

# HAZARDOUS LOCATIONS

## WIRING METHODS

Hazardous locations are found in industrial facilities like chemical plants, power generation plants, oil refineries, offshore drilling rigs, oil extraction plants, etc. where explosive liquids, gases, or dusts are present in the operation environment. Hazardous locations are defined in Article 500 of the National Electrical Code® (NEC®) 2020. Each type of hazardous locations area requires different types of cables depending on the wiring methods allowed in the NEC®.

### HAZARDOUS LOCATION CLASSIFICATIONS

HAZARDOUS MATERIAL	GROUP (NEC® 500.6)	NEC® CLASS	NEC® DIVISION	
Gas & Vapor	A - Acetylene B - Hydrogen, etc. C - Ethylene, etc. D - Propane, etc.	Class I	Division 1	In which ignitable concentrations of flammable gases, flammable liquid–produced vapors, or combustible liquid–produced vapors can exist under normal operating conditions.
			Division 2	Explosive or ignitable gases or vapors are not normally present (but may accidentally exist).
Dust	E - Metal dusts F - Carbon dusts G - Flour, grain, wood, plastic, or chemical dusts	Class II	Division 1	In which combustible dust is in the air under normal operating conditions in quantities sufficient to produce explosive or ignitable mixtures.
			Division 2	In which combustible dust due to abnormal operations may be present in the air in quantities sufficient to produce explosive or ignitable mixtures
Fibers & Flyings	Textiles, wood chips, etc. (ignitable but not explosive)	Class III	Division 1	Easily ignitable fibers or flyings are handled, manufactured, or used.
			Division 2	Easily ignitable fibers are stored or handled.

### CLASS I DIVISION 1

**NEC® ARTICLE 501.10(A).** The following wiring methods are permitted:

- Any suitable type of wire or cable if installed in threaded rigid metal conduit (Type RMC) or threaded steel intermediate metal conduit (Type IMC), with approved termination fittings (end seals).
- Any suitable type of wire or cable if installed in type PVC conduit, type RTRC conduit, and type HDPE encased in a concrete envelope a minimum of 50 mm (2 in.) thick and provided with not less than 600 mm (24 in.) of cover measured from the top of the conduit.
- Type MI cable terminated with fittings listed for the location.
- Type MC-HL cable listed for use in Class I, Zone 1, or Division 1 locations, and terminated with fittings listed for the application.
- Type ITC-HL cable listed for use in Class I, Division 1, or Zone 1 locations, and terminated with fittings listed for the application.
- Optical fiber cable Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC shall be permitted to be installed in raceways in accordance with 501.10(A).
- Type TC-ER-HL cable shall be listed for use in Class I, Division 1, or Zone 1 locations, and terminated with fittings listed for the location. Cable must have a bare grounding conductor.
- Type P cable with metal braid armor, with an overall jacket, terminated with fittings listed for the location.



## CLASS I DIVISION 2

**NEC® ARTICLE 501.10 (B).** The following wiring methods are permitted:

- All wiring methods permitted for Class I Division 1.
- Any suitable type of wire or cable if installed in rigid metal conduit (Type RMC) and intermediate metal conduit (Type IMC) with listed threaded or threadless fittings.
- Enclosed gasketed busways and enclosed gasketed wireways.
- Types PLTC and PLTC-ER cables terminated with listed fittings.
- Types ITC and ITC-ER cables terminated with listed fittings.
- Type MC, MV, TC, or TC-ER cables terminated with listed fittings. Type TC-ER cable shall include equipment grounding conductor.
- Optical fiber cable Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC shall be permitted to be installed in cable trays or any other raceway in accordance with 501.10(B).
- Type P cable with or without metal braid armor, with an overall jacket, terminated with fittings listed for the location.

## CLASS II DIVISION 1

**NEC® ARTICLE 502.10 (A).** The following wiring methods are permitted:

- Any suitable type of wire or cable if installed in threaded rigid metal conduit (Type RMC) or threaded steel intermediate metal conduit (Type IMC).
- Type MI cable with termination fittings listed for the location.
- Type MC-HL cable, listed for use in Class II, Division 1 locations, and provided with termination fittings listed for the location.
- Optical fiber cable Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC shall be permitted to be installed in raceways in accordance with 502.10(A).
- Type ITC-HL cable terminated with fittings listed for the application.
- Type TC-ER-HL cable with fittings listed for the location. Cable must have a bare grounding conductor.
- Type P cable with metal braid armor, with an overall jacket, terminated with fittings listed

## CLASS II DIVISION 2

**NEC® ARTICLE 502.10 (B).** The following wiring methods are permitted:

- All wiring methods permitted in Class II Division 1.
- Any suitable type of wire or cable if installed in rigid metal conduit (Type RMC), intermediate metal conduit (Type IMC), with listed threaded or threadless fittings.
- Any suitable type of wire or cable if installed in electrical metallic tubing (Type EMT) or dusttight wireways.
- Type MC, MV, TC, or TC-ER cable terminated with listed fittings. Type TC-ER cable shall include equipment grounding conductor.
- Types PLTC and PLTC-ER cable terminated with listed fittings.
- Types ITC and ITC-ER cable terminated with listed fittings.
- Where metal conduit will not provide sufficient corrosion resistance, any of the following shall be permitted:
  - Listed reinforced thermosetting resin conduit (RTRC), factory elbows, and associated fittings, all marked with suffix -XW.
  - PVC-coated rigid metal conduit (RMC), factory elbows, and associated fittings.
  - PVC-coated intermediate metal conduit (IMC), factory elbows, and associated fittings.
  - In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Schedule 80 PVC conduit, factory elbows, and associated fittings.



### **CLASS II DIVISION 2 CONT.**

- Optical fiber cable Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC shall be permitted to be installed in cable trays or any other raceway in accordance with 502.10(B).
- Cablebus
- Type P cable with or without metal braid armor, with an overall jacket, terminated with listed fittings.

### **CLASS III DIVISION 1 AND 2**

**NEC® ARTICLE 503.10 (A) AND (B).** The following wiring methods are permitted:

- Any suitable type of wire or cable if installed in rigid metal conduit (Type RMC), type PVC conduit, type RTRC conduit, intermediate metal conduit (Type IMC), electrical metallic tubing (EMT), and dusttight wireways.
- Type MC or MI cable installed with listed termination fittings.
- Types PLTC and PLTC-ER cables terminated with listed fittings.
- Types ITC and ITC-ER cable as permitted and terminated with listed fittings.
- Type MV, TC, or TC-ER cable, including installation in cable tray systems. The cable shall be terminated with listed fittings.
- Cablebus