



**CONNECT AND PROTECT**

# System 1850 Fire Rated & Space Savings

Wiring Solutions

  
nvent

**PYROTENAX**



## COMMERCIAL BUILDING SAFETY & PROTECTION

nVent PYROTENAX MI inorganic wiring cable solutions offer maximum ampacity with uncompromising performance of critical life safety circuits in the event of fire. Over 30 Million feet of these proven superior performance systems installed worldwide are protecting people when they need it most.

## THE HEART OF OUR SOLUTIONS

For over 80 years, nVent PYROTENAX Mineral Insulated (MI) fire-rated wiring systems, components and accessories have satisfied the unique requirements of the wiring and heating industries. The rugged and no-smoke producing inorganic construction of the cables delivers superior critical life safety circuit performance in the event of fire and when increased ampacity is required.

Our MI cables allow for the safe operation of critical emergency circuits. These circuits are essential for the safe evacuation of buildings and to continue firefighters' efforts during an emergency. Typical fire-rated applications include wiring for fire pumps, emergency generators, firefighters' elevators and smoke extraction fans.

Other applications include the retrofitting of electrical power feeders in commercial buildings due to increased power consumption and the elimination of the effects of electromagnetic interference (caused by high current feeders) on electronic equipment.

## BUILDING A MORE SUSTAINABLE AND ELECTRIFIED WORLD



### Energy Efficiency

Our solutions improve energy efficiency for our customers.



### Customer Productivity

Our solutions reduce labor cost in design and installation, improve utilization and reduce total cost of ownership.



### Safety

Our solutions improve end-user safety and help our customers enhance the safety of their operations.



### Resiliency and Protection

Our solutions add resiliency to critical systems by helping keep them safe from natural and manmade disruptions.



### Lifespan and Serviceability

Our solutions extend the lifespan of our customers' systems, reducing waste and lowering cost.



### Eco-Friendly

We support customers sustainability goals by developing environmentally friendly products and solutions.

# Protecting People, Processes & Critical Life Safety Circuits

## FIRE-RATED SYSTEMS

High-rise buildings, hospitals, airports, and tunnels are locations where fires can be costly and deadly if the emergency systems in place do not operate properly. Our fire-rated cables will operate for at least 2 hours under fire conditions to allow for the continued operation of life safety equipment and the safe evacuation of the facility.

## SPECIALTY WIRING SYSTEMS

Our MI cable technology for special applications include patented systems for eliminating electromagnetic interference and systems for introducing utility services into a building using MI cable instead of concrete encasement of the service conductors. Historic and commercial building retrofits are typical applications where the space for electrical wiring is limited. nVent non-fire-rated cables and service entrance systems are small in profile and unobtrusive, providing the perfect solution for these applications.

## PROTECTING ELECTRICAL CIRCUITS WITH FIRE-RESISTANT WIRE

Our two-hour fire-rated cable is dependable and versatile while providing the ultimate in safety and electrical circuit protection. Zero smoke, zero flame spread and zero fuel contribution. Up to 80% space savings compared to conventional conduit and wire systems. Specifically suited for:

- Fire pump emergency generator feeders
- Fire alarm system wiring
- Pressurization and extraction fans

## 30 MILLION FEET OF INSTALLATIONS WORLDWIDE:

- Amazon Crystal City Headquarters, USA
- Vienna Metro, Austria
- Brussels Metro, Belgium
- Montreal Metro, Canada
- National Assembly Building, Canada
- Parliament Hill, Canada
- Toronto Transit Commission (TTC), Canada
- Stuttgart International Airport, Germany
- Wing Lung Bank, Hong Kong
- Dublin Airport, Ireland
- Riyadh University Hospital, Saudi Arabia
- Buckingham Palace, UK
- Channel Tunnel, UK
- Heathrow International Airport, UK
- Harvard University, USA
- Los Angeles City Hall, USA
- NYC Museum of Natural History, USA
- NYU Medical Center, USA
- Pentagon Building, USA
- Rockefeller Center, USA
- The White House, USA
- Texas Medical Center, USA
- U.S. Capitol Building, USA
- Yankee Stadium, USA



Tunnels



Airports

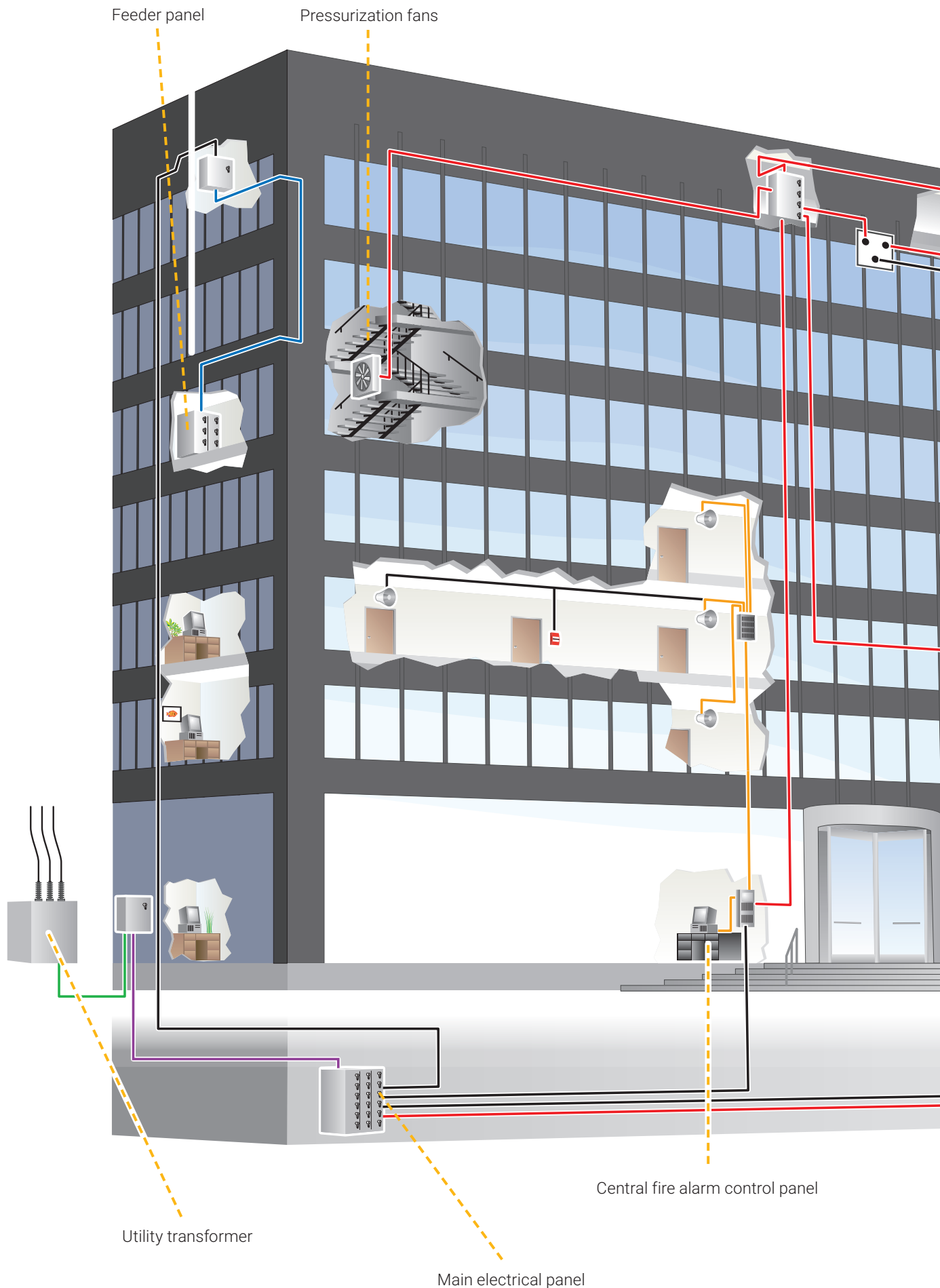


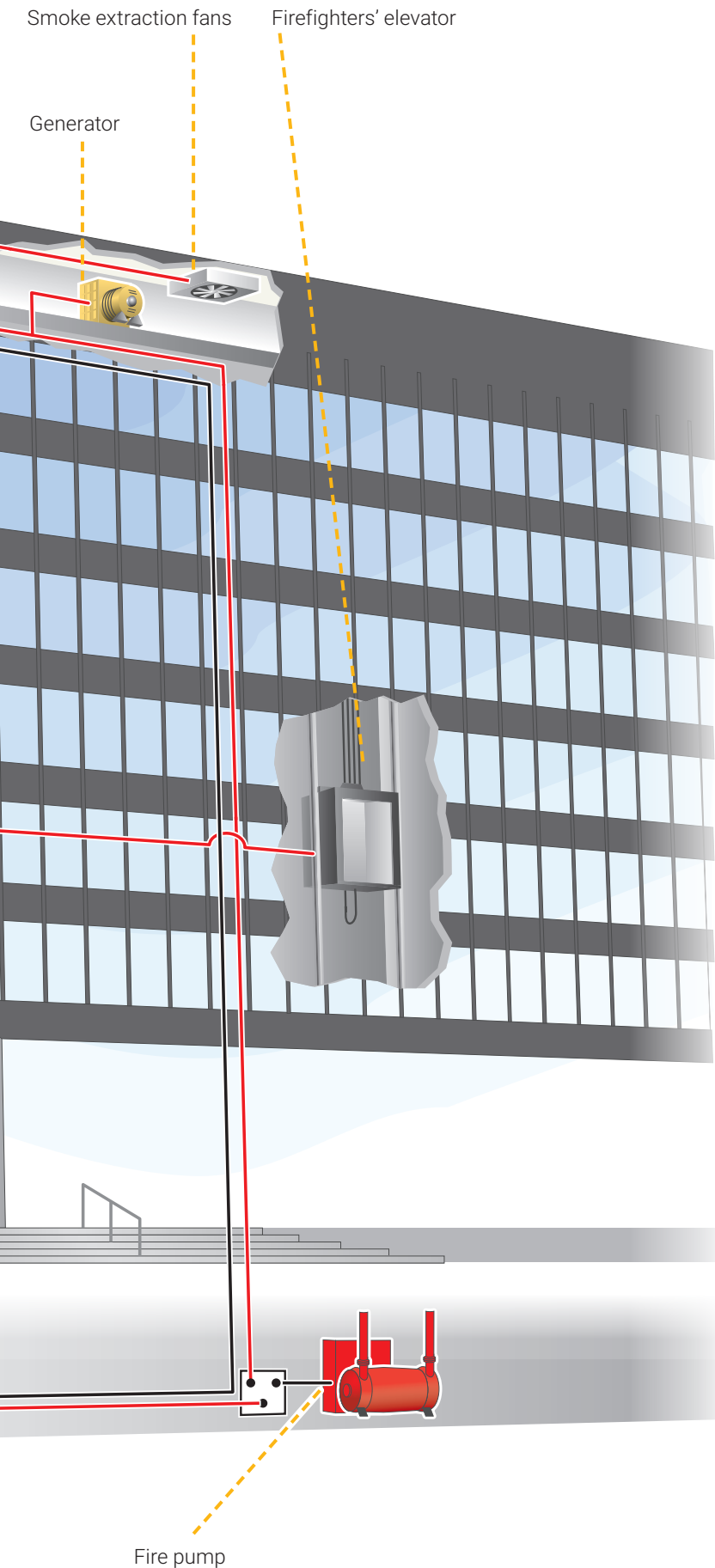
Hospitals



High-rise buildings

# Fire-Rated Applications & Cable Systems





## FIRE-RATED CABLE SYSTEM

### Power Cables █

### Fire Alarm Cables\* █

For all critical life safety circuits fed by the emergency supply including: the fire pump, fire alarm system, smoke extraction fans, pressurization fans, and power for the firefighters' elevator.

### SPACE SAVING CABLE SYSTEM █

For the retrofit of power feeders in locations where space is limited and difficult installation conditions exist.

### SERVICE ENTRANCE CABLE SYSTEM █

For the retrofit of service entrance feeders when additional power is needed and where encasement of conventional conductors in concrete is not feasible.

### NORMAL POWER CABLES █

Standard power feeders throughout the building.

\* System 1850 twisted pair and shielded twisted pair Mi cables are ULC Listed 2-hour fire-resistive cables (Canada only)

# Fire-Rated Wiring Systems & Technology



## **NVENT PYROTENAX SYSTEM 1850**

Backed by decades of industry leading design, installation and manufacturing expertise and with more than 30 million feet of cable installed worldwide and with many installations still in service after 50 years of performance, nVent PYROTENAX's rugged, reliable and no-smoke producing inorganic construction delivers superior critical life safety circuit performance in the event of fire and when increased ampacity is required.

System 1850 mineral insulated fire-rated, copper-sheathed power cables are UL listed and can withstand temperatures up to 1850 °F / 1010 °C for at least two hours, ensuring critical equipment and processes continue to operate in the event of a fire.

Some of the following applications System 1850 would be used in include:

- High-rise buildings – emergency feeders for fire pumps, elevators, smoke extraction and pressurization fans, fire alarm wiring, etc.
- Hospitals and other institutions where occupant mobility is limited, to preserve power for emergency response, defend in place and allow time for egress. Type MI cables are specifically approved by NEC 517.
- Historic buildings where it can be installed unobtrusively, as well as to assure preservation of fire fighting systems.
- Tunnels and subways for emergency lighting and smoke extraction fans, where its inherent ruggedness and zero smoke properties and our exclusive agency approved three way splice make it ideal for emergency response and evacuation operations.
- Airports, stadiums, hotels, banks, etc.

System 1850 MI cable terminations are typically field installed. Factory terminated cables are also available in a range of sizes and lengths.

### **Space Saving Cable System**

System 1850 for space saving applications are ideal for high capacity feeders and low profile wiring in the following locations:

- Older high-rise buildings
- Historic buildings
- Health care facilities
- Any location where space is limited





## NVENT PYROTENAX SYSTEM 1850-SE

### Service Entrance System

System 1850-SE systems are UL Classified 2-hour fire-rated, mineral insulated, copper-sheathed service entrance cable system that allows service entrance conductors to be routed inside the building.

System 1850-SE offers an alternative to concrete encasement that has been approved by the Authorities Having Jurisdiction (AHJs) in several major cities, including New York, Washington D.C., Philadelphia and New Orleans; and is allowed on a case-by-case basis in many other cities.

System 1850-SE can be used in the following environments:

- High-rise buildings
- Health care facilities
- Historic buildings
- Airports, stadiums, hotels, banks etc.

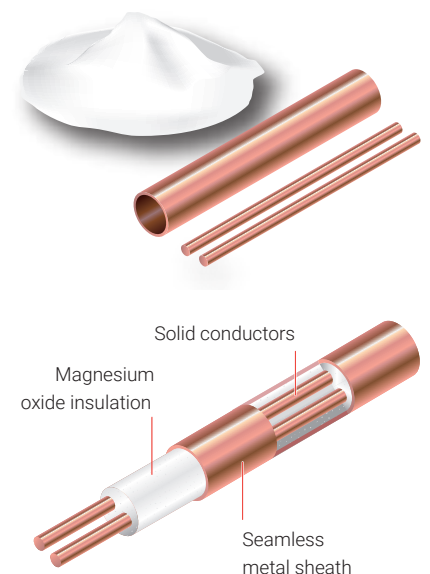


## MINERAL INSULATED TECHNOLOGY

Using only inorganic materials, copper and magnesium oxide (MgO), our MI wiring cable offers a unique combination of dependability, versatility, and performance. Highly compacted magnesium oxide insulation provides exceptional temperature and electrical performance. Manufactured using a process unique only to our cables, this product has set the standard for fire-rated electrical cables worldwide.

System 1850 cable is listed in the NEC/CEC as "Type MI" and is available in 1, 2, 3, 4 and 7 conductor configurations in a range of sizes between 18 AWG and 500 kcmil. System 1850Z cables are manufactured using our rugged 2-hour fire-rated MI cable and is jacketed with a material that complies with wet-location and "low-smoke, zero-halogen" requirements for transit applications as outlined in NFPA 130. Although developed for transit tunnel applications, it may also be used in other areas where corrosion due to moisture may be of concern, such as partially-buried, buried or concrete encased runs or crawlspaces.

Our MI fire-rated wiring cable offers unique fire survival properties as well as small size and enhanced ampacity capability. Designed to specified length tolerances, our MI factory terminated cables are ideal for a wide variety of wiring applications including hazardous locations and areas where the space for electrical wiring is limited.



# Safety & Reliability Backed by External Agencies

## CODES AND STANDARDS EVOLUTION

For over 100 years, fire safety codes and standards have been instrumental in saving lives and property by promoting continuous improvement of best methods and practices for designing buildings, including building materials and electrical systems. Over time, as building designs, materials and construction methods have evolved, so too have codes and standards. It is a serious responsibility on the part of all professionals to make sure that building life safety systems are designed and function properly when needed.

### NFPA

Did you know that up to 5" of concrete is required to provide two hours of protection when using standard building wire? In December 2018, the National Fire Protection Association (NFPA) Research Foundation published a technical report titled 'Fire Resistance of Concrete for Electrical Conductors'. This report has several insights about the inadequacy of 2" (50 mm) of concrete when protecting critical electrical circuits from fire conditions.

Two inches of concrete has historically been considered adequate for 1-hour fire resistance. But as indicated in Table 1, concrete type and thickness can dramatically affect fire resistance. Note that approximately 2.5 to 3.5 inches are required for one hour fire resistance and that four to five inches are required for two hours. These thicknesses should be taken into account if concrete is being used to protect electrical cables either by embedding conduit/cables within floors or walls or by using concrete blocks or building concrete vaults or shafts.

### NEC

Consistent with the latest NFPA requirements, the National Electric Code (NEC) has updated its survivability requirements as follows:

- Article 695 "Fire Pumps" requires 2-hour protection per 2008 NEC
- Article 700 "Emergency Systems" requires 2 hour Protection per 2011 NEC
- Article 708 "Critical Operating Power Systems" requires 2-hour Protection per 2011 NEC
- New Article 728 "Fire-Resistive Cable Systems" in 2014
- Article 760 "Fire Alarm Systems" requires 2 hour Protection per 2005 NEC
- NFPA 72 "Fire Alarms" requires 2-hour "Survivable Circuit" and cables must be installed per Article 760

The National Building Code of Canada has similar requirements including:

- Emergency Power Supply Generator to transfer switch, transfer switch to emergency distribution switch board : Ref 3.2.7.8 (3)(b) and others
- Fire pumps : Ref 3.2.5.18 and others
- Firefighter's Elevator : Ref 3.2.6.5(6) and others

Requirements listed above a partial list from the NBCC.

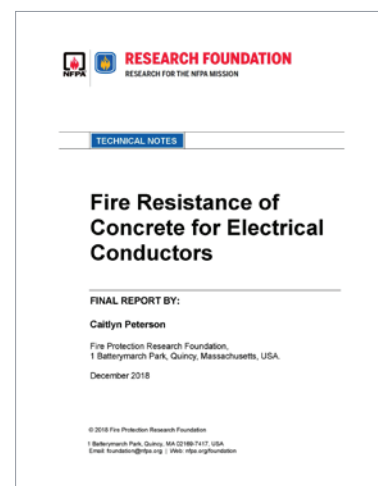
The common element in all of these standards is that cable systems have moved from 1 hour to 2-hour survivability. To date, mineral insulated copper-clad MI cable are the only cables that meet the 2-hour vertical and horizontal UL fire test with no limitations.

Fire Resistance Rating					
Concrete Type	1 Hour	1.5 Hour	2 Hour	3 Hour	4 Hour
Siliceous aggregate	3.5	4.3	5.0	6.2	7.0
Carbonate aggregate	3.2	4.0	4.6	5.7	6.6
Sand-lightweight	2.7	3.3	3.8	4.6	5.4
Lightweight	2.5	3.1	3.6	4.4	5.1

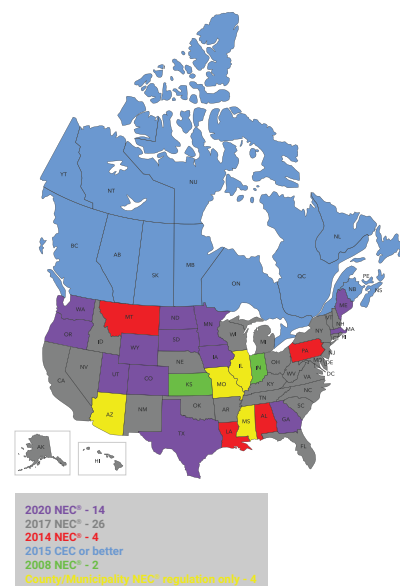
Table 1. Minimum Thickness (inches) for Cast in Place Floor and Roof Slabs.

Fire-rated electrical cables are UL Classified/ULC Listed as 2-hour fire-rated if they successfully pass the ANSI/UL 2196 and ULC-S139 fire test standards, which require that circuit integrity be maintained throughout a fire test that reaches 1850°F over a two hour period, followed by the full force of a firefighter's hose-stream.

You can trust System 1850 fire-rated cable, the original, and the best solution for protection of life safety circuits.



NEC® in Effect  
1/1/2022







## **BEYOND UL 2196**

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Did you know? Some UL 2196/ULC-S139 Listed fire-rated cables produce toxic and combustible gases under typical building fire conditions. Some - including System 1850 - do not! It is also important to note that UL currently does not test for the presence of these gasses.

An ISO 9001 certified and a nationally recognized third party laboratory conducted a series of experiments beyond the current UL 2196/ULC-S139 test protocol to characterize and quantify the following:

- Smoke and gas generation
- Composition, concentration, combustibility and flammability of gasses generated
- Mechanical strength
- Electrical integrity

The testing showed that some UL 2196/ULC-S139 approved cables produced toxic smoke and gasses under fire conditions that can ignite and explode with forces similar to natural gas. These findings have important implications for Specifying Engineers, Fire Marshalls, and for Codes and Standards Committees.



Watch our video on YouTube. Search for "Beyond UL2196 PYROTENAX"

**[Watch Our Beyond UL2196 Video](#)**

# Why nVent PYROTENAX Fire-Rated Wiring Systems?

The totally inorganic construction of unjacketed System 1850 MI cable allows for an environmentally clean electrical cable that does not burn, produce smoke, or contribute fuel when exposed to fire conditions.

- Provides superior protection versus typical 2" thick concrete encasement and gypsum board enclosure methods
- Tens of millions of feet installed worldwide
- Industry leading warranty and outstanding support

## FIRE-RATED

It is critical that circuits involving life safety and firefighting efforts remain operable during an emergency. These circuits provide power for emergency equipment, fire pumps, pressurization fans and fire alarm systems. nVent PYROTENAX fire-rated cables are designed to operate for at least 2 hours under fire conditions to allow for the continued operation of life safety equipment and the safe evacuation of the facility.

## SINGLE CONDUCTOR ADVANTAGES

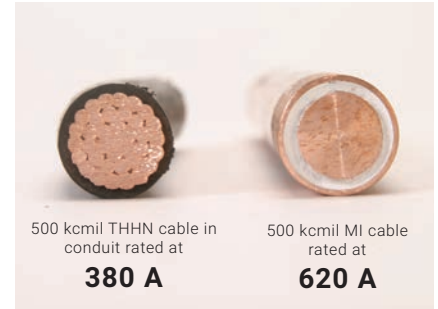
Single conductor nVent PYROTENAX MI cables require no conduit, allowing for as much as 80% space savings over conduit and wire. In addition, the NEC and CEC allow bundled single-conductor MI cable to be operated at higher ampacities, resulting in significant savings in materials and installation costs.

## FREE AIR RATING

The inorganic construction of our MI wiring cables and approved connection systems allow our wiring cable systems to operate at higher ampacities than conventional or other fire-rated cable systems, resulting in significant cost savings in materials and installation (especially in shorter runs). All components and termination kits have been approved to support full free air capacity of given conductor sizes.

## INSTALLATION

- Installed by professional Electrical Contractors
- Easy to pull smooth outer surface
- Excellent for pulling through tight spaces
- Workshop Access
- Easy to finish and install once pulled
- Up to 67% less supports required
- Unlimited number of bends allowed without the need for a pullbox
- Industry leading Lifetime warranty backed by more than 60 years experience in the demanding North American market



## FIRE-RATED WIRING VS. CONCRETE CONSTRUCTION

Life safety circuits must operate for a minimum of two hours during a fire test, as specified by NFPA, per the American Society for Testing and Materials (ASTM) test-temperature curve. System 1850 cables meet the 2-hour requirement. It is understood that 2" of concrete may not equal a two hour fire rating.

	System 1850	Concrete Encasement
Warranty	Yes (Lifetime)	No
Inorganic Construction	Yes	No
UL/ULC Fire Rated	Yes	No
Free Air Rated	Yes	No
Broad Distribution	Yes	Yes
Trade Sensitivity	Medium	High
Ideal for Retrofits	Yes	No
Mechanical Strength (Ability to withstand a blow, falling concrete etc.)	High	Low/Medium

## MI WIRING VS. POLYMERIC ALTERNATIVES

During a fire emergency, it's critical to reduce the contribution of smoke, flames or fire. However, some fire protection systems, unlike nVent PYROTENAX mineral insulated cable, can actually give off smoke and combustible gasses under fire conditions.

	System 1850	Other Cables
Warranty	Yes (Lifetime)	Yes (1 to 2 Years)
Inorganic Construction	Yes	No
UL/ULC Fire Rated	Yes	Yes
Full Free Air Rated	Yes	Sometimes
Broad Distribution	Yes	Yes
Space Required	Low	Medium/High
Ideal for Retrofits	Yes	Sometimes
Mechanical Strength (Ability to withstand a blow, falling concrete etc.)	High	Medium

## MI WIRING FOR ELECTRICAL MODERNIZATION

Maintaining new modernization standards is a priority for many designers, which often means a variety of cables for phone lines, online systems, data cables, WiFi and more. System 1850 cables minimize the power cable size, so that continued modernization of a building can be achieved. Fire-rated wiring achieves more cable ampacity in a small space, while achieving the highest level of required protection from the NFPA. System 1850 fire-rated wiring cables require little to no maintenance after installation, saving you space, time and money.

## NVENT PYROTENAX MI VS. OTHER MI

Backed by decades of industry leading design, installation and manufacturing expertise and with more than 30 million feet of cable installed worldwide and with many installations still in service after 50 years of performance with an industry leading Lifetime extended warranty, nVent PYROTENAX's rugged, reliable and no-smoke producing inorganic construction delivers superior critical life safety circuit performance in the event of fire and when increased ampacity is required.

# Services, Support, & Tools



## FIELD AND TECHNICAL SUPPORT

With years of experience in the demanding North American Market, nVent field service engineers are highly qualified to offer field support, advice, and training at all stages of a project. Backed by expert factory engineering support, the service is available worldwide.

## EXPERTISE IN LIFE SAFETY CIRCUITS

nVent PYROTENAX has been at the forefront in the development of life safety wiring systems for many years. Our engineering expertise is frequently called upon to consult on critical applications, create technical product standards and to revise national and local codes. Our specialists can help you with your specification needs as well.

## UNIQUE SOLUTIONS

The construction of System 1850 MI fire-rated wiring cable lends itself to a variety of applications that would be difficult or impossible to solve otherwise. Examples include using the MI cable sheath and a compensator to eliminate magnetic fields around the MI cables, as well as using hollow conductors to allow circulation of coolant to limit temperature rise at high current densities in particle accelerator applications.

### ISO Certification

nVent maintains an ISO 9001 registered Quality Management System and 14001 Environmental Management Systems at its MI cable manufacturing facility in Trenton, Ontario. The Quality Management System covers all manufacturing and business processes and the Environmental Management Systems ensures sound environmental performance.

### On Time Delivery

nVent consistently meets customer demands for product delivery. We strive to ship product from stock on the day the order is placed and for 100% on time delivery of all custom manufactured products.

### Specify and Insist on nVent PYROTENAX to ensure proven performance when it really matters!

Find and download Our Specifications at MasterSpec, BIMObjects and CADDetails.

Find us in



## POWER STRIPPING KIT

nVent PYROTENAX Power Stripping Kit improves removal of the copper sheath during termination. The PSTKIT delivers significant time saving which will help reduce total installed costs and aid contractors when quoting and budgeting for projects.

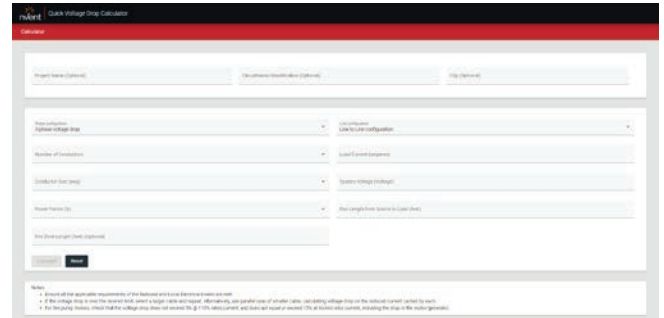


## QUICK VOLTAGE DROP CALCULATOR

The **nVent PYROTENAX Quick Voltage Drop Calculator** allows you to quickly calculate voltage drop in an instant based on:

- Ampacity
- Cable size
- Circuit length

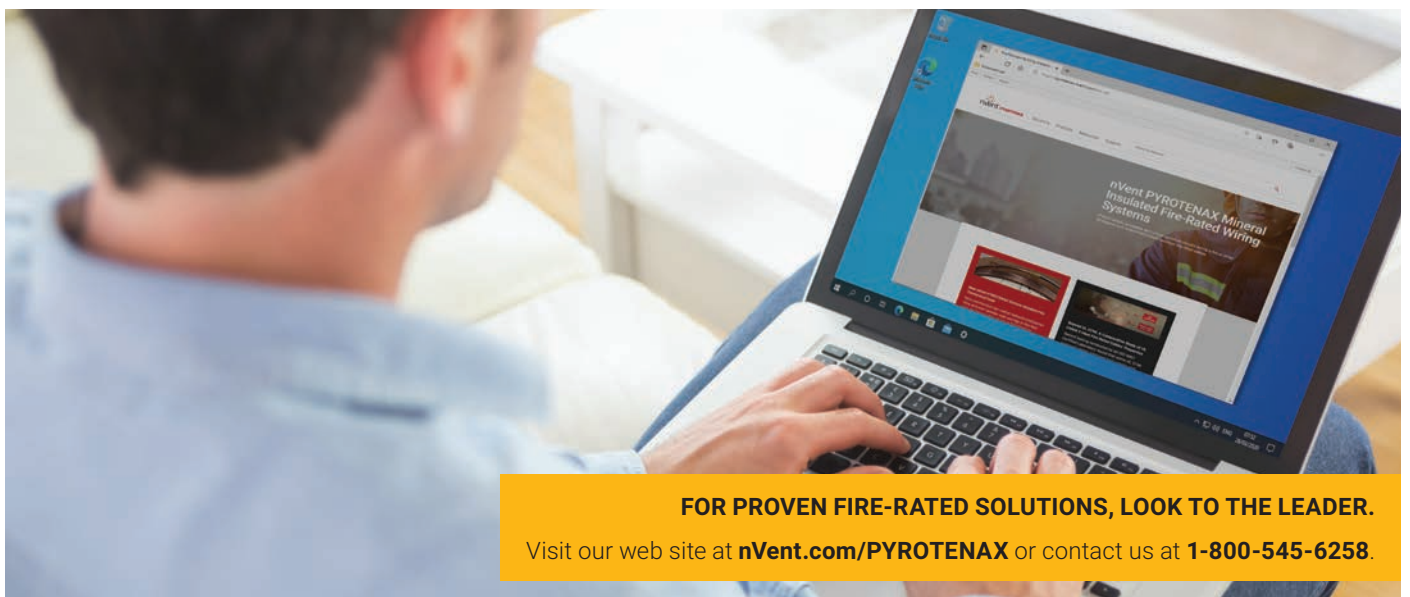
You can calculate voltage drop for line to line in a three-phase system under normal conditions, and includes an optional calculation of drop in a fire zone under fire conditions.



## FACTORY PRE-TERMINATED ENDS PROGRAM

**Factory Installed Pre-Terminated Ends (PTE)** is highly recommended for multiple benefits. Whether single conductor, multi conductor, or twisted pair MI cables, factory installed PTE is a great way to minimize cost uncertainty in the field. No more guessing or incorrectly estimating the time needed to complete a termination. PTE limits the contractors exposure to ever changing job conditions and helps them maximize profits.

Learn more about [Factory Pre-Terminated Ends](#) and contact [PYROTENAX Customer Care](#) for specifics and quotes.



**FOR PROVEN FIRE-RATED SOLUTIONS, LOOK TO THE LEADER.**

Visit our web site at [nVent.com/PYROTENAX](http://nVent.com/PYROTENAX) or contact us at **1-800-545-6258**.

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Our powerful portfolio of brands:

**CADDY ERICO HOFFMAN RAYCHEM SCHROFF TRACER**



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