

SPECIFICATION**For****FS/LH-0.6/1KV-XLPE (C)**

0.6/1(1.2)kV Copper Conductor Mica fire-barrier

XLPE Insulated Fire Resistant and Flame Retardant

With Low Smoke and Zero Halogen Single Core Cable

(0.6/1(1.2)kV, Cu/Mica/FR-LSOH-XLPE)

BY



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CUSTOMER

Rev.	Date	Description
0	24/09/2019	Issued specification
1	24/03/2021	Correct the standard reference test

Customer Document	Rev.

Remark:

This document is based on the Customer Document for the structure and properties of electric wire and cable only. If there are different points, will be shown in deviation table.

1. Scope

This specification covers 1000V copper conductor mica fire-barrier cross-linked polyethylene (FR-LSOH-XLPE) insulated fire resistant and flame retardant with low smoke and zero halogen power cable.

The cable shall be based on BS EN 50525-3-41 : 2011.

The complete cable shall meet the fire-resistant test according to BS 6387 Category CWZ.

Remark : Resistance to fire with water (W) and with mechanical shock (Z) ; Not all sizes or types of cable with overall diameters greater than 20 mm. can be presently accommodated with in the standard and guidance on testing, these cables should be sought from the manufacturer.

The completed cables shall meet the flame test requirements including BS EN 60332-1-2 : 2004, BS EN IEC 60332-3-24 : 2018 and BS EN IEC 60332-3-22 : 2018.

The cables shall have limited evolution of smoke when assessed under the fire conditions as specified in BS EN 61034-2 : 2005.

The corrosive and acid gas emission when assessed under the fire conditions as specified in BS EN 60754-1 : 2014 and BS EN 60754-2 : 2014.

2. Conductor

For size $\leq 6 \text{ mm}^2$:

The conductor shall be non-compacted concentric stranded uncoated annealed copper conductor in accordance with BS EN 60228, Class 2.

The direction of lay shall be left-hand (S) lay.

For size $\geq 10 \text{ mm}^2$:

The conductor shall be compacted concentric stranded uncoated annealed copper conductor in accordance with BS EN 60228, Class 2.

The direction of lay shall be reversed in successive layers and left-hand (S) lay in the outermost layer.

3. Fire Barrier Tape

The mica tape shall be longitudinally applied over the conductor.

4. Insulation

The insulation shall be flame retardant, low smoke and zero halogen cross-linked polyethylene (FR-LSOH-XLPE) compound type EI5 meet the requirements of BS EN 50363-5.

The average thickness of the insulation shall be not less than that given in Table 2.


The minimum thickness shall not fall below the value given in Table 2 by more than 10 plus 0.1 mm.

The color of the insulation shall be orange.

The insulation shall be corrosive and acid gas emission meeting the requirements in BS EN 50525-3-41 : 2011 a test method specified in BS EN 60754-1 : 2014 and BS EN 60754-2 : 2014.

5. Marking on Cable

The marking items shall be printed with suitable means throughout the length of cable.

"  YAZAKI (Year) 600/1000V 90°C LSOH XLPE INSULATED (Core x Size) SQ.MM.
FS/LH-0.6/1KV-XLPE (C) : BS EN 60332-1, BS EN IEC 60332-3-22, BS EN 60754-1,
BS EN 60754-2, BS EN 61034-2, BS 6387 CAT. CWZ : TYE"

The continuous reel length marking (in figure) shall be made on the insulation at every 1 meter (For size $\geq 25 \text{ mm}^2$).

6. Test and Properties

The cable shall be meet the requirements in Table 1 and Table 2 when tested in accordance with BS EN 50525-3-41 : 2011, BS 6387 Cat. CWZ, BS EN 61034-2 : 2005, BS EN 60754-1 : 2014, BS EN 60754-2 : 2014, BS EN 60228, BS EN 60332-1-2 : 2004, BS EN IEC 60332-3-24 : 2018 and BS EN IEC 60332-3-22 : 2018.

Remark: For longer life of cable should be avoid exposure to direct solar radiation it necessary, cover is required.

7. Packing

The cable shall be placed on non-returnable wooden reels.

The reels shall be covered with suitable covering to provide the cable with physical protection during transportation and during ordinary storage and handling operations.

Each reel shall be clearly marked as follows.


1. Designation "FS/LH-0.6/1KV-XLPE (C)"
2. Number of core and size of conductor
3. Cable length
4. Net and gross weight
5. Manufacturer's name and/or trade mark "  YAZAKI "
6. Rolling direction of reel

Table 1 Test and Inspection

Test	Standard	Requirements
Routine Tests		
- AC test voltage for 5 minutes	IEC 60502-1 : 2004	3.5kV
- Absence of faults on insulation	BS 6387: 2013	No Breakdown
Sample Tests		
- Conductor Construction	BS EN 60228	Specified in Table 2
- Corrosive and acid gas of insulation		
Acid gas emission test	BS EN 60754-1 : 2014	
- Bromine and chlorine content (HCl)		$\leq 0.5\%$
pH and conductivity test	BS EN 60754-2 : 2014	
- pH		≥ 4.3
- Conductivity		$\leq 10 \mu\text{S/mm}$
- Conductor resistance	BS EN 60228	Specified in Table 2
- Insulation resistance $90 \pm 2^\circ\text{C}$	BS 6387: 2013	Table 3 ; BS EN 50525-3-41 : 2011
- Voltage test on complete at 2500 V 15 min.	BS 6387: 2013	No Breakdown
- Fire test on single core	BS EN 60332-1-2 : 2004	$> 50 \text{ mm.}$
- Smoke emission	BS EN 61034-2 : 2005	Light transmittance $\geq 60 \%$

Definition concerning the tests

Routine tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

Sample tests: Tests made by the manufacturer on samples of completed cable or components taken from a completed cable, at a specified frequency, so as to verify that the finished product meets the specified requirements.

Type tests: Tests made before supplying, on a general commercial basis, a type of cable covered by this standard, in order to demonstrate satisfactory performance characteristics to meet the intended application.

Table 1 Test and Inspection (Continuous)

Test	Standard	Requirements
Type Tests		
- Material of insulation	BS EN 50363-5 : 2005	Table 2 ; EI 5
- Shrinkage test at $130 \pm 2^{\circ}\text{C}$ for 1 h	BS EN. 60811-1-3	$\leq 4\%$
- Fire resistant Test	BS 6387 Cat. CWZ	No Breakdown
- Fire test on multiple cable	BS EN IEC 60332-3-24 : 2018 and BS EN IEC 60332-3-22 : 2018	Charred portion ≤ 2.5 m.

Definition concerning the tests

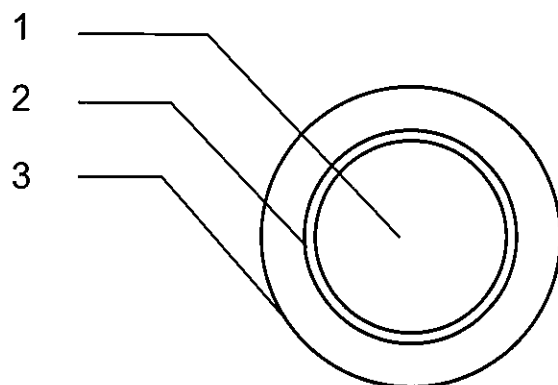
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Cable structure

Cross-sectional (Not scale)



No.	Structure	Material
1	Conductor	Non-Compacted & Compacted concentric stranded annealed copper
2	Fire Barrier	Mica Tape
3	Insulation	Flame retardant, Low smoke and Zero halogen Cross-linked Polyethylene (FR-LSOH-XLPE)

Application: For fixed installation in electrical cabinet, conduit and wire way which provide flame retardant, low smoke and non toxic emission under fire. Maximum conductor temperature of 90°C for normal operation and 250°C for short circuit conditions.

Table 2

No. of core	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	Overall diameter approx. (mm)	Conductor resistance at 20°C maximum (Ohm/km)	Weight of cable approx. (kg/km)	Standard packing length (m)
1	1.5	7/Non-compacted	1.59	0.7	4.3	12.1	30	500
1	2.5	7/Non-compacted	2.01	0.8	4.8	7.41	40	500
1	4	7/Non-compacted	2.55	0.8	5.3	4.61	60	500
1	6	7/Non-compacted	3.12	0.8	5.9	3.08	80	500
1	10	7/Compacted	3.80	1.0	6.6	1.83	120	500
1	16	7/Compacted	4.80	1.0	7.6	1.15	180	500
1	25	7/Compacted	6.00	1.2	9.2	0.727	270	500
1	35	7/Compacted	7.10	1.2	10.5	0.524	360	500
1	50	19/Compacted	8.30	1.4	12.0	0.387	490	500
1	70	19/Compacted	9.90	1.4	13.5	0.268	700	500
1	95	19/Compacted	11.70	1.6	16.0	0.193	950	500
1	120	37/Compacted	13.20	1.6	17.5	0.153	1200	500
1	150	37/Compacted	14.60	1.8	19.0	0.124	1500	500
1	185	37/Compacted	16.30	2.0	22	0.0991	1850	500
1	240	61/Compacted	18.70	2.2	24	0.0754	2400	500
1	300	61/Compacted	20.90	2.4	27	0.0601	3000	500
1	400	61/Compacted	23.50	2.6	30	0.0470	3800	500
1	500	61/Compacted	26.70	2.8	34	0.0366	4900	500
1	630	61/Compacted	30.30	2.8	37	0.0283	6000	500