TPMC Fire Alarm Cable

EN/BS Series - LPCB Approved

LPCB approved fire resistant cable maintains circuit integrity under fire for a stated period of time and under defined conditions. With features of thermosetting insulation, resistance to fire, low smoke and low gas emissions, it ensures the maximum fire safety and fire evacuation capability.

Design	**BS 7629-1: 2008** Category STANDARD 30 The complete cable shall have a duration of survival of ≥ 30 min when tested as BS EN 50200.
Fire resistance test	**BS EN 50200:2006,** class PH30 as 30 minutes to flame at 830°C and mechanical shocks. **BS EN 50200 Annex E,** 15 minutes to fire at 830°C and impact + additional 15 minutes of fire, impact and water spray. **BS 5839-1: 2013,** clause 26.2d, meet the class PH30 with EN50200.
Fire resistance test	**BS 6387:2013 (Category CWZ)** **Category C,** 3 hours to flame at 950°C. **Category W,** 15 minutes to flame at 650°C and further 15 minutes to flame and water spray. **Category Z,** 15 minutes to flame at 950°C with mechanical shocks each 30s.
Smoke emission test	**BS EN 61034-2: 2005,** the smoke generated shall result in transmittance values of not less than 80%.
Halogen emission test	**EN 50267-2-1:1999,** less than 0.5% HCl for the outer covering, binder tape & insulation when test.

Basic specification:

Certificate	LPCB approved	**Standard**	BS 7629-1: 2008, STANDARD 30
Operating temperature	-40°C to 200°C (ambient temp. 90°C)	**Voltage rating**	300V / 500V
Min bending radius	6 x Diameter	**Packaging**	Reel 500m, or customized
Feature	Sunlight resistant; Sequential footage marking every 1 meter		
Application	Primary for emergency lighting circuit, fire detection, fire alarm, voice alarm, etc.		

Address: 25th floor, 2nd Tower, Beichen Building, Jingjin Road, Beichen District, Tianjin , CHINA
Tianjin Profound Multinational Trade Co., Ltd. Tel: +86-22-58892191, +86-22-58892195
Web: www.tpmcsteel.com

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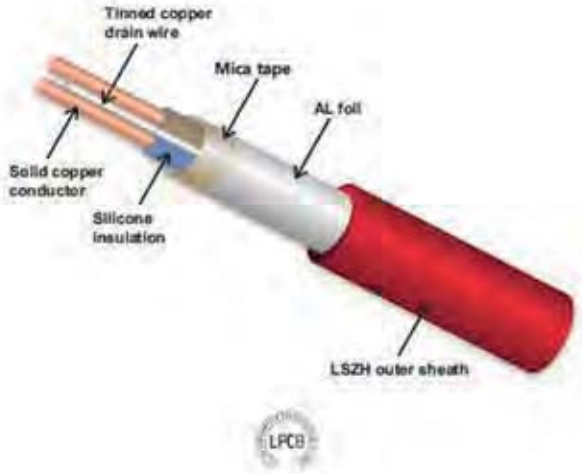

- Conductor: Plain annealed copper, as BS EN 60228 Class 1
- Insulation: Fire resistant silicone rubber, EI 2 type as BS EN 50363-1
- Wrapping: Mica tape
- Screen/Shield: Aluminum foil, thickness ≥ 0.075mm
- Drain wire: Tinned copper, 1 x 0.8mm Diameter (0.50mm2)
- Outer Sheath: LSZH (Low smoke zero halogen) thermoplastic sheathing compound, LTS 3 type as BS 7655-6.1

Available size

Ref. No.	C04-2Cx1.0	C04-2Cx1.5	C04-2Cx2.5
Stranded / solid conductor	Solid	Solid	Solid
Conductor size (mm)	1.13	1.35	1.70
Core NO. x Section (mm²)	2 x 1.00	2 x 1.50	2 x 2.50
DC Resistance 20°C (Max, Ω/KM)	18.10	12.10	7.41
Insulation OD (mm)	2.45 ± 0.1	2.60 ± 0.1	2.90 ± 0.1
Insulation THK (mm)	0.62	0.62	0.62
Insulation color	Brown / blue	Brown / blue	Brown / blue
Outer Sheath OD (mm)	6.60 ± 0.2	7.20 ± 0.2	7.80 ± 0.2
Outer Sheath THK (mm)	0.60	0.70	0.70
Outer Sheath color	Red	Red	Red

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TPMC Fire Alarm Cable

NFPA/NEC Series -UL Listed

Basic specification:

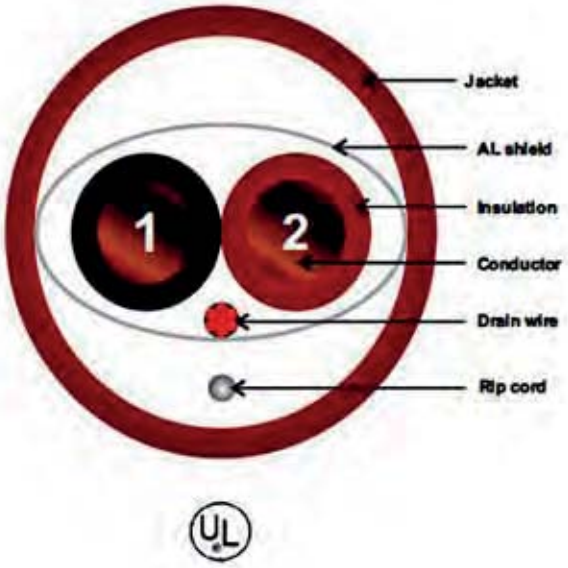
Certificate	UL Listed / **E489608**	**Brand**	**TPMC**
AWG cable	Unshielded / Shielded	**European cable**	2x1.5 / 2x2.5
Standard	UL 1424 / NEC Article 760 / ASTM B-3	**Operating voltage**	300V max
Temperature	-20°C to 75°C	**Packaging**	Reel 1000feet (305m), or customized
FPL cable test	UL test 1424 + vertical flame test UL 1581.	**FPLR cable test**	UL test 1424 + vertical riser test UL 1666.
Feature	Sunlight resistant; Sequential footage marking every 2 feet		
Application	Wiring of fire alarms, smoke detectors, voice communications, burglar alarms, fire protective circuits, etc		

FPL power-limited fire alarm cable is NEC listed and suitable for general purpose of fire alarm use. But it doesn't include installation in riser, ducts and plenums unless the cable is installed in conduit.

FPLR power-limited fire alarm riser cable is NEC listed and suitable for use in a vertical run of a shaft or from floor to floor. The cable has fire-resistant characteristics of holding fire travel from floor to floor.

TPMC supplies both FPL and FPLR fire alarm cable in UL listed.

AWG UL fire alarm cable (Shielded)



- **Certificate:** UL Listed
- **Brand:** TPMC
- **Conductor:** Bare copper
- **Insulation (dielectric):** Black or red PVC
- **Insulation thickness:** 22 ~ 16AWG: 0.010 inch (0.25 mm)
  14 ~ 12AWG: 0.013 inch (0.33mm)
- **Jacket:** Red PVC
- **Jacket thickness:** THK: 0.017 inch (0.43 mm)
- **Shield:** Aluminum mylar
- **Drain wire (earth wire):** Tinned copper
- **Drain wire size:** 7-strand x 0.2mm, with 0.22m²
- **Rip cord:** 150D Nylon

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Available size

Conductor size	Core	Cross-section area	DC Resistance at 20°C	Nominal OD of cable	Ref. No.
inch / mm	Solid / 7-strand	mm²	Max, Ω/km	inch / mm	
22AWG x 4C (0.0253/0.64)	Solid	0.32	59.1	0.182 / 4.62	C02-AWG22-4
22AWG x 4C (0.0295/0.75)	7-strand	0.44	55.4	0.213 / 5.42	C02-AWG22-4S
18AWG x 2C (0.0403/1.02)	Solid	0.82	21.4	0.187 / 4.75	C02-AWG18-2
18AWG x 4C (0.0403/1.02)	Solid	0.82	21.4	0.216 / 5.49	C02-AWG18-4
18AWG x 2C (0.0403/1.17)	7-strand	1.07	21.9	0.214 / 5.45	C02-AWG18-2S
18AWG x 4C (0.0403/1.17)	7-strand	1.07	21.9	0.248 / 6.29	C02-AWG18-4S
16AWG x 2C (0.0508/1.29)	Solid	1.31	13.5	0.206 / 5.23	C02-AWG16-2
16AWG x 4C (0.0508/1.29)	Solid	1.31	13.5	0.240 / 6.10	C02-AWG16-4
16AWG x 2C (0.0508/1.50)	7-strand	1.77	13.7	0.240 / 6.09	C02-AWG16-2S
16AWG x 4C (0.0508/1.50)	7-strand	1.77	13.7	0.279 / 7.09	C02-AWG16-4S
14AWG x 2C (0.0641/1.63)	Solid	2.09	8.45	0.240 / 6.10	C02-AWG14-2
14AWG x 4C (0.0641/1.63)	Solid	2.09	8.45	0.283 / 7.19	C02-AWG14-4
14AWG x 2C (0.0508/1.87)	7-strand	2.75	8.60	0.275 / 6.99	C02-AWG14-2S
14AWG x 4C (0.0508/1.87)	7-stranded	2.75	8.60	0.325 / 8.24	C02-AWG14-4S
12AWG x 2C (0.0808/2.05)	Solid	3.30	5.31	0.269 / 6.83	C02-AWG12-2
12AWG x 2C (0.0808/2.37)	7-strand	4.41	5.41	0.311 / 7.90	C02-AWG12-2S

Equivalent UL and IEC tests:

CABLE TYPE	UL TEST STANDARD	EQUIVALENT IEC STANDARD
	UL 1581§1100 Horizontal-specimen flame test	IEC 60331-2
	UL 1581§1060 Vertical flame test	IEC 60332-1
CMX	UL 1581§1080 VW-1 (vertical specimen) flame test	IEC 60332-1
	UL 1581§1160 UL vertical-tray flame test	IEC 60332-3
	UL 1581§1164 UL vertical-tray flame test; vertical-tray combustion propagation tes	No equivalent
CMR	UL 1666 General Riser test	No equivalent
CM, CMG	UL 1685 Low-smoke, low-flame cable test	No equivalent
CMP	UL 910 General Plenum cable test (Steiner tunnel)	No equivalent

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LSOH

In contrast to these jacket types is Low Smoke, Zero Halogen (LSOH or LSZH) cables. The advantages of this construction are a reduction of smoke, which can impair visibility, and the elimination of exposure by both personnel and active equipment to halogenated (acid) gases.

LSOH cables are typically subjected to a three distinct tests: flame retardency (IEC 60332), halogen content (IEC 60754) and smoke emission (IEC 61034). For flame retardency, there are two different grades: IEC 60332-2-2 (formerly IEC 60332-1) for a single cable and the more stringent IEC 60332-3-24 (formerly IEC 60332-3c) for bundled cables. Requirements for which grade is applicable varies by country and local codes should be consulted.

CABLE TEST REQUIREMENTS

Rating	Reference	Definition	Test Requirements	FPN Notes
CMP	NEC 2008 Article 800.179 (A)	Type CMP communications plenum cable shall be listed as being suitable for use in ducts, plenums, and other spaces used for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.	NFPA 262-2007	One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52m (5 ft) or less when tested in accordance with NFPA 262- 2007, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.
CMR	NEC 2008 Article 800.179 (B)	Type CMR communications riser cable shall be listed as being suitable for use in a vertical run in a shaft or from floor to floor and shall also be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.	ANSI/UL 1666-2002	One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is that the cables pass the requirements of ANSI/UL 1666-2002, Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts.
CMG	NEC 2008 Article 800.179 (C)	Type CMG general-purpose communications cable shall be listed as being suitable for general-purpose communications use, with the exception of risers and plenums, and shall also be listed as being resistant to the spread of fire.	CSA C22.2 No. 0.3-M-2001	One method of defining resistant to the spread of fire is for the damage (char length) not to exceed 1.5m (4 ft 11 in.) when performing the CSA Vertical Flame Test - Cables in Cable Trays, as described in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.
CM	NEC 2008 Article 800.179 (D)	Type CM communications cable shall be listed as being suitable for general-purpose communications use, with the exception of risers and plenums, and shall also be listed as being resistant to the spread of fire.	ANSI/UL 1685-2000 or CSA C22.2 No. 0.3-M-2001	One method of defining resistant to the spread of fire is that the cables do not spread fire to the top of the tray in the "UL Flame Exposure, Vertical Tray Test" in UL 1685-2000, Standard for Safety for Vertical-Tray Fire Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables. The smoke measurements in the test method are not applicable Another method of defining resistant to the spread of fire is for the damage (char length) not to exceed 1.5m (4 ft. 11 in.) when performing the CSA Vertical Flame Test - Cables in Cable Trays, as described in CSA C22.2 No. 0.3-M-2001, Test Methods for Electrical Wires and Cables.
CMX	NEC 2008 Article 800.179 (E)	Type CMX limited-use communications cable shall be listed as being suitable for use in dwellings and for use in raceway and shall also be listed as being resistant to flame spread.	ANSI/UL 1581-2001 (VW-1 Vertical Flame Test)	One method of determining that cable is resistant to flame spread is by testing the cable to the VW-1 (vertical-wire) flame test in ANSI/UL 1581-2001, Reference Standard for Electrical Wires, Cables and Flexible Cords.

Fire Tests For Cables

Fire Test	Gas Burner	Orientation	Duration	Application
NFPA 262 Plenum Steiner Tunnel First Test	Methane, 86 kW Flame @>830°C	Horizontal Cable tray	20 minutes	Plenum Cable CMP,OFNP
UL 1666 Riser Cable Fire Test	Propane, 154.5 kW Flame @>950°C	Vertical	30 minutes	Riser Cable CMR, OFNR
UL 1685 Vertical Tray Test	Propane, 20.6 kW Flame @>950°C	Vertical Cable tray	30 minutes	General purpose cable CM, OFN
VW-1 Vertical Flame Test	Methane, 500 W Flame @>830°C	Vertical	15 seconds x 5 cycles	Restricted cable CMX
UL 1581 Vertical /Horizontal Flame Test	Methane, 20.61 Flame @>830°C	Vertical/ Horizontal	3 hours	General purpose cable CMG

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ASSOCIATED TEST METHODS

CSA C22.2 No. 0.3 *Clause 4.11.4 Vertical Flame Test - Cables in Cable Trays*

Intent: To determine flame propagation tendency of cables in a vertical tray.

Test: This test applies a 20 kW (~70k BTU/h) flame source to a cable attached to a vertically mounted ladder-type cable tray. The source is to be applied to the cable midway between rungs for a continuous period of 20 min. Following application of the flame, the cable fire (if any) will be allowed to extinguish.

Criteria: The evaluation for this test is the char length of the cable. It is measured from the location where the flame source is applied. This is a test method only and does not contain specific pass/fail criteria.
Note: A 1.5 m (4 ft. 11 in.) char length is required for CM and CMG cables per NFPA 70 (2005 NEC); CMG cables per CSA C22.2 No. 214; and FT4 cables per CSA C22.2 No. 0.3. Note that an alternate method for qualification of CM cables (only) per NFPA 70 (2005 NEC) is the UL 1581 Vertical-Tray Flame Test.

IEC 60754-2 *Determination of degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity*

Intent: To specify a method for the determination of the degree of acidity of gases evolved during the combustion of compounds taken from the components of electric or optical cables.

Test: This test takes a 1000mg +/- 5mg sampling of the cable jacketing material and burns it in a tube furnace. The evolved gases are trapped by bubbling through distilled or demineralized bottles of water and the acidity is measured via the pH value. The conductivity of the solution is also measured.

Criteria:
•The weighted pH value should not be less than 4.3 when related to 1 liter (0.26 gal) of water
•The weighted value of conductivity should not exceed 10μs/mm

IEC 60332-1-2 *Test for Vertical Flame Propagation for a single insulated wire or cable – Procedure for a 1 kW Pre-Mixed Flame*

Intent: To determine the resistance to vertical flame propagation for a single vertical electrical insulated conductor or cable, or optical fibre cable, under fire conditions.

Test: This test applies a 1 kW (~ 3400 BTU/h) flame source for a duration of 60 sec to a single vertically positioned cable.

Criteria: After any associated burning has ceased, the cable must meet the following criteria:
• No charring can be present upward more than 425mm (~ 17 in.) from the source
• No charring can be present downward more than 65mm (~ 2.5 in.) below the source

IEC 60332-1-3 *Test for vertical flame propagation for a single insulated wire or cable – Procedure for determination of flaming droplets/particles*

Note: This testing may be performed simultaneously with IEC 60332-1-2.

Intent: To assess falling flaming droplets/particles when a single vertical electrical insulated conductor or cable, or optical fibre cable, is subjected to defined fire conditions.

Test: This test applies a 1 kW (~ 3400 BTU/h) flame source for a duration of 60 sec to a single vertically positioned cable.

Criteria: The cable must meet the following criteria:
• The cable cannot emits any particles that ignite filter paper located 150mm (~ 6 in.) below the source during the test duration.

IEC 60332-3-24 *Test for vertical flame spread of vertically-mounted bunched wires or cables – Category C*

Intent: To assess the vertical flame spread of vertically mounted bunched wires or cables, electrical or optical, under defined conditions.

Test: The test applies a [TBD kw/h] flame to a 3.5m (11.5 ft.) length of 300mm (11.6 in.) wide side-stacked line of cables attached to a vertically mounted ladder tray. The cable shall be allowed to burn or glow until cessation up to a maximum time of one hour, after which any remaining cable burning or glowing shall be extinguished.

Criteria: The maximum extent of the charred portion measured on the sample shall not have reached height exceeding 2.5m above the bottom edge of the burner.

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