PRYSMIAN
CABLES & SYSTEMS

FIRE RESISTANT CABLES

FP600®

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FP600®

BS7346-6 120MIN
BS8491 120MIN

Certificate No 077m

FP600®

> Prysmian FP600 is a unique enhanced performance fire resistant power cable, designed specifically to meet the more onerous fire survival requirements now requested by regulators and specifiers for many fire fighting and life safety applications. Its superior mechanical protection provided by an interlocking steel tape armour is, unlike standard single wire armour designs, maintained to a high level under fire conditions. This armour design ensures that FP600 meets the new generation fire test requirement currently given in BS7346-6:2005 “Components for smoke and heat control systems - Part 6 Specification for cable systems” or BS8491:2008 “Method for assessment of fire integrity of large diameter power cables for use as components for smoke and heat control systems and certain other active fire safety systems” which involves direct mechanical impact and water jet application under fire conditions.

FP600 achieves the maximum 120 minute rating under the BS7346-6 test conditions, which is required for fire fighting applications.

STANDARDS

> FP600 meets the 120 min survival time of BS7346-6.
FP600 meets the 120 min survival time of BS8491.
The test method given in BS8491:2008 is technically identical to the method given in Annex B of BS7346-6:2005.

INSTALLATION

> FP600 is an easy to install cable that requires no special tools or techniques. It is however important to follow the installation recommendations given in this document to ensure a trouble free installation and to ensure that the fire integrity of the installed system is not compromised.

In accordance with BS7346-6 requirements, cables must be supported by a fixing that can withstand the same fire conditions as the cable. Any cable management system, joints and terminations should be similarly selected.

It is recommended that joints are avoided wherever possible with FP600 in order to maintain the highest integrity of the installation.

CABLE CHARACTERISTICS

Temperature Range
-25 to +90°C

Bending Radius
Fixed r=8D

Mechanical Impact
Excellent

Fire Performance
BS EN 60332-1-2
BS EN 50266-2-4

Flexibility
Rigid

Halogen Free
BS EN 50267-2-1

Low Smoke Emissions
BS EN 61034-2

Fire Resistance
BS 7346-6 120 min
BS 8491 120 min

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FIRE RESISTANT CABLES

Two Core

Nominal cross sectional area mm²	Approximate overall diameter mm	Approximate cable weight kg/km	Maximum conductor resistance at 20°C ohms/km	Short circuit rating (1 sec) of conductor kA	Current rating DC of single phase AC Clipped direct Amps	Current rating DC or single phase AC Free Air Amps	Volt drop DC mV/A/m	Volt drop single phase AC mV/A/m	Recommended accessories: Claw cleat Ref No.	Recommended accessories: Brass gland Ref No.
4	23	750	4.61	0.57	49	52	12.0	12.0	370CG05	416FP54
6	24	850	3.08	0.86	62	66	7.9	7.9	370CG05	416FP54
10	27	1050	1.83	1.4	85	90	4.7	4.7	370CG05	416FP55
16	28	1200	1.15	2.2	110	115	2.9	2.9	370CG06	416FP55
25	31	1550	0.727	3.6	146	152	1.85	1.9	370CG06	416FP56
35	35	2100	0.524	5.0	180	188	1.35	1.35	370CG07	416FP56
50*	35	2300	0.387	7.1	219	228	0.98	1.0	370CG07	416FP56
70*	38	2900	0.268	10.0	279	291	0.67	0.69	370CG07	416FP57

Three Core

Nominal cross sectional area mm²	Approximate overall diameter mm	Approximate cable weight kg/km	Maximum conductor resistance at 20°C ohms/km	Short circuit rating (1 sec) of conductor kA	Current rating three phase AC Clipped direct Amps	Current rating three phase AC Free Air Amps	Volt drop three phase AC mV/A/m	Recommended accessories: Claw cleat Ref No.	Recommended accessories: Brass gland Ref No.
4	24	850	4.61	0.57	42	44	10.0	370CG05	416FP54
6	25	950	3.08	0.86	53	56	6.8	37CG605	416FP54
10	28	1200	1.83	1.4	73	78	4.0	370CG05	416FP55
16	29	1450	1.15	2.2	94	99	2.5	370CG06	416FP55
25	34	2150	0.727	3.6	124	131	1.65	370CG07	416FP56
35	36	2550	0.524	5.0	154	162	1.15	370CG07	416FP57
50*	37	2900	0.387	7.1	187	197	0.87	370CG07	416FP57
70*	40	3700	0.268	10.0	238	251	0.60	370CG08	416FP57

Four Core

4	25	950	4.61	0.57	42	44	10.0	370CG05	416FP54
6	27	1100	3.08	0.86	53	56	6.8	370CG06	416FP55
10	28	1300	1.83	1.4	73	78	4.0	370CG06	416FP55
16	30	1600	1.15	2.2	94	99	2.5	370CG06	416FP55
25	35	2350	0.727	3.6	124	131	1.65	370CG07	416FP56
35	38	2900	0.524	5.0	154	162	1.15	370CG08	416FP57
50*	41	3550	0.387	7.1	187	197	0.87	370CG08	416FP57
70*	44	4500	0.268	10.0	238	251	0.60	370CG08	416FP59

Note* Shaped conductors
Installation methods for current rating in accordance with BS7671/IEE Wiring Regulations.
The tabulated ratings are based upon a 30°C operating temperature and 90°C operating temperature.

KEY APPLICATIONS

Electrical supplies for fire fighting, life safety and property protection systems. Active fire safety systems which, as part of a Fire Safety Engineering solution, rely on an effective electrical supply remaining operational during a fire.

Greater emphasis is now being given to the integrity of electrical circuits which maintain the functional safe working conditions of such equipment and system. FP600® is the first of a new generation of fire resistant cables designed to meet the much more onerous fire survival requirement now considered appropriate for such applications.

Examples of circuits which are required to remain operational under such conditions include:

- Atrium, basement, underground car park and shopping mall smoke venting systems
- Electrically operated fire shutters and smoke curtains
- Fire fighting lifts
- Pressurisation and depressurisation fans
- Smoke dampers motor driven
- Smoke relief dampers motor driven open
- Sprinkler and wet-riser pumps

The new requirements and test method for cables for use in such applications, which involves an integrated fire test with the application of radiation by flame, direct impact and water jet to a single sample of cable are given in BS7346-6 'Components for smoke and heat control systems – Part 6 Specification for Cable systems'.

FP600® has been extensively tested against these requirements and achieved the maximum 120 minute rating.

CABLE DESCRIPTION

CONDUCTOR

Plain annealed copper stranded circular (4 - 35mm²) or shaped (50 - 70mm²) conductor complying with BS EN 60228 Class 2.

INSULATION

Primary Insulation:
Mineral ceramic (Mica/Glass) fire resistant tape

Secondary Insulation:
90°C cross - linked insulation

CORE IDENTIFICATION

oo brown-blue
ooo brown-black-grey
oooo blue-brown-black-grey

BEDDING

Extruded LSOH bedding compound

ARMOUR

Single layer of interlocking steel tape

SHEATH

Robust thermoplastic LSOH sheath. Colour - Black
Other colours to special order

Correction factors for Ambient temperatures

Ambient Temperature °C	25	30	35	40	45	50	55	60
Rating factor	1.02	1.00	0.96	0.91	0.87	0.82	0.76	0.71

Correction Factors for grouping of cables

Installation Method		Number of circuits or multi-core cables							
		2	3	4	5	6	7	8	9
Single layer clipped to a non-metallic surface	Touching	0.85	0.79	0.75	0.73	0.72	0.72	0.71	0.70
	Spaced*	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Single layer mulitcore on a perforated metal cable tray, vertical or horizontal	Touching	0.86	0.81	0.77	0.75	0.74	0.73	0.73	0.72
	Spaced*	0.91	0.89	0.88	0.87	0.87	-	-	-

* Spaced by a clearance between adjacent surfaces of at least one cable diameter.
Note: Where the horizontal clearance between adjacent cables exceeds 2 cable diameters no correction factor need be applied
Standard conditions of groupings as stated in BS7671/IEE Wiring Regs apply.

INSTALLATION RECOMMENDATIONS

FP600® cables should be installed in accordance with BS7671/IEE Wiring Regulations and/or any other appropriate national legislation. They are primarily intended for use installed in air.

INSTALLATION METHOD

FP600® cables are primarily intended for use in buildings. They may be fixed directly to the building structure or be carried upon suitable cable management systems (e.g. tray, ladder). Due to its extremely robust nature, FP600® does not require additional mechanical protection.

MINIMUM INSTALLATION TEMPERATURE

The cable should not be installed at temperatures below 0°C.

MINIMUM BENDING RADIUS

The minimum recommended bending radius for FP600® cables during installation is 12x the cables overall diameter. Under controlled bending conditions the bending radius may be reduced to 8x the overall diameter.

CABLE CLEAT SPACING

The maximum spacing of cleats should not exceed 1800mm when installed horizontally. When installed vertically the maximum spacing of the cleats should not exceed 900mm and alternate cleats should be offset about the vertical by a minimum of one cable diameter.

CABLE FIXINGS

When the cable is required to maintain circuit integrity during a fire, it is essential that the cleats or cable trays used to support the cable can also withstand the fire. Fixings and supports should be manufactured from a suitable metal and be suitable for fixing fire rated cable. The cable should not be fixed by plastic, nylon or similar fixings. The use of BICON 370CG series claw cleats is recommended.

CABLE PULLING

The construction of FP600® means that if the cable is not installed by a suitable technique, the outer armour/sheath combination may stretch, but the inner cores/bedding combination will not, thereby giving the appearance that the cores have shrunk back into the cable.

It is recommended that the cable should be installed using a stocking pulling technique that locks the relative positions of the outer armour/sheath and inner cores/bedding combinations:

- Remove the armour/sheath combination for a length of 500mm, taking care to avoid injury from any sharp edges of the armour.
- Place a cable stocking of at least 1 metre in length over the inner bedding and outer sheath, ensuring that the stocking firmly grips both the outer sheath and the inner bedding.
- Pull the cable in the normal manner taking into account all limiting factors. If the cable is to be pulled where there is a possibility that water, mud, etc. may be present, then, before the cable stocking is placed into position, a self amalgamating tape should be applied to the cable to stop any ingress of water between the cable bedding and armour and within the inner cores.
- Once the cable has been pulled into position, the excess core/bedding shall be cut back to the armour/sheath and a heat shrink capping shall be applied.

The maximum stocking pulling tension is 5 kg per sq.mm of total conductor cross sectional area up to a maximum of 1000 kg. The use of guide rollers or other friction reducing devices is recommended.

CABLE GLANDING

FP600® may be easily glanded using BICON 416FP series glands. It is not necessary to use shrouds with these glands.

Each gland includes a continuity clip which, when the gland is correctly fitted, provides adequate electrical connection of the cable armour to the gland. Reference should be made to the fitting instructions supplied with the gland for detailed advice.

The sheath and armour should be removed by cutting back the oversheath to the length specified in the gland fitting instruction leaflet. Remove the armour by cutting one section of the steel strip at an angle of 45 degrees with a hacksaw. Rotate the tape armour anti clockwise and remove the cut section. Care should be taken to avoid injury from any sharp edges of the armour.

ELECTRICAL DATA

CURRENT RATINGS

Current ratings are to BS7671, (IEE wiring regs 17th edition) table 4E4A.

SHORT CIRCUIT TEMPERATURE

The maximum short circuit temperature of the conductor is 250°C.

HEALTH AND SAFETY

Please refer to Prysmian Cables leaflet 'Statement to Cable Users' on the Health & Safety at Work Act 1974 and to the Control of Substances Hazardous to Health Regulation (COSHH).

Maximum Resistance of conductor and armour and gross cross-sectional areas of armour tape

Conductor cross sectional area	Maximum Resistance of Conductor at 20°C	Calculated maximum Resistance of Armour at 20°C			Effective Cross Sectional Area of Tape Armour		
		2 Core	3 Core	4 Core	2 Core	3 Core	4 Core
mm²	ohms/km	ohms/km	ohms/km	ohms/km	mm²	mm²	mm²
4	4.61	8.6	8.1	7.7	32	34	36
6	3.08	7.9	7.7	7.3	35	36	38
10	1.83	7.7	7.3	6.8	36	38	41
16	1.15	7.1	6.8	6.2	39	41	45
25	0.727	7.1	4.9	4.4	39	57	64
35	0.524	5.0	4.5	4.0	56	62	70
50	0.387	4.5	4.0	3.5	62	70	79
70	0.268	4.0	3.5	3.1	70	79	91

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