

Halogen Free Flame-Retardant Heat Shrinkable Tube



Content and Application

This specification defines technical requirement, testing method, testing rules and packing of halogen free flame-retardant heat shrinkable tube

This specification applies to wire connection, disposal of wire termination, sign of the wire bind, insulate protection of resistance and capacitance, surface protection of sport equipment and the steel frame, rust-proof and corrosion-proof of relative products, wire protection and other application of halogen free flame-retardant heat shrinkable tube



Standard

Standard for Extruded Electrical Tubing UL 224

Terms

Heat shrinkable material

The heat-shrinkable materials are obtained by cross-linking of polyethylene with chemical or radiation method. The shape of a product is formed at high temperatures and then solidified by cooling it to a room temperature. Owing its “shape memory”, it will attempt to return to its original shape, thus significantly decreasing its cross dimensions and tightly closing the object placed previous into it. This ensures electrical insulation, anticorrosion protection, improve aesthetics

Heat shrinkable tubes

The polymer or polymer alloy through extrusion molding are defined size tubular intermediate product, irradiation (or chemical) heating expansion after cross linking, cooling and shaping with certain size tubular products have become heat shrinkable sleeve

Technical Requirement

Conditions

- The use of the environment temperatures: -55 ... 125°C
- Can be used in acid, alkali conditions
- Use with strict requirement about environment

Appearance requirement

- V ≤ 0.05 mm
- U ≤ 0.05 mm
- Printing clear

Heat shrinking property

- Minimum shrink temperature: 70°C
- Minimum full recovery temperature for thin wall: 110°C
- Minimum full recovery temperature for normal wall: 125°C
- Longitudinal shrinking ratio less than $\pm 5\%$

Material performance

Material physical and chemical performance confirm to table 1

Products' dimension

Normal wall Halogen Free Flame-Retardant Heat shrinkable Tube dimension confirm to table 3

Colour

Black

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Storage requirements and storage period

- Avoid direct sunlight, rain and trampling
- Temperature: -10 ... 45°C
- Humidity: annual mean $\leq 75\%$, less than 30 days $> 75\%$, $\leq 95\%$ one year
- Max storage period: 36 months from the date of production

The method of usage

In the use process, in order to ensure the heat shrinkable sleeve can complete contraction in place, the use of forced air oven thermostat, and the shrinkage temperature control in 125°C. In particular, when the heat shrinkable sleeve is put into the oven, oven temperature has a downward trend, to reach the set temperature requires a certain amount of time. At the same time, the heat shrinkable sleeve to achieve the ultimate shrinkage temperature also needs a certain time by hot air circulating in the oven. Therefore, we must make oven reach the set temperature and keep the temperature for 3 minutes, heat shrinkable sleeve can complete contraction in place

TABLE 1 Halogen Free Flame-Retardant Heat shrinkable Tube Characters

ITEM		TESTING METHOD	REQUIREMENT
Physical	Tensile strength/MPa	UL224	≥ 10.4
	Elongation/%	UL224	≥ 200
	Tensile strength afer aging/MPa	UL224;158°C×168hr	≥ 7.3
	Elongation after aging/%	UL224;158°C×168hr	≥ 100
	Heat Shock	UL224;	No viscosity No cracking
	Cold Blend	UL224;-30°C×1hr	No cracking
Electrical	Dielectric Withstand	300V	UL224;1500V 1min without breakdown
		600V	UL224;2500V 1min without breakdown
	Dielectric Strength/KV/mm	UL224	≥ 15
	Volume resistance/ $\Omega \cdot \text{cm}$	UL224	$\geq 1 \times 10^{14}$
Chemical	Copper stability	UL224; 158°C×168hr	PASS
	Anti Corrosion	UL224; 158°C×168hr	PASS
	Flammability	ASTM D2671 C	☆

Note: Yellow and White flame retardant performance needs to be improved, the other colour can reach the required flame retardant properties

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TABLE 2 Normal wall Halogen Free Flame-Retardant Heat shrinkable Tube Dimensional Requirement

Art Nr.	Spec. (mm)	As supplied(mm)		After shrinkage(mm)		Application range(mm)
		Inner Diameter	Wall Thickness	Inner Diameter	Wall Thickness	
RND 465-00973	Φ3.0	3.50±0.2	0.20±0.05	≤1.50	0.45±0.10	1.60~2.70
RND 465-00974	Φ4.5	5.00±0.2	0.28±0.05	≤2.30	0.56±0.10	2.35~4.00
RND 465-00975	Φ6.0	6.50±0.2	0.28±0.05	≤3.00	0.56±0.10	3.10~5.40
RND 465-00976	Φ9.0	9.50±0.3	0.30±0.08	≤4.50	0.56±0.10	4.7~8.0
RND 465-00977	Φ12	12.5±0.3	0.30±0.08	≤6.00	0.56±0.10	6.2~11.0
RND 465-00978	Φ18	19.0±0.5	0.35±0.10	≤9.00	0.70±0.10	9.3~17.0
RND 465-00979	Φ25	26.0±0.5	0.45±0.12	≤12.50	0.90±0.15	12.8~24.0
RND 465-00980	Φ40	41.5±1.0	0.50±0.12	≤20.00	1.00±0.15	21~39
RND 465-00981	Φ50	≥50	0.50±0.15	≤25.00	1.10±0.20	26~49

Note: These products (above Φ30) are considered as G Tubes(comply with (EU)2015/863(RoHS2.0))

Environmental material

This specification promise that our products nonuse materials as below. Four heavy metals、PBB、PBDE etc, have passed the SGS inspection. We also promise that meet SONY-SS-00259, REACH standard. The environmental characteristics are listed in table 3.

TABLE 3 Halogen Free Flame-Retardant Heat shrinkable Tube environmental characteristics

Harmful Materials	Content	Test Method
PBBS	≤1000ppm	IEC62321
PBDES	≤1000ppm	IEC62321
DBP	≤1000ppm	IEC62321
BBP	≤1000ppm	IEC62321
DEHP	≤1000ppm	IEC62321
DIBP	≤1000ppm	IEC62321
Cr6+	≤1000ppm	IEC62321
Pb	≤1000ppm	IEC62321
Hg	≤1000ppm	IEC62321
Cd	≤100ppm	IEC62321
Cl	≤900ppm	EN 14582 Method B
Br	≤900ppm	EN 14582 Method B

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Material Composition

Halogen Free Flame-Retardant Heat shrinkable Tube of RND is a flame retardant tubes made from Polyolefin and Flame-Retardant Material etc. The contents of Pb,Cd,Hg,Cr6+,PBBS,PBDES are all confirmed to requirements of (EU) 2015/863 (RoHS2.0) standards. The contents of Cl and Br confirmed to SONY-SS-00259 standards. The main components as follows:

Raw Material Name		Using aim	Content
Name	make up of		
Ethylene-vinyl acetate copolymer	$(\text{CH}_2\text{-CH}_2)_m - (\text{CH}_2\text{-CH-COOCH}_3)_n$	Main Material	50%
Magnesium hydroxid	$\text{Mg}(\text{OH})_2$	Flame-Retardant Material	35%
Phosphorus	P	Flame-Retardant Material	10%
Color Material Grain	Pigment	Colorant Material	5%
Printing ink	Ink	Printing ink	—

Technology Documents

ISO9001 certificate
ISO14001 certificate
ISO/TS16949 certificate
UL/cUL certificate