	D543	Excellent	Excellent	Excellent	Excellent
Water Absorption 24h,%	D570	<0.01	<0.01	<0.03	<0.03
Deformation Under Load	*D621 100 ºC	5	5	2.4	5.4
Deformation Under Load	**D621 25 ºC	7	3	2.7	2.3
Refractive Index		1.35	1.338	1.34	1.4
Arc Resistivity, %		>300	>300	>300	75
sec	D495	>200	>300	>300	122
Limiting Oxygen Index, %	D2863	>95	>95	>95	31

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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 non infringing, 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.

9/91-P

Catalog 4155

Parker Hannifin Corporation
Parflex Division/Parker TexLoc
4700 Lone Star Blvd.
Fort Worth, TX 76106
phone 817 625 5081
fax 817 624 9095
www.texloc.com