

SPECIFICATIONS

FOR

Thin Wall, Flexible, Flame Retardant Heat Shrinkable Tubing

H-2 (Z)

Revision record

This specification's preparation and explanation are in the charge of Research and Development Center of Hongshang.

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Nov. 12, 2013	A0	New issue	Zhai Yongai (Director of R&D)	Zhai Yongai (Director of R&D)	Zhong Xiaoguang (Chief Engineer)
Feb. 27, 2014	A1	Adjust format etc.	Huang Sha (Engineer of R&D)	Liu Jian (Engineer of R&D) Zhai Yongai (Director of R&D)	Zhong Xiaoguang (Chief Engineer)
Oct. 12, 2016	A2	Adjust Technical requirements and dimensions etc.	Zhai Yongai (Director of R&D)		Zhong Xiaoguang (Chief Engineer)

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1 Aim and Scope

1.1 Aim

This specification is a controlled file used for describing the products customer ordered. It's applicable in the following department also:

R&D Department: Major for product design and development

Technology Department: Major for preparing production directives

Quality control Department: Major for quality control

Purchasing Department: Major for external materials purchasing

1.2 Scope

This specification can be used for the production and quality control of H-2 (Z). It described the product specifications, dimension, requirements and the standards followed.

1.3 Product type

H-2 (Z) is one type of thin wall, flexible, flame retardant heat shrinkable tubing whose diameter will reduce to a predetermined size upon the application of heat in excess of 70 °C. The products manufactured by crosslinked polyolefin, which is suitable for applications in electronic where electrical insulation and color marking are required. This tubing meets the requirements of UL 224 with a continuous operating temperature range of -55 °C to 125 °C.

1.4 Color

The Standard colors for the tubing shall be black, red, blue, yellow, green and white. Other colors are available on request.

2 Standards

This specification takes precedence over documents referenced herein. Unless otherwise specified, the latest issue of referenced documents applies. The following documents form a part of this specification to the extent specified herein.

UL 224 Extruded Insulating Tubing

ASTM D 2671 Standard Test Method for Heat Shrinkable Tubing for Electrical Use

ISO 62 Plastics - Determination of water absorption

3 Technical specifications

3.1 Dimensions



Size (inch)	As supplied (mm)	After recovered (mm)		Standard length (m/spool)
	D*(Min.)	d*(Max.)	w*(Min.)	
3/64	1.2	0.6	0.32	200
1/16	1.6	0.8	0.32	200
3/32	2.4	1.2	0.42	200
1/8	3.2	1.6	0.42	200
3/16	4.8	2.4	0.52	100
1/4	6.4	3.2	0.54	100
5/16	8.0	4.0	0.54	100
3/8	9.5	4.8	0.54	100
1/2	12.7	6.4	0.62	100
5/8	16.0	8.0	0.67	50
3/4	19.0	9.5	0.75	50
1	25.4	12.7	0.85	50
1 1/4	31.8	15.9	0.85	50
1 1/2	38.1	19.1	0.96	50
2	50.8	25.4	0.96	50
3	76.2	38.1	1.17	30
4	101.6	50.8	1.30	30
5	127.0	63.5	1.30	15
6	152.4	76.2	1.30	15

Note: D* = Inner diameter as supplied

d* = Inner diameter after fully recovered

w* = Wall thickness after fully recovered

3.2 Basic requirements

H-2 (Z) thin wall, flexible, flame retardant heat shrinkable tubing is made from radiation crosslinked polyolefin. Specifically designed formulation makes the tubing to have outstanding physical, chemical and electrical properties, and also meet the requirement of RoHS and other environment concerned standards. The tubing shall be homogeneous and essentially free from flaws, defects, pinholes, bubbles, seams, cracks and inclusions.

3.3 Technical requirements

Property	Unit	Test Method	Required Value	Test Value
Shrinking properties				
Longitudinal Changes	%	UL 224	-5 to 5 %	-5 to 5 %
Eccentricity	%	UL 224	Max. 30% (the size D <50mm)	10 to 30 %
			Max. 45% (the size D ≥50mm)	Max. 40%
Physical properties				
Tensile strength	MPa	ASTM D 2671	Min. 10.4MPa	Min. 11MPa
Ultimate Elongation	%	ASTM D 2671	Min 200 %	Min 400 %
Thermal aging Tensile strength	MPa	ASTM D 2671	Remain 70%	Min. 11 MPa
Ultimate Elongation	%	158℃ /168 hr	Min. 100%	Min. 250%
Heat shock 250℃ / 4 hrs		UL 224	No cracking, flowing, dropping	No cracking, flowing, dropping
Cold bend test -30℃ / 1 h		UL 224	No cracking	No cracking
Water absorption	%	ISO 62	Max. 0.5	0.2
Electrical properties				
Dielectric strength	kV/mm	ASTM D 2671	Min. 15	32
Volume resistivity	Ω.cm	UL224	Min. 10 ¹⁴	10 ¹⁴
Chemical properties				
Copper corrosion		UL 224	No corrosion	No corrosion
Flammability VW-1		UL 224	Pass	Pass

3.4 Shelf Life and Storage

H-2 (Z) thin wall, flexible, flame retardant heat shrinkable tubing has a over 5 year's shelf life from date of manufacture when stored in a humidity controlled storage (-10 ℃ to 40 ℃ and <75% relative humidity).

4 Environmental protection requirements

H-2 (Z) thin wall, flexible, flame retardant heat shrinkable tubing has to meet the latest RoHS and REACH requirements.

Note:

Test Machine: Thermo Scientific NITON XL3t XRF Analyzer

Test condition: Test temperature: 23±3℃