



# Subways and Tunnels

Champion Fiberglass Flame Shield® Phenolic Conduit System holds its own in a number of environments, whether damp or dry, hot or cold. Conforming to the stringent NFPA 130 requirements, Champion Flame Shield's superior characteristics make it the number one choice of surface-mounted conduit for transit and passenger rail systems – including subway tunnels and stations.

## CONDUIT REQUIREMENTS IN TUNNELS

- High temperature rating, combustion resistance, tensile and mechanical strength, dimensional stability and chemical resistance
- Low smoke density, toxicity, water absorption and coefficient of expansion
- Good electrical insulation
- Ease of installation

## INDUSTRY CONCERNS

- Metal conduit systems do not hold up
  - Low resistance to corrosive chemicals, moisture and stray current corrosion
  - No electrical insulation
  - Complex installation procedures
- PVC conduit systems do not hold up
  - Not rated for high temperatures
  - High smoke density, toxicity (chlorinated gases) and coefficient of expansion

## INDUSTRY'S VISION FOR CONDUIT

- Compliance with NFPA 130
- Greater system longevity
- No impact from stray currents
- A cost-effective UL listed system
- Lower maintenance costs
- Simple specifications
- A proven manufacturer



## NFPA 130: STANDARDS FOR FIXED GUIDEWAY TRANSIT AND PASSENGER RAIL SYSTEMS

### 5.4 Station: Wiring Requirements

- 5.4.2 Materials manufactured for use as conduits, raceways, ducts, boxes, cabinets, equipment enclosures, and their surface finish materials shall be capable of being subjected to temperatures up to 1000°C (1850°F) for 1 hour and shall not support combustion under the same temperature conditions.
- 5.4.2.1 Other materials when encased in concrete shall be acceptable.

### 6.2 Trainways: Underground (Subways)

- 6.2.3 Wiring Requirements (See Section 5.4)
- 6.2.3.2 Materials manufactured for use as conduits, raceways, ducts, boxes, cabinets, equipment enclosures, and their surface finish materials shall be capable of being subjected to temperatures up to 1000°C (1850°F) for 1 hour and shall not support combustion under the same temperature conditions.
- 6.2.3.2.1 Other materials when encased in concrete shall be acceptable.

### 7.7 Emergency Ventilation System: Power and Wiring

- 7.7.3 Materials manufactured for use as conduits, raceways, ducts, boxes, cabinets, equipment enclosures, and their surface finish materials shall withstand temperatures up to 1000°C (1850°F) for 1 hour and shall not support combustion under the same temperature conditions. Other materials when encased in concrete shall be acceptable.

### A.6.2.3.6 & A.7.7.7

The trainway, although used for ventilation, shall not be considered as an air plenum for purposes of mounting electrical appurtenances.

# Champion Flame Shield® Phenolic Conduit

- NFPA 130 compliant
- Meets the industry vision for conduit conditions
- Product range: 3/4" - 12"
- SW - MW - HW - XW (non-tapered)
- Installation
  - Simple cut and install
  - Labor units the same as PVC conduit
- Complete fitting offering:
  - Box connectors, male adapters, female adapters, couplings, expansion joints, end bells, adapters, elbows, conduit bodies and custom fitting Integral bells and spigot designs
  - High temperature rating and combustion resistance
  - Proven engineered products for the toughest industrial environments
- Low smoke and coefficient of thermal expansion
- Does not release toxic gases

## PHENOLIC APPLICATIONS

- Subways (NFPA 130)
- Tunnels (NFPA 130)
- Emergency power supply
- Fire pumps
- Pressurizing fans
- Smoke dampers
- Ventilation fans
- Emergency lighting
- Fire alarm
- Plenum areas
- Low smoke applications
- Elevator shafts
- Fire pump rooms
- High temperature applications
- Fire-rated cable installations

Champion Fiberglass manufactures the most dependable conduit, strut and hangers in our class. We go farther, exceed quality standards and create installations that are built to last. Champion Fiberglass helps you do more on every project.

## PHENOLIC CONDUIT PROPERTIES

Temperature Range	-60°F - +1850°F
Vertical Flame Test (FT4)	Passed
Surface Flammability (ASTM E162)	<2
Tunnel Test (ASTM E84)	
Flame Spread	<1
Smoke Density	<1
Tensile Strength (ASTM D2105)	7,000 psi
Flexural Strength (ASTM D638)	>30,000 psi
Impact Resistance (ASTM D2444)	
1" SW	40 lbs/ft
2" SW	50 lbs/ft
3" SW	60 lbs/ft
4" SW	70 lbs/ft
5" MW	90 lbs/ft
6" MW	110 lbs/ft
Conduit Stiffness 5% Deflection (ASTM D2412)	
1" SW	300 lbf/in/in
2" SW	200 lbf/in/in
3" SW	130 lbf/in/in
4" SW	125 lbf/in/in
5" MW	120 lbf/in/in
6" MW	120 lbf/in/in
Dielectric Strength (ASTM D149)	
Dry (+/- 20)	150 V/mil
Wet (+/- 20)	150 V/mil
Smoke Density (ASTM E662)	
DS4 min	<1
Dmax flaming	<30
Dmax non-flaming	<20
Flammability Classification	VO
Pittsburg Toxicity Test LC50	61
Water Absorption (ASTM D570)	<1.0%
Coefficient of Expansion (ASTM D696)	.51 X 10 <sup>-5</sup> in/in/°F
Specific Gravity (ASTM D792)	1.70-1.75
Barcol Hardness (ASTM D2583)	68-72
Glass Content (API SPEC 15 LR)	65-75%

## DESIGNED TO BE THE NUMBER ONE CHOICE – INSIDE AND OUT

Galvanizing zinc on the interior of rigid galvanized steel conduit destroys fire-rated cables at high temperatures.

Champion Flame Shield® Phenolic Conduit ALONE was determined to be the solution by cable manufacturers.

