FEP Heat Shrink Tubing

Zeus fluoropolymer heat shrink provides the ideal method for the application of a tight, protective jacketing to items that ultimately will be subjected to extremes of heat, corrosion, shock, moisture, or other critical environmental conditions. The application of heat shrink tubing extends the life of such items indefinitely, and assures their reliable performance. Zeus heat shrink tubing is used successfully in areas such as the aerospace, electrical, chemical, optical, medical, nuclear, and automotive fields.

Zeus offers a unique combination of properties in fluoropolymer heat shrink tubing, including high strength, outstanding electrical characteristics, excellent chemical and solvent resistance, purity, uniformity, lubricity, shock and abrasion resistance, and reliable operational performance up to and exceeding 500°F. Our products conform to both military and commercial standards and in most cases exceed the intent of these standards.

FEP heat shrink tubing in particular is chosen for its lower shrink temperature than PTFE, greater flexibility, optical clarity, and high lubricity in comparison to PFA.

Zeus heat shrink tubing products are provided in the expanded state. With the brief application of heat, they mold themselves snugly around the most intricate and irregular shapes to form a completely sealed covering (see our heat shrink recovery information). Sources of heat and methods of heating are optional. Please contact your Zeus Technical Account Manager for guidance on the optimal heat shrinking process.

FEP 1.3:1 Heat Shrinkable Tubing
AWG Tubing

Ordered as AWG Size	As Supplied Inside Diameter Minimum	Recovered Dimension After Shrinking			
		I.D. Will Shrink to at Least	Wall Thickness		
			Min.	Nom.	Max.
24	0.031	0.027	0.006	0.008	0.010
22	0.036	0.032	0.006	0.008	0.010
20	0.045	0.039	0.006	0.008	0.010
18	0.060	0.049	0.006	0.008	0.010
16	0.075	0.061	0.007	0.009	0.011
14	0.092	0.072	0.007	0.009	0.011
12	0.115	0.089	0.007	0.009	0.011
10	0.141	0.114	0.007	0.010	0.013
9	0.158	0.124	0.007	0.010	0.013
8	0.180	0.143	0.007	0.010	0.013
7	0.197	0.158	0.007	0.011	0.015
6	0.225	0.180	0.007	0.011	0.015
5	0.248	0.198	0.007	0.011	0.015

4	0.290	0.226	0.007	0.011	0.015
3	0.310	0.249	0.007	0.011	0.015
2	0.365	0.280	0.008	0.012	0.016
1	0.400	0.311	0.008	0.012	0.016
0	0.440	0.349	0.008	0.012	0.016

Fractional Inch Tubing

Size		As Supplied Inside Diameter Minimum	Recovered Dimension After Shrinking			
Frac.	Decimal		I.D. Will Shrink to at Least	Wall Thickness		
				Min.	Nom.	Max.
3/8	0.375	0.500	0.383	0.011	0.015	0.019
7/16	0.438	0.580	0.448	0.016	0.020	0.024
1/2	0.500	0.666	0.510	0.016	0.020	0.024
5/8	0.625	0.830	0.637	0.021	0.025	0.029
3/4	0.750	1.000	0.764	0.026	0.030	0.034
7/8	0.875	1.170	0.891	0.031	0.035	0.039
1	1.000	1.330	1.020	0.031	0.035	0.039
1-1/8	1.125	1.500	1.145	0.031	0.035	0.039
1-1/4	1.250	1.666	1.270	0.031	0.035	0.039
1-3/8	1.375	1.833	1.390	0.031	0.035	0.039
1-1/2	1.500	2.000	1.520	0.031	0.035	0.039

Metric Dimensions

AWG Tubing

Ordered as AWG Size	As Supplied Inside Diameter Minimum	Recovered Dimension After Shrinking			
		I.D. Will Shrink to at Least	Wall Thickness		
			Min.	Nom.	Max.
24	0.79	0.69	0.15	0.20	0.25
22	0.91	0.81	0.15	0.20	0.25
20	1.14	0.99	0.15	0.20	0.25
18	1.52	1.25	0.15	0.20	0.25
16	1.91	1.55	0.18	0.23	0.28
14	2.34	1.83	0.18	0.23	0.28

12	2.92	2.26	0.18	0.23	0.28
10	3.58	2.90	0.18	0.25	0.33
9	4.01	3.15	0.18	0.25	0.33
8	4.57	3.63	0.18	0.25	0.33
7	5.00	4.01	0.18	0.28	0.38
6	5.72	4.57	0.18	0.28	0.38
5	6.30	5.03	0.18	0.28	0.38
4	7.37	5.74	0.18	0.28	0.38
3	7.87	6.32	0.18	0.28	0.38
2	9.27	7.11	0.20	0.30	0.41
1	10.16	7.90	0.20	0.30	0.41
0	11.18	8.86	0.20	0.30	0.41

Fractional Inch Tubing

Size		As Supplied Inside Diameter Minimum	Recovered Dimension After Shrinking			
Frac.	Decimal		I.D. Will Shrink to at Least	Wall Thickness		
				Min.	Nom.	Max.
3/8	9.53	12.70	9.73	0.28	0.38	0.48
7/16	11.13	14.73	11.38	0.41	0.51	0.61
1/2	12.70	16.92	12.95	0.41	0.51	0.61
5/8	15.88	21.08	16.18	0.53	0.64	0.74
3/4	19.05	25.40	19.41	0.66	0.76	0.86
7/8	22.23	29.72	22.63	0.79	0.89	0.99
1	25.40	33.78	25.91	0.79	0.89	0.99
1-1/8	28.58	38.10	29.08	0.79	0.89	0.99
1-1/4	31.75	42.32	32.26	0.79	0.89	0.99
1-3/8	34.93	46.56	35.31	0.79	0.89	0.99
1-1/2	38.10	50.80	38.61	0.79	0.89	

1.6:1 Shrink Ratio

Dimensions (inches)

Size		Expanded I.D. Min.	Recovered I.D. Max.	Recovered Wall Thickness	
Fractional	Decimal Inches			Nom.	Tol.
3/32	0.093	0.093	0.056	0.008	+/- 0.003
1/8	0.125	0.125	0.075	0.010	+/- 0.003
3/16	0.188	0.188	0.115	0.010	+/- 0.003
1/4	0.250	0.250	0.150	0.010	+/- 0.003
3/8	0.375	0.375	0.225	0.012	+/- 0.003
1/2	0.500	0.500	0.300	0.015	+/- 0.004
3/4	0.750	0.750	0.450	0.020	+/- 0.004
1	1.000	1.000	0.600	0.025	+/- 0.005
1-1/2	1.500	1.500	0.900	0.030	+/- 0.005
2	2.000	2.000	1.200	0.030	+/- 0.005

Dimensions (Metric)

Size		Expanded I.D. Min.	Recovered I.D. Max.	Recovered Wall Thickness	
Fractional	Decimal Inches			Nom.	Tol.
3/32	2.36	2.36	1.42	0.20	+/- 0.003
1/8	3.18	3.18	1.91	0.25	+/- 0.003
3/16	4.78	4.78	2.92	0.25	+/- 0.003
1/4	6.35	6.35	3.81	0.25	+/- 0.003
3/8	9.53	9.53	5.72	0.31	+/- 0.003
1/2	12.70	12.70	7.62	0.38	+/- 0.004
3/4	19.05	19.05	11.43	0.51	+/- 0.004
1	25.40	25.40	15.24	0.64	+/- 0.005
1-1/2	38.10	38.10	22.86	0.76	+/- 0.005
2	50.80	50.80	30.48	0.76	+/- 0.005

Shrink Ratios

Zeus FEP heat shrink tubing is available with shrink ratios of 1.3:1 and 1.6:1 or greater incorporating all the same high standards and characteristics of FEP. Micro-miniature dimensions are also available. Custom specifications and tolerances quoted upon request.

Heat Shrinking Guidelines for FEP Heat Shrink Tubing

1. Always assure good ventilation in the immediate work area prior to beginning the heat shrink process. Caution: Fumes may cause nausea and dizziness.

2. Heat shrink FEP tubing requires approximately 420°F +/- 50°F (215°C +/- 10°C). This is a liberal and safe range. Please keep in mind that these temperatures are approximate. Actual shrink temperatures will vary based on the dimensions and wall thickness of the tubing, application techniques, and other factors. Zeus is happy to provide samples to test in your application to determine the best material to use.

3. The mandrel (part) to be covered by heat shrink FEP must be able to withstand this range of temperature.

4. Zeus recommends preheating larger diameter mandrels.

5. Heat shrink FEP needs only a small degree of recovery. You may experience some slight longitudinal change depending on the amount of recovery. Contact Zeus if longitudinal change is a concern.

6. Even heating of all sides and even cooling of all sides provides the best results. Uneven heating or cooling tends to split the side still in the "gel" state while the other side is in the hard or crystalline state - especially upon recovery.
   NOTE: Shrink starts when the FEP is brought up to the "gel" state but completes its recovery during the cooling cycle.
   In its gel state the tubing becomes crystal clear and glassy in appearance.

7. Ovens are the most reliable way to recover heat shrink products due to their ability to ensure even heating and reduce the risk of over heating the material (which can lead to brittleness and cracking).
   If a heat gun will be used, please contact Zeus for tips on proper application of heat to achieve the most uniform recovery.

Standards and Specifications

Color: Supplied in "natural" unpigmented state unless otherwise specified. Custom Pantone colors or Zeus standard colors available upon request. See our **coloring polymers information** for more about Zeus' coloring capabilities.
Complies with: AMS-DTL-23053/11
UL File # E64007
CSA File # 082582