

**SPECIFICATION****For****FRLH-IE (0010)**

450/750V Copper Conductor XLPE Insulated Flame Retardant

With Low Smoke and Zero Halogen Single Core Cable

(450/750V, Cu/FR-LSOH-XLPE)

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Rev.	Date	Description
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CUSTOMER

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 450/750V copper conductor cross-linked polyethylene (FR-LSOH-XLPE) insulated flame retardant with low smoke and zero halogen single core cable.

The wire shall be in accordance with BS EN 50525-3-41 : 2011.

The finished cables shall meet the flame test requirements per BS EN 60332-1-2 : 2004 and BS EN 60332-3-24 : 2009.

The cables shall have limited evolution of smoke and corrosive gases when assessed under the fire conditions as specified in BS EN 61034-2 : 2005 and BS EN 50267-2-2 : 1999.

## 2. Conductor

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 left-hand (S) lay in the outermost layer.

## 3. 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 or black or green.

The insulation shall be low corrosive gases emission meeting the requirements in BS EN 50525-3-41 : 2011 a test method specified in BS EN 50267-2-2 : 1999.

## 4. Marking on Cable

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

"  YAZAKI (Year) H07Z-R (Core x Size) SQ.MM. FRLH-IE : TYE"

The continuous reel length marking (in figure) shall be made on the insulation at every 1 meter

## 5. 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 EN 61034-2 : 2005, BS EN 50267-2-2 : 1999, BS EN 60228, BS EN 60332-1-2 : 2004 and BS EN 60332-3-24 : 2009.

## 6. Packing

The finished wire shall be placed on the non-returnable wooden reels .

The reels shall be lagged to provide the cable with physical protection during transportation and during ordinary storage and handling operation.

Each package shall be clearly marked as follows.

1. Designation "FRLH-IE (0010)"
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
<b>Routine Tests</b>		
- Max. Conductor resistance, Ohm/km	BS EN 60228	Specified in Table 2
- AC test voltage for 5 minutes	IEC 60502-1 : 2004	3.5kV
- Absence of faults on insulation	BS EN 50525-3-41 : 2011	No Breakdown
<b>Sample Tests</b>		
- Corrosive and acid gas of insulation		
- pH	BS EN 50267-2-2 : 1999	$\geq 4.3$
- Conductivity	BS EN 50267-2-2 : 1999	$\leq 10 \mu\text{S/mm}$
- Insulation resistance $90 \pm 2^\circ\text{C}$	BS EN 50525-3-41 : 2011	Table B.1; BS EN 50525-3-41 : 2011
- Voltage test on complete at 2500 V 15 min.	BS EN 50525-3-41 : 2011	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 $\geq 60\%$
<b>- Type Tests</b>		
- 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 test on multiple cable	BS EN 60332-3-24 : 2009	Charred portion $\leq 2.5 \text{ m.}$

**Definition concerning the tests**

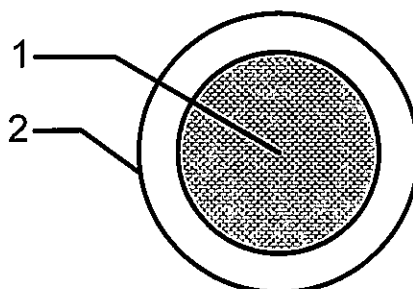
**Routine tests:** Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

**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.

### Cable structure

Cross-sectional (Not scale)



No.	Structure	Material
1	Conductor	Compacted concentric stranded annealed copper
2	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**

Size (mm <sup>2</sup> )	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 wire approx. (kg/km)	Standard packing length (m)
25	7/Compacted	6.00	1.2	9.0	0.727	260	500
35	7/Compacted	7.10	1.2	10.0	0.524	360	500
50	19/Compacted	8.30	1.4	11.5	0.387	480	500
70	19/Compacted	9.90	1.4	13.0	0.268	650	500
95	19/Compacted	11.70	1.6	15.5	0.193	950	500
120	37/Compacted	13.20	1.6	17.0	0.153	1200	500
150	37/Compacted	14.60	1.8	19.0	0.124	1500	500