深圳市沃尔核材股份有限公司
SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO.,LTD.

Product Specification

Edition : A/1

Product Name	Halogen FreeFlame-retardant Heat Shrinkable Tube	Supplier Code	
spec	All specs	Customer Code	

Supplier Conform:(The Electronic Department of Shenzhen Woer Heat-shrinkable Material Co,Ltd)

Maker / Date	Reviewer / Date
Songlin Fan / Jan 15 2016	Da chun Song / Jan 15 2016

Customer Conform: (The Sale Department of Shenzhen Woer Heat-shrinkable Material Co,Ltd)

Customer Approved / Date		

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1 CONTENT AND APPLICATIONS

This specification defines technical requirement, testing method, testing rules and packing of heat shrinkable tubes.

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，corrosion-proof of metallic rods or tubes and antenna protection，wire and other sign of products.

2 STANDARD

Standard for Extruded Electrical Tubing UL 224

3 TERMS

3．1 heat shrinkable material.

Radiate the tubes to make it cross linked and heating and expand it.

3．2 Heat shrinkable tubes

Extrude the tubes to the required size, radiate to make it cross linked, then expand and cool the tubes.

3.3 green RSFR halogen free flame retardant normal wall heat shrinkable tube

Increase certain free retardant dose without halogen and heavy metal, reach the standard of flame retardant and environment.

4.TECHNICAL REQUIREMENT

4．1 CONDITIONS

4．1．1 Temperature ranges：-55℃～125℃。

4．1．2 Use under acid and alkali.

4．1．3 Use with strict requirement about environment.

4．2 appearance

4．2．1 No cracking in appearance.

4．2．2 Smooth, no oil or duty in appearance.

4．2．3 Printing clear.

4．3 heat shrinking property

4．3．1 shrinking temperature 70℃；shrunk totally at 125℃ for thin wall tubes，

4．3．2 longitudinal shrinking less than±5%

4．4 Physical and Chemical Propertyrefer to table 1

4．5 Thin wall tubes specification refer to table2. Normal tube Specification refer to table 3，

4．6 Standard Color: Black、Red、Blue、Yellow、Green、White,Other colors such as purple、Grey、Brown can be made according to the customer's requirements.

4．7　The Method of Used

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 ℃. In particular, when the heat shrinkable sleeve into the oven process, 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 reach the set temperature and keep the temperature for 3 minutes in the actual temperature oven, heat shrinkable sleeve can complete contraction in place.

TABLE 1　PROPERTY

ITEM			TESTING METHOD	REQURIMENT
Physical	Tensile strength /MPa		GB/T1040	≥10.4
	Elongation/%		GB/T1040	≥200
	Tensile strength afer aging/MPa		UL224；158℃×168hr	≥7.3
	Elongation after aging/%		UL224；158℃×168hr	≥100
	Heat Resistance		UL224；250℃×4hr	No viscidity No cracking
	Cold Blend		UL224；-30℃×1hr	No cracking
Electrical	Dielectric Withstand	300V	UL224	1500V,1minute without breakdown
		600V	UL224	2500V,1minute without breakdown
	Dielectric Strength KV/mm		GB/T1408	≥15
	Volume resistance /Ω•cm		GB/T1410	≥1×10^{14}
Chemical	Anti Corrosion		UL224；158℃×168hr	PASS
	Copper　stability		UL224；158℃×168hr	PASS
	Flammability		UL224	☆

Note: yellow and white flame retardant performance needs to be improved, the other can reach the required color flame retardant properties

Table 2 Thin wall Halogen free heat shrinkable tubes specifications

Spec (mm)	As supplied (mm)		After recovery (mm)		Packing	application (mm)
	I.D	W.T.	I.D	W.T.	meter/spool	I.D
Φ0.6CB	0.90±0.2	0.13±0.05	≤0.40	0.20±0.10	200	0.4～0.7
Φ0.8CB	1.10±0.2	0.13±0.05	≤0.50	0.20±0.10	200	0.6～0.8
Φ1.0CB	1.40±0.2	0.13±0.05	≤0.65	0.20±0.10	200	0.7～1.0
Φ1.5CB	1.90±0.2	0.13±0.05	≤0.85	0.20±0.10	200	0.9～1.4
Φ2.0CB	2.40±0.2	0.13±0.05	≤1.00	0.22±0.10	200	1.1～1.8
Φ2.5CB	2.90±0.2	0.13±0.05	≤1.30	0.25±0.10	200	1.4～2.3
Φ3.0CB	3.40±0.2	0.13±0.05	≤1.50	0.28±0.10	200	1.6～2.7
Φ3.5CB	3.90±0.2	0.13±0.05	≤1.80	0.28±0.10	200	1.9～3.2
Φ4.0CB	4.40±0.2	0.15±0.05	≤2.00	0.30±0.10	200	2.1～3.6
Φ4.5CB	4.90±0.2	0.15±0.05	≤2.30	0.30±0.10	100	2.4～4.0
Φ5.0CB	5.50±0.2	0.15±0.05	≤2.5	0.32±0.10	100	2.6～4.5
Φ6.0CB	6.50±0.2	0.15±0.05	≤3.0	0.32±0.10	100	3.1～5.4
Φ7CB	7.50±0.3	0.15±0.05	≤3.5	0.32±0.10	200	3.7～6.3
Φ8CB	8.50±0.3	0.15±0.05	≤4.0	0.32±0.10	200	4.2～7.2
Φ9CB	9.50±0.3	0.15±0.05	≤4.5	0.35±0.10	200	4.7～8.0
Φ10CB	10.5±0.3	0.15±0.05	≤5.0	0.35±0.10	200	5.2～9.0
Φ11CB	11.5±0.3	0.18±0.05	≤5.5	0.40±0.10	200	5.7～10.0
Φ12CB	12.5±0.3	0.20±0.05	≤6.0	0.40±0.10	200	6.2～11.0
Φ13CB	13.5±0.3	0.20±0.05	≤6.5	0.40±0.10	200	6.7～12.0
Φ14CB	14.5±0.3	0.20±0.05	≤7.0	0.40±0.10	200	7.3～13.0
Φ15CB	15.5±0.4	0.20±0.05	≤7.5	0.40±0.10	200	7.8～14.0
Φ16CB	16.5±0.4	0.22±0.05	≤8.0	0.40±0.10	200	8.3～15.8
Φ17CB	17.5±0.4	0.22±0.05	≤8.5	0.40±0.10	200	8.8～16.0
Φ18CB	18.5±0.4	0.22±0.05	≤9.0	0.42±0.10	200	9.3～17.0
Φ20CB	20.5±0.5	0.25±0.05	≤10.0	0.45±0.10	200	10.5～19.0
Φ22CB	22.5±0.5	0.25±0.05	≤11.0	0.45±0.10	200	11.5～20.5
Φ25CB	25.5±0.5	0.25±0.05	≤12.5	0.45±0.10	100	13.0～24.0
Φ28CB	28.5±0.5	0.30±0.08	≤14.0	0.60±0.10	100	14.5～27.0

TABLE 3 NORMAL HEAT SHRINKABLE TUBES SPECIFICATION

Spec (mm)	As supplied (mm)		After recovery (mm)		Old Packing	New Packing	application (mm)
	I.D	W.T.	I.D	W.T.	meter/ spool	meter/ spool	I.D
Φ0.5	0.8±0.2	0.18±0.05	≤0.30	0.33±0.10	400	400	0.3～0.6
Φ0.6	0.9±0.2	0.18±0.05	≤0.40	0.33±0.10	200	400	0.4～0.7
Φ0.8	1.1±0.2	0.18±0.05	≤0.50	0.33±0.10	200	400	0.6～0.8

Spec (mm)	As supplied (mm)		After recovery (mm)		Old Packing	New Packing	application (mm)
Φ1.0	1.5±0.2	0.20±0.05	≤0.65	0.36±0.10	200	400	0.75～0.9
Φ1.5	2.0±0.2	0.20±0.05	≤0.85	0.36±0.10	200	400	0.95～1.4
Φ2.0	2.5±0.2	0.20±0.05	≤1.00	0.45±0.10	200	400	1.1～1.8
Φ2.5	3.0±0.2	0.20±0.05	≤1.30	0.45±0.10	200	400	1.35～2.3
Φ3.0	3.5±0.2	0.23±0.05	≤1.50	0.45±0.10	200	400	1.6～2.7
Φ3.5	4.0±0.2	0.23±0.05	≤1.80	0.45±0.10	200	400	1.85～3.2
Φ4.0	4.7±0.2	0.25±0.05	≤2.00	0.45±0.10	200	400	2.1～3.6
Φ4.5	5.0±0.2	0.28±0.05	≤2.30	0.56±0.10	100	200	2.35～4.0
Φ5.0	5.5±0.2	0.28±0.05	≤2.50	0.56±0.10	100	200	2.6～4.5
Φ6.0	6.5±0.2	0.28±0.05	≤3.00	0.56±0.10	100	200	3.1～5.4
Φ7.0	7.5±0.3	0.30±0.05	≤3.50	0.56±0.10	100	100	3.7～6.3
Φ8.0	8.5±0.3	0.30±0.08	≤4.00	0.56±0.10	100	100	4.2～7.2
Φ9.0	9.5±0.3	0.30±0.08	≤4.50	0.56±0.10	100	100	4.7～8.0
Φ10	10.5±0.3	0.30±0.08	≤5.00	0.56±0.10	100	100	5.2～9.0
Φ11	11.5±0.3	0.30±0.08	≤5.50	0.56±0.10	100	100	5.7～10
Φ12	12.5±0.3	0.30±0.08	≤6.00	0.56±0.10	100	100	6.2～11
Φ13	13.5±0.3	0.35±0.08	≤6.50	0.56±0.10	100	100	6.7～12
Φ14	14.5±0.3	0.35±0.10	≤7.00	0.70±0.10	100	100	7.3～13
Φ15	15.5±0.4	0.35±0.10	≤7.50	0.70±0.10	100	100	7.8～14
Φ16	16.5±0.4	0.35±0.10	≤8.00	0.70±0.10	100	100	8.3～15
Φ17	17.5±0.4	0.35±0.10	≤8.50	0.70±0.10	100	100	8.8～16
Φ18	19.0±0.5	0.35±0.10	≤9.00	0.70±0.10	100	100	9.3～17
Φ20	22.0±0.5	0.40±0.10	≤10.00	0.83±0.10	100	100	10.4～19
Φ22	24.0±0.5	0.40±0.12	≤11.00	0.83±0.15	100	100	11.4～21
Φ25	26.0±0.5	0.45±0.12	≤12.50	0.90±0.15	50	50	12.8～24
Φ28	29.0±0.5	0.45±0.12	≤14.00	0.90±0.15	50	50	14.4～29
Φ30	31.5±1.0	0.45±0.12	≤15.00	1.00±0.15	50	50	16～29
Φ35	36.5±1.0	0.45±0.12	≤17.50	1.00±0.15	50	50	18～34
Φ40	41.5±1.0	0.50±0.12	≤20.00	1.00±0.15	50	50	21～39
Φ45	46.5±1.0	0.50±0.15	≤22.50	1.00±0.20	25	25	23.5～44
Φ50	50.0±3.0	0.50±0.15	≤25.00	1.10±0.20	25	25	26～49

Note: These products (above Φ30) are considered as G Tubes(comply with RoHS2.0(2011/65/EU),You should note in the order if you need halogen-free tubes.

4.8

This acknowledgment promise not to use the following material,Four heavy metal, halogen and through the SGS test. Halogen free flame retardant shrinkage sleeve environmental characteristics listed in table 4.

Table 4 Environment Friendly Characteristics

Substances	Content	Test Method
（F）	≤200PPM	EN 14582 Method B
（Cl）	≤900ppm	EN 14582 Method B
（Br）	≤900ppm	EN 14582 Method B
（I）	≤200PPM	EN 14582 Method B
（Cd）	≤5ppm	IEC 62321
（Pb）	≤90ppm	IEC 62321
（Cr^{6+}）	≤5ppm	IEC 62321

Note：Cl + Br<1500ppm

5 Material Composition

Halogen Free Flame-retardant Heat Shrinkable Tube of Shenzhen Woer Heat-Shrinkable Material Co.,Ltd. is a flame retardant tubes made from Polyolefin and Flame-Retardant Material etc. The contents of Pb,Cd,Hg,Cr 6+ ,PBB,PBDE are all confirmed to requirements of Sony-SS-00259 and RoHS2.0(2011/65/EU) standards. The composition as follows:

Raw Material Name		Using aim	Content	Manufacturer	CAS No.
English Name	make up of				
Ethylene-vinyl acetate copolymer	(CH2-CH2)m-(CH2-CH-COOCH3)n	Main Material	50%	China Sinopec	24937-78-8
Magnesium hydroxid	$Mg(OH)_2$	Flame-Retardant Material	35%	Jinhaohui Material Co.,Ltd.	1309-42-8
Phosphorus	P	Flame-Retardant Material	10%	Shanghai Haiyi Co.,Ltd	7723-14-0
Color Material Grain	Pigment	Colorant Material	5%	Huawangcai Co.,Ltd.	—
Printint ink	Ink	Printint ink	—	Shanghai Jiexin Co.,Ltd.	—

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