



Article 501 Class I Hazardous (Classified) Locations

Introduction

If enough flammable gases or vapors are present to produce an explosive or ignitable mixture, you have a Class I location. Examples of such locations include fuel storage areas, certain solvent storage areas, grain processing (where hexane is used), plastic extrusion where oil removal is part of the process, refineries, and paint storage areas.

Article 500 contains a general background on hazardous (classified) locations as well as describing the differences between Class I, II, and III locations and the difference between Division 1 and Division 2 in each of the three classifications.

Article 501 contains the actual Class I, Division 1 and Division 2 installation requirements, including wiring methods, seals, and specific equipment requirements.

A Class I hazardous (classified) location is an area where flammable gases or vapors may be present in quantities sufficient to produce an explosive or ignitable mixture.

Questions

- Article 501 covers the requirements for electrical and electronic equipment and wiring for all voltages in Class I, Divisions 1 and 2 locations where fire or explosion hazards may exist due to _____.
(a) flammable gases (b) vapors (c) flammable liquids (d) any of these
- Which of the following wiring methods are permitted in a Class I, Division 1 location?
(a) Threaded rigid metal conduit (b) Threaded IMC
(c) MI cable (d) all of these
- Wiring methods permitted in Class I, Division 1 locations include _____.
(a) threaded rigid metal or threaded intermediate metal conduit
(b) flexible fittings listed for Class I, Division 1 locations
(c) boxes approved for Class I, Division 1 locations
(d) all of these
- When provisions for limited flexibility are required in a Class I, Division 2 location, such as motor terminations, flexible metal conduit with listed fittings may be used.
(a) True (b) False
- Boxes, enclosures, fittings, and joints are not required to be explosionproof in a Class I, Division 2 location. However, if arcs or sparks (such as from make-and-break contacts) can result from equipment being utilized, that equipment must be installed in an explosionproof enclosure meeting the requirements for Class I, Division 1 locations.
(a) True (b) False
- Conduits 1 1/2 in. or smaller entering an explosionproof enclosure that houses switches intended to interrupt current in the normal performance of the function are not required to be sealed, if the current-interrupting contacts are within a chamber hermetically sealed against the entrance of gases and vapors.
(a) True (b) False

7. Each conduit leaving a Class I, Division 1 location requires a seal to be located on either side of the hazardous (classified) location boundary. Unions, couplings, boxes, or fittings are permitted between the seal and the point where the conduit leaves the Division 1 location.
- (a) True (b) False
8. A sealing fitting must be installed within _____ of either side of the boundary where a conduit leaves a Class I, Division 1 location. The sealing fitting must be designed and installed so as to minimize the amount of gas or vapor within the Division 1 portion of the conduit being communicated beyond the seal.
- (a) 5 ft (b) 6 ft (c) 8 ft (d) 10 ft
9. Where the Class I, Division 1 boundary is beneath the ground, the sealing fitting must be installed _____. Except for listed explosionproof reducers at the conduit seal, there must be no union, coupling, box or fitting between the conduit seal and the point at which the conduit leaves the ground.
- (a) after the conduit leaves the ground (b) before the conduit leaves the ground
(c) within 10 ft of where the conduit leaves the ground (d) none of these
10. For connections to enclosures that are required to be explosionproof in Class I, Division 2 locations, _____ must be located in accordance with 501.15(A)(1) and (A)4.
- (a) mounting brackets (b) conduit seals (c) warning signs (d) none of these
11. A sealing fitting is required for each conduit run passing from a Class I, Division 2 location into an unclassified location for the purpose of minimizing the passage of gases. It must be located no more than _____ from the boundary.
- (a) 3 ft (b) 6 ft (c) 10 ft (d) 20 ft
12. A conduit seal fitting must be installed in each conduit that passes from a Class I, Division 2 location into an unclassified location. Conduit boundary seals are not required to be _____, but must be identified for the purpose of minimizing the passage of gases under normal operating conditions.
- (a) listed (b) installed (c) explosionproof (d) accessible
13. No seal is required if a conduit (with no unions, couplings, boxes, or fittings) passes completely through a Class I, Division 2 location if the termination points of the unbroken conduit are in unclassified locations and it has no fittings less than _____ beyond each boundary of the classified location.
- (a) 6 in. (b) 12 in. (c) 18 in. (d) 24 in.
14. When seals are required for Class I locations, they must comply with the following rule(s):
- (a) They must be listed for Class I locations and must be accessible.
(b) The minimum thickness of the sealing compound must not be less than the trade size of the sealing fitting and, in no case, less than 5/8 in.
(c) Splices and taps must not be made in the conduit seal.
(d) all of these
15. The minimum thickness of sealing compound in Class I, Division 1 and 2 locations must not be less than the trade size of the conduit or sealing fitting and, in no case, less than _____
- (a) 1/8 in. (b) 1/4 in. (c) 3/8 in. (d) 5/8 in.

16. The cross-sectional area of the conductors permitted in a sealing fitting must not exceed _____ percent of the cross-sectional area of rigid metal conduit of the same trade size unless the seal is specifically listed for a higher percentage of conductor fill.
- (a) 25 (b) 50 (c) 100 (d) 125
17. When MC-HL cable containing shielded cables and/or twisted-pair cables is installed in a Class I, Division 1 location, the removal of the shielding material or the separation of the twisted pairs is not required, provided the termination is accomplished by a(n) _____ means to minimize the entrance of gases or vapors and to prevent propagation of flame into the cable core.
- (a) approved (b) listed (c) acceptable (d) none of these
18. When shielded cables and twisted-pair cables are installed in Class I, Division 2 locations, the removal of the shielding material or separation of the twisted pairs is not required, provided the termination is by an approved means to minimize the entrance of _____ and prevent propagation of flame into the cable core.
- (a) gases (b) vapors (c) dust (d) a or b
19. In Class I, Division 1 and 2 locations where condensed vapors or liquids may collect on or come in contact with the insulation on conductors, the insulation must be of a type _____.
- (a) identified for such use
(b) with integral drying agents
(c) listed for contact with water
(d) enclosed only in liquidtight flexible metal conduit
20. In Class I, Division 1 and 2 locations, locknut-bushing and double-locknut types of fittings are depended on for bonding purposes.
- (a) True (b) False
21. When flexible metal conduit or LFMC is used as permitted in Class I, Division 2 locations, it must be installed with an _____ bonding jumper installed in parallel with the raceway conduit in compliance with 250.102.
- (a) internal (b) external (c) a or b (d) a and b
22. In a Class I, Division 1 location, a multiwire branch circuit is allowed to be protected using single-pole breakers.
- (a) True (b) False
23. Transformers and capacitors installed in Class I, Division 1 locations containing flammable liquids must be installed in vaults.
- (a) True (b) False
24. Transformers and capacitors installed in Class I, Division 1 locations that do not contain flammable liquids are not required to be installed in vaults if they are approved for Class I locations.
- (a) True (b) False
25. Meters, instruments and relays installed in Class I, Division 2 locations can have switches, circuit breakers, and make-and-break contacts of push buttons, relays, alarm bells, and horns installed in general purpose enclosures if current-interrupting contacts are _____.
- (a) immersed in oil (b) enclosed within a hermetically-sealed chamber
(c) a or b (d) a and b