



# FLEXIShield®

THE ORIGINAL  
BS8436 CABLE

 **amokabel**  
FLEXISHIELD LTD



# FLEXISHield®

FLEXISHIELD BASEC BS8436 XLPE 2.5mm 4c+E ELECTRIC CABLE 300/500V 2022 .H.



Flexishield has been specifically developed for applications where cables are required to be concealed within partitions and building voids, at a depth of less than 50mm.

Flexishield's main feature is its ability to fail safe when used as part of an electrical circuit that is penetrated by a sharp metallic object. The cable has now been designed to fail safe at 200 amps under nail penetration conditions, as such it will operate an MCB of up to 40A Type B or up to 20A Type C this surpassing the requirements of BS8436.

A fully compliant cable, Flexishield is a cost effective solution to meet the 18th Edition of The Wiring Regulations BS 7671:2018 for concealed cables at a depth of less than 50mm, Regulations 522.6.201 to 522.6.204.

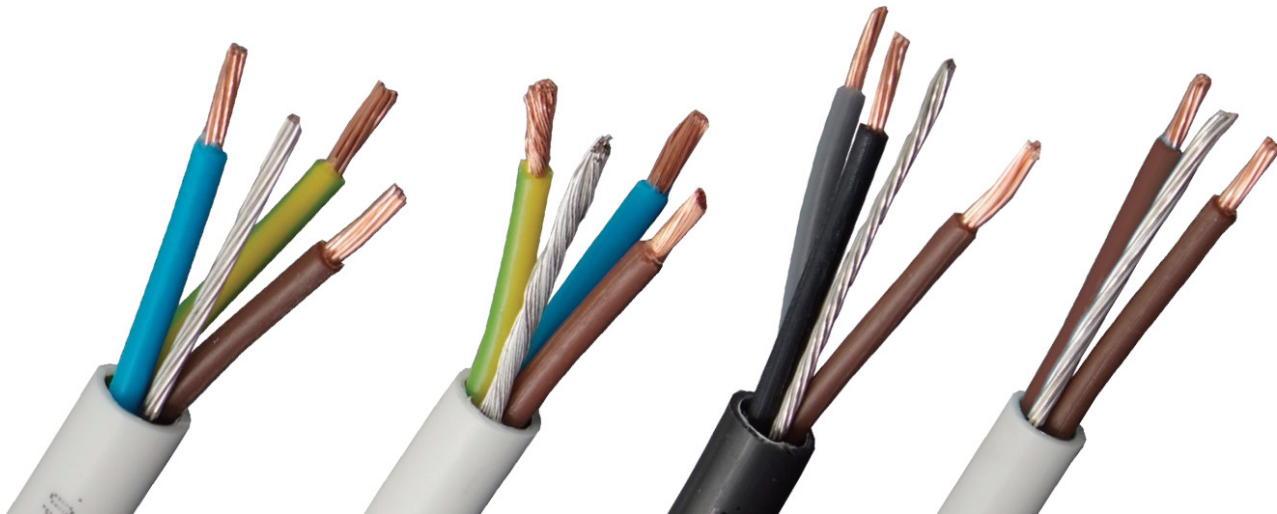
Flexishield is a protected fixed wiring cable, it uses a bonded aluminium tape which gives excellent mechanical resistance and acts as an effective screen to help reduce electrical interference. Flexishield is certified to BS 8436:2011 Certificate Nr 169/001/018 and I.S.273:1988 Certificate Nr 169/001/016 by BASEC.

## THE RANGE

Flexishield as standard comes in the range of 1.5 to 4.0mm<sup>2</sup> to BS 8436 300/500v and the 6.0mm<sup>2</sup> to IS 273 600/1000v. All available with stranded conductors of 2, 3 and 4 cores and a CPC of equal cross sectional area. Now available in 10.0mm<sup>2</sup> made to the same standard.










Standard sheath colours are white and black, core colours as per the harmonised wiring codes and supplied on 100m drums. Options by request are available with sheath and core colours, drum lengths and 600/1000v ratings on the 1.5 to 4.0mm<sup>2</sup> sizes.

## SOME TYPICAL NON-STANDARD FLEXISHIELD CABLES



**FEATURES**

COMES WITH BENEFITS – FLEXISHIELD TICKS ALL THE BOXES:

	<b>FAST</b>	Ease and speed of Installation	Up to 40% reduction in installation times can be seen when compared to traditional cabling systems
	<b>FAIL SAFE</b>	Can withstand fault currents of up to 200A	Will operate up to 40A Type B or 20A Type C MCB so will fail safe when penetrated by a nail or similar object
	<b>LIGHTWEIGHT</b>	Lightweight, up to 60% less weight and 20% less space required than traditional small armoured multilayered cables	Easy to handle and install, lighter cable tray could be used for multiple layers of cables
	<b>FLEXIBLE</b>	Pliable yet robust	Offers impact resistance, retains its shape when bent and dressed
	<b>MULTI-USE</b>	Can be installed on many surfaces or chased behind plaster and within different building structures	Flexible in the applications it can be used for as a multi purpose cable
	<b>BS 7671</b>	Full sized CPC	Compliant with BS7671 earthing
	<b>SHIELDED</b>	Bonded aluminium tube	Effective screen to electrical interference, easy to strip sheath to expose cores for termination
	<b>UV STABLE</b>	UV stable sheath	Can be used outside
	<b>LSHF</b>	Low Smoke Halogen Free	Now expected with most building cabling today



## APPLICATIONS & INSTALLATIONS

As an alternative to SWA (Steel wire armoured) and singles in conduit Flexishield is very easy to install, it is lightweight and dresses extremely well, it makes an excellent alternative as a multi-purpose cable for many fixed wiring applications including:

- Ring main power
- Lighting
- Fan motor and compressor supplies
- Air conditioning and ventilation systems
- Outside lighting circuits
- Signage supplies
- Bus-bar feed
- Domestic solar PV

Not only can it be used within partitioned walls, it can also be installed\*:

- In cable trays and baskets
- In roof spaces
- In duct work
- Directly on brick, stone and other materials.
- Behind plaster
- As part of modular wiring systems
- Indoors or outside.

\*Provided the design and installation is carried out in accordance with BS7671 regulations.

## CONSTRUCTION



1	CONDUCTORS	Plain annealed stranded copper to BS EN60228:2005
2	INSULATION	XLPE complying to BS7655-1.3 Type GP8
3	EARTH	Tinned annealed stranded copper to BS EN13603:2002
4	SCREEN	Bonded aluminium tube
5	SHEATH	Low smoke halogen free compound to BS 7655-6.1 Type LTS 3 UV Stable

# SOLAR PV

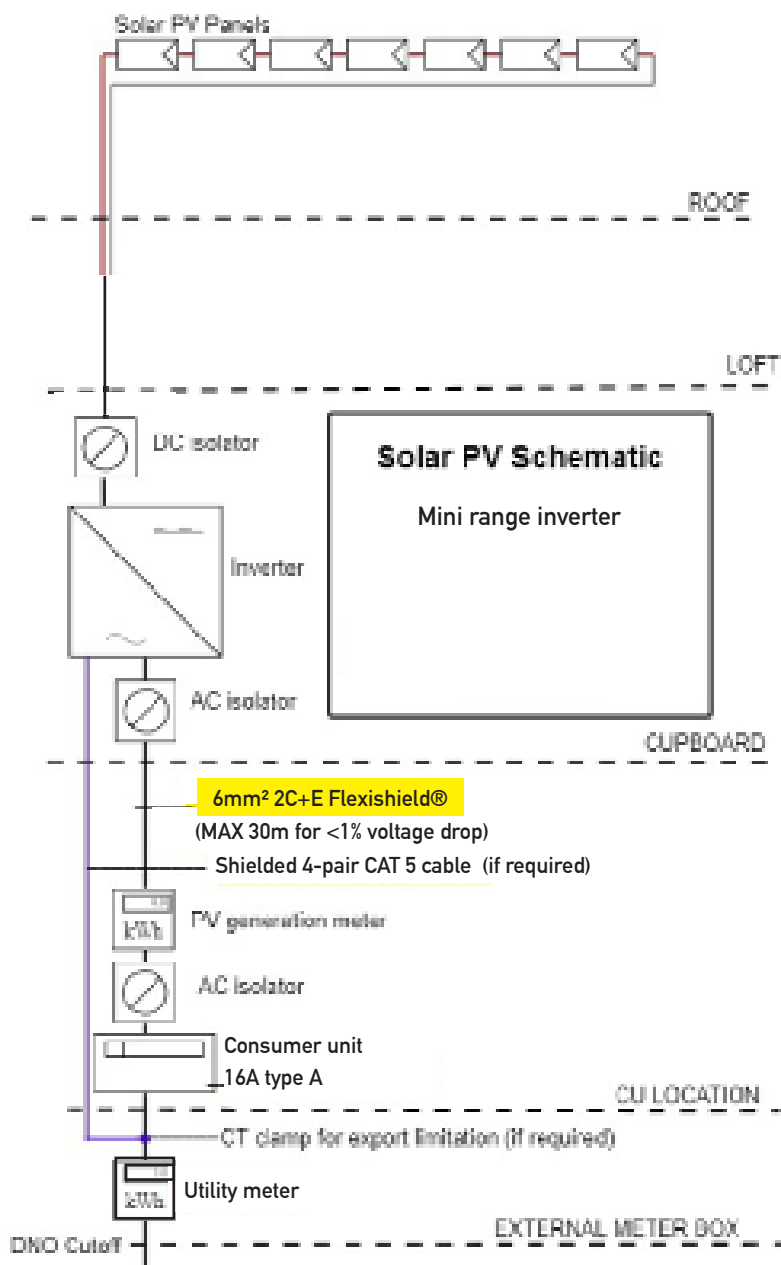
With the ongoing energy cost crisis, the popularity of Solar PV installations has soared.

One of the issues associated with Solar PV installations is that of 'nuisance tripping', where an additional RCD or RCBO device is required.

By using Flexishield, the leading BS8436 cable, embedded in a wall at <50mm from the surface, with an MCB overcurrent device you can eliminate the requirement for the RCD or RCBO whilst remaining compliant with BS7671 regulations, specifically parts 721.531.3.5.1 (iii), 522.6.203 (ii) – 522.6.204 (i)

The following assumptions are made:

- All installations are new build TNC-S systems.
- All Installations are G98 <3.68kW. (In-house, known as a Standard Install, see diagram below)
- The inverter manufacturer has provided a written statement saying 'the inverter does not require an RCD on the supply cable'.
- Protective device for the PV system will be a maximum of C20A and the majority will be B20A



The same principle that negates the requirement of the additional RCDs also applies to EV Charger, Air Source Heat Pump and Ground Source Heat Pump Installations.

## PROJECTS

Flexishield cables have been specified and installed on many building projects ranging from small, domestic housing projects to large construction projects such as hospitals, universities, hotels, and large residential blocks.

WAITROSE STORES	MATTHEW BOULTON COLLEGE	BBC
TILBURY DOCKS	UNIVERSITY OF CENTRAL ENGLAND	FIFE HOSPITAL
SUNDERLAND HOSPITAL	A V HILL BIOSCIENCE BUILDING UNIVERSITY OF MANCHESTER	GREENOLYSIS BIO-DIESEL PLANT
ISLINGTON ARTS & MEDIA CENTRE	NCP - CAR PARKS	SINGLETON HOSPITAL - SWANSEA
ROYAL CHELSEA HOSPITAL	BARLINNE PRISON	REFURBISHED COUNCIL HOMES
M&S SIMPLE FOODS	OPERATING THEATRE - NOTTINGHAM	STOCKLAND GREEN TECH COLLEGE
ASHBURTON COURT HAMPSHIRE CC HQ	ARK DATA CENTRES	NOVA VICTORIA DEVELOPMENT - LONDON
JOHN LEWIS STORES	CHELSEA BARRACKS - LONDON	CENTER POINT DEVELOPMENT - LONDON
CURRYS STORES	IMPERIAL COLLEGE - LONDON	BARKING HOSPITAL
LOW SCHOOL - EDINBURGH	WIMBLEDON LAWN TENNIS ASSOCIATION	CRAMLINGTON HOSPITAL
BRIGHTON DOME	WOBURN ABBEY	STAFFORD HOSPITAL

## TECHNICAL DATA

Voltage Rating	1.5 - 4.0mm <sup>2</sup> - 300/500v 6.00mm <sup>2</sup> - 600/1000v 10.0mm <sup>2</sup> - 600/1000v	Bending radius	6 x Outside Diameter
Standard core colours	2 core: Blue and brown 3 core: Brown, black and grey 4 core: Blue, brown, grey and black	Maximum continuous conductors operating temperature	+70°C
On Request	5 core: Black, brown, grey, blue and green/yellow (or white with black numbers)	Minimum installation temperature	-30°C
	Other special builds available on request	Flame retardant	IEC 60332-1-2
		Smoke emissions	BS EN 61034-2
		Acid gas emissions	BS EN 50267-2-1

Construction Products Regulation (CPR): Declaration of Performance - Reaction to fire classification: Dca

## ELECTRICAL & PHYSICAL DATA

### PHYSICAL DATA

NOMINAL AREA* SQ.MM	CONDUCTOR NO. OF STRANDS/ MM	CPC NO. OF STRANDS/MM	NOMINAL INSULATION THICKNESS MM	NOMINAL CABLE DIAMETER MM					OPTION	APPROX. WEIGHT OF CABLE KG/1000M				OPTION
				MM2	2 CORE	3 CORE	4 CORE	5 CORE		2 CORE	3 CORE	4 CORE	5 CORE	
1.5	7/0.53	7/0.53	0.70	1.5	8.1	8.4	9.4	11.5*		100	120	150	190*	
2.5	7/0.67	7/0.67	0.70	2.5	9	10	11.6	12.8*		133	167	219	290*	
4.0	7/0.85	7/0.85	0.70	4	10.3	11.5	13	14.9*		190	241	296	375*	
6.0	7/1.04	7/1.04	0.95	6	12.5	13.4	16.5	17.5*		276	356	466	586*	
10.0	7/1.35	7/1.35	0.95											

\* 5 core and 10.0 sq.mm available on request, non BASEC approved

### ELECTRICAL DATA

AREA SQ.MM	MAXIMUM DC RESISTANCE OHMS/ KM @20°C	NOMINAL AC RESISTANCE OHMS/ KM @90°C, AT 50HZ	INDUCTIVE REACTANCE OHMS/ KM, AT 50HZ	MAXIMUM CONTINUOUS CONDUCTOR OPERATING TEMP.°C	SHORT CIRCUIT RATING IN KA FOR 1 SEC.*
1.5	12.1	15.3	0.100	70	0.17
2.5	7.41	9.43	0.097	70	0.29
4.0	4.61	5.86	0.092	70	0.46
6.0	3.08	3.93	0.088	70	0.69
10.0**	1.83	1.79	0.086	70	0.99

\* Based upon a K value of 115, taken from BS7671:2008 table 43.1.

\*\* On request

## TEMPERATURE CORRECTING FACTORS FOR CABLES IN FREE AIR OTHER THAN 30 °C

CORRECTION FOR AMBIENT TEMPERATURE							
AMBIENT TEMP °C	25	35	40	45	50	55	60
	1.03	0.94	0.87	0.79	0.71	0.61	0.50

## CORRECTION RATING FOR GROUPING

NO OF CABLES	2	3	4	5	6	8	9	12
CLIPPED DIRECT	0.80	0.70	0.65	0.60	0.57	0.52	0.50	0.45
ON CABLE TRAY	0.88	0.82	0.77	0.75	0.73	0.72	0.72	0.72

## CURRENT RATINGS – AMBIENT TEMP. AT 30 °C, CONDUCTOR OPERATING TEMP. 70 °C AS BS7671

CLIPPED DIRECT – REF METHOD C				
NOMINAL AREA SQ.MM	TWO CORE CABLE, SINGLE PHASE AC OR DC		THREE OR FOUR CORE CABLE, THREE PHASE AC	
	CURRENT RATING AMPS	VOLT DROP MV PER AMP PER M	CURRENT RATING AMPS	VOLT DROP MV PER AMP PER M
1.5	19.5	29	17.5	25
2.5	27	18	24	15
4.0	36	11	32	9.5
6.0	46	7.3	41	6.4
10.0	63	4.4	5.7	3.8

## ON CABLE TRAY – REF METHOD E

NOMINAL AREA SQ.MM	TWO CORE CABLE, SINGLE PHASE AC OR DC		THREE OR FOUR CORE CABLE, THREE PHASE AC	
	CURRENT RATING AMPS	VOLT DROP MV PER AMP PER M	CURRENT RATING AMPS	VOLT DROP MV PER AMP PER M
1.5	22	29	18.5	25
2.5	30	18	25	15
4.0	40	11	34	9.5
6.0	51	7.3	43	6.4
10.0	7.0	4.4	60	3.8

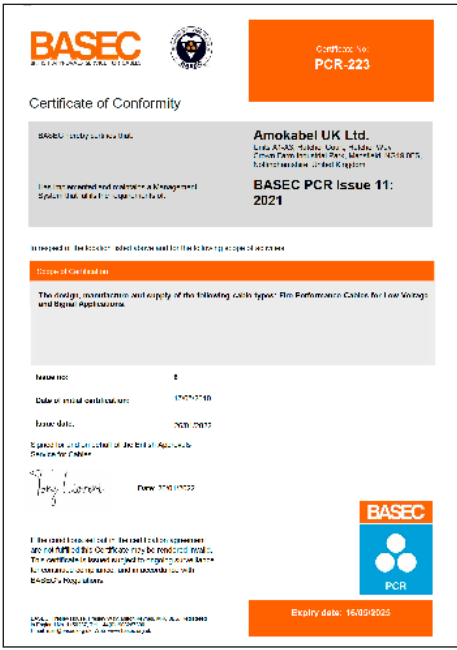
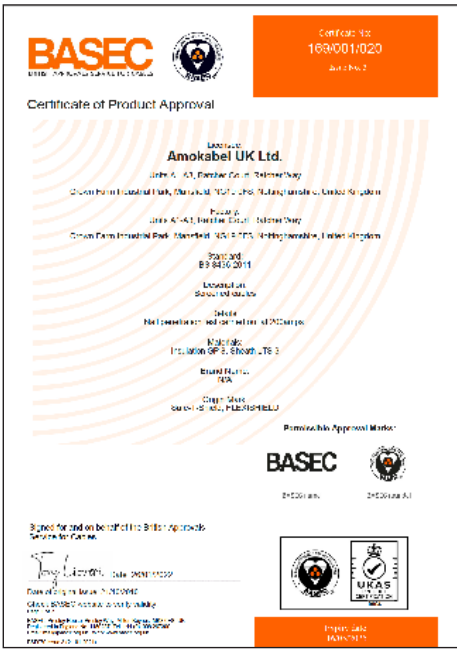
Current ratings are based on a “single circuit” in accordance with the IEE Wiring Regulations BS7671, Table 4D2A. Where a conductor operates at a temperature exceeding 70°C it shall be ascertained that the equipment connected to the conductors is suitable for the conductor operating temperature. (BS7671 reg 512.1.5).

Important: All information is believed to be correct at time of issue. Amokabel Flexishield Ltd reserve the right to alter dimensions, specifications and materials at any time under its development programme.



**QUALITY & BASEC**

As a safety cable Flexishield, has been independently Type tested by ERA Technology Ltd, Warrington Fire Research Centre Ltd and BRE to all relevant standards. Flexishield is fully product approved by BASEC to BS8436:2011 and the IS 273 standards, it is manufactured under a BASEC ISO 9001:2018 quality assurance system. Flexishield carries the CE marking as required.



## BS8436:2011:

BS 8436 was released in August 2004, knowledge of the BS 8436 standard has slowly filtered into the fixed electrical wiring sector, it did feature in the 16th Edition of the Wiring regulations but now has a more prominent role as a safety cable for concealed cables in the 17th Edition and still remains as a key cable option for this application.

Scope of the standard is:

- Voltage rating: 300/500v
- Range: 1.5mm to 4.0mm<sup>2</sup>, 2c 3c & 4c plus earth

Three principle performance criteria called up in BS 8436:2011 are:

### NAIL TEST

A 0.9kg weight dropped from a height of 400mm driving a steel nail through the cable, the cable is deemed to have passed if it operates up to a 32A Type B MCB in six consecutive valid strikes.

### IMPACT TEST

A 0.5kg chisel-edged weight is dropped from a height of 250mm and the cable shall maintain its electrical integrity. The same is done with a radiused weight. The test is carried out at 20° C.

### WATER IMMERSION TEST

A 20m sample of cable is immersed into water at 20° C for 24 hours. The cable's electrical integrity is tested following this.

## IS273:

An existing Irish standard that was modified to include cable failing safe under nail penetration, this standard addition was based on BS8436, but has a number of important differences:

Scope of the standard is:

- Voltage rating: 600/1000v
- Range: 6.0mm, 2c 3c & 4c plus earth

The principle performance criteria called up in IS 273 are similar to those used in BS8436.

\*10.0mm now available, made to and based on IS273 standard.

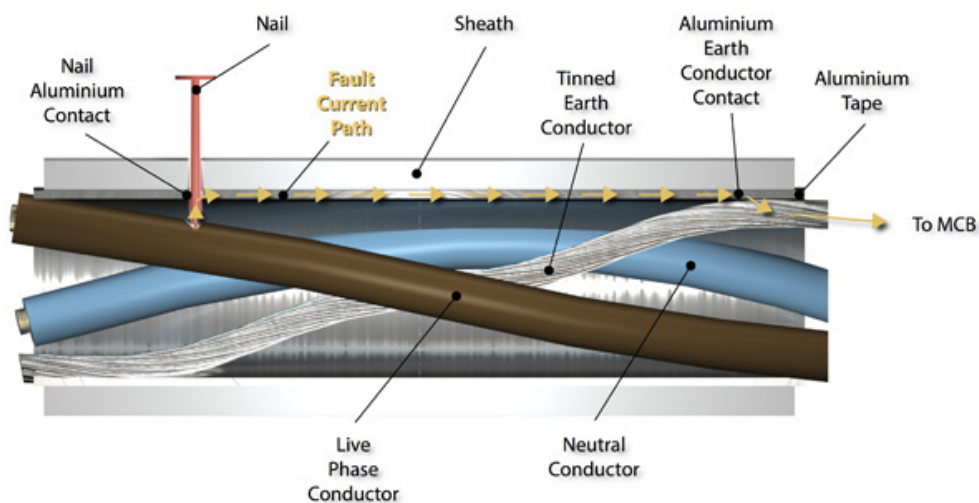
## BS 8436 & IS 273 - CIRCUIT BREAKERS

Flexishield cables are manufactured to BS 8436 & IS 273 standards, one of the main performance requirements within these standards is that the cable must fail safe if penetrated by a nail.

In order for the cable to meet this requirement Flexishield has been designed with a heavy duty aluminium tape bonded to the inside of the outer sheath, it is in contact with a bare full size tinned copper earth conductor, therefore if the cable was penetrated by a nail which hit the live phase conductor, the fault current path would follow the direction as illustrated below and trip the circuit MCB.

Within BS 8436 it outlines the test/overcurrent current requirements to operate a Type B MCB in relation to the cable size and the breaker ratings, this based on BS7671:2008 Fig 3A4 time/current curves:

- 1.5mm<sup>2</sup> - 100A.
- 2.5mm<sup>2</sup> - 160A
- 4.0mm<sup>2</sup> - 160A
- 6.0mm<sup>2</sup> - 160A.
- On request 10.0mm<sup>2</sup> - 160A



For the IS 273 standard, it is defined slightly different as follows:

PROACTIVE DEVICE RATING (A)	TEST CURRENT VALUES (A) FOR DIFFERENT CIRCUIT-BREAKER TYPES			
	BS 88	FUSE TYPE B CIRCUIT-BREAKER	TYPE C CIRCUIT-BREAKER	TYPE D CIRCUIT-BREAKER
16	85	80	160	320
20	130	100	200	400
32	220	160	320	640

In essence cables that meet these standards have to have the ability for the fault current flow path to withstand up to 160A to be able to operate a Type B MCB rated up to 32A, a Type C of 16A and a Type D of 6A rating, as per Figs 3A4, 3A5 and 3A6 in BS7671:2008.

Flexishield has now been designed to withstand a 200A fault current, this allows circuits to be used with up to 40A Type B or a 20A Type C circuit breaker. This is witnessed on a regular basis by BASEC as part of the company's quality and product certification system.



PROUDLY MANUFACTURED  
IN THE MIDLANDS

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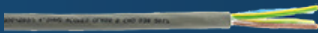
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**FLEXIPower**<sup>®</sup>



BASEC approved, 90C, low smoke, zero halogen, highly flexible, fixed wiring cable

**FLEXIShield**<sup>®</sup>



Multicore screened small power cables XLPE insulated Halogen free sheathed low smoke cables for use in walls partitions and building voids basket and tray. BASEC approved to BS8436

### The **FLEXI** Range of Installation cables

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Important: All information is believed to be correct at time of issue. The company reserve the right to alter dimensions, specifications and materials at any time under its development programme. Visit our website for latest information.