



FIRE SECURE & FIRE SECURE PUNCH

C A B L E S

FOREWORD

Paramount FireSecure and FireSecure Punch Cables are the most technologically advanced Fire Survival -FS Cables in the world which provide critical additional protection in the event of a fire.

Paramount Cables is one of the few cable brands in the world which has a state of art facility to manufacture Fire Survival Cables holding certificates of conformity by both:

BASEC- British Approvals Service for Cables, and

LPCB- Loss Prevention Certification Board

For all the categories, including the highest rated category of Fire Survival Cables, namely F120.

Paramount FireSecure and FireSecure Punch Cables are non-toxic, resistant to chemicals, halogen free and are specially designed to maintain long term circuit integrity performance under various combinations of defined fire conditions so as to withstand:

- Resistance to fire of temperature 950°C for duration of 3 hours,
- Resistance to fire with intermittent water spray mimicking fireman's water hose,
- Resistance to fire with mechanical impact mimicking falling stones/ debris,
- Combination of resistance to fire with mechanical impact & water jet spray,
- While limiting the generation of toxic gases and fumes which hinder fire-fighting and rescue operations

Paramount FireSecure and FireSecure Punch Cables are intended for use in fixed installations in high occupancy buildings like airports, underground railways etc and strategically sensitive buildings like defense establishments, industrial areas etc where maintenance of power supply during fire for a minimum defined period of time is crucial.

Fire Resistance Characteristics of Paramount Fire Secure Cables

Paramount FireSecure Cables meet the Category F2 as per BS 7846 and are suitable for continuous operation at 90°C conductor temperature and maximum short circuit temperature of 200° C and meet the following test conditions:

- Resistance to Fire: Resistant to fire of temperature 950°C for duration of 3 hours by main taining the electric circuit continuity of voltage 1000 V between phases (As per IEC-331, it is 750°C for 3 hours).
- Resistance to Fire with water spray: Resistant to fire at 650°C with water spray over burned area of the cable with 15 minutes of burning and 15 minutes of water spray.
- Resistance to Fire with mechanical shock: Resistant to fire of temperature 950°C with mechanical shock by MS rod of 25mm diameter falling on the cable mounting at regular intervals of 30 seconds for cycle of 15 minutes.

Enhanced Fire Resistance characteristics of Paramount FireSecure Punch Cables

Paramount Fire Secure Punch Cables meet Category F120 of BS 7846, the highest category of performance under fire conditions. In addition to meeting the three critical fire performance tests met by Category F2 cables, F120 category cables are required to meet the test for

• Resistance to fire with mechanical shock and water spray in combination: Withstands an extended test procedure which involves testing the cable under fire at temperature of 830°C for 2 hours, with direct mechanical impact by MS rod on the bending point of the cable at regular intervals of 10 Minutes and intermittent water jet spray for 5 minutes at finishing stage.

Paramount FireSecure and FireSecure Punch Cables also meet the following international fire performance and other test parameters:

- Minimum 70% light transmission requirement for Smoke emission on burning of cables in a chamber for a duration of 40 minutes as per IEC-61034-2.
- Flame propagation of bunched cables under fire as per IEC-60332-2/IEEE-383.
- Maximum 20% smoke density rating of sheath material tested as per ASTM-2843.
- Critical oxygen index more than 30 at room temperature for sheath material as per ASTM-2863.
- Ultraviolet and thermal stability tests as per DIN-53387.
- Maximum 0.5% Acid gas generation for Sheath material as per IEC-754(P-2).

Construction Details of Paramount FireSecure and FireSecure Punch Cables

Copper conductor, thermosetting polymer insulated, Fire-resistant inner and outer sheath having low emission of smoke and corrosive gases when effected by fire, galvanized steel wire armoured, of voltage 1000 volts in accordance with BS:7846:2009.

Conductor : Stranded annealed copper wires as per BSEN: 60228.

Fire Retardant Insulating Barrier : Glass Mica tape/tapes applied helically.

Insulation : Low Halogen Thermosetting XLPE.

Core Identification by : Coloring of cores.

Laying Up of Cores : Laid up and lapped with binder having HCL level

less-than 0.5% by weight.

Inner Sheath : Extruded layer of Halogen Free Low Smoke polymeric

material.

Armouring : Galvanized steel round wire armoured with heavy duty

zinc coating

Outer Sheath : Extruded layer of Halogen Free Low Smoke polymeric

material.



Fire Performance Testing- An Overview

Fire Performance Tests for Category F2 Fire Survival Cable are:

BS 7846:2009 requires the cables to be tested as per BS 6387:2013 for each of the following three protocols:

- i) Resistance to Fire Alone, Protocol C
- ii) Resistance to Fire & Water, Protocol W
- iii) Resistance to Fire with Mechanical Shock, Protocol Z

Category F2 Cables passing all the three Protocols can therefore also be designated as Category "CWZ". These tests are described as follows:

(i) Resistance to Fire alone, Protocol C Clause 6 of BS 6387:2013

- Flame Temperature: 950°C ±40°C for 3 Hours.
- Test Voltage in each Core: 1000 volts
- Test Requirement: No failure of circuit continuity during the test.



Fig 1: Fixture for Resistance to Fire alone, Protocol C

(ii) Resistance to Fire with Water Protocol W, Clause 7 of BS 6387:2013

- Flame Temperature: 650°C ±40°C for 15 Minutes.
- Test Voltage in each Core: 1000 volts
- Flame and Water Spray on flames: duration 15 Minutes
- Total Duration of Test: 30 Minutes
- Test Requirement: No failure of circuit continuity during the test.



Fig: 2 Fixture for Resistance to Fire with Water, Protocol W

(iii) Resistance to fire with Mechanical Shock-Protocol Z Clause 8 of BS 6387:2013

- Flame Temperature: 950°C ±40°C for 15 Minutes.
- Test Voltage in each Core: 1000 volts
- Total Mechanical Shocks: 30 (2 shocks in 1 minute)
- Test Requirement: No failure of circuit continuity during the test.



Fig: 3 Fixture for Resistance to Fire with Mechanical Shock, Protocol Z

Additional Fire Performance Tests for Category F120 Fire Survival Cables as per BS 8491:2008 are:

• Flame Temperature: 830°C +40°C -0 °C for 120 Minutes.

Propane Flow Rate: 10 ±0.4 LPM
Air Flow Rate: 160 ±8 LPM Water

Jet Nozzle Flow Rate: 12.5 Liter / Minute:

Test Voltage in each Core: 1.0 kv

Number of Impacts after 10 Minutes: 12

- Initial Water Drenching start time at 115.55 minutes for 5 cycles of 5 seconds each after 1 minute intervals.
- Test Requirement: No failure of circuit continuity during the test.



Fig 4: Fixture for Assessment of Fire Integrity to BS 8491:2008 Category F120

Note:

If a cable conforms to the requirements for category F120 it shall be deemed to conform to the requirements for categories F30 (30 Minutes, 3 Impacts) & F60 (60 Minutes, 6 Impacts) as the tests are identical except for the test duration and the number of Impacts.

The tests in BS 8491 are applicable to cables having overall diameter greater than 20mm

Constructional & Electrical data for 2 core FS Cable 600/1000 Volts

Nominal Area	Nom. Insulation Thicknes s	Approx thickness of Innershea th	Nominal Diameter of Armour wire	Nom. Outer sheath Thicknes s	Approx. Overall diameter	Approx. Net Weight	Max.DC Resistan ce of conducto rat 20°C	Max.AC Resistan ce of conducto r at 90℃	Approx. Reactanc e (At 50 Hz)	Impedanc e at 90℃	Current carrying capacity In Ground at 15°C	Current carrying capacity In Air at 30°C	Short circuit of conducto rfor 1 sec.	Voltage drop DC	Voltage drop 1Ø AC
mm 2	mm	mm	mm	mm	mm	Kg/KM	Ω/Km	Ω/Km	Ω/Km	Ω/Km	Amps.	Amps.	KA	mV/A/m	mV/A/m
*16	0.7	0.8	1.25	1.5	21.5	1000	1.15	1.47	0.081	1.472	141	118	2.29	2.9	2.9
*25	0.9	0.8	1.25	1.6	25	1300	0.727	0.927	0.079	0.93	183	154	3.58	1.85	1.9
*35	0.9	1	1.6	1.7	28.5	1750	0.524	0.668	0.077	0.672	219	190	5.01	1.35	1.35
50	1	1	1.6	1.8	26.5	1900	0.387	0.494	0.076	0.5	259	229	7.15	0.98	1
70	1.1	1	1.6	1.9	30	2400	0.268	0.342	0.075	0.35	317	288	10.01	0.67	0.69
95	1.1	1.2	2	2	34	3250	0.193	0.247	0.073	0.257	381	355	13.59	0.49	0.52
120	1.2	1.2	2	2.1	37	3810	0.153	0.197	0.073	0.21	433	411	17.16	0.39	0.42
150	1.4	1.2	2	2.2	40	4500	0.124	0.16	0.073	0.176	485	469	21.45	0.31	0.35
185	1.6	1.4	2.5	2.4	46	5750	0.0991	0.128	0.073	0.147	547	541	26.46	0.25	0.29
240	1.7	1.4	2.5	2.5	50	6950	0.0754	0.0989	0.072	0.122	632	639	34.32	0.195	0.24
300	1.8	1.6	2.5	2.6	55	8250	0.0601	0.0802	0.072	0.108	708	728	42.9	0.155	0.21
400	2	1.6	2.5	2.8	60	10200	0.047	0.064	0.071	0.096	799	838	57.2	0.12	0.19

^{*} Compacted Circular Conductor

Constructional & Electrical data for 3 core FS Cable 600/1000 Volts

Nominal Area	Nom. Insulation Thicknes s	Approx thickness of Innershea th	Nominal Diameter of Armour wire	Nom. Outer sheath Thicknes s	Approx. Overall diameter	Approx. Net Weight	Max.DC Resistan ce of conducto rat 20℃	ce of	Approx. Reactanc e (At 50 Hz)	Impedanc e at 90℃	Current carrying capacity In Ground at 15°C	Current carrying capacity In Air at 30°C	Short circuit of conducto r for 1 sec.	Voltage drop 3 Ø AC
mm 2	mm	mm	mm	mm	mm	Kg/KM	Ω/Km	Ω/Km	Ω/Km	Ω/Km	Amps.	Amps.	KA	mV/A/m
*16	0.7	0.8	1.25	1.6	22.5	1180	1.15	1.47	0.081	1.472	119	101	2.29	2.5
*25	0.9	1	1.6	1.7	27.5	1750	0.727	0.927	0.079	0.93	152	132	3.58	1.65
*35	0.9	1	1.6	1.8	31	2100	0.524	0.668	0.077	0.672	182	162	5.01	1.15
50	1	1	1.6	1.8	30	2450	0.387	0.494	0.076	0.5	217	196	7.15	0.87
70	1.1	1	1.6	1.9	33	3150	0.268	0.342	0.075	0.35	266	247	10.01	0.64
95	1.1	1.2	2	2.1	38	4250	0.193	0.247	0.073	0.257	319	305	13.59	0.45
120	1.2	1.2	2	2.2	42	5050	0.153	0.197	0.073	0.21	363	353	17.16	0.37
150	1.4	1.4	2.5	2.3	47	6400	0.124	0.16	0.073	0.176	406	404	21.45	0.3
185	1.6	1.4	2.5	2.4	51	7500	0.0991	0.128	0.073	0.147	458	465	26.46	0.26
240	1.7	1.4	2.5	2.6	56	9350	0.0754	0.0989	0.072	0.122	529	549	34.32	0.21
300	1.8	1.6	2.5	2.7	61	11250	0.0601	0.0802	0.072	0.108	592	626	42.9	0.185
400	2	1.6	2.5	2.9	68	13850	0.047	0.064	0.071	0.096	667	720	57.2	0.165

^{*} Compacted Circular Conductor

Constructional & Electrical data for 4 core FS Cable 600/1000 Volts

Nominal Area	Nom. Insulation Thicknes s	Approx thickness of Innershea th	Nominal Diameter of Armour wire	Nom. Outer sheath Thicknes s	Approx. Overall diameter	Approx. Net Weight	Max.DC Resistan ce of conducto r at 20℃	Max.AC Resistan ce of conducto r at 90℃	Approx. Reactanc e (At 50 Hz)	Impedanc e at 90°C	Current carrying capacity In Ground at 15°C	Current carrying capacity In Air at 30°C	Short circuit of conducto r for 1 sec.	Voltage drop 3 Ø AC
mm 2	mm	mm	mm	mm	mm	Kg/KM	Ω/Km	Ω/Km	Ω/Km	Ω/Km	Amps.	Amps.	KA	mV/A/m
*16	0.7	0.8	1.25	1.6	22.5	1180	1.15	1.47	0.081	1.472	119	101	2.29	2.5
*25	0.9	1	1.6	1.7	27.5	1750	0.727	0.927	0.079	0.93	152	132	3.58	1.65
*35	0.9	1	1.6	1.8	31	2100	0.524	0.668	0.077	0.672	182	162	5.01	1.15
50	1	1	1.6	1.8	30	2450	0.387	0.494	0.076	0.5	217	196	7.15	0.87
70	1.1	1	1.6	1.9	33	3150	0.268	0.342	0.075	0.35	266	247	10.01	0.64
95	1.1	1.2	2	2.1	38	4250	0.193	0.247	0.073	0.257	319	305	13.59	0.45
120	1.2	1.2	2	2.2	42	5050	0.153	0.197	0.073	0.21	363	353	17.16	0.37
150	1.4	1.4	2.5	2.3	47	6400	0.124	0.16	0.073	0.176	406	404	21.45	0.3
185	1.6	1.4	2.5	2.4	51	7500	0.0991	0.128	0.073	0.147	458	465	26.46	0.26
240	1.7	1.4	2.5	2.6	56	9350	0.0754	0.0989	0.072	0.122	529	549	34.32	0.21
300	1.8	1.6	2.5	2.7	61	11250	0.0601	0.0802	0.072	0.108	592	626	42.9	0.185
400	2	1.6	2.5	2.9	68	13850	0.047	0.064	0.071	0.096	667	720	57.2	0.165

^{*} Compacted Circular Conductor

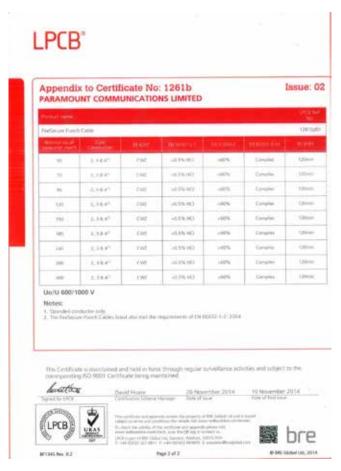
CERTIFICATIONS

BASEC Certificate for BS 7846: Paramount FireSecure and FireSecure Punch Cables



LPCB Certificate for category F120: Paramount FireSecure Punch Cables





BASEC Certificate for BS 7846: Paramount FireSecure and FireSecure Punch Cables







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ISO 9001 & 14001 Certified





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