

Hazardous locations are usually found in industrial facilities where explosive liquids, gases or dusts are present. The various types of hazardous locations are defined in Article 500 of the National Electrical Code (NEC). Each type of hazardous location requires specific types of cable and/or installation methods. Approved wiring methods range from a rigid, highly impenetrable type of cable, such as Type MI (mineral insulated cable), to a raceway system such as metallic conduit.

HAZARDOUS LOCATION CLASSIFICATIONS

Hazardous locations are broken into different categories called Classes and Divisions per the 2014 NEC Article 500 *Hazardous (Classified) Locations, Classes I, II, and III, Divisions 1 and 2*. The process of classifying an area is often complex, so it is generally determined by the facility's engineering staff. "Class I, Division 1" is the most hazardous classification, but "Class I, Division 2" is the type most often of concern to cable users. The various classifications are summarized in the table below. Class I and II materials are further subdivided by the NEC into "Groups" (A, B, C, etc.) as shown. However, the type of Group has no effect on the type of cable required.

TABLE 1: HAZARDOUS LOCATION CLASSIFICATIONS

Class	Group (NEC 500.6)	Division (NEC 500.5)	
I Gases, Vapors and Liquids	A: Acetylene B: Hydrogen, etc. C: Ether, etc. D: Hydrocarbons, fuels, solvents, etc.	1	2
		Explosive or ignitable gases or vapors are present under normal operating conditions	Explosive or ignitable gases or vapors are not normally present (but may accidentally exist)
II Dusts	E: Metal dusts F: Carbon dusts G: Flour, grain, wood or chemical dusts	Combustible dust is in the air under normal operating conditions	Dust is not normally in the air in ignitable concentrations (but may accidentally exist)
III Fibers and Flyings	Textiles, wood chips, etc. (ignitable but not explosive)	Easily ignitable fibers or flyings are handled, manufactured or used	Easily ignitable fibers are stored or handled

HAZARDOUS LOCATION CABLES

After the Hazardous Location Class and Division is determined, the next step is to decide what type(s) of cable to use and how they will be installed. The NEC has different articles for the approved wiring methods of different Hazardous Location Classes.

The NEC is very precise in its language in this area since even one misunderstood word can result in the loss of life or increase the cost of a project by millions of dollars. A summary of the wiring methods permitted by the NEC in hazardous locations is shown below. For additional details, please refer to the applicable article of the NEC.

TABLE 2: WIRING METHODS FOR HAZARDOUS LOCATIONS

Class	Division	Methods Permitted by the NEC
I (Article 501)	1	<ul style="list-style-type: none"> Any suitable type of wire or cable if installed in threaded metallic conduit with approved termination fittings (end seals) Type MI (mineral insulated) cable installed with approved termination fittings Any suitable type of wire or cable if installed in nonmetallic conduit encased in concrete and buried under at least 2 feet of earth In certain industrial establishments, Type MC-HL or Type ITC-HL continuously corrugated welded armor (CCW) sheathed cable with approved termination fittings. Optical fiber cable types (OFN, OFC, etc) installed in raceways in accordance with NEC 501.10(A) and 501.15.
	2	<ul style="list-style-type: none"> All wiring methods permitted for Class I Div 1 Type PLTC or PLTC-ER cables installed in accordance with Article 725 including cable trays. Cables need to be installed with approved termination fittings. Type ITC or ITC-ER installed as permitted in Article 727.4 and terminated with approved fittings Type MC, MV, TC, or TC-ER cables installed in cable trays with approved termination fittings (end seals) Optical fiber cable types (OFN, OFC, etc) installed in raceways in accordance with NEC 501.10(A) and 501.15.
II (Article 502)	1	<ul style="list-style-type: none"> Any suitable type of wire or cable if installed in threaded metallic conduit with approved termination fittings (end seals) Type MI (mineral insulated) cable installed with approved termination fittings In certain industrial establishments, Type MC-HL continuously corrugated aluminum cable having an overall jacket and Listed for use in hazardous locations with approved termination fittings Optical fiber cable types (OFN, OFC, etc) installed in raceways in accordance with NEC 501.10(A) and 501.15.
	2	<ul style="list-style-type: none"> All wiring methods permitted for Class II Div 1 Any suitable type of wire or cable if installed in metallic conduit with approved termination fittings (end seals) Type MC or MI cables if installed with approved termination fittings (end seals) Type PLTC or PLTC-ER cables installed in accordance with Article 725 including cable trays. Cables need to be installed with approved termination fittings. Type ITC or ITC-ER installed as permitted in Article 727.4 and terminated with approved fittings MC, MI, TC or TC-ER cables installed in cable trays Optical fiber cable types (OFN, OFC, etc) installed in raceways in accordance with NEC 501.10(A) and 501.15.
III (Article 503)	1 and 2	<ul style="list-style-type: none"> Any suitable type of wire or cable if installed in metallic or PVC conduit with approved termination fittings (end seals) Type PLTC or PLTC-ER cables installed in accordance with Article 725 including cable trays. Cables need to be installed with approved termination fittings. Type ITC or ITC-ER installed as permitted in Article 727.4 and terminated with approved fittings Type MC, MI, TC, or TC-ER cables installed in cable trays with approved termination fittings (end seals)

FLEXIBILITY IN HAZARDOUS LOCATIONS

The NEC allows flexible cords to be installed in Hazardous Locations. For more information, please see Anixter's Wire Wisdom: *Flexibility in Hazardous Locations*.