



## THIN WALL HALOGEN FREE HEAT-SHRINKABLE TUBING

**SHRINK RATIO 2:1**

**FLAME RETARDANT**

**RoHS COMPLIANT**

**HIGHLY FLEXIBLE**

**FREE-221TW** 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-221TW** meets the highest environmental standards in the industry; which includes Sony's green standard and surpasses RoHS compliance test standards. Its thin wall is perfect for applications where space saving is necessary.

### **FREE-221TW Applications**

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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-221TW-3/64	1.2	0.046	0.60	0.20±0.10	1000'
FREE-221TW-1/16	1.6	0.063	0.65	0.20±0.10	1000'
FREE-221TW-3/32	2.4	0.093	1.00	0.22±0.10	500'
FREE-221TW-1/8	3.2	0.125	1.50	0.28±0.10	500'
FREE-221TW-3/16	4.8	0.25	2.30	0.35±0.10	500'
FREE-221TW-1/4	6.4	0.375	3.00	0.39±0.10	250'
FREE-221TW-3/8	9.5	0.375	4.50	0.35±0.10	250'
FREE-221TW-1/2	12.7	0.5	6.00	0.40±0.10	100'
FREE-221TW-3/4	19.1	0.75	9.00	0.45±0.10	100'
FREE-221TW-1	25.4	1	12.50	0.45±0.10	100'

## Properties

Property	Test Method	Standard
Tensile Strength	GB/T1040	≥10.4
Elongation at Break	GB/T1040	≥ 200%
Longitudinal Shrinkage	UL224	≤ 0.5%
Dielectric Strength	ASTM D150	≥15kv/mm
Volume Resistance	ASTM D876	≥10 <sup>14</sup> Ω .cm
Water Absorption	ASTM D570	≤ 0.5%
Copper Stability	UL224	No Corrosion

## Heavy Metal Properties

Hazardous Elements	Test Method	Result
Cd	EN1122:2001Method 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, 1=BRN, 2=RED, 3=ORN, 4=YLW, 5=GRN, 6=BLU, 7=VIO, 8=GRY, 9=WHT, X=CLR

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

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