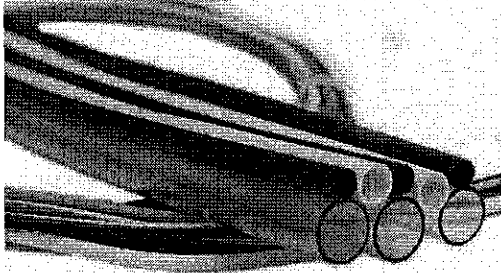


GRAYLINE INC

105°C

High Performance PVC Tubing



Product Description

Grayline 105°C is a flexible polyvinyl chloride tubing designed for a wide range of electrical insulating applications. This flame retarded product features wide operating temperature, and outstanding physical and electrical insulating properties.

It is typically used as a wiring harness covering, or as a terminal and splice insulation where low cost, mechanical toughness and flame resistance are important considerations.

*Standard Packaging: Reels or Cut to Customer Specifications.
Standard Color: Clear, Black, White, Natural
Custom Sizes & Colors Available Upon Request*

Specifications

- UL: 105°C, 300V/600V, VW-1 (File #E40745)
- CSA: 105°C, 300V/600V, VW-1 (File #31347)
- MIL-I-631, Type F, Form U, Grade C, Class I* & II, Category I.
- ASTM D922, Grade C
- EU Directive 2000/53/EC (ELV)
- EU Directive 2002/95/EC (RoHS)
- EU Directive 2003/11/EC
- FMVSS302
*optional anti-fungal

Features

- Operating Temperature is -30°C to 105°C
- Both 300V and 600V Walls Available
- Highly Flame Retardant
- Low Temperature Flexibility
- Mechanical Strength
- UV Resistant (Optional)
- Low Odor
- Lead Free

PROPERTY	TYPICAL VALUE	TEST METHOD
Durometer Hardness, Shore A/C (10 Seconds)	88/62 Colors 94/69 Clear	ASTM D2240
Tensile Strength (psi)	2,500	ASTM D412
Elongation (%)	280	ASTM D412
Brittleness Temperature, Pass (°C)	-28 Colors -23 Clear	ASTM D746
Heat Aging, 7 Days @ 136°C % of Original Tensile Strength % of Original Elongation	102% 82%	UL 224
Copper Corrosion	None	UL 224
Longitudinal Shrinkage, 2 Hours @ 100°C	Less Than 5 %	UL 224
Dielectric Strength (Volts/Mil, .031)	800	ASTM D149
Volume Resistivity (ohm-cm)	10 ¹¹	ASTM D257
Low Temperature Flexibility, -30°C	Pass	UL 224

The values listed in this bulletin, to the best of our knowledge, are accurate. They are typical performance results and are not intended to be used as design data. We disclaim all liability in connection with the use of information contained herein or otherwise.



Dimensional Tolerances - Flexible PVC

ASTM Sizes (Inside Diameter & Wall Thickness)

ASTM SIZE	INSIDE DIAMETER NOMINAL		INSIDE DIAMETER MIN.		INSIDE DIAMETER MAX.		WALL THICKNESS (INCHES)			STANDARD PACKAGING (on reels)	
	Inch	mm	Inch	mm	Inch	mm	Standard Wall	1/32 Wall	±	Standard Wall	1/32 Wall
24	.022	.559	.020	.508	.027	.686	.012	-	.002	5000'	-
22	.027	.686	.025	.635	.032	.813	.012	-	.002	5000'	-
20	.034	.864	.032	.813	.039	.991	.016	-	.003	5000'	-
19	.038	.965	.036	.914	.044	1.118	.016	-	.003	5000'	-
18	.042	1.067	.040	1.016	.049	1.245	.016	.031	.003	5000'	2500'
17	.047	1.194	.045	1.143	.054	1.372	.016	.031	.003	5000'	2500'
16	.053	1.346	.051	1.295	.061	1.549	.016	.031	.003	5000'	2500'
15	.059	1.499	.057	1.448	.067	1.702	.016	.031	.003	5000'	2500'
14	.066	1.676	.064	1.626	.074	1.880	.016	.031	.003	2500'	2500'
13	.076	1.930	.072	1.829	.080	2.032	.016	.031	.003	2500'	2500'
12	.085	2.159	.081	2.057	.091	2.311	.016	.031	.003	2500'	2500'
11	.095	2.413	.091	2.311	.101	2.566	.016	.031	.003	2500'	2000'
10	.106	2.692	.102	2.591	.112	2.845	.016	.031	.003	2500'	2000'
9	.118	2.997	.114	2.896	.124	3.150	.020	.031	.003	2500'	2000'
1/8"	.125	3.175	.125	3.175	.136	3.454	.020	.031	.003	2500'	1500'
8	.133	3.378	.129	3.277	.141	3.581	.020	.031	.003	2500'	1500'
7	.148	3.759	.144	3.658	.158	4.013	.020	.031	.003	2500'	1500'
6	.166	4.216	.162	4.115	.175	4.521	.020	.031	.003	2000'	1500'
5	.186	4.724	.182	4.623	.198	5.029	.020	.031	.003	1750'	1500'
4	.208	5.283	.204	5.182	.224	5.690	.020	.031	.003	1500'	1250'
3	.234	5.944	.229	5.817	.249	6.325	.026	.031	.003	1250'	1250'
1/4"	.250	6.350	.250	6.350	.270	6.868	.020	.031	.003	1000'	1000'
2	.263	6.680	.258	6.553	.278	7.061	.020	.031	.003	1000'	1000'
1	.294	7.468	.289	7.341	.311	7.899	.020	.031	.003	750'	750'
0	.330	8.382	.325	8.255	.347	8.814	.020	.031	.003	750'	750'
5/16"	.312	7.925	.312	7.925	.334	8.484	.025	.031	.003	750'	750'
3/8"	.375	9.525	.375	9.525	.399	10.135	.025	.031	.003	625'	625'
7/16"	.438	11.125	.438	11.125	.462	11.735	.025	.031	.003	500'	500'
1/2"	.500	12.7	.500	12.700	.524	13.310	.025	.031	.003	400'	400'
9/16"	.562	14.275	.562	14.275	.585	14.859	.031	-	.003	375'	-
5/8"	.625	15.875	.625	15.875	.655	16.637	.031	-	.003	300'	-
3/4"	.750	19.050	.750	19.050	.786	19.964	.035	-	.005	250'	-
7/8"	.875	22.225	.875	22.225	.911	23.139	.035	-	.005	200'	-
1"	1.000	25.4	1.000	25.400	1.036	26.314	.036	-	.005	200'	-
1-1/8"	1.125	28.575	1.125	28.575	1.163	29.540	.040	-	.005	150'	-
1-1/4"	1.250	31.750	1.250	31.750	1.290	32.766	.040	-	.005	100'	-
1-3/8"	1.375	34.925	1.375	34.925	1.420	36.068	.040	-	.005	100'	-
1-1/2"	1.500	38.100	1.500	38.100	1.550	39.370	.045	-	.006	100'	-

Non-ASTM diameters and wall thicknesses available upon request. See Page 3 for tolerances.
Cut Length Tolerances can be found on page 3.



Dimensional Tolerances - Flexible PVC

ASTM Metric Sizes (Inside Diameter & Wall Thickness)

ASTM SIZE*	INSIDE DIAMETER NOMINAL		INSIDE DIAMETER MIN.		INSIDE DIAMETER MAX.		WALL THICKNESS (INCHES)			STANDARD PACKAGING (on reels)**	
	mm	Inch	mm	Inch	mm	Inch	Standard Wall (mm)	Thin Wall (mm)	Thick Wall (mm)	Standard Wall & Thin Wall	Thick Wall
0.5	0.5	0.020	0.40	0.016	0.60	0.024	0.4±0.1	0.3±0.1	0.5±0.1	500'	500'
0.8	0.8	0.031	0.70	0.026	0.90	0.035	0.4±0.1	0.3±0.1	0.5±0.1	500'	500'
1	1.0	0.039	0.85	0.033	1.15	0.045	0.4±0.1	0.3±0.1	0.5±0.1	500'	500'
1.5	1.5	0.059	1.35	0.053	1.65	0.065	0.4±0.1	0.3±0.1	0.5±0.1	500'	250'
2	2.0	0.079	1.85	0.073	2.15	0.085	0.4±0.1	0.3±0.1	0.5±0.1	250'	250'
2.5	2.5	0.098	2.35	0.093	2.65	0.104	0.4±0.1	0.3±0.1	0.5±0.1	2500'	2500'
3	3.0	0.118	2.85	0.112	3.15	0.124	0.4±0.1	0.3±0.1	0.5±0.1	2500'	2500'
4	4.0	0.157	3.75	0.148	4.25	0.167	0.5±0.1	0.3±0.1	0.6±0.1	2500'	2000'
5	5.0	0.197	4.75	0.187	5.25	0.207	0.5±0.1	0.3±0.1	0.6±0.1	1500'	1500'
6	6.0	0.236	5.75	0.226	6.25	0.246	0.5±0.1	0.3±0.1	0.6±0.1	1250'	1250'
8	8.0	0.315	7.75	0.305	8.25	0.325	0.7±0.1	0.5±0.1	0.8±0.15	750'	750'
10	10.0	0.394	9.50	0.374	10.50	0.413	0.7±0.1	0.5±0.1	0.8±0.15	625'	625'
12	12.0	0.472	11.50	0.453	12.50	0.492	0.7±0.1	0.5±0.1	0.8±0.15	400'	400'
16	16.0	0.630	15.50	0.610	16.50	0.660	0.85±0.15	0.5±0.1	1.2±0.2	300'	250'
20	20.0	0.787	19.50	0.768	20.50	0.807	0.85±0.15	0.5±0.1	1.2±0.2	250'	200'
25	25.0	0.984	24.50	0.965	25.50	1.004	0.85±0.15	0.5±0.1	1.2±0.2	200'	175'
30	30.0	1.181	29.50	1.161	30.50	1.201	0.85±0.15	0.5±0.1	1.2±0.2	150'	150'

Dimensional Tolerances per ASTM D922

Cut Length Tolerances can be found on page 3.

*Non-ASTM diameters and wall thicknesses available upon request. See page 3 for tolerances.

**Metric reel put-ups available upon request.



Dimensional Tolerances - Flexible PVC

Non-ASTM
Inside Diameter Tolerances
Decimal sizes, inch (mm)

Target	Tolerance
0.020 - 0.039 (0.50 - 1.00)	±0.0035 (0.09)
0.040 - 0.085 (1.01 - 2.16)	±0.004 (0.10)
0.086 - 0.134 (2.17 - 3.40)	±0.005 (0.13)
0.135 - 0.169 (3.41 - 4.29)	±0.006 (0.15)
0.170 - 0.213 (4.30 - 5.41)	±0.008 (0.20)
0.214 - 0.386 (5.42 - 9.80)	±0.010 (0.25)
0.387 - 0.639 (9.81 - 16.23)	±0.012 (0.30)
0.640 - .767 (16.24 - 19.48)	±0.015 (0.38)
0.768 - 1.269 (19.49 - 32.23)	±0.018 (0.46)
1.270 - 1.397 (32.24 - 35.48)	±0.020 (0.51)
1.398 - 1.524 (35.49 - 38.71)	±0.022 (0.56)
1.525 - 1.750 (38.72 - 44.45)	±0.025 (0.64)

Non-ASTM
Wall Thickness Tolerances
inch (mm)

Target	Tolerance
0.008 - 0.013 (0.20 - 0.33)	±0.002 (0.05)
0.014 - 0.034 (0.34 - 0.86)	±0.003 (0.08)
0.035 - 0.044 (0.87 - 1.12)	±0.005 (0.13)
0.045 - 0.054 (1.13 - 1.37)	±0.006 (0.15)
0.055 - 0.069 (1.37 - 1.75)	±0.008 (0.20)
0.070 - 0.089 (1.76 - 2.26)	±0.010 (0.25)
0.090 - 0.125 (2.27 - 3.18)	±0.012 (0.30)

Cut Length Tolerances

Standard (inch)

Length	Tolerance
1/4" to less than 1"	±1/32" (.031")
1" to less than 3"	±1/16" (.062")
3" to less than 5"	±3/32" (.093")
5" to less than 12.5"	±1/8" (.125")
12.5" to less than 16"	±5/32" (.156")
16" to less than 25"	±1/4" (.250")
25" to less than 37.5"	±3/8" (.375")
37.5" to less than 50"	±1/2" (.500")
50" to less than 62.5"	±5/8" (.625")
62.5" to less than 75"	±3/4" (.750")
75" to less than 87.5"	±7/8" (.875")
87.5" to less than 100"	±1" (1.00")
100" and above	± 1%

Metric (mm)

Length	Tolerance
6.35 mm to less than 25.4 mm	±0.787 mm
25.4 mm to less than 76.2 mm	±1.574 mm
76.2 mm to less than 127.0 mm	±2.362 mm
127.0 mm to less than 317.5 mm	±3.175 mm
317.5 mm to less than 406.4 mm	±3.962 mm
406.4 mm to less than 635.0 mm	±6.350 mm
635.0 mm to less than 952.5 mm	±9.525 mm
952.5 mm to less than 1270.0 mm	±12.700 mm
1270.0 mm to less than 1587.5 mm	±15.875 mm
1587.5 mm to less than 1905.0 mm	±19.050 mm
1905.0 mm to less than 2222.5 mm	±22.225 mm
2222.5 mm to less than 2540.0 mm	±25.400 mm
2540.0 mm and above	± 1%

Note: A Grayline representative must authorize any deviation from these specifications.