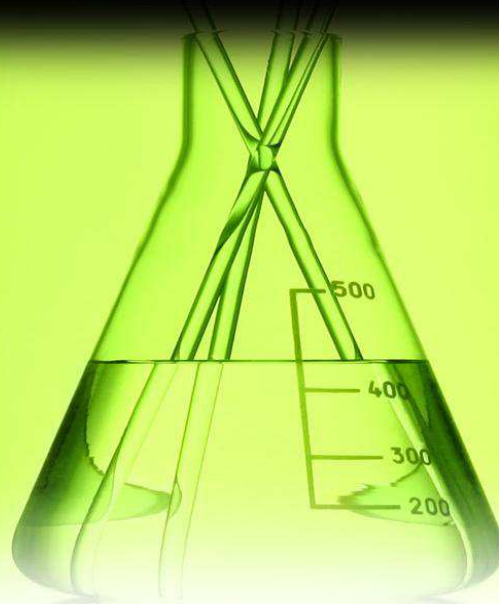




# High Performance FLUOROPOLYMER'S



Chemical



Electrical



Aero Space



Pharmaceutical



Semi - Conductor



Telecommunication

## *PRODUCT LINE*

### Fluoropolymer Tubing

- Extruded Teflon PTFE , FEP , PFA , UHP PFA & ETFE
- Convoluted PTFE , FEP & ETFE
- Corrugated FEP & PFA
- Spiral wrap
- PTFE Rod & Beading
- Retractable & Coiled Tubing

### Special Applications

- FEP Coated Copper
- Teflon Encapsulation
- Etching
- Flaring
- Slitting & Cuffing
- Thermosetting
- Product Assembly
- Custom Cutting

### Heat Shrinkable Fluoropolymer Tubing

- PTFE Tubing 2:1 & 4:1
- FEP Tubing 1.3:1 & 1.6:1
- FEP Roll Covers 1.25:1
- Dual Wall PTFE / FEP

### Heat Shrinkable Teflon Probe Covers

- Teflon FEP Probe Cover
- Teflon PFA Probe Cover

### Heat Shrinkable Polyolefin

- Single Wall 2:1 , 3:1 , 4:1
- Adhesive Lined 2:1 , 3:1
- Heavy Wall Lined



# Heat Shrinkable Fluoropolymer Tubing

Heat Shrinkable Fluoropolymer PTFE and FEP tubing from Tef Cap is designed to industry specifications such as MIL, UL, AMS & ASTM. Both Materials offer high temperature resistance, excellent dielectric strength, non flammable VW-1 rated and are chemically inert. Custom sizes are available for both PTFE and FEP materials.

## ***Standard Wall Heat Shrink PTFE 2:1***

AWG Size	Expanded ID	Recovered ID	Wall	Mil 23053/12-
30	.034	.015	.009 +/- .002	***
28	.038	.018	.009 +/- .002	***
26	.046	.022	.010 +/- .002	***
24	.050	.027	.012 +/- .002	201
22	.055	.032	.012 +/- .002	202
20	.060	.039	.016 +/- .003	203
19	.065	.043	.016 +/- .003	204
18	.076	.049	.016 +/- .003	205
17	.085	.054	.016 +/- .003	206
16	.093	.061	.016 +/- .003	***
15	.110	.067	.016 +/- .003	207
14	.120	.072	.016 +/- .003	208
13	.140	.080	.016 +/- .003	210
12	.150	.089	.016 +/- .003	211
11	.170	.101	.016 +/- .003	212
10	.191	.112	.016 +/- .003	213
9	.205	.124	.020 +/- .004	214
8	.240	.141	.020 +/- .004	216
7	.270	.158	.020 +/- .004	217
6	.302	.178	.020 +/- .004	218
5	.320	.198	.020 +/- .004	219
4	.370	.224	.020 +/- .004	220
3	.390	.249	.020 +/- .004	221
2	.430	.278	.020 +/- .004	223
1	.450	.311	.020 +/- .004	224
0	.470	.347	.020 +/- .004	226

## **Thin Wall Heat Shrink PTFE 2:1**

<b>AWG Size</b>	<b>Expanded ID</b>	<b>Recovered ID</b>	<b>Wall</b>	<b>Mil 23053/12-</b>
30	.034	.015	.009 +/- .002	301
28	.038	.018	.009 +/- .002	302
26	.046	.022	.010 +/- .002	303
24	.050	.027	.010 +/- .002	304
22	.055	.032	.012 +/- .003	305
20	.060	.039	.012 +/- .003	306
19	.065	.043	.012 +/- .003	307
18	.076	.049	.012 +/- .003	308
17	.085	.054	.012 +/- .003	309
16	.093	.061	.012 +/- .003	310
15	.110	.067	.012 +/- .003	311
14	.120	.072	.012 +/- .003	312
13	.140	.080	.012 +/- .003	313
12	.150	.089	.012 +/- .003	314
11	.170	.101	.012 +/- .003	316
10	.191	.112	.012 +/- .003	317
9	.205	.124	.015 +/- .004	318
8	.240	.141	.015 +/- .004	320
7	.270	.158	.015 +/- .004	321
6	.302	.178	.015 +/- .004	322
5	.320	.198	.015 +/- .004	323
4	.370	.224	.015 +/- .004	324
3	.390	.249	.015 +/- .004	325
2	.430	.278	.015 +/- .004	327
1	.450	.311	.015 +/- .004	328
0	.470	.347	.015 +/- .004	330

## **Light Wall Heat Shrink PTFE 2:1**

AWG Size	Expanded ID	Recovered ID	Wall	Mil 23053/12-
30	0.034	0.015	.006 +/- .002	***
28	0.038	0.018	.006 +/- .002	***
26	0.046	0.022	.006 +/- .002	***
24	0.05	0.025	.006 +/- .002	401
22	0.055	0.031	.006 +/- .002	402
20	0.06	0.038	.006 +/- .002	403
19	0.065	0.043	.006 +/- .002	404
18	0.076	0.046	.006 +/- .002	405
17	0.085	0.054	.006 +/- .002	406
16	0.093	0.057	.006 +/- .002	407
15	0.11	0.063	.006 +/- .002	408
14	0.12	0.072	.008 +/- .002	409
13	0.14	0.08	.008 +/- .002	410
12	0.15	0.089	.008 +/- .002	411
11	0.17	0.099	.008 +/- .002	412
10	0.191	0.11	.008 +/- .002	413
9	0.205	0.122	.008 +/- .002	414
8	0.24	0.139	.008 +/- .002	416
7	0.27	0.154	.008 +/- .002	417
6	0.302	0.172	.010 +/- .003	418
5	0.32	0.192	.010 +/- .003	419
4	0.37	0.214	.010 +/- .003	420
3	0.39	0.241	.010 +/- .003	421
2	0.43	0.27	.010 +/- .003	423
1	0.45	0.301	.010 +/- .003	424
0	0.47	0.347	.012 +/- .003	426

## **Fractional Thin Wall Heat Shrink PTFE 2:1**

Fractional Size	Expanded ID	Recovered ID	Recovered Wall	Mil 23053/12-
1/8	.215	.130	.015 +/- .003	319
1/4	.410	.260	.015 +/- .003	326
5/16	.470	.329	.015 +/- .003	329
3/8	.560	.399	.015 +/- .003	***
7/16	.655	.462	.018 +/- .004	***
1/2	.750	.524	.018 +/- .004	***
5/8	.930	.655	.020 +/- .004	***
3/4	1.125	.786	.025 +/- .005	***
7/8	1.310	.911	.030 +/- .006	***
1	1.500	1.036	.030 +/- .006	***

## ***Fractional Standard Wall Heat Shrink PTFE 2:1***

<b>Fractional Size</b>	<b>Expanded ID</b>	<b>Recovered ID</b>	<b>Recovered Wall</b>	<b>Mil 23053/12-</b>
1/8	.215	.130	.020 +/- .004	215
1/4	.410	.260	.020 +/- .004	222
5/16	.470	.329	.020 +/- .004	225
3/8	.560	.399	.025 +/- .006	228
7/16	.655	.462	.025 +/- .006	229
1/2	.750	.524	.025 +/- .006	230
5/8	.930	.655	.030 +/- .006	231
3/4	1.125	.786	.035 +/- .008	232
7/8	1.310	.911	.035 +/- .008	233
1	1.500	1.036	.035 +/- .008	234

## ***Fractional Heavy Wall Heat Shrink PTFE 2:1***

<b>Fractional Size</b>	<b>Expanded ID</b>	<b>Recovered ID</b>	<b>Recovered Wall</b>	<b>Mil 23053/12-</b>
1/8	.166	.130	.030 +/- .005	101
3/16	.250	.193	.030 +/- .005	102
1/4	.333	.257	.030 +/- .005	103
5/16	.415	.320	.030 +/- .005	104
3/8	.498	.383	.030 +/- .005	105
7/16	.580	.448	.030 +/- .006	106
1/2	.666	.510	.030 +/- .006	107
9/16	.748	.572	.030 +/- .006	108
5/8	.830	.637	.030 +/- .006	109
11/16	.915	.700	.032 +/- .006	110
3/4	1.000	.764	.040 +/- .007	111
7/8	1.170	.891	.045 +/- .007	112
1	1.330	1.020	.050 +/- .008	113

## **Fractional Heat Shrink PTFE 4:1**

Fractional Size	Expanded ID	Recovered ID	Recovered Wall	Mil 23053/12-
5/64	.078	.250	.009 +/- .002	501
1/8	.125	.037	.012 +/- .002	502
3/16	.187	.050	.012 +/- .002	503
1/4	.250	.063	.012 +/- .002	504
5/16	.312	.078	.012 +/- .002	505
3/8	.375	.096	.012 +/- .002	506
7/16	.438	.112	.012 +/- .002	507
1/2	.500	.144	.015 +/- .004	508
9/16	.562	.155	.015 +/- .004	509
5/8	.625	.178	.015 +/- .004	510
11/16	.687	.198	.015 +/- .004	511
3/4	.750	.224	.015 +/- .004	512
7/8	.875	.244	.015 +/- .004	513
1	1.000	.278	.015 +/- .004	514
1 1/4	1.250	.347	.015 +/- .004	515
1 1/2	1.500	.400	.015 +/- .004	516
1 3/4	1.750	.450	.015 +/- .004	517
2	2.000	.520	.020 +/- .005	518
2 1/4	2.250	.585	.020 +/- .005	519
2 1/2	2.500	.650	.020 +/- .005	520
2 3/4	2.750	.710	.020 +/- .005	521
3	3.000	.775	.020 +/- .005	522
3 1/4	3.250	.835	.020 +/- .005	523
3 1/2	3.500	.900	.025 +/- .005	524
3 3/4	3.750	.960	.025 +/- .005	525
4	4.000	1.025	.025 +/- .005	526

## **Dual Shrink PTFE FEP Light Wall**

Size	Expanded ID	Recovered ID	Recovered 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	.040

## **Dual Shrink PTFE FEP Standard Wall**

Size	Expanded ID	Recovered ID	Recovered 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

## **AWG Heat Shrink FEP 1.3 / 1**

AWG Size	Expanded ID	Recovered ID	Recovered Wall	Mil 23053/11-
24	.031	.027	.008 +/- .002	101
22	.036	.032	.008 +/- .002	102
20	.045	.039	.008 +/- .002	103
18	.060	.049	.008 +/- .002	104
16	.075	.061	.009 +/- .002	105
14	.092	.072	.009 +/- .002	106
12	.115	.089	.009 +/- .002	107
10	.141	.114	.010 +/- .003	108
9	.158	.124	.010 +/- .003	109
8	.180	.143	.010 +/- .003	110
7	.197	.158	.011 +/- .004	111
6	.225	.180	.011 +/- .004	112
5	.248	.198	.011 +/- .004	113
4	.290	.226	.011 +/- .004	114
3	.310	.249	.011 +/- .004	115
2	.365	.289	.012 +/- .004	116
1	.400	.311	.012 +/- .004	117
0	.440	.349	.012 +/- .004	118

### ***Fractional Heat Shrink FEP 1.3 / 1***

<b>Size</b>	<b>Expanded ID</b>	<b>Recovered ID</b>	<b>Recovered Wall</b>	<b>Mil 23053/11-</b>
3/8	.500	.383	.015 +/- .004	119
7/16	.580	.448	.020 +/- .004	120
1/2	.666	.510	.020 +/- .004	121
5/8	.830	.637	.025 +/- .004	122
3/4	1.000	.764	.030 +/- .004	123
7/8	1.170	.891	.035 +/- .004	124
1	1.330	1.020	.035 +/- .004	126
1 1/8	1.500	1.145	.035 +/- .004	***
1 1/4	1.666	1.270	.035 +/- .004	***
1 3/8	1.833	1.390	.035 +/- .004	***
1 1/2	2.000	1.570	.035 +/- .004	127

### ***Fractional Heat Shrink FEP 1.6 / 1***

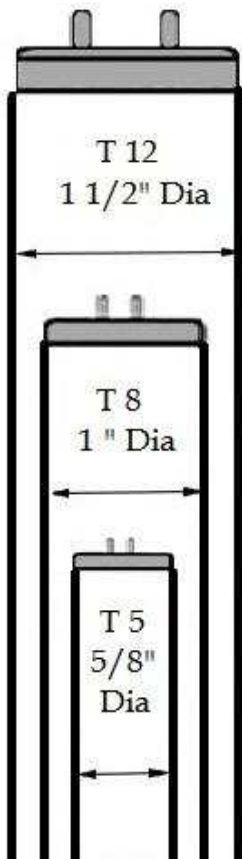
<b>Size</b>	<b>Expanded ID</b>	<b>Recovered ID</b>	<b>Recovered Wall</b>	<b>Mil 23053/11-</b>
3/32	.093	.056	.008 +/- .003	201
1/8	.125	.075	.010 +/- .003	202
3/16	.188	.115	.010 +/- .003	203
1/4	.250	.150	.010 +/- .003	204
3/8	.375	.225	.012 +/- .003	205
1/2	.500	.300	.015 +/- .004	206
3/4	.750	.450	.020 +/- .004	207
1	1.000	.600	.025 +/- .005	208
1 1/2	1.500	.900	.030 +/- .005	209
2	2.000	1.200	.030 +/- .005	210



## **Heat Shrink FEP Roll Cover 1.25 / 1**

Size	Expanded ID	Recovered ID	Recovered Wall
1/2	.550	.440	.020 +/- .003
5/8	.700	.540	.020 +/- .003
3/4	.800	.640	.020 +/- .003
7/8	.950	.760	.020 +/- .003
1	1.100	.880	.020 +/- .003
1 1/4	1.300	1.000	.020 +/- .003
1 1/2	1.700	1.300	.020 +/- .003
2	2.100	1.700	.020 +/- .003
2 1/4	2.300	2.000	.020 +/- .003
2 1/2	2.600	2.100	.020 +/- .003
3	3.100	2.600	.020 +/- .003
3 1/2	3.600	3.100	.020 +/- .003
4	4.200	3.500	.020 +/- .003
5	5.200	4.300	.020 +/- .003
6	6.200	5.200	.020 +/- .003
7	7.200	6.200	.020 +/- .003
8	8.300	7.200	.020 +/- .003
9	9.200	8.300	.020 +/- .003
10 1/2	10.600	9.200	.020 +/- .003
12	12.100	10.600	.020 +/- .003

# Heat Shrink FEP Lay Flat Tubing



## Shatter Resistant FEP Covers for Lamps

FEP encapsulation of Fluorescent lamps avoids costly clean up and cross contamination during mishandling and accidental breakage of “ T “series lamps. As a standard safety feature in the food and medical industries FEP covers for lamps are made from FDA compliant resins and are Biocompatible and USP Class VI Approved.

### Benefits of FEP Lay Flat :

- Easy to Shrink
- Unaffected by UV light
- UV Pass through up to 97 %
- Will not degrade or discolor
- Chemically resistant to solvents and cleaners
- Designed for T5 , T8, T12 bulbs
- Wall Thickness : .010 “

## Fluoroplastics

Properties	ASTM	UNIT	PTFE	FEP	PFA	ECTFE	MFA
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### Mechanical Properties

Specific Gravity	D792		2.130 - 2.20	2.12 - 2.17	2.12 - 2.17	1.68	2.12 - 2.17
Elongation	D638	%	200 - 450	250 - 330	280 - 400	200 - 300	300 - 600
Tensile Strength	D638	PSI	2,000-45,000	2,800 - 5,000	4,000 - 4,500	6,600 - 7,800	3,500 - 4,400
Flexural Strength	D790	PSI	no break	no break	no break	7000	N/A
Compressive Strength	D695	PSI	3500	2200		1276 - 1711	2200
Tensile Elastic Modulus	D638	PSI	57000	50,000	72,500 - 87,000	240,000	65,000-78,000
Flexural Modulus	D790	PSI	71,000 - 85,000	78,000-92,000	94,000-99,000	240,000	95,000
Flex Life	D2176	MIT Cycles	> 1,000,000	5,000 - 80,000	10,000 - 50,000	N/A	10,000 - 100,000
Hardness Durometer		Shore D	D56 - D65	D55	D55 - D60	D75 - D90	D55 - D60
Coefficient of Friction		On Steel	0.02	0.05	0.02	0.19	0.02
Abrasion Resistance	Taber	1000 Revs.	12	14 - 20	9 - 17	0.005	10 - 17
Impact Strength IZOD	D256	Notched ft/lbs/in	3	no break	no break	no break	no break

### Thermal Properties

Melting Point		°C	327	260	305	240	285
		°F	621	500	582	464	545
Upper Service Temp		°C	260	204	260	150 - 170	260
		°F	500	400	500	300 - 340	500
Flamibility		UL 94	V-0	V-0	V-0	V-0	V-0
Linear Coefficient of Thermal Expansion	D696	10 <sup>-5</sup> °C	>11.6	8.0 - 10.5	13	N/A	11 - 12
Heat of Fusion		BTU/LB	29-37	11	13	N/A	25.6
Heat of Combustion		BTU/LB	2,200	2,200	2,300	N/A	6,200
Low Temperature Embrittlement		°C	- 268	- 268	- 268	- 76	- 232
		°F	- 450	- 450	- 450	- 105	- 450

### Electrical Properties

Dielectric Constant	D150	10 <sup>3</sup> Hz	2.1	2.1	2.1	2.5	2.0
Dielectric Strength 10 mil Film	D149	v/mil	≥ 1,400	≥ 1,400	≥ 1,400	N/A	2,000
Volume Resistivity	D257	ohm-cm	> 10 <sup>18</sup>	> 10 <sup>18</sup>	> 10 <sup>18</sup>	> 10 <sup>16</sup>	> 10 <sup>17</sup>
Surface Resistivity	D257	ohm/sq.	> 10 <sup>17</sup>	> 10 <sup>17</sup>	> 10 <sup>17</sup>	> 10 <sup>14</sup>	> 10 <sup>17</sup>

### General Properties

Chemical / Solvent Resistance	D543		Excellent	Excellent	Excellent	Excellent	Excellent
Water Absorption 24hr	D570	%	<.01	<.01	<.03	<.01	<.03
Deformation Under Load	D621	100 °C	5.0	5.0	2.4	2.6	N/A
Refractive Index			1.35	1.338	1.34	1.447	N/A
Limiting Oxygen Index	D2863	%	> 95	> 95	> 95	60	> 95
Properties	ASTM	UNIT	PTFE	FEP	PFA	ECTFE	MFA