Self-Regulating Technology

50y

Since 1972

nVent RAYCHEM

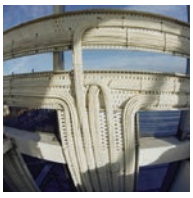
CONNECT AND PROTECT

Mineral Insulated Wiring Cable System

nVent

PYROTENAX

nVent PYROTENAX MI The Ultimate Fire Survival MI Wiring Cable System for Versatility and Ultimate Fire Survival Performance



nVent PYROTENAX MI Cable Systems were installed when fire broke out in the Channel Tunnel in November 1996. Resisting extreme temperatures that destroyed concrete and welded rails, the Pyro MI Wiring Cable allowed emergency lighting to operate for the safe evacuation of passengers; proving its superior fire survival capability.

Pyro MI Fire Survival Cable System - provides the ideal solution to many difficult and demanding wiring installations making a permanent and dependable wiring cable system for all low and medium voltage applications. Safe in hazardous installations and radio active environments. Exceeds all world wide fire performance standards. The Pyro MI Cable System is the natural choice for domestic, commercial and industrial applications.

CONTENTS

Pyro MI Enhanced Grade Wiring Cable System

PYRO MI RANGE

The standard range of Pyro MI Cable provides the ideal solution for almost all electrical circuits in the low voltage category.

Two voltage grades - 500 and 750 Volts, are available with conductors from 1.0 sq.mm to 240 sq.mm. A full range of complementary accessories and tools provides a complete wiring system supplied and supported by the “Genuine nVent PYROTENAX” component assurance.

Standard colours are Orange, Red, White and Black. Other colours such as Stone, Blue, Grey etc. are also available subject to minimum order requirements.

PYRO MI BENEFITS

- Pyro MI survives the fire test requirements for enhanced grade cables as defined in BS 5839: part 1
- Peace of mind from the third party (LPCB) approval for categories C, W and Z in BS 6387
- Also attains categories C, W and Z of BS 6387 with one single cable sample

PYRO MI CONSTRUCTION

With a basic inorganic construction of a copper sheath and conductors, together with a mineral insulant, the cable provides a unique combination of dependability, versatility and permanence.

This construction, with the melting points of 1083°C and 2800°C for the copper and the insulant respectively, provides the unsurpassed Fire Survival properties which enable the cable to continue to carry current at temperatures in excess of 1000°C.

PYRO MI CONSTRUCTION CHARACTERISTICS

- Fireproof
- High Operating Temperatures
- Inherent Flameproof Barrier
- Zero Energy
- Non-Ageing
- Great Mechanical Strength
- Small Overall Diameter
- Pliable
- Wiring Cable and Conduit Combined
- Competitive Installed Cost
- High Degree of Electrical Screening
- Radiation Resistant
- Integral Earth Continuity
- High Corrosion Resistance
- Waterproof

Pyro Twist Cable System

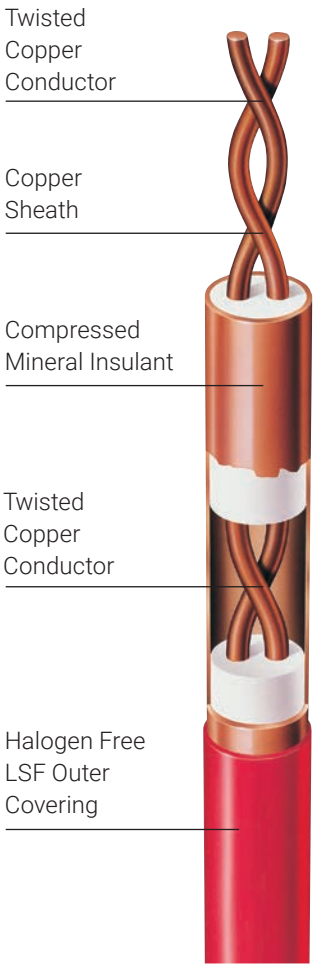
PYRO MI RANGE

Pyro Twist is a range of communication and signal cables for life preservation and integrated building management systems.

They have been developed from the proven characteristics of Pyro MI to maintain the security of vital signals in communication and data networks, particularly in hostile conditions.

PYRO TWIST ADDITIONAL CHARACTERISTICS AND ADVANTAGES

- Twisted conductor configuration with a solid copper screen
- Pyro Twist available in red (other colours available upon request)
- Pyro Twist uses standard accessories for the equivalent Pyro MI Light Duty cable size
- Pyro Twist can be installed and terminated by following the normal procedures for Pyro MI Cable
- The twisted copper conductor configuration enhances the EMC noise rejection characteristics, reducing the possibility of system malfunction
- The exceptionally low impedance of the solid copper sheath provides a superior EMC screening than other cable systems
- Minimal smoke obscuration in the event of fire



Pyro MI survived in this high rise office complex fire

Pyro MI Typical Applications

- Moving Walkways
- Car Parking
- Public Buildings
- Metro Links
- Hotels
- Shopping Complexes
- Building Services
- Offshore
- Rail Tunnels
- Road Tunnels
- Dock and Harbour
- Original Equipment
- Building Exteriors
- Power Generating
- Escalators
- Transport/Interchanges
- Petrol Stations
- Petrochemicals
- Airport
- Water Treatment

PYRO MI WORLDWIDE MAJOR PROJECTS

The following is a very brief list of products where Pyro MI Cables have been extensively specified and installed in situations demanding circuit integrity in the most critical situations.

Thermal Power Stations - Gas, Coal, Oil and Nuclear

Project	Location
Fawley	United Kingdom
Fiddler's Ferry	United Kingdom
Doha West	Kuwait
Nkand Mine	Zambia
Ap Lei Chan	Hong Kong
Heysham	United Kingdom
Kalpakam	India
Torness	United Kingdom
Hartlepool	United Kingdom
Marvikien	Sweden
Latina	Italy
Solovakia Al	Slovakia
Torre	Italy
Kalkar (FBR)	Germany
Dungeness (A&B)	United Kingdom
Rihand	India
Trillo (PWR)	Spain
Monju (FBR)	Japan
Sabiya	Kuwait
Taweelaah'B'	Abu Dhabi
Blackpoint	Hong Kong

Production Platforms - Oil and Gas

Major Oil Companies Specifying nVent PYROTENAX for On and Offshore Installations.

Reference List

Kuwait Oil Company (KOC)

Kuwait National Petroleum Co (KNPC)

ARAMCO

Petromin - Saudi Arabia

National Iranian Oil Company

Royal Dutch Shell - Netherlands

Union Oil

EXXON

Abu Dhabi National Oil Company (ADNOC)

Shell UK

Chevron, Statoils

Qatar General Petroleum Corporation

BP Chemicals

Oil & Natural Gas Company - India (ONGC).

Pyro MI survived in this power station fire

Throughout the world Pyro MI Fire Survival Wiring products are used for vital communication and power distribution.

Pyro MI Middle East Major Projects

Pyro MI Cables have been selected and approved for use in Middle East Projects by an impressive number of renowned specifiers as shown below.

The list of projects where Pyro MI Cables have been installed is much longer than, those mentioned below.

Project References

Dubai International Airport
Bahrain International Airport
Riyadh International Airport)
Muscat International Airport
Kuwait International Airport
North Dome - QGPC Qatar
Gulf Hotel - Bahrain
Sheraton - Doha
Alba - Bahrain Aluminium Smelter
Dubai - Dubai Aluminium Smelter
Sharjah Suk
Dubai 'G' Power Station
Dubai 'F' Power Station
Sabiya Power Station Kuwait
ADNOC Das Island - Gas Storage
Doha East Power Station - Kuwait
Doha West Power Station - Kuwait
Etisalat Telecommunications
Building - Abu Dhabi
Mew Sub-Stations
Holiday Inn Crown Plaza - Dubai
Riyadh University Hospital
Al Zoor Power - Kuwait
Ras Abu Fontas P S Qatar
ADNOC HQ Building Abu Dhabi
Bahrain Islamic Bank
BATELCO - Bahrain
National Bank of Dubai
Al Wasl Hospital - Dubai
Chamber of Commerce
Buildings - Dubai
Hilton Apartments - Kuwait
SECO Sub-Station - Saudi Arabia
Diplomatic Area - Riyadh
Jubail Port - Saudi Arabia
Damman Port - Saudi Arabia
Jeddah Port - Saudi Arabia
Jebel Ali Port - Dubai

Road Tunnels

Project	Location
Kai Tak	Kowloon - Hong Kong
Mersey Kingsway	Liverpool - United Kingdom
Mersey Queensway	Liverpool - United Kingdom
Tyne	Newcastle - United Kingdom
Lewes	Lewes - United Kingdom

Rail Tunnels

Brussels Metro, London Underground, Mass Transit Rail Loop, Montreal Metro, Newcastle Metro, Paris Metro, Glasgow Underground, Merseyside Underground Loop,Channel Tunnel, Vienna Metro

Pyro MI Standards & Approvals

Cables

nVent PYROTENAX MI Wiring Cables are manufactured, tested in accordance with, and LPCB approved to, BS EN 60702-1.

nVent PYROTENAX MI Wiring Cables are LPCB approved to BS 8434-2, BS 5839-1 Clause 26.2 (Enhanced), BS EN 50267-1, and BS EN 50200 Class PH 120. nVent PYROTENAX MI Wiring Cables have also been witnessed tested, by Lloyds Register, to the test requirements of BS7346-6.

Quality Certification

Assessed to ISO 9001
LPCB ref: 1659a

LPCB ref: 1659a/01

Terminations

nVent PYROTENAX Terminations are tested in accordance with BS EN 60702: Part 2. nVent PYROTENAX Terminations are Certified for use in potentially explosive atmospheres.

For ATEX approved glands, please contact nVent Thermal Sales for support.

nVent PYROTENAX cable drums, reels and termination packaging are marked with the CE mark as required by the low voltage directive, except for Terminations primarily intended for installation in potentially explosive atmospheres which are not marked, because the directive does not apply.

Other Standards and Codes of Practice Referring to MI Cables:

BS 8434- Methods of test for assessment of the fire integrity of electric cables Part1: Test for unprotected small cables for use in emergency circuits - BS EN 50200 with the addition of water spray.

Part 2: Test for unprotected small cables for use in emergency circuits - BS EN 50200 with a 930°C flame and with water spray.

BS 6387- 1994 Performance Requirements for Cables Required to Maintain Circuit Integrity under Fire Conditions.

IEC 60331- Tests for Electric Cables under fire conditions.

Underwriters Laboratories- UL2196-USA, ULC-S139-Canada. Tests for fire resistant cables.

London Underground- Fire Survival Cable (MICC) EME-SP-14-028-A1.

BS EN 60702-1 & 60702-2- Mineral Insulated Cables and their Terminations.

BS 7671- Requirements for Electrical Installations (IEE Wiring Regulations).

BS 5588- Fire Precautions in the design, construction and use of buildings,

BS 5266- Emergency Lighting.

BS 60079- Code of Practice for the selection, installation and maintenance of electrical apparatus for use in Potentially Explosive Atmospheres.

BS 5454- Storage and exhibition of Archival Documents.

BS 5839- Fire detection and alarm systems in Buildings.

The Institute of Petroleum Guidance for the design, Construction, Modification and Maintenance of Petrol Filling Stations. Electrical Installations.

C.I.O. Lighting and Wiring of Churches.

Fire Performance

Pyro MI easily meets and exceeds the BS 5839-1 Enhanced and Standard Grade Requirements

The BS 5839-1 (Fire detection and alarm systems for buildings – Part 1: Code of practice for system design, installation, commissioning and maintenance) describes two levels of fire performance for fire rated cabling for fire alarm systems. These performance levels have now been published within a British Standard.
BS 8434 Parts 1 and 2 (Methods of test for the assessment of the fire integrity of electric cables.

Pyro MI easily complies with and exceeds all the requirements for **Enhanced Grade** and **Standard Grade** described within these new standards and is LPCB approved.

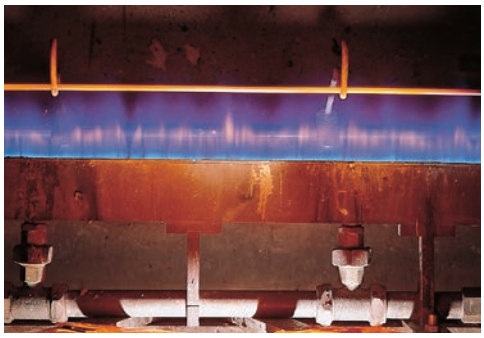
Pyro MI is the obvious choice for both **Standard Grade** and **Enhanced Grade** critical signal paths.

Fire Performance BS 6387 Performance Requirements for Cables Required to Maintain Circuit Integrity under Fire Conditions.

This standard details the following tests to categorise cables according to their fire withstand capabilities.

Resistance to Fire 950°C for 3 hours – Category C

The cable is tested by exposure to gas burner flames while passing a current at its rated voltage. Four survival categories are defined in the Performance Table below.



Performance Table

	Symbol	Pyro MI
650°C for 3 hours	A	Surpasses
750°C for 3 hours	B	Surpasses
950°C for 3 hours	**C**	**Surpasses**
950°C for 20 minutes	S	Surpasses

Resistance to Fire with Water Spray 650°C – Category W

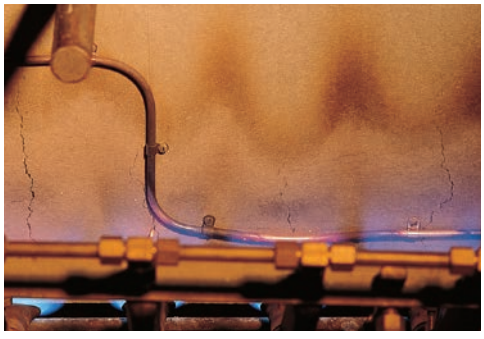
A new sample of cable is exposed to flames at 650°C for 15 minutes whilst passing a current at the rated voltage and then the spray is turned on to give exposure to both fire and water for a further 15 minutes.
A single survival category is defined in the Performance Table below.

Performance Table

	Symbol	Pyro MI
650°C for 3 hours	W	Surpasses

Resistance to Fire with Mechanical Shock 950°C Category Z

The final requirement is mechanical shock damage. A fresh sample of cable is mounted on a backing panel in an S-bend and is exposed to flames whilst the backing panel is struck with a solid steel bar the same diameter as the cable under test every 30 seconds for 15 minutes. Whilst the cable has been exposed to temperatures as defined in the Performance Table below.



Performance Table

	Symbol	Pyro MI
650°C	X	Surpasses
750°C	Y	Surpasses
950°C	**Z**	**Surpasses**

"Beyond the Standard...
Pyro MI Cable can easily comply and withstand the most onerous categories of C, W and Z
using one single Cable Sample

London Underground Limited
Test for Fire Survivable Cable

To fully assess the Fire Survival qualities of Pyro MI Cable and in response to requests from major specifiers, more rigorous testing criteria have been devised. The aim of the tests is to extend the conditions of BS 6387 to effectively recreate a more realistic fire situation by exposing the cable to significant thermal and physical shock.

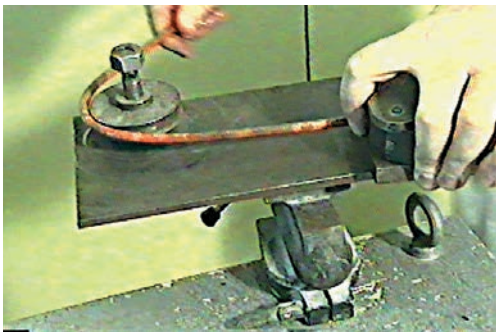
In a fire environment cable has to survive not only the extremes of high temperature but also the impact from falling debris together with water exposure from fire fighting equipment.

In the aftermath of a fire the cable must also withstand bending, further impact and possible water immersion during building and structural restoration.

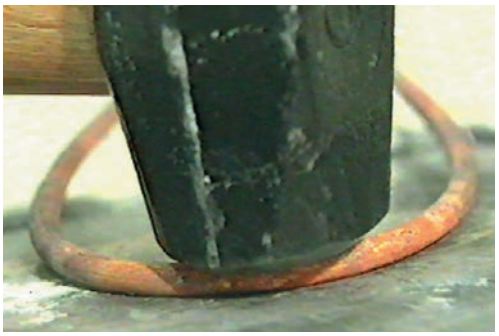
Cable struck directly with a steel bar (at the centre of the burner) every 10 minutes during a 3 hour period in a flame at 950˚C.

Cable then sprayed with water for 15 minutes whilst still being struck by the bar.

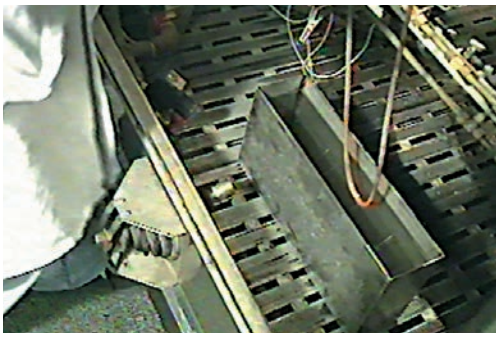
Close-up of cable subjected to the LUL Test.



Cable then bent at the point of impact through 180°.



Further mechanical impact shock.



Finally immersed in water for 1 hour whilst energised at its rated voltage.

Pyro MI survived in this department store fire

Pyro MI Cable System Data and Accessory Selection

Pyro MI Enhanced Grade Fire Survival Cable

CABLE SIZE REFERENCE BARE CABLECC LSF COVERED CCM	NUMBER & CROSS SECTIONAL AREA OF CONDUCTORS	CABLES EXPOSED TO TOUCH				CABLE DIAMETER		APPROXIMATE NOMINAL CONDUCTOaR DIAMETER	APPROXIMATE LONGEST BARE COIL LENGTHS FOR ESTIMATING PURPOSES	COIL DIAMETERS	APPROX. WEIGHT PER 1000 M		SCREW ON SEAL 105°C			
		CURRENT RATINGS		VOLT DROP												
		LSF	BARE	PER AMP PER METRE		LSF	BARE				LSF	BARE	PLAIN SEAL		EARTH TAIL SEAL	
																
Followed By	No. x sq mm	amps**	amps**	mV**		mm		mm	m	mm	kg		RPS		RPSL	
Light Duty 500V Grade																
2L1	2x1	19.5	17.5	42		6.6	5.1	1.13	†1800◆	500	125	104	2L1	20	2L1	20
2L1.5	2x1.5	25	22.5	28		7.2	5.7	1.39	†1400◆	††500	159	136	2L1.5	20	2L1.5	20
2L2.5	2x2.5	33	30	17		8.1	6.6	1.77	†1100◆	††500	213	187	2L2.5	20	2L2.5	20
2L4	2x4	44	40	10		9.4	7.7	2.25	800	915	282	248	2L4	20	2L4	20
3L1*	3x1	16.5	15	36		7.3	5.8	1.13	†1500	500	159	136	3L1	20	3L1	20
3L1.5*	3x1.5	21	19	24		7.9	6.4	1.39	†1100◆	500	201	176	3L1.5	20	3L1.5	20
3L2.5*	3x2.5	28	25	14		9.0	7.3	1.77	900	915	256	223	3L2.5	20	3L2.5	20
4L1*	4x1	16	14.5	36		7.8	6.3	1.13	†1200	500	187	162	4L1	20	4L1	20
4L1.5*	4x1.5	21	19	24		8.5	7.0	1.39	†900	500	230	203	4L1.5	20	4L1.5	20
4L2.5*	4x2.5	28	25	14		9.8	8.1	1.77	700	915	313	277	4L2.5	20	4L2.5	20
7L1	7x1	11	10	42		9.3	7.6	1.13	800	915	269	236	7L1	25	7L1	25
7L1.5	7x1.5	14	12.5	28		10.1	8.4	1.39	600	915	332	295	7L1.5	25	7L1.5	25
7L2.5	7x2.5	19	17	17		11.4	9.7	1.77	500	915	454	411	7L2.5	25	7L2.5	25
Heavy Duty 750 V Grade																
1H10*	1x10	90	81	3.6		9.0	7.3	3.57	950	915	273	240	1H10	20	1H10	25
1H16*	1x16	119	107	2.3		10.0	8.3	4.50	740	915	361	326	1H16	20	1H16	25
1H25*	1x25	154	139	1.5		11.3	9.6	5.66	540	915	499	457	1H25	20	1H25	32
1H35*	1x35	187	168	1.1		12.4	10.7	6.66	435	1370	632	585	1H35	20	1H35	32
1H50*	1x50	230	207	0.87		13.8	12.1	7.75	345	1370	810	758	1H50	25	1H50	40
1H70*	1x70	279	251	0.65		15.4	13.7	9.32	270	1370	1075	1016	1H70	25	–	
1H95*	1x95	333	300	0.53		17.7	15.4	10.98	215	1370	1413	1324	1H95	25	–	
1H120*	1x120	382	344	0.46		19.1	16.8	12.33	185	1370	1709	1612	1H120	32	–	
1H150*	1x150	431	388	0.42		20.7	18.4	13.70	155	1370	2055	1949	1H150	32	–	
1H185*	1x185	482	434	0.39		23.2	20.4	15.18	125	1370	2514	2370	1H185	32	–	
1H240*	1x240	537	483	0.36		26.1	23.3	17.33	98	1370	3213	3050	1H240	40	–	
2H1.5	2x1.5	26	23.5	28		9.6	7.9	1.39	750	915	272	237	2H1.5	20	2H1.5	20
2H2.5	2x2.5	36	32	17		10.4	8.7	1.77	610	915	314	276	2H2.5	20	2H2.5	20
2H4	2x4	47	42	10		11.5	9.8	2.25	480	915	397	355	2H4	20	2H4	25
2H6	2x6	60	54	7		12.6	10.9	2.75	370	1370	493	446	2H6	20	2H6	25
2H10	2x10	82	74	4.2		14.4	12.7	3.57	280	1370	673	619	2H10	25	2H10	32
2H16	2x16	109	98	2.6		16.4	14.7	4.50	205	1370	912	850	2H16	25	2H16	40
2H25	2x25	142	128	1.65		19.4	17.1	5.66	150	1370	1277	1178	2H25	32	2H25	40
3H1.5*	3x1.5	22	20	24		10.0	8.3	1.39	670	915	290	254	3H1.5	20	3H1.5	20
3H2.5*	3x2.5	30	27	14		11.0	9.3	1.77	520	915	364	323	3H2.5	20	3H2.5	25
3H4*	3x4	40	36	9.1		12.1	10.4	2.25	420	1370	460	415	3H4	20	3H4	25
3H6*	3x6	51	46	6		13.2	11.5	2.75	345	1370	575	526	3H6	25	3H6	25
3H10*	3x10	69	62	3.6		15.3	13.6	3.57	245	1370	812	754	3H10	25	3H10	32
3H16*	3x16	92	83	2.3		17.9	15.6	4.50	180	1370	1124	1034	3H16	25	3H16	40
3H25*	3x25	120	108	1.45		20.5	18.2	5.66	135	1370	1549	1444	3H25	40	3H25	40
4H1.5*	4x1.5	23	20.5	24		10.8	9.1	1.39	560	915	345	305	4H1.5	20	4H1.5	20
4H2.5*	4x2.5	30	27	14		11.8	10.1	1.77	445	1370	428	384	4H2.5	20	4H2.5	25
4H4*	4x4	40	36	9.1		13.1	11.4	2.25	350	1370	556	507	4H4	25	4H4	25
4H6*	4x6	51	46	6		14.4	12.7	2.75	270	1370	698	644	4H6	25	4H6	32
4H10*	4x10	68	61	3.6		16.5	14.8	3.57	205	1370	974	911	4H10	25	4H10	32
4H16*	4x16	89	80	2.3		19.6	17.3	4.50	145	1370	1386	1286	4H16	32	4H16	40
4H25*	4x25	116	104	1.45		22.9	20.1	5.66	110	1370	1947	1805	4H25	40	4H25	40
7H1.5	7x1.5	15.5	14	28		12.5	10.8	1.39	385	1370	479	432	7H1.5	25	7H1.5	25
7H2.5	7x2.5	21	19	17		13.8	12.1	1.77	310	1370	611	559	7H2.5	25	7H2.5	25
12H1.5	12x1.5	13	11.5	28		15.8	14.1	1.39	210	1370	772	712	12H1.5	32	–	
12H2.5	12x2.5	17	15.5	17		17.9	15.6	1.77	175	1370	1001	911	12H2.5	32	–	
19H1.5	19x1.5	11	10	28		18.9	16.6	1.39	150	1370	1088	992	19H1.5	40	–	

Values quoted are nominal lenghts only. Please contact our customer service department for confirmation of exact available lengths.