

# LOW SMOKE&FUME ZERO HALOGEN WIRES & CABLES

BS 7211 | BS 6724 | IEC 60502-1  
CONTENTS

**GENERAL**  
INTRODUCTION

1

## LOW SMOKE&FUME WIRES AND CABLES

4

INTRODUCTION

## XLPE INSULATED LSFOH SHEATHED CABLES

12

WIRES

13

COPPER | UNARMoured

17

ALUMINUM WIRE ARMoured CABLES | COPPER

18

STEEL WIRE ARMoured CABLES | COPPER



# GENERAL

## INTRODUCTION

---

Bahra Cables Company was established in 2008 to serve Saudi & GCC Markets. It is based in Bahra industrial city located 25km from Jeddah. Bahra Cables Factory occupies over 200,000 square meters of prime manufacturing space together with associated design offices, laboratories and storage area. It specializes in Manufacturing and Distributing Electric Cables.

Bahra Cables Company is committed to the production of the best product quality and service, utilizing cutting edge European Technology in its manufacturing. The core technologies in production processes, material applications and logistic procedures were provided by German experts with key functions being managed by German engineers.

The organization has a lean vertical management structure which is designed to integrate with a highly developed IT-based structure. This partnership allows the rapid flow of information through the management chain and facilitates timely response in the best traditions of 'hands on' management. Bahra Cables Company has the flexibility to provide a versatile product range to serve the construction, electric utilities, distribution, industrial, oil & gas and petrochemical sectors. The cables produced comply with both American standards ( UL , ANSI and ICEA ) and European standards ( IEC, BS, NF and VDE specifications.)

The scope of this catalogue is to provide an in depth view of the technical information of the low voltage cables 0.6/1.0KV, with PVC or XLPE insulation to IEC 60502-1 and XLPE insulation to BS 5467.

Bahra Cables Company Catalogues is about Control & Auxiliary cables, Power and control Tray Cables to UL 1277, cables having low emission of smoke and corrosive gases (LSF) to IEC60502-1 or BS 6724 are available upon request.

### AREA

Bahra Cables Company has a total land area of about 200,000sqm at disposal.

The built area, including offices and plant, of start up phase is more than 30,000sqm.

The factory extension under construction is more than 20,000sqm already.

The total available stock yard for storage is more than 20,000sqm

## PRODUCT SCOPE

BAHRA CABLES COMPANY is committed to deliver the highest standard wires and power cables to the local market, GCC and for export.

To do so, Bahra Cables Company produces a versatile product range cover most of our customer needs:

- Flexible wires and cables up to 300 mm<sup>2</sup> to IEC 60227 , BS 6004 & BS 6500 .
- Building wires, THHN/THWN & THW to UL 8.3, with conductor sizes starting from 16 AWG.
- Thermosetting insulated wires types XHHW-2 , XHHW, XHH, RHW-2, RHW & RHH to UL44
- Building wires ( NYA) to IEC 60227 and BS 6004, from 1.5 mm<sup>2</sup> and above.
- LV power Cables with PVC and XLPE insulation to IEC 60502-1, BS 5476, BS 7889 and UL 1277.
- MV cables to IEC 60502-2 up to 18/30 (36) kv and to BS 6622 up to 19/33 (36) kv.
- Low smoke and fume , zero halogen building wire ( LSFZH) to BS 7211 , with thermo setting insulation which is alternative to wire type (NYA) , where the application requires higher standards of safety against the emission of smoke, fumes and toxic gases.
- LV cables with LSFZH, thermosetting insulation which under exposure of to fire generate low emission of smoke, fumes and toxic gases and zero halogens. The cables are produced according to BS 6724, IEC 60502-1 and tested to IEC 61034 , IEC 60754 & IEC 60332.
- MV cables with LSFZH to BS 7835.
- HV cables up to 69 kv to IEC 60840, and to ANSI / ICEA S-108-720, with conductor sizes up to 1200 mm<sup>2</sup>.

The future product scope will be extended to Extra High Voltage cables up to 480 kv and conductor cross sections bigger than 2000 mm<sup>2</sup>.

## FACTORY MACHINERY

All production machines are top of the line of the cables machinery suppliers. From start up with wire drawing lines to extrusion lines, to assembly machines up to the laboratories and the final test fields, all technical equipment is provided with the highest European standards of electronic control equipment and measuring devices which insures that the requirements of different quality standards are met.

All machines/production lines are prepared for data communication and data exchange bottom up and top down using the most modern decentralized control software at the lines (PLC) combined with an efficient central steering and a planning system focused on the demand of cable manufacturers. This way, full traceability will be guaranteed from production start to end, by being able to follow up the machines involved and the material used.

## LOGISTICS

All material flow in BCC from incoming raw material up to outgoing cables will be planned and controlled by a complete software system. Herein a classical ERP system will be enhanced and completed by the most modern MES (Manufacturing Executive System) which has a unique focus on the specific problematic issues of cables manufacturing with longitudinal products being wound up and wound off.

The Manufacturing Executive System - MES - covers:

## PLANNING

The planning system is active on several levels. For the proper function, all master data (material properties, dimensions, etc.) are saved and permanently maintained in the central database based on

- Cable design
- Planning of Sales Orders
- Planning of Production Orders

## DATA COMMUNICATION

The exchange of data is important in several areas.

- Incoming inspection
- Raw Materials - Status quo of production orders
- Finished goods
- Shipping status



# LOW SMOKE & FUME WIRES AND CABLES

## INTRODUCTION

The increase of safety awareness against fire risk inside buildings has raised the requirements for electrical installation using wire and cable having low emission of smoke and corrosive gases when affected by fire to safe people, building, equipments and the environment.

Bahra cables provides its customers with a high quality cables with low smoke , low fume and corrosive gases, zero halogen manufactured and tested to the heist international standards assuring the ultimate safe electrical installations.

## FEATURES

Halogen is added to the plastics used in conductor's insulation and to cable sheathing in order to increase the aspects of flame retardant and give it the property of self-extinguish such as PVC which contain chlorine atom. Chlorine is one of halogens as Fluorine, Bromide and Iodine. But, in case of fire, halogens produce great amount of smoke that hamper visibility required for escaping from a dangerous places or trying to find an exit out.

Additionally, the action of burning generates amounts of asphyxiating gases (PVC produces HCl, CO & CO<sub>2</sub>) which dissolves in the fluids of the human body organs like lungs, nose and eye causing cell damage, shortage of oxygen and suffocation.

Because of these risks, it is not proper to use cables that contain halogens when installing cables in places crowded with people.

Corrosive gases generating by burning have a sever effect in damaging the metals, equipments and electronic components inside buildings.

Low smoke and fume, zero halogen insulation and sheathing material is used in cables have several advantages in reducing the risk of fire as:

- The smoke density of burnt cables is to minimum, allow people to evacuate safely from the building, and rescue groups to act efficiently.
- No halogens / toxic fumes or asphyxiating gases.
- No Corrosive gases damage the hardware.
- Cables are flame retardant, preventing the flame spread.
- Ozone and Environmental freindly

Several different abbreviations are usually used to inscribe Low smoke, zero halogen compounds, for example:

Abbreviation	Description
LSFOH	Low Smoke and Fume Zero Halogen
LSOH	Low Smoke Zero Halogen
OH-LSF	Zero Halogen , Low Smoke and Fume
LSFH	Low Smoke and Free of Halogen
HFFR	Halogen Free Flame RetardantGrey
LSOH-XL	Low Smoke Zero Halogen, Cross Linked (Thermosetting compound)

# LOW SMOKE & FUME WIRES AND CABLES

## INTRODUCTION

### APPLICATION

Several critical buildings where safety against fire is mandatory to reduce the risk death or injured personals, as example:

MOSQUES

SCHOOLS&UNIVERSITIES

HOSPITALS

MARKETS&MALLS



AIRPORTS

RECREATIONAL PLACES  
& AMUSEMENT PARKS

INDOOR WORK - PLACES

### Types of Low Smoke and fume, Zero Halogen wires and cables

- Building wires 450/750 V to BS 7211
- Non armoured cables 450/750 V BS 7211
- Non-Armoured cables to IEC 60502-1
- Armoured cables to IEC 60502-1 & BS 6724

# LOW SMOKE & FUME WIRES AND CABLES

## INTRODUCTION

### CABLE STRUCTURE

#### 1.0 CONDUCTORS

A conductor is the metallic part of cables that is carrying the electric current. Conductor materials are:

- 1.1 Plain annealed or tin coated copper conductor (to BS EN 1977, ASTM B3, ASTM B49 & ASTM B 33)

The conductor structure is complying to the requirements of BS EN 60228 (IEC 60228) class 2 stranded, non Compacted, compacted or compacted sector shaped conductors.

The shape codes are:

re, round solid  
rm, round stranded  
rmc, round compacted stranded  
sm, sectoral stranded

#### 2 INSULATION

- 2.1 Each core conductor is insulated by extruded plastic material as will follow; the insulation thickness is selected based on the designated voltage rate complying with BS7211 for 450/750KV and IEC 60502-1 & BS 6724 suitable for 0.6/1.0 KV.

- 2.2 The insulation integrity is controlled online by an AC spark tester with test methods specified in BS EN 62230 and using test voltage specified in BS 5099.

- 2.3 Insulation Material :  
Insulation material is selected to match the desired customer requirements and customer specification.

- 2.3.1 Low Smoke Zero Halogen, Cross Linked flame retardant type **EI 5** conforming to BS 7655-5.1

- 2.3.2 Low Smoke Zero Halogen, Cross Linked XLPE complying with IEC 60502, and to the requirements of **GP-8** type as specified in BS 7655-1.3

- 2.3.3 Bahra Cables' stranded insulation color codes are described in Table-1 (i.e. used in the products of this catalogue), meanwhile the color code as per BS 6724 is offered to our customers upon their request.

Table 1: Insulated Core Color Codes

Number of Cores	Colors to IEC 60502-1	Colors to BS 6724 (A:2008)
1	Red or Black	Brown or Blue
2	Red & Black	Brown & Blue
3	Red, Yellow and Blue	Brown, Black and Grey
4	Red, Yellow, Blue and Black	Blue, Brown, Black and Grey
5	Red, Yellow, Blue, Black and Green / Yellow	Green / Yellow, Blue, Brown, Black and Grey

# LOW SMOKE & FUME WIRES AND CABLES

## INTRODUCTION

---

### 3.0 CABLE ASSEMBLY

The Insulated cores are laid up together to form the laid up cable cores. Extruded suitable polymer compound or non-hygroscopic polypropylene filler is applied (when required) between laid up cores to provide a circular shape to the cable.

Suitable polymeric tape(s) is used as a barrier tape over the laid up cores. Such tape(s) will bind the cores together and prevents them from opening out, acts as a separator between different polymers used in a cable and works as a heat barrier between the cores and the extruded bedding.

### 4.0 BEDDING

It could be also called inner sheath, which serves as a bedding under cable armouring to protect the laid up cores and as a separation sheath. Suitable low smoke and fume zero halogen material is used as bedding material.

### 5.0 ARMOURING

The cable intended for tray application is protected enough and does not require an armour in general, while it is recommended to have an armour for the cable intended for Direct Burial applicable. The armour provides mechanical protection against crushing forces. Armour also can serve as an Earth Continuity Conductor (ECC). The armouring type could be:

- 5.1 One layer of Galvanized Round Steel Wire to BS EN 10257 is applied helically over the bedding.
- 5.2 Aluminum wire armouring for a single Core Cable acts as non magnetic armour.

### 6.0 OUTERSHEATH (OUTERJACKET)

- 6.1 It is the outer protection part of the cable against the surrounding environment. Halogen Free Flame Retardant (HFFR) compounds complying with ST8 to IEC 60502-1 or Types LTS 1 & LTS 4 to BS 7655: section 6 with low smoke, low fume and low toxic gas emitting in case of fire. The standard sheath color is Black, meanwhile other colors such as Red and Light Blue can also be provided as per customer request and in this case suitable UV proved additive is added to the Master batch to ensure resistance to sunlight.

# LOW SMOKE & FUME WIRES AND CABLES

## INTRODUCTION

### PERFORMANCE AND SPECIFICATION STANDARDS

Low smoke and fume, zero halogen cables are manufactured and tested to different standards,

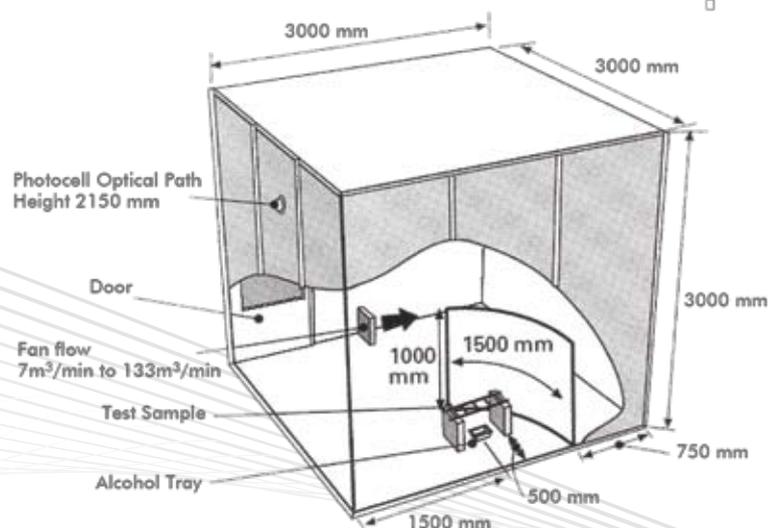
#### 1. Smoke Density Test - ICE 61034

The smoke emission of cables or wires is measured using a room chamber called named the three meters cube as shown in figure (1), it is a cube with sides of (3m) long. By putting the cables to be tested horizontally upon alcoholic tray as a source of fire with limited amount of smoke (the number of samples to be determined according to the required specification "standard"), in addition to scalar lamp in one of the sides of the room facing a electro-photocell photo-electric cell to measure the density of light in the opposite wall connected to an electric circuit and a computer to record the value of the absorbed light and its relation to the time of test. The level of smoke density shall be determined on the basis that before the test the density of the absorbed light shall be considered to be 100% as there is no smoke that hampers the light to reach from the source.

After starting the test and as a result of the smoke emission due to burning cables that causes hindering the light from the emitted by the lamp from reaching the electro-photocell photo-electric cell, then the amount of light starts to be less gradually and according to the increment and the density of smoke, the electro-photocell photo-electric cell starts to calculate the percentage of transmitted light during the test.

The duration of the test according to the specification IEC 61034 is (40 minutes), in addition, the minimum percentage of transmitted light required according to the international specification is 60%. The factory and the client can agree on lesser or higher value as per the required safety degree and according to the number of persons to be in the site (building, facility or market, etc.)

Figure 1:



# LOW SMOKE & FUME WIRES AND CABLES

## INTRODUCTION

### 2. Testing the Content of Acidic Halogen Gases- ICE 60754-1

It is required in cables of zero halogen that all insulation, inner and outer sheath materials to pass a test to determine the percentage of halogen content within each component (IEC 60754-1). This percentage should not exceed 0.5%. The test is conducted by burning a small sample of the insulation or the covering inside a tubular furnace as shown in figure (2), at 800 oC in the presence of a source of dry and cleans air. The result of the burning process to be collected and then to be analyzed chemically in order to determine the percentage of halogen, which should be not more than 0.5%. This is called the direct way.

### 3. Testing Acidity and Conductivity for the burned Halogens -IEC 60754-2

The percentage of halogen could be measured indirectly through measuring the degree acidity and conductivity. The percentage of acidity (which has a direct relation with halogen) should not be more than 4.3% per every (1) one liter of the distilled water. In this method, a sample of the insulation or the outer covering to be burned as per the first method shown in figure (2) but with higher temperature (935 oC), the result of the burning process to be collected in a distilled water, then measuring the acidity which should not be more than 4.3% representing a low degree of acidity.

When measuring the percentage of conductivity, it should be more than 10 $\mu$ S/mm.

Any of the previous methods or both of them could be used.

Figure 2:



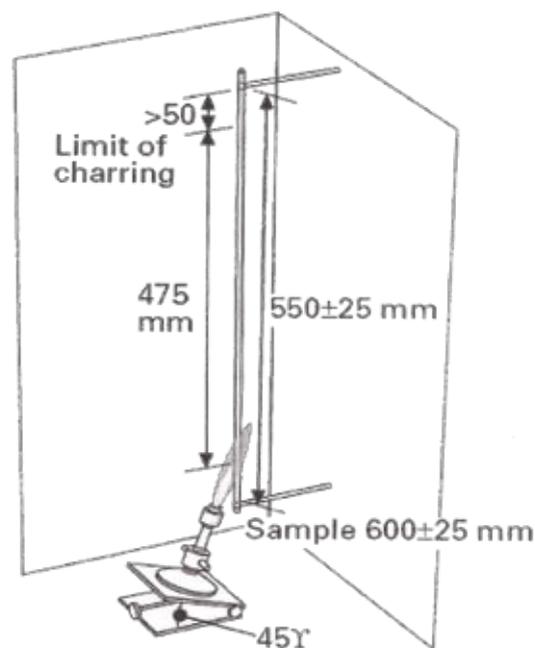
# LOW SMOKE & FUME WIRES AND CABLES

## INTRODUCTION

### 4. Flame retardant test for a single Cable (IEC-60332-1)

Where each sample with a length of 60cm fixed vertically as shown in figure (3) is exposed to a flame of 3.500Btu/h for a period according to the cable diameter, The measure for passing the test that fire is self-extinguished when moving the flame away and that the affected part by fire should not be more than 5 cm below the top of the upper support. Cables that complying with this test is safe enough in case of using a single cable on cable ladder or any other place within the site.

Figure 3:





# H07 Z-R INSULATED CONDUCTOR

ANNEALED STRANDED COPPER WIRES/LSOH-XL INSULATION RATED 90°C | 450/750 V

BS 7211



Catalogue Code	Size mm <sup>2</sup>	Conductor Construction No. of Wires X Nominal Wire Diameter mm	Maximum Conductor Resistance ohm/km at 20°C	Insulation Thickness mm	Nominal Outer Diameter mm	Current Carrying Capacity	Packaging
12660130	1.5	7 X 0.525	12.1	0.7	3.0	22	100 Yard/Coil
12660140	2.5	7 X 0.672	7.41	0.8	3.64	30	100 Yard/Coil
12660150	4.0	7 X 0.844	4.61	0.8	4.23	40	100 Yard/Coil
12660160	6.0	7 X 1.04	3.08	0.8	4.67	51	100 Yard/Coil
12660170	10	7 X 1.35	1.83	1.0	6.13	71	100 Yard/Coil
12660180	16	7 X 1.7	1.15	1.0	7.17	95	100 Yard/Coil
12660190	25	7 X 2.13	0.727	1.2	8.86	126	100 Yard/Coil
12660200	35	7 X 2.5	0.542	1.2	9.5	140	100 Yard/Coil
12661130	1.5	7 X 0.525	12.1	0.7	3.0	22	1000 M/Drum
12661140	2.5	7 X 0.672	7.41	0.8	3.64	30	1000 M/Drum
12661150	4.0	7 X 0.844	4.61	0.8	4.23	40	1000 M/Drum
12661160	6.0	7 X 1.04	3.08	0.8	4.67	51	1000 M/Drum
12661170	10	7 X 1.35	1.83	1.0	6.13	71	1000 M/Drum
12661180	16	7 X 1.7	1.15	1.0	7.17	95	1000 M/Drum
12661190	25	7 X 2.13	0.727	1.2	8.86	126	1000 M/Drum
12661200	35	7 X 2.5	0.542	1.2	9.5	140	1000 M/Drum
12661210	50	19 X 1.78	0.387	1.4	11.76	166	1000 M/Drum
12661220	70	19 X 2.13	0.268	1.4	13.5	204	1000 M/Drum
12661230	95	19 X 2.5	0.193	1.6	15.74	245	1000 M/Drum
12661240	120	37 X 2.02	0.153	1.6	16.2	279	1000 M/Drum
12661250	150	37 X 2.23	0.124	1.8	19.23	313	1000 M/Drum
12661260	185	37 X 2.5	0.0991	2.0	20.6	354	1000 M/Drum
12661270	240	61 X 2.25	0.0754	2.2	24.65	412	1000 M/Drum
12661280	300	61 X 2.54	0.0601	2.4	27.65	466	1000 M/Drum
12661290	400	61 X 2.85	0.047	2.6	30.69	531	1000 M/Drum
12661300	500	61 X 3.2	0.0366	2.8	34.21	603	1000 M/Drum
12661310	630	61 X 3.79	0.0286	2.8	36.2	686	1000 M/Drum

**SPECIFICATION:**

International standards BS 7211

**CONDUCTOR:**

Soft annealed copper to BS-EN 60228, class 2 stranded conductor

**INSULATION:**

Thermoplastic insulation of LSOH-XL type EI5 in accordance with BS 7655-51

**IDENTIFICATION ON WIRE:**

BAHRA CABLES CO. KSA 1.5mm<sup>2</sup> CU/LSOH-XL (450/750V) 90 DEG C, BS 7211

**PACKING:**

Very modern packing with standard length 100 yards coils or 1000m drums (or according to the requirement) with strong wrapping plastic easy to open and easy to use up to the last meter, Light weight environment friendly.

**COLOR:**

Available colors for wires Red, yellow, blue, black, brown, green, green/ yellow, white & grey. Other colors are available upon request

The fourth digit of the product catalogue code number is for wire color identification.

Color Codes:

0	1	2
3	4	5
6	7	8



# XLPE INSULATED LSF0H SHEATHED CABLES

COPPER CONDUCTOR | UNARMOURED | 0.6/1 kV  
CU/XLPE/LSF0H



## Single core

Cable Code	Conductor		Insulation	Outer Sheath		Packaging	
	Cross Sectional Area Nominal mm <sup>2</sup>	Number of Wires	Thickness Nominal mm	Thickness Nominal mm	Overall Diameter Approx mm	Net Weight Approx kg/km	Standard Drum m +/- 2%
16510006	4 rm	7	0.7	1.4	7.5	83	1000
16510008	6 rm	7	0.7	1.4	8.1	105	1000
16510009	10 rm	7	0.7	1.4	9.0	151	1000
16510010	16 rm	7	0.7	1.4	10.0	215	1000
16510011	25 rm	7	0.9	1.4	11.7	315	1000
16510012	35 rm	7	0.9	1.4	12.8	410	1000
16510013	50 rm	19	1	1.4	14.5	530	1000
16510014	70 rm	19	1.1	1.4	16.5	745	1000
16510015	95 rm	19	1.1	1.5	18.5	1005	1000
16510016	120 rm	37	1.2	1.5	20.3	1245	1000
16510017	150 rm	37	1.4	1.6	22.5	1525	1000
16510018	185 rm	37	1.6	1.6	24.5	1890	1000
16510019	240 rm	61	1.7	1.7	26.7	2515	1000
16510020	300 rm	61	1.8	1.8	29.4	3125	500
16510021	400 rm	61	2.0	1.9	32.7	3965	500
16510022	500 rm	61	2.2	2.0	36.4	5035	500
16510023	630 rmc	61	2.4	2.2	41.8	6355	500



# XLPE INSULATED LSFOH SHEATHED CABLES

COPPER CONDUCTOR | UNARMoured | 0.6/1 kV  
CU/XLPE/LSFOH

## Two cores

Cable Code	Conductor		Insulation	Outer Sheath		Packaging	
	Cross Sectional Area Nominal mm <sup>2</sup>	Number of Wires	Thickness Nominal mm	Thickness Nominal mm	Overall Diameter Approx mm	Net Weight Approx kg/km	Standard Drum m +/-2%
16510105	4 rm	7	0.7	1.8	14.2	230	1000
16510107	6 rm	7	0.7	1.8	15.3	295	1000
16510108	10 rm	7	0.7	1.8	17.2	415	1000
16510109	16 rm	7	0.7	1.8	19.2	585	1000
16510110	25 rm	7	0.9	1.8	22.6	875	1000
16510111	35 rm	7	0.9	1.8	24.6	982	500

## Three cores

Cable Code	Conductor		Insulation	Outer Sheath		Packaging	
	Cross Sectional Area Nominal mm <sup>2</sup>	Number of Wires	Thickness Nominal mm	Thickness Nominal mm	Overall Diameter Approx mm	Net Weight Approx kg/km	Standard Drum m +/-2%
16510201	1.5 rm	7	0.7	1.8	12.8	155	1000
16510203	2.5 rm	7	0.7	1.8	13.7	208	1000
16510205	4 rm	7	0.7	1.8	14.8	275	1000
16510207	6 rm	7	0.7	1.8	16.0	355	1000
16510208	10 rm	7	0.7	1.8	18.0	511	1000
16510209	16 rm	7	0.7	1.8	20.2	730	1000
16510210	25 rm	7	0.9	1.8	23.8	1105	1000
16510211	35 sm	7	0.9	1.8	21.2	1220	1000
16510212	50 sm	7	1.0	1.8	24.3	1615	1000
16510213	70 sm	19	1.1	1.9	27.5	2265	1000
16510214	95 sm	19	1.1	2.0	30.8	3065	1000
16510215	120 sm	37	1.2	2.1	34.1	3825	500
16510216	150 sm	37	1.4	2.3	40.0	4735	500
16510217	185 sm	37	1.6	2.4	42.1	5885	500
16510218	240 sm	61	1.7	2.6	47.2	7655	500
16510219	300 sm	61	1.8	2.8	55.2	9255	500
16510220	400 sm	61	2.0	3.0	59.3	12140	300
16510221	500 sm	61	2.2	3.3	65.7	15500	300

# XLPE INSULATED LSFOH SHEATHED CABLES

COPPER CONDUCTOR | UNARMoured | 0.6/1 kV  
 CU/XLPE/LSFOH



## Four cores

Cable Code	Conductor		Insulation	Outer Sheath		Packaging	
	Cross Sectional Area Nominal mm <sup>2</sup>	Number of Wires	Thickness Nominal mm	Thickness Nominal mm	Overall Diameter Approx mm	Net Weight Approx kg/km	Standard Drum m +/-2%
16510305	4 rm	7	0.7	1.8	15.9	405	1000
16510307	6 rm	7	0.7	1.8	17.3	515	1000
16510308	10 rm	7	0.7	1.8	19.4	720	1000
16510309	16 rm	7	0.7	1.8	21.8	1000	1000
16510310	25 rm	7	0.9	1.8	26.0	1470	1000
16510311	35 sm	7	0.9	1.8	25.4	1595	1000
16510312	50 sm	7	1.0	1.9	29.5	2130	1000
16510313	70 sm	19	1.1	2.0	33.6	3000	1000
16510314	95 sm	19	1.1	2.1	37.6	4045	500
16510315	120 sm	37	1.2	2.3	40.4	5135	500
16510316	150 sm	37	1.4	2.4	44.9	6370	500
16510317	185 sm	37	1.6	2.6	51.0	7740	500
16510318	240 sm	61	1.7	2.8	57.0	10155	500
16510319	300 sm	61	1.8	3.0	63.3	12647	300
16510320	400 sm	61	2.0	3.3	70.2	16160	300
16510321	500 sm	61	2.2	3.5	79.0	20570	300





# XLPE INSULATED LSF0H SHEATHED CABLES

COPPER CONDUCTOR | ALUMINUM WIRE ARMoured | 0.6/1 kV  
 CU/XLPE/AWA/LSF0H



## Single core

Cable Code	Conductor		Insulation	Armouring	Outer Sheath		Packaging	
	Cross Sectional Area Nominal mm <sup>2</sup>	Number of Wires	Thickness Nominal mm	Dia. of Aluminum wire Nominal mm	Thickness Nominal mm	Overall Diameter Approx mm	Net Weight Approx kg/km	Standard Drum m +/-2%
16600004	95 rm	19	1.1	1.6	1.8	22.8	1300	1000
16600005	120 rm	37	1.2	1.6	1.8	24.5	1565	1000
16600006	150 rm	37	1.4	1.6	1.8	26.4	1870	1000
16600007	185 rm	37	1.6	1.6	1.8	28.5	2265	1000
16600008	240 rm	61	1.7	1.6	1.9	31.8	2895	1000
16600009	300 rm	61	1.8	1.6	1.9	33.7	3460	500
16600010	400 rm	61	2.0	2.0	2.1	38.4	4490	500
16600011	500 rm	61	2.2	2.0	2.2	42.6	5660	500
16600012	630 rmc	61	2.4	2.0	2.4	47.0	7155	500



# XLPE INSULATED LSFOH SHEATHED CABLES

COPPER CONDUCTOR | STEEL WIRE ARMoured | 0.6/1 kV  
CU/XLPE/SWA/LSFOH

## Two cores

Cable Code	Conductor		Insulation	Armouring	Outer Sheath		Packaging	
	Cross Sectional Area Nominal mm <sup>2</sup>	Number of Wires	Thickness Nominal mm	Dia. of Steel wire Nominal mm	Thickness Nominal mm	Overall Diameter Approx mm	Net Weight Approx kg/km	Standard Drum m +/-2%
16530004	6 rm	7	0.7	1.25	1.8	17.9	700	1000
16530005	10 rm	7	0.7	1.25	1.8	19.7	880	1000
16530006	16 rm	7	0.7	1.25	1.8	21.5	1090	1000
16530007	25 rm	7	0.9	1.6	1.8	26.8	1650	1000
16530008	35 rm	7	0.9	1.6	1.8	28.8	1960	1000

## Three cores

16530103	6 rm	7	0.7	1.25	1.8	18.6	785	1000
16530104	10 rm	7	0.7	1.25	1.8	20.5	995	1000
16530105	16 rm	7	0.7	1.25	1.8	22.5	1265	1000
16530106	25 rm	7	0.9	1.6	1.8	28.1	1895	1000
16530107	35 sm	7	0.9	1.6	1.8	27.7	2115	1000
16530108	50 sm	7	1.0	1.6	1.9	31.3	2635	1000
16530109	70 sm	19	1.1	2.0	2.0	35.4	3630	500
16530110	95 sm	19	1.1	2.0	2.2	39.6	4635	500
16530111	120 sm	37	1.2	2.0	2.3	43.6	5540	500
16530112	150 sm	37	1.4	2.5	2.5	48.5	7095	500
16530113	185 sm	37	1.6	2.5	2.6	52.7	8455	500
16530114	240 sm	61	1.7	2.5	2.8	58.3	10495	300
16530115	300 sm	61	1.8	2.5	3.0	63.8	12680	300
16530116	400 sm	61	2.0	2.5	3.2	72.3	15700	300
16530117	500 sm	61	2.2	3.15	3.5	80.1	20380	250

# XLPE INSULATED LSFOH SHEATHED CABLES

COPPER CONDUCTOR | STEEL WIRE ARMoured | 0.6/1 kV  
 CU/XLPE/SWA/LSFOH



## Four cores

Cable Code	Conductor		Insulation	Armouring	Outer Sheath		Packaging	
	Cross Sectional Area Nominal mm <sup>2</sup>	Number of Wires	Thickness Nominal mm	Dia. of Steel wire Nominal mm	Thickness Nominal mm	Overall Diameter Approx mm	Net Weight Approx kg/km	Standard Drum m +/-2%
16530202	4 rm	7	0.7	1.25	1.8	18.4	745	1000
16530203	6 rm	7	0.7	1.25	1.8	19.8	890	1000
16530204	10 rm	7	0.7	1.25	1.8	22.0	1155	1000
16530205	16 rm	7	0.7	1.6	1.8	26.1	1660	1000
16530206	25 rm	7	0.9	1.6	1.8	30.2	2250	1000
16530207	35 sm	7	0.9	1.6	1.9	30.8	2600	1000
16530208	50 sm	7	1.0	1.6	2.0	34.9	3265	500
16530209	70 sm	19	1.1	2.0	2.2	40.0	4590	500
16530210	95 sm	19	1.1	2.0	2.3	44.4	5805	500
16530211	120sm	37	1.2	2.5	2.5	48.6	7480	500
16530212	150sm	37	1.4	2.5	2.6	53.3	8905	500
16530213	185sm	37	1.6	2.5	2.8	59.2	10565	500
16530214	240sm	61	1.7	2.5	3.0	65.6	13430	300
16530215	300 sm	61	1.8	2.5	3.2	71.9	16225	250
16530216	400 sm	61	2.0	3.15	3.5	82.6	21195	250
16530217	500 sm	61	2.2	3.15	3.8	90.8	26150	250

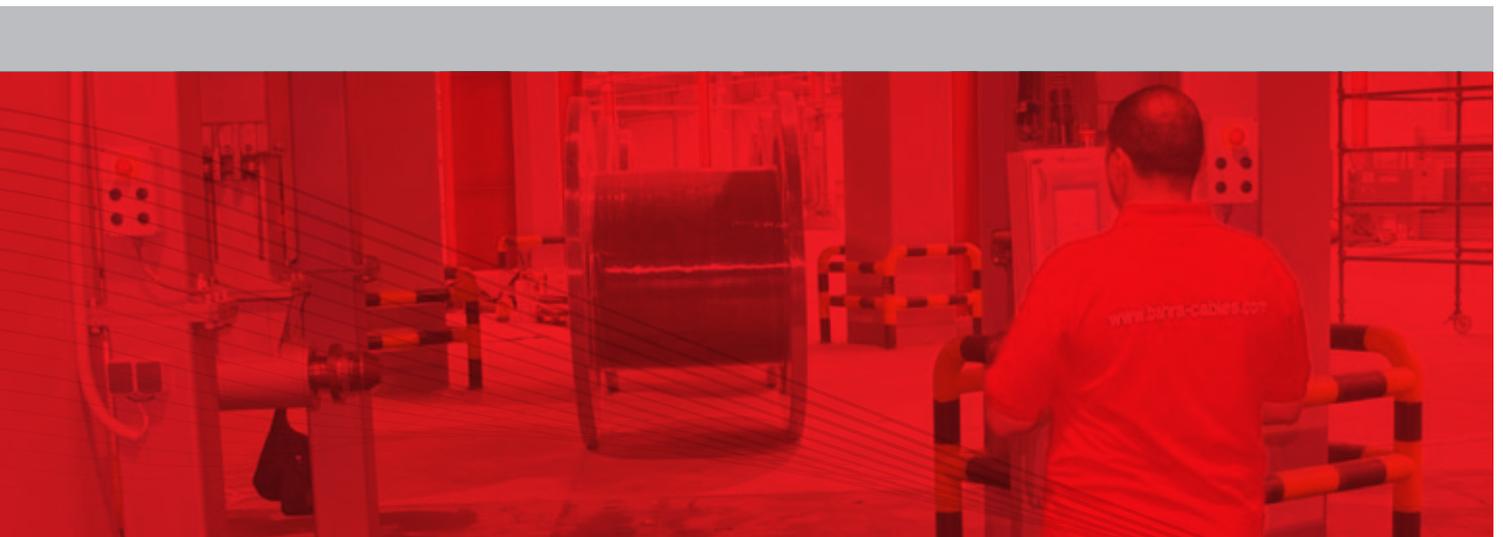


# XLPE INSULATED LSFOH SHEATHED CABLES

COPPER CONDUCTOR | STEEL WIRE ARMoured | 0.6/1 kV  
CU/XLPE/SWA/LSFOH

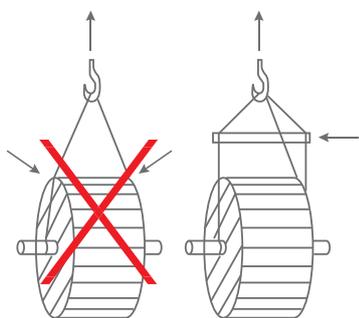
## Four cores with reduced neutral

Cable Code	Conductor				Insulation		Armouring	Outer Sheath		Packaging	
	Cross Sectional Area Nominal mm <sup>2</sup>		Number of Wires		Thickness Nominal mm		Dia. of Steel wire Nominal mm	Thickness Nominal mm	Overall Diameter Approx mm	Net Weight Approx kg/km	Standard Drum m +/-2%
	Ph	Ne	Ph	Ne	Ph	Ne					
16530250	16 rm	10 rm	7	7	0.7	0.7	0.8	1.8	23.8	1275	1000
16530251	25 rm	16 rm	7	7	0.9	0.7	1.6	1.8	29.4	2125	1000
16530252	35 sm	16 rm	7	7	0.9	0.7	1.6	1.8	30.6	2450	1000
16530253	50 sm	25 rm	7	7	1.0	0.9	1.6	1.9	34.7	3130	500
16530254	70 sm	35 rm	19	7	1.1	0.9	2.0	2.1	39.8	4315	500
16530255	95 sm	50 rm	19	19	1.1	1.0	2.0	2.2	44.2	5420	500
16530256	120 sm	70 rm	37	19	1.2	1.1	2.0	2.3	46.8	6940	500
16530257	150 sm	70 rm	37	19	1.4	1.1	2.5	2.5	52.9	7680	500
16530258	185 sm	95 rm	37	19	1.6	1.1	2.5	2.7	59.0	9935	500
16530259	240 sm	120rm	61	37	1.7	1.2	2.5	2.9	65.4	12395	300
16530260	300 sm	150 rm	61	37	1.8	1.4	2.5	3.0	71.5	14850	300
16530261	400 sm	185 rm	61	37	2.0	1.6	3.15	3.3	81.1	21300	250
16530262	500 sm	240 rm	61	61	2.2	1.7	3.15	3.6	90.4	26170	250

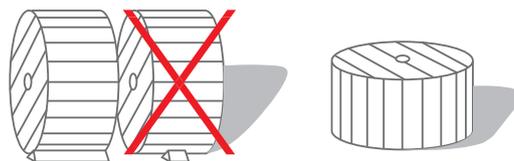


# DRUM HANDLING INSTRUCTIONS

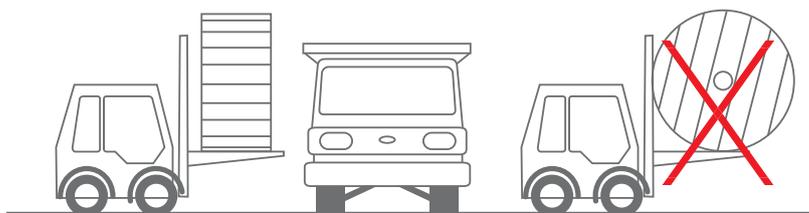
Cables and Conductors should be installed by trained personnel in accordance with good engineering practices, recognized codes of practise, statutory local requirements, IEE wiring regulations and where relevant, in accordance with any specific instructions issued by the company. Cables are often supplied in heavy cable reels and handling these reels can constitute a safety hazard. In particular, dangers may arise during the removal of steel binding straps and during the removal of retaining battens and timbers which may expose projecting nails.



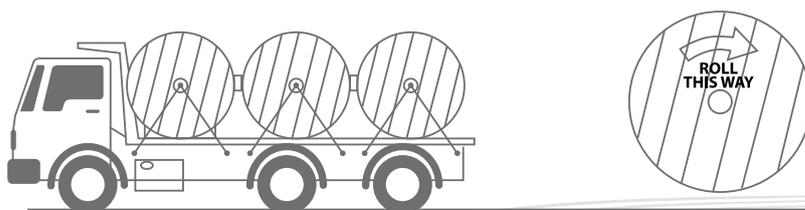
Lifting cable drums using crane.



Do not lay drums flat on their sides, use proper stops to prevent drums rolling.



Lift drums on fork trucks correctly.



Secure drums adequately before transportation.

Roll in the direction shown by the arrow.

# DRUM HANDLING INSTRUCTIONS

---

## IMPORTANT!!!

This cable is jacketed with Low Smoke and Fume, Zero Halogen (LSFOH) material which is a special product produced with the highest material quality for ultimate fire performance and safety, however to have such improved fire characteristics could have different mechanical characteristics than of the PVC sheathed cable.

Accordingly, to avoid any sheath damage or cracks the following instructions must be followed:

1. Store the drums in shaded area, and not exposed to direct sunlight for long period, unless the drums are covered with the protective cover.
2. Do not pull the cable directly from the sheath, ensure that the pulling force is distributed through the conductor or armour metallic parts.
3. During installation, don't run the cable on rollers / wheels that have sharp edges, and when cable tray installation is used, avoid the sheath contact with any sharp objects.
4. The recommended minimum bending radius of this cable is about 1.5 times that of PVC cables.

For more Information, please contact Bahra Cables Company – Technology Department, or call Toll free at **800 124 8111**

# RECOMMENDATIONS FOR CABLES INSTALLATION

## PRODUCT LIFE DATA

Low Voltage cables is not subjected to high electric stress, the XLPE insulating material has a dielectric strength voltage of about 22 KV, with the best manufacturing and testing practice applied in Bahra Cables Company to ensure good quality insulation . As Insulation treeing is uncommon problem for LV cables, the chance of electric break down is very minor. The PVC or PE jacketing material is very stable against most of the Chemical traces could be existing at the soil, these material with Black colour Master batch up to 2.5 % have a strong resistance against UV and Environmental conditions.

The cables have to be selected and installed as per the recommendation mentioned below. By keeping such standard of installation and operation, Low Voltage cables can survive in service for a time of 25 years or more without failure.

## RECOMMENDATIONS FOR THE SELECTION, INSTALLATIONS AND OPERATION OF CABLES

- The cables are intended to be installed in air, or for burial in free draining soil Conditions. Where the cables are to be laid in any other environment, reference should be made to the cable Bahra Cables Company.
- The rated voltage of the cable for a given application should be suitable for the operating conditions in the system in which the cable is used. To facilitate the selection of the cable, systems are divided into three categories as follows.

### a) Category A

This category comprises those systems in which any phase conductor that comes in contact with earth or an earth conductor is disconnected from the system within 1 min.

### b) Category B

This category comprises those systems which, under fault conditions, are operated for a short time with one phase earthed. This period, according to IEC 60183, should not exceed 1 h. For cables specified in this standard, a longer period, not exceeding 8 h on any occasion, can be tolerated. The total duration of earth faults in any year should not exceed 125 h.

### c) Category C

This category comprises all systems which do not fall into categories A and B.

The nominal system voltage  $U$ , (up to 1.0 KV) is the nominal voltage between phases,

The maximum sustained system voltage,  $U_m$  ( 1.2 KV) is the highest voltage between phases that can be sustained under normal operating conditions at any time and at any point in the system. It excludes transient voltage variations, due, for example, to lightning impulses, fault conditions and rapid connection of loads.

Single-core cables are suitable for d.c. systems operating at up to 1 000 V to earth and two-core 600/1 000 V cables at up to 1 500 V between conductors.

### **CABLES INSTALLED IN HAZARDOUS AREAS**

Where cables are required to be installed in areas classified as hazardous, i.e. potentially explosive gas

atmospheres, reference should be made to IEC 60079-14.

### **CURRENT RATINGS**

The current rates introduced previously in this catalogue have to be followed.

- Cables should be installed and used in association with other equipment in accordance with BS7671 and/or the Electricity Safety, Quality and Continuity Regulations, as appropriate.

In special environments, the appropriate regulations and codes of practice should be observed.

- Minimum temperature during installation

It is recommended that the cables be installed only when both the cable and ambient temperatures are above 0 °C and have been so for the previous 24 h, or where special precautions have been taken to maintain the cable above this temperature.

### **MINIMUM INSTALLATION RADIUS**

None of the cables specified in this catalogue should be bent during installation to a radius smaller than that given in BCC product Catalogues and the offered data sheets, wherever possible, larger installation radii should be used.

### **PREVENTION OF MOISTURE INGRESS**

Care should be exercised during installation to avoid any damage to cable coverings. This is important in wet or other aggressive environments. The protective cable end cap should not be removed from the ends of the cable until immediately prior to termination or jointing, especially for cables that do not have extruded bedding. When the end caps have been removed the unprotected ends of the cable should not be exposed to any kind of moisture.

## TEST AFTER INSTALLATION

A voltage test after installation should be performed with direct current of 3.5 KV DC between conductor phases and the same value between each conductor and armouring.

During the test, the voltage should be increased gradually to the full value and maintained continuously for 15 min. The test should be made between conductors and between each conductor and armour.

The requirement is : No breakdown should occur.

The test voltages given above are intended for cables immediately after installation and not for cables that have been in service. When testing is required after cables have been in service, regardless of service duration, Bahra Cables Company- Technology Department should be consulted for the appropriate test conditions, which depend on the individual circumstances.

## CABLES FAULTS PREVENTION

The Low Voltage Cables faults are possible due to different reasons:

1. Physical damage due to mishandling or misuse
2. Physical Damage during operations.
3. Over current.
4. Fire or excessive temperature at the cables location.
5. Manufacturing malfunction, which Bahra Cables Company guarantees its product against any defect or wrong workmanship, meanwhile in case of damage due to this reason, the action will be taken as per the submitted warranty letter, and the company will apply the required corrective and preventive actions.

Recommendation for failures:

Insulation failure, the defected section is recommended to be replaced , the replacement should be from joint to joint.

Serving/ jacketing failure, if the water did not ingress through the cable, the jacket will be repaired using proper repairing techniques carried out by skilled technician. If the water came inside the cables to insulation, for cables suitable for wet location, practically dry the defected portion before repair.

If the cable is not suitable for wet applications and the underground water engrossed inside it, replacing the defected section from joint to joint is the recommend solution.

# ORDERING INFORMATION

To serve our customer in minimum time and high efficiency, our valuable customers are requested to provide the following details along with their enquiries and orders:

1. Number of phases/cores.
2. Conductor required cross sectional area (conductor size along with size of neutral phase).
3. System Voltage Rate .
4. Applicable customer specification or International Standard / Norm.
5. Conductor material (Copper).
6. Insulation Material (XLPE/LSFOH-XL).
7. Bedding / Inner Sheathing (Inner Jacketing (LSFOH).
8. Armouring Type (SWA or AWA).
9. Cable jacketing material (LSFOH).
10. Required length of cables (drum schedules)



# LOCATION MAP

