



HALOGEN FREE HEAT-SHRINKABLE TUBING

SHRINK RATIO 2:1 FLAME RETARDANT RoHS HIGHLY FLEXIBLE

FREE-221 provides optimal insulation for cable assemblies, wire harnesses, and wire connections. It is designed to provide resistance to abrasion, thermal heat, and fluids in demanding environments. It provides excellent protection for wire bundles and may be used for wire identification. **FREE-221** meets the highest environmental standards in the industry; which includes Sony's green standard and surpasses RoHS compliance test standards.

FREE-221 Applications

General Purpose Insulation & Repair

Wire & Cable Harnessing & Bundling

Cable & Connector Protection

Spools Used in Automatic Cutting Machines

Characteristics

Operating Temperature: -55° to 125° Celsius

Shrink Temperature: 120°

Flame Retardant (Except Clear), UL Standard 224

Shrink Ratio: 2:1

Environmentally Friendly

Packaging: 3/64 to 2 Inch Spools or 4FT Lengths per Request

Specifications

Gamma	Minimum Expanded		Maximum Recovered	Recovered Thickness	Standard Packaging
Part No.	as Supplied		After Heating	After Heating	Packaging
W/ Size	Mm	Inch	Mm	Mm	Spool
FREE-221-3/64	1.2	0.046	0.60	0.22±0.10	1000'
FREE-221-1/16	1.6	0.063	0.65	0.28±0.10	1000'
FREE-221-3/32	2.4	0.093	1.00	0.35±0.10	500'
FREE-221-1/8	3.2	0.125	1.50	0.40±0.10	500'
FREE-221-3/16	4.8	0.25	2.30	0.50±0.10	500'
FREE-221-1/4	6.4	0.375	3.00	0.55±0.10	250'
FREE-221-3/8	9.5	0.375	4.50	0.60±0.10	250'
FREE-221-1/2	12.7	0.5	6.00	0.60±0.10	100'
FREE-221-3/4	19.1	0.75	9.00	0.80±0.15	100'
FREE-221-1	25.4	1	12.50	0.90±0.15	100'

Properties

Property	Test Method	Standard
Tensile Strength	ASTM D 2671	≥10.4
Elongation at Break	ASTM D 2671	≥ 200%
Longitudinal Shrinkage	UL 224	≤ 0.5%
Dielectric Strength	ASTM D150	≥15kv/mm
Volume Resistance	ASTM D876	≥10 ¹⁴ Ω .cm
Water Absorption	ASTM D570	≤ 0.5%
Copper Stability	UL 224	No Corrosion

Heavy Metal Properties

Hazardous Elements	Test Method	Result
Cd	EN 1122 : 2001 Method B	≤5
Pb	EPA 3050 B	≤90
Sb	EPA 3050 B	≤60
Ba	EPA 3050 B	≤1000
Cr	EPA 3050 B	≤5
Hg	EPA 3052	≤5
As	EPA 3052	≤50
Se	EPA 3052	≤25
F	EN 14582 Method B	≤200
Cl	EN 14582 Method B	≤800
Br	EN 14582 Method B	≤800
I	EN 14582 Method B	≤200

Color Code: 0=BLK or 4=YLW

P/N Example: FREE-221-1/4-0 = Black ¼" Tubing

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