According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot.

The attached report shows the number of affirmative, negative and abstaining votes as well as the explanation of the vote for each revision.

To pass ballot, each revision requires: (1) a simple majority of those eligible to vote and (2) an affirmative vote of $\frac{2}{3}$ of ballots returned. See Sections 3.3.4.3 (c) and 4.3.10.1 of the Regulations Governing the Development of NFPA Standards.
Second Revision No. 3912-NFPA 70-2015 [ Definition: Combustible Dust [as applied to Hazardous (Classified) Locations].

Combustible Dust [as applied to Hazardous (Classified) Locations].

Dust particles that are 500 microns or smaller (i.e., material passing a U.S. No. 35 Standard Sieve as defined in ASTM E11-13, Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves for Testing Purposes), and present a fire or explosion hazard when dispersed and ignited in air.

Informational Note: See ASTM E1226-12a, Standard Test Method for Explosibility of Dust Clouds, or ISO 6184-1, Explosion protection systems — Part 1: Determination of explosion indices of combustible dusts in air, for procedures for determining the explosibility of dusts.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 09 19:13:05 EST 2015

Committee Statement

Response Message:

Public Comment No. 204-NFPA 70-2015 [Definition: Combustible Dust [as applied to Hazardous (Class...]
Public Comment No. 805-NFPA 70-2015 [Definition: Combustible Dust [as applied to Hazardous (Clas...]

Ballot Results

✅ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.
Second Revision No. 3913-NFPA 70-2015 [Definition: Cord Connector [as applied to Hazardous (Classified) Locations].
A fitting intended to terminate a cord or cable to a box or similar device and reduce the strain at points of termination and may include an explosionproof, a dust-ignitionproof, or a flameproof seal.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 09 20:01:39 EST 2015

Committee Statement

Committee Statement: The definition is consistent with the use of the term “cord connector” in Chapter 5.

Response Message:
Public Comment No. 701-NFPA 70-2015 [Definition: Cord Connector [as applied to Hazardous (Classified) Locations].

Ballot Results

☑ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood

National Fire Protection Association Report
http://submittals.nfpa.org/TerraViewWeb/ContentFetcher?commentPara...
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

**Affirmative with Comment**

Parks, Ryan

No comment.
Second Revision No. 3916-NFPA 70-2015 [Section No. 500.5(A)]

(A) General.

Locations shall be classified depending on the properties of the flammable gas, flammable liquid–produced vapor, combustible liquid–produced vapors, combustible dusts, or fibers/flyings that may be present, and the likelihood that a flammable or combustible concentration or quantity is present. Each room, section, or area shall be considered individually in determining its classification. Where pyrophoric materials are the only materials used or handled, these locations are outside the scope of this article.

Informational Note No. 1: Through the exercise of ingenuity in the layout of electrical installations for hazardous (classified) locations, it is frequently possible to locate much of the equipment in a reduced level of classification or in an unclassified location and, thus, to reduce the amount of special equipment required.

Refrigerant machinery rooms containing ammonia refrigeration systems that are equipped with adequate mechanical ventilation that operates continuously or is initiated by a detection system at that alarms at 1000 ppm may be classified as “unclassified” locations. Rooms and refrigerated areas containing ammonia refrigeration systems that are equipped with adequate mechanical ventilation that operates continuously or is initiated by a detection system at alarms at 1000 ppm may be a concentration not exceeding 150 ppm shall be permitted to be classified as “unclassified” locations.


Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [Not Specified]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Nov 10 11:14:54 EST 2015

Committee Statement

Committee Statement: This change will correlate the NEC® with applicable ANSI standards that govern ammonia refrigeration systems, ANSI/IIAR 2 and ANSI/ASHRAE 15. Ammonia refrigeration machinery rooms are always required by these standards to have leak detection and ventilation systems and are designated as unclassified locations based on these mitigations. The NEC® is therefore being updated to reflect IIAR 2’s more restrictive 150 ppm ventilation trigger. Other areas where ammonia refrigeration equipment may be present, such as freezers, may have detection, alarms, ventilation or other mitigation measures approved by the AHJ, in accordance with ANSI/ASHRAE 15 and ANSI/IIAR 2 as a basis of assigning an unclassified area designation. The provisions in these standards are too lengthy to warrant duplication in the NEC® for such a special situation. Informational Note 2 provides an appropriate pointer directing NEC® users to ANSI/ASHRAE 15 and ANSI/IIAR 2 for guidance, and these are legally mandated reference standards in adopted fire and mechanical codes.

Response Message:

Public Comment No. 1580-NFPA 70-2015 [Section No. 500.5(A)]
Ballot Results

☑ This item has passed ballot

16  Eligible Voters
  0  Not Returned
  14  Affirmative All
      2  Affirmative with Comments
      0  Negative with Comments
      0  Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
  No comment.
Wechsler, David B.

This second revision does not reflect the complete action agreed to by both the panel and the submitter (present at the meeting). The panel agreed to delete the inserted words “closed-circuit” and “refrigeration systems” from the Informational Note #2. While strictly “not enforceable”, because found in an Informational Note, this language has always been more generic and directs the user to these applicable standards, regardless of whether the ammonia source is a refrigeration system or an industrial process using ammonia. Fundamentally, the guidance found in these documents is far more complete than in any other document on the subject, including NFPA 497. These words need to be deleted from the Second Revision and re-balloted by the committee, if needed.
Second Revision No. 3920-NFPA 70-2015 [Section No. 500.8(E)(1)]

(1) Equipment Provided with Threaded Entries for NPT-Threaded Conduit or Fittings.

For equipment provided with threaded entries for NPT-threaded conduit or fittings, listed conduit, listed conduit fittings, or listed cable fittings shall be used. All NPT-threaded conduit and fittings shall be threaded with a National (American) Standard Pipe Taper (NPT) thread.

NPT-threaded entries into explosionproof equipment shall be made up with at least five threads fully engaged.

Exception: For listed explosionproof equipment, joints with factory-threaded NPT entries shall be made up with at least four and one-half threads fully engaged.

Informational Note No. 1: Thread specifications for male NPT threads are located in ANSI/ASME B1.20.1-1983, Pipe Threads, General Purpose (Inch).


Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Nov 10 14:06:05 EST 2015

Committee Statement


Response Message:

Public Comment No. 307-NFPA 70-2015 [Section No. 500.8(E)(1)]

Ballot Results

✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
 1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.
Second Revision No. 3921-NFPA 70-2015 [Section No. 500.8(E)(2)]

(2) Equipment Provided with Threaded Entries for Metric-Threaded Fittings.

For equipment with metric-threaded entries, listed conduit fittings or listed cable fittings shall be used. Such entries shall be identified as being metric, or listed adapters to permit connection to conduit or NPT-threaded fittings shall be provided with the equipment and shall be used for connection to conduit or NPT-threaded fittings.

Metric-threaded fittings installed into explosionproof equipment shall have a class of fit of at least 6g/6H and shall be made up with at least five threads fully engaged and wrenchtight.


Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Nov 10 14:11:51 EST 2015

Committee Statement

Committee Statement: The requirement to be wrenchtight is already contained in 500.8(E).

Response Message:

Public Comment No. 567-NFPA 70-2015 [Section No. 500.8(E)(2)]

Ballot Results

✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment

Parks, Ryan

No comment.
Second Revision No. 3902-NFPA 70-2015 [ Section No. 501.10(A)(1) ]

(1) General.
In Class I, Division 1 locations, the wiring methods in (a) through (f) shall be permitted.
(a) Threaded rigid metal conduit or threaded steel intermediate metal conduit.

Exception: Type PVC conduit, Type RTRC conduit, and Type HDPE conduit shall be permitted where 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 to grade. The concrete encasement shall be permitted to be omitted where subject to the provisions of 514.8, Exception No. 2, or of 515.8(A). Threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway. An equipment grounding conductor shall be included to provide for electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.

(b) Type MI cable terminated with fittings listed for the location. Type MI cable shall be installed and supported in a manner to avoid tensile stress at the termination fittings.

(c) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Type MC-HL cable listed for use in Class I, Zone 1 or Division 1 locations, with a gas/vaportight continuous corrugated metallic sheath, an overall jacket of suitable polymeric material, and a separate equipment grounding conductor(s) in accordance with 250.122, and terminated with fittings listed for the application.

Type MC-HL cable shall be installed in accordance with the provisions of Article 330, Part II.

(d) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Type ITC-HL cable listed for use in Class I, Zone 1 or Division 1 locations, with a gas/vaportight continuous corrugated metallic sheath and an overall jacket of suitable polymeric material, and terminated with fittings listed for the application, and installed in accordance with the provisions of Article 727.

(e) 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). These optical fiber cables shall be sealed in accordance with 501.15.

(f) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, for applications limited to 600 volts, nominal, or less, and where protected from damage by location or a suitable guard, listed Type TC-ER-HL cable with an overall jacket and a separate equipment grounding conductor(s) in accordance with 250.122 that is terminated with fittings listed for the location. Type TC-ER-HL cables shall be installed in accordance with the provisions of Article 336.10, including the restrictions of 336.10(7).

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 09 16:03:56 EST 2015

Committee Statement

Committee Statement: The word "article" has been deleted in accordance with the style manual.
Response Message:

**Ballot Results**

- ✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
13 Affirmative All
3 Affirmative with Comments
0 Negative with Comments
0 Abstention

**Affirmative All**
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

**Affirmative with Comment**
Goodman, Mark

In the current system, this appears to be the only place to comment on the use of TC-ER-HL cable in Division 1 locations. As indicated in a number of Public Comments rejected by Panel 14, the use of this cable type could potentially result in a reduction in safety. API supports Panel 7 actions that are documented in SR 1809 that provide specific requirements for the jacket material, applicable voltages, ampacity restrictions, cable diameter, and labeling requirements. This is illustrated in the second revision in 336.10(11) below: 336.10(11)(11) In hazardous (classified) locations where specifically permitted by other articles in this Code. For Class I, Division 1 and Zone 1 locations only, Type TC cable used for other than flexible connections shall also comply with the following: a. The cable jacket and construction shall be evaluated and listed for the specific hazardous materials present in the location. b. The hazardous material group(s) evaluated shall be marked on the cable. c. The cable diameter shall be limited to 1" or smaller. d. The cable shall be permitted only for voltages of 150 volts to ground or less and currents of 30 amps or less, and e. The cable shall be marked both “-ER” and “-HL” Panel 7 Committee Statement for justification of the above second revision. Revisions are being made in order to correlate the Uses Permitted for Type TC cable with the permitted installations in Sections 501.10(A)(1)(f) and 505.15(B)(1)(i). Many proposals were submitted during the 2014 and 2017 NEC revision cycles requesting and opposing the use of Type TC cable for use in hazardous locations. This resulted in First Revision 3940 expanding the use of tray cable into general wiring for Class I, Division I locations and removing the size restriction for Class I, Zone 1 locations. The Panel has evaluated both the proposals and information provided by manufacturers of Type TC cable, and the added language to 336.10 will provide guidance to users of Type TC for the allowed uses in hazardous locations for the 2017 NEC. Technical substantiation was submitted to the panel indicating that many of the
hazardous materials will have an adverse effect on commercially available jacketing materials. Based on the information above, we recommend that for consistency, 501.10(A)(1)(f) be revised as per the following with 336.10(11) added as the correct reference for Zone 1 restrictions: (f) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, for applications limited to 600 volts, nominal, or less, and where protected from damage by location or a suitable guard, listed Type TC-ER-HL cable with an overall jacket and a separate equipment grounding conductor(s) in accordance with 250.122 that is terminated with fittings listed for the location. Type TC-ER-HL cables shall be installed in accordance with the provisions of 336.10, including the restrictions of 336.10(7) and (11).

McBride, William E.

In the current NEC Update system, this appears to be the only place to comment on the use of TC-ER-HL cable in Division 1 Locations. As indicated in a number of Public Comments rejected by Panel 14, the use of this cable type could potentially result in a reduction in safety. IEEE supports Code Making Panel 7 actions that are documented in SR 1809 that provide specific requirements for the jacket material, applicable voltages, ampacity restrictions, cable diameter, and labeling requirements. However, for consistency 501.10(A)(1)(f) should have been revised as follows with 336.10(11) added as the correct reference for Zone 1 restrictions: (f) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, for applications limited to 600 volts, nominal, or less, and where protected from damage by location or a suitable guard, listed Type TC-ER-HL cable with an overall jacket and a separate equipment grounding conductor(s) in accordance with 250.122 that is terminated with fittings listed for the location. Type TC-ER-HL cables shall be installed in accordance with the provisions of 336.10, including the restrictions of 336.10(7) and (11).

Parks, Ryan

No comment.
(1) General.

In Class I, Division 2 locations, all wiring methods permitted in 501.10(A) and the following wiring methods shall be permitted:

(1) Rigid metal conduit (RMC) and intermediate metal conduit (IMC) with listed threadless fittings.
(1) Electrical metallic tubing (EMT) with listed fittings.
(2) Enclosed gasketed busways and enclosed gasketed wireways.
(3) Type PLTC and Type PLTC-ER cable in accordance with the provisions of Article 725, including installation in cable tray systems. The cable shall be terminated with listed fittings.
(4) Type ITC and Type ITC-ER cable as permitted in 727.4 and terminated with listed fittings.
(5) Type MC, MV, TC, or TC-ER cable, including installation in cable tray systems. The cable shall be terminated with listed fittings.
(6) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where metallic conduit does not provide sufficient corrosion resistance, listed reinforced thermosetting resin conduit (RTRC), factory elbows, and associated fittings, all marked with the suffix -XW, and Schedule 80 PVC conduit, factory elbows, and associated fittings shall be permitted.
(7) 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). Optical fiber cables shall be sealed in accordance with 501.15.
(8) Cablebus.

Where seals are required for boundary conditions as defined in 501.15(A)(4), the Division 1 wiring method shall extend into the Division 2 area to the seal, which shall be located on the Division 2 side of the Division 1–Division 2 boundary.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Mon Nov 09 15:51:41 EST 2015

Committee Statement

Committee Statement: Support requirements in 358.30 are not sufficient to prevent loss of grounding path in threadless couplings when located in Class I, Division 2 areas where uncontrolled arcing becomes an ignition source under fault conditions.

Response Message:

Public Comment No. 1061-NFPA 70-2015 [Section No. 501.10(B)(1)]
Public Comment No. 912-NFPA 70-2015 [Section No. 501.10(B)(1)]
Public Comment No. 564-NFPA 70-2015 [Section No. 501.10(B)(1)]
Ballot Results

- This item has passed ballot

16 Eligible Voters
0 Not Returned
13 Affirmative All
  1 Affirmative with Comments
  2 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Cahill, Corey
Goodman, Mark
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.

Negative with Comment
Blais, Steven J.

Listed EMT Fittings are tested with listed EMT and meet requirements of the Resistance, Short-Time-Current, Bending, and Pullout tests. These tests are also conducted on fittings that are listed for use with Rigid Metal Conduit (RMC). In addition, EMT Fittings are subjected to a joint deformation test. EMT is not permitted to be installed where, during installation or afterward, it will be subject to severe physical damage. This provides the necessary authority to an AHJ to determine the severity of the Class I, Division 2 location in regards to being subjected to severe physical damage.

Jones, Robert A.

CMP 14 did not provide a technical reason for not allowing EMT as a wiring method for Class I Division 2 locations. In the panel statement, support was considered not sufficient and if that is a concern CMP 14 can require support spacing more stringent than required by 358.30. Also, grounding was cited as not adequate and again CMP 14 can require an equipment grounding conductor of the wire type to be installed when using EMT in a Class I Division 2 location.
(1) Entering Enclosures.

Each conduit entry into an explosionproof enclosure shall have a conduit seal where either of the following conditions apply:

1. The enclosure contains apparatus, such as switches, circuit breakers, fuses, relays, or resistors, that may produce arcs, sparks, or temperatures that exceed 80 percent of the autoignition temperature, in degrees Celsius, of the gas or vapor involved in normal operation.

   Exception: Seals shall not be required for conduit entering an enclosure under any one of the following conditions:
   a. The switch, circuit breaker, fuse, relay, or resistor is enclosed within a chamber hermetically sealed against the entrance of gases or vapors.
   b. The switch, circuit breaker, fuse, relay, or resistor is immersed in oil in accordance with Section 501.115(B)(1)(2).
   c. The switch, circuit breaker, fuse, relay, or resistor is enclosed within a factory-sealed explosionproof chamber located within the enclosure, identified for the location, and marked “Leads Factory Sealed,” or “Factory Sealed,” or “Seal not Required,” or equivalent.
   d. The switch, circuit breaker, fuse, relay, or resistor is part of a nonincendive circuit.

2. The entry is metric designator 53 (trade size 2) or larger, and the enclosure contains terminals, splices, or taps.

Factory-sealed enclosures: An enclosure, identified for the location, and marked “Leads Factory Sealed,” or “Factory Sealed,” or “Seal not Required,” or equivalent, shall not be considered to serve as a seal for another adjacent explosionproof enclosure that is required to have a conduit seal.

Conduit seals shall be installed within 450 mm (18 in.) from the enclosure or as required by the enclosure marking. Only explosionproof unions, couplings, reducers, elbows, and capped elbows that are not larger than the trade size of the conduit shall be permitted between the sealing fitting and the explosionproof enclosure.

Supplemental Information

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Submitter Information Verification

<table>
<thead>
<tr>
<th>Submitter Full Name:</th>
<th>CMP 14</th>
</tr>
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<tr>
<td>Organization:</td>
<td>[ Not Specified ]</td>
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<td>City:</td>
<td></td>
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<tr>
<td>State:</td>
<td></td>
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<td>Zip:</td>
<td></td>
</tr>
<tr>
<td>Submittal Date:</td>
<td>Tue Nov 10 16:00:04 EST 2015</td>
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Committee Statement

Committee: The exception in 501.15(A)(1), Exception, item (c) was confusing and not clear that the users of...
Statement: the code should be looking for markings on identified equipment to confirm if a conduit seal is needed. The revised text clarifies what should be done. A definition for factory sealed equipment is thus not needed and adds no additional value.

Response
Message:

Public Comment No. 214-NFPA 70-2015 [New Section after 500.7(J)]

Ballot Results

✅ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.
Second Revision No. 3925-NFPA 70-2015 [Section No. 501.105(A)(2)]

(2) Connections.

To facilitate replacement in industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, and where the cable is not subject to physical damage, meters, instruments, and relays shall be permitted to be connected through Type TC-ER-HL cable by means of attachment plugs and receptacles, provided that all of the following conditions apply:

1. Attachment plug and receptacle is listed for use in Class I, Division 1 locations and for use with TC-ER-HL cable.
2. The attachment plug and receptacle is interlocked mechanically or electrically, or otherwise designed so that they cannot be separated when the contacts are energized and the contacts cannot be energized when the plug and socket outlet are separated.
3. Type TC-ER-HL cable is listed for use in Class I, Division 1 locations.
4. Type TC-ER-HL cable is installed in accordance with the provisions of Article 336.10, including the restrictions of 336.10(7).
5. Only necessary receptacles are provided. Receptacles that comply with the requirements in 406.4(F).

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Nov 10 16:29:36 EST 2015

Committee Statement

Committee Statement: List item (5) was not enforceable and was removed. New item (5) was added to clarify that receptacles shall not be interchangeable among different voltage levels. List item (4) was revised to comply with the NEC Style Manual.

Response Message:

Public Comment No. 1642-NFPA 70-2015 [Section No. 501.105(A)(2)]

Ballot Results

✓ This item has passed ballot

16 Eligible Voters
0 Not Returned
6 Affirmative All
10 Affirmative with Comments
0 Negative with Comments
0  Abstention

**Affirmative All**
Alexander, Harold G.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
McBride, William E.
Wirfs, Mark C.

**Affirmative with Comment**
Ankele, Donald W.

In (5), the word “that” should not appear. Otherwise, the text does not fit in the list. The text for (5) should read exactly the same as the text for (5) in SR3926 (no “that”) which addresses the same situation for Class I, Division 2.

Goodman, Mark

Editorial: In item (5), delete the word "that" for consistency and proper intent in the list of items.

Jones, Robert A.

In (5) the word “that” should not appear. The text for (5) should read exactly the same as the text for (5) in SR3926.

Kines, Haywood

The word "That" is not necessary in (5), it should read the same as (5) in SR3926

Lawrence, Jr., William G.

In (5), the word “that” should not appear. Otherwise, the text does not fit in the list. The text for (5) should read exactly the same as the text for (5) in SR3926 (no “that”) which addresses the same situation for Class I, Division 2.

Massey, L. Evans

In (5), the word “that” should not appear. Otherwise, the text does not fit in the list. The text for (5) should read exactly the same as the text for (5) in SR3926 (no “that”) which addresses the same situation for Class I, Division 2.

Neagle, Jeremy

In item (5) the word 'that' should be deleted.

Parks, Ryan

Delete "that"

Simmons, John L.

This second revision has an editorial issue that should be addressed In (5), the word “that” should not appear. Otherwise, the text does not fit in the list. The text for (5) should read exactly the same as the text for (5) in SR3926 (no “that”) which addresses the same situation for Class I, Division 2. The change will not effect the requirement addressed in the revision.

Wechsler, David B.

There is an "editorial issue" with the proposed second revision. In list item # (5), the word "that" should not appear. Otherwise, the text does not fit in the list. The text for (5) should read exactly the same as the text for (5) in SR3926 (no “that”) which addresses the same situation for Class I, Division 2.
Second Revision No. 3926-NFPA 70-2015 [ Section No. 501.105(B)(6) ]

(6) Connections.

To facilitate replacements, process control instruments shall be permitted to be connected through flexible cord, listed Type TC-ER cable, or Type TC-ER-HL cable, by means of attachment plug and receptacle, provided that all of the following conditions are met:

1. Attachment plug and receptacle are listed for use in Class I, Division 2 locations and for use with flexible cords, Type TC-ER cable, or Type TC-ER-HL cable, as applicable, and shall be of the locking and grounding type.

   Exception: A Class I, Division 2 listing is not required if the circuit is nonincendive field wiring.

2. Unless the attachment plug and receptacle are interlocked mechanically or electrically, or otherwise designed so that they cannot be separated when the contacts are energized and the contacts cannot be energized when the plug and socket outlet are separated, the following shall apply:

   a. A switch complying with 501.105(B)(2) is provided so that the attachment plug or receptacle is not depended on to interrupt current.

      Exception: The switch is not required if the circuit is nonincendive field wiring.

   b. The receptacle carries a label warning against plugging or unplugging under load.

   c. The circuit is limited to 3 amps at 120 volts nominal.

3. The flexible cord does not exceed 900 mm (3 ft) and is of a type listed for extra-hard usage or for hard usage if protected by location, if applicable.

4. Type TC-ER cable or Type TC-ER-HL cable is installed in accordance with the provisions of Article 336, including the restrictions of 336.10(7), if applicable.

5. Only necessary receptacles are provided. Receptacles comply with the requirements in 406.4(F).

(5) Unless the attachment plug and receptacle are interlocked mechanically or electrically, or otherwise designed so that they cannot be separated when the contacts are energized and the contacts cannot be energized when the plug and socket outlet are separated, the instrumentation receptacle carries a label warning against plugging or unplugging under load.

Supplemental Information

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Submitter Information

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Nov 10 18:12:36 EST 2015

Committee Statement

Committee: The section was rewritten to clarify the requirements. The request to remove the requirement for a
Statement: warning label was rejected as there was inadequate substantiation in the comment. The limit for the circuit amperage was restored. List item (5) was not enforceable and was removed. New item (5) was added to clarify that receptacles shall not be interchangeable among different voltage levels.

Response

Message:

Public Comment No. 1062-NFPA 70-2015 [Section No. 501.105(B)(6)]
Public Comment No. 1340-NFPA 70-2015 [Section No. 501.105(B)(6)]
Public Comment No. 1674-NFPA 70-2015 [Section No. 501.105(B)(6)]

Ballot Results

✓ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.
Second Revision No. 3923-NFPA 70-2015 [ Section No. 501.115(B)(1) ]

(1) Type Required.

Circuit breakers, motor controllers, and switches intended to interrupt current in the normal performance of the function for which they are installed shall be provided with enclosures identified for Class I, Division 1 locations in accordance with 501.105(A), unless general-purpose enclosures are provided and any of the following apply:

(1) The interruption of current occurs within a chamber hermetically sealed against the entrance of gases and vapors.

(2) The current make-and-break contacts are oil-immersed and of the general-purpose type having a 50-mm (2-in.) minimum immersion for power contacts and a 25-mm (1-in.) minimum immersion for control contacts.

(3) The interruption of current occurs within a factory-sealed explosionproof chamber, an enclosure, identified for the location, and marked “Leads Factory Sealed”, or “Factory Sealed”, or “Seal not Required”, or equivalent.

(4) The device is a solid state, switching control without contacts, where the surface temperature does not exceed 80 percent of the autoignition temperature in degrees Celsius of the gas or vapor involved.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Nov 10 16:10:14 EST 2015

Committee Statement

Committee Statement: The requirements in 501.115(B)(1)(3) were clarified. Users of the code should be looking for markings on identified equipment to confirm if the equipment is factory sealed. The revised text clarifies what should be done. A definition for factory sealed equipment is thus not needed and adds no additional value. This corresponds to the action taken on PC #214.

Response Message:

Ballot Results

✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention
Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.
Second Revision No. 3927-NFPA 70-2015 [Section No. 501.125(B)]

(B) Class I, Division 2.

In Class I, Division 2 locations, motors, generators, and other rotating electrical machinery shall comply with the following: (1), (2), or (3). They shall also comply with (4) and (5), if applicable.

(1) Be identified for Class I, Division 2 locations, or
(2) Be identified for Class I, Division 1 locations where sliding contacts, centrifugal or other types of switching mechanism (including motor overcurrent, overloading, and overtemperature devices), or integral resistance devices, either while starting or while running, are employed, or
(3) Be open or nonexplosionproof enclosed motors, such as squirrel-cage induction motors without brushes, switching mechanisms, or similar arc-producing devices that are not identified for use in a Class I, Division 2 location.

(4) The exposed surface of space heaters used to prevent condensation of moisture during shutdown periods shall not exceed 80 percent of the autoignition temperature in degrees Celsius of the gas or vapor involved when operated at rated voltage, and the maximum space heater surface temperature [based on a 40°C or higher marked ambient] shall be permanently marked on a visible nameplate mounted on the motor. Otherwise, space heaters shall be identified for Class I, Division 2 locations.

(5) A sliding contact shaft bonding device used for the purpose of maintaining the rotor at ground potential, shall be permitted where the potential discharge energy is determined to be nonincendive for the application. The shaft bonding device shall be permitted to be installed on the inside or the outside of the motor.

Informational Note No. 1: It is important to consider the temperature of internal and external surfaces that may be exposed to the flammable atmosphere.

Informational Note No. 2: It is important to consider the risk of ignition due to currents arcing across discontinuities and overheating of parts in multisection enclosures of large motors and generators. Such motors and generators may need equipotential bonding jumpers across joints in the enclosure and from enclosure to ground. Where the presence of ignitable gases or vapors is suspected, clean-air purging may be needed immediately prior to and during start-up periods.

Informational Note No. 3: For further information on the application of electric motors in Class I, Division 2 hazardous (classified) locations, see IEEE 1349-2011, IEEE Guide for the Application of Electric Motors in Class I, Division 2 and Class I, Zone 2 Hazardous (Classified) Locations.

Informational Note No. 4: Reciprocating engine–driven generators, compressors, and other equipment installed in Class I, Division 2 locations may present a risk of ignition of flammable materials associated with fuel, starting, compression, and so forth, due to inadvertent release or equipment malfunction by the engine ignition system and controls. For further information on the requirements for ignition systems for reciprocating engines installed in Class I, Division 2 hazardous (classified) locations, see ANSI/UL 122001-2004, General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations.

Informational Note No. 5: For details of the evaluation process to determine incendivity, refer to Annex A and Figure A1 of UL SU1836 1836–2014, Outline of Investigation for Electric Motors and Generators for Use in Class I, Division 2, Class I, Zone 2, Class II, Division 2 and Zone 22 Hazardous (Classified) Locations.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [Not Specified]
Street Address:
Committee Statement

Committee Statement: This section has been rewritten to clarify the requirements at the direction of the Correlating Committee. Updated standards references to the applicable editions

Response Message:

Public Comment No. 117-NFPA 70-2015 [Section No. 501.125(B)]
Public Comment No. 1804-NFPA 70-2015 [Section No. 501.125(B)]

Ballot Results

✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
14 Affirmative All
   1 Affirmative with Comments
   1 Negative with Comments
   0 Abstention

Affirmative All

Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wirfs, Mark C.

Affirmative with Comment

Parks, Ryan
No comment.
Wechsler, David B.

The language in list item (5) is not enforceable as written. The language states that the shaft bonding device "shall be permitted where the potential discharge energy is determined to be nonincendive for the application". Informational Note #5 was then added to provide guidance on how to determine incendivity. The problem is this language opens up the door for equipment to be installed that isn’t third-party certified to be non-incendive and which is known to be a potentially sparking device. Informational Notes aren’t enforceable so this very well could be “assumed” by the manufacturers to be a task that the user will “self-certify”. This leaves the door open for equipment manufacturers to sell these devices for installation in hazardous classified locations and the users will not have sufficient information from either the motor supplier or the adjustable speed drive supplier to determine the circuit to be non-incendive. Fundamentally, if we are going to allow these devices in hazardous locations, we should state how they are to be determined to be non-incendive in mandatory language and not leave this to chance.
(B) Class II, Division 2.

In Class II, Division 2 locations, motors, generators, and other rotating electrical equipment shall be totally enclosed nonventilated, totally enclosed pipe-ventilated, totally enclosed water-air-cooled, totally enclosed fan-cooled, or dust-ignitionproof, for which maximum full-load external temperature shall be in accordance with 500.8(D)(2) for normal operation when operating in free air (not dust blanketed) and shall have no external openings.

Exception: If the authority having jurisdiction believes accumulations of nonconductive, nonabrasive dust will be moderate and if machines can be easily reached for routine cleaning and maintenance, the following shall be permitted to be installed:

1. Standard open-type machines without sliding contacts, centrifugal or other types of switching mechanism (including motor overcurrent, overloading, and overtemperature devices), or integral resistance devices
2. Standard open-type machines with such contacts, switching mechanisms, or resistance devices enclosed within dusttight housings without ventilating or other openings
3. Self-cleaning textile motors of the squirrel-cage type
4. Sealed bearings, bearing isolators, and seals.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [Not Specified]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Nov 10 19:53:39 EST 2015

Committee Statement

Committee Statement: Suitable means for sealing external openings have been addressed by the addition of list item (4) to the exception. The panel does not agree with the PC-1406 language that provides examples as to what are external openings, as these examples are not all inclusive.

Response Message: Public Comment No. 1406-NFPA 70-2015 [Section No. 502.125(B)]

Ballot Results

✅ This item has passed ballot

16 Eligible Voters
0 Not Returned
6 Affirmative All
10 Affirmative with Comments
0 Negative with Comments
Abstention

Affirmative All
Alexander, Harold G.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
McBride, William E.
Wirfs, Mark C.

Affirmative with Comment
Ankele, Donald W.

The words "Machines with....." appears to be missing from (4). The intent is to permit installation of a motor (machine) with those attributes included. There would be no point in installing only those non-electrical parts without the motor, which is what it currently states!

Goodman, Mark

Editorial: In item (4) add, "Machines with" before "sealed bearings, bearing isolators and seals.

Jones, Robert A.

The words "Machines with" are missing from (4). These words need to be added otherwise this sentence does not make sense. The intent is to permit the installation of a motor (machine) with sealed bearings, bearing isolators, and seals.

Kines, Haywood

the wording "Machines with" is missing in (4)

Lawrence, Jr., William G.

The words "Machines with....." appears to be missing from (4). The intent is to permit installation of a motor (machine) with those attributes included. There would be no point in installing only those non-electrical parts without the motor, which is what it currently states!

Massey, L. Evans

The words "Machines with....." appears to be missing from (4). The intent is to permit installation of a motor (machine) with those attributes included. There would be no point in installing only those non-electrical parts without the motor, which is what it currently states!

Neagle, Jeremy

Add the words 'Machines with' to the beginning of item (4).

Parks, Ryan

Add the words 'Machines with' to the beginning of item (4).

Simmons, John L.

This second revision has an editorial issue that should be addressed. The words "Machines with....." appears to be missing from (4). The intent is to permit installation of a motor (machine) with those attributes included. There would be no point in installing only those non-electrical parts without the motor, which is what it currently states! The change will not effect the requirement addressed in the revision.

Wechsler, David B.

There is an "editorial issue" with the proposed second revision. The words "Machines with....." appears to be missing from (4). The intent is to permit installation of a motor (machine) with those attributes included. There would be no point in installing only those non-electrical parts without the motor, which is what it currently states!
505.2 Definitions.

Encapsulation “m”.
Type of protection where electrical parts that could ignite an explosive atmosphere by either sparking or heating are enclosed in a compound in such a way that this explosive atmosphere cannot be ignited.


Informational Note No. 2: Encapsulation is designated type of protection “ma” for use in Zone 0 locations. Encapsulation is designated type of protection “m” or “mb” for use in Zone 1 locations. Encapsulation is designated type of protection “mc” for use in Zone 2 locations.

Flameproof “d”.
Type of protection where the enclosure will withstand an internal explosion of a flammable mixture that has penetrated into the interior, without suffering damage and without causing ignition, through any joints or structural openings in the enclosure, of an external explosive gas atmosphere consisting of one or more of the gases or vapors for which it is designed.


Increased Safety “e”.
Type of protection applied to electrical equipment that does not produce arcs or sparks in normal service and under specified abnormal conditions, in which additional measures are applied so as to give increased security against the possibility of excessive temperatures and of the occurrence of arcs and sparks.


Intrinsic Safety “i”.
Type of protection where any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions.


Informational Note No. 2: Intrinsic safety is designated type of protection “ia” for use in Zone 0 locations. Intrinsic safety is designated type of protection “ib” for use in Zone 1 locations. Intrinsic safety is designated type of protection “ic” for use in Zone 2 locations.

Informational Note No. 3: Intrinsically safe associated apparatus, designated by [ia], [ib], or [ic], is connected to intrinsically safe apparatus (“ia,” “ib,” or “ic,” respectively) but is located outside the hazardous (classified) location unless also protected by another type of protection (such as flameproof).
Oil Immersion “o”.
Type of protection where electrical equipment is immersed in a protective liquid in such a way that an explosive atmosphere that may be above the liquid or outside the enclosure cannot be ignited.


Powder Filling “q”.
Type of protection where electrical parts capable of igniting an explosive atmosphere are fixed in position and completely surrounded by filling material (glass or quartz powder) to prevent the ignition of an external explosive atmosphere.


Pressurization “p”.
Type of protection for electrical equipment that uses the technique of guarding against the ingress of the external atmosphere, which may be explosive, into an enclosure by maintaining a protective gas therein at a pressure above that of the external atmosphere.


Type of Protection “n”.
Type of protection where electrical equipment, in normal operation, is not capable of igniting a surrounding explosive gas atmosphere and a fault capable of causing ignition is not likely to occur.


Supplemental Information

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Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Nov 10 11:25:04 EST 2015

Committee Statement

Committee Statement: Standards referenced in the informational notes have been updated and the current revisions of these documents have been shown. In cases where the ANSI/UL standard has moved to a new edition and no corresponding ANSI/ISA document is available, the ANSI/ISA reference has been eliminated to ensure that we don’t introduce two different editions of the same standard in these references. IEC 60079-13-2010 was not adopted in the US and it is confusing to be referring to it in...
this informational note because this standard is not formally adopted.

Response
Message:

Public Comment No. 111-NFPA 70-2015 [Section No. 505.2]

Ballot Results

✔ This item has passed ballot

16  Eligible Voters
0  Not Returned
14  Affirmative All
  2  Affirmative with Comments
0  Negative with Comments
0  Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Berens, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan

Under powder filling, add date for "ANSI/UL 60079-5" to "ANSI/UL 60079-5-2009"

Wechsler, David B.

There is an "editorial issue" in the Informational Note for "Powder Filling "q"". The first standard referenced, ANSI/ISA-60079-5 (12.00.04) – 2009 correctly references the date of the standard but the second reference for ANSI/UL 60079-5 does not reflect the 2009 date. These are the same standards and they should both be dated references to avoid confusion. Hopefully this can be handled as an editorial correction but it should be re-balloted, if necessary, for consistency within the document and compliance with the style manual.
505.4 General.
(A) Documentation for Industrial Occupancies.

All areas in industrial occupancies designated as hazardous (classified) locations shall be properly documented. This documentation shall be available to those authorized to design, install, inspect, maintain, or operate electrical equipment at the location.


Informational Note No. 2: Where gas detection equipment is used as a means of protection in accordance with 505.8(I)(1), (I)(2), or (I)(3), the documentation typically includes the type of detection equipment, its listing, installation location(s), alarm and shutdown criteria, and calibration frequency.
Reference Standards.

Important information relating to topics covered in Chapter 5 may be found in other publications.

Informational Note No. 1: It is important that the authority having jurisdiction be familiar with recorded industrial experience as well as with standards of the National Fire Protection Association (NFPA), the American Petroleum Institute (API), the International Society of Automation (ISA), and the International Electrotechnical Commission (IEC) that may be of use in the classification of various locations, the determination of adequate ventilation, and the protection against static electricity and lightning hazards.


Informational Note No. 3: For further information on protection against static electricity and lightning hazards in hazardous (classified) locations, see NFPA 77-2014, Recommended Practice on Static Electricity; NFPA 780-2014, Standard for the Installation of Lightning Protection Systems; and API RP 2003-2008, Protection Against Ignitions Arising Out of Static Lightning and Stray Currents.

Informational Note No. 4: For further information on ventilation, see NFPA 30-2015, Flammable and Combustible Liquids Code, and ANSI/API RP 505-1997, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, or Zone 2.

Informational Note No. 5: For further information on electrical systems for hazardous (classified) locations on offshore oil and gas producing platforms, see ANSI/API RP 14FZ-2013, Recommended Practice for Design and Installation of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Zone 0, Zone 1, and Zone 2 Locations.

Informational Note No. 6: For further information on the installation of electrical equipment in hazardous (classified) locations in general, see IEC 60079-14-2013, Electrical apparatus for explosive gas atmospheres — Part 14: Electrical installations in explosive gas atmospheres (other than mines), and IEC 60079-16-1990, Electrical apparatus for explosive gas atmospheres — Part 16: Artificial ventilation for the protection of analyzer(s) houses.

Informational Note No. 7: For further information on application of electrical equipment in hazardous (classified) locations in general, see ANSI/ISA-60079-0 (12.00.01)-2013, Explosive Atmospheres — Part 0: Equipment — General Requirements; ANSI/ISA-12.12.01.1999-2013, Definitions and Information Pertaining to Electrical Apparatus in Hazardous (Classified) Locations; and ANSI/UL 60079-0:2013, Electrical Apparatus for Explosive Gas Atmospheres — Part 0: General Requirements.

Informational Note No. 8: Portable or transportable equipment having self-contained power supplies, such as battery-operated equipment, could potentially become an ignition source in hazardous (classified) locations. See ANSI/ISA-12.12.03-2011, Standard for Portable Electronic Products Suitable for Use in Class I and II, Division 2, Class I Zone 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations.

Informational Note No. 9: For additional information concerning the installation of equipment utilizing optical emissions technology (such as laser equipment) that could potentially become an ignition source in hazardous (classified) locations, see ANSI/ISA-60079-28 (12.21.02)-2013, Explosive Atmospheres — Part 28: Protection of equipment and transmission systems using optical radiation.
Committee Statement

Committee Statement: The recommended change for IP Model Code P15 is not a correct reference as the “IP 15” has been changed to EI 15 per the Energy Institute website. The recommendation to update the ANSI/ISA 12.01.01 to 2013 has been so adopted, though it is worth noting that the Energy Institute has published a 4th edition effective July 2015.

Response Message:

Public Comment No. 160-NFPA 70-2015 [Section No. 505.4]

Ballot Results

This item has passed ballot

16 Eligible Voters
0 Not Returned
14 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
This Second Revision does not reflect the entire action discussed by and agreed to by the committee. The committee discussed and agreed to completely delete the reference to IP15 in Informational Note #2 vs. just updating it as done. These discussions occurred at the end of the review of PC 160 and weren’t captured by staff in the word file (changes weren’t made online in Terra). This is further supported by the committee statement on Second Revision 3918, last sentence, though the committee action on that Second Revision also does not reflect this agreed upon change. This needs to be corrected.

Wechsler, David B.

This Second Revision does not reflect the entire action discussed by and agreed to by the committee. The committee discussed and agreed to completely delete the reference to IP15 in Informational Note #2 vs. just updating it as done. These discussions occurred at the end of the review of PC 160 and weren’t captured by staff in the word file (changes weren’t made online in Terra). This is further supported by the committee statement on Second Revision 3918, last sentence, though the committee action on that Second Revision also does not reflect this agreed upon change. This needs to be corrected and re-balloted by the committee.
(A) Classification of Locations.

Locations shall be classified depending on the properties of the flammable gases, flammable liquid–produced vapors, combustible liquid–produced vapors, combustible dusts, or fibers/flyings that may be present and the likelihood that a flammable or combustible concentration or quantity is present. Each room, section, or area shall be considered individually in determining its classification. Where pyrophoric materials are the only materials used or handled, these locations are outside the scope of this article.

Informational Note No. 1: See 505.7 for restrictions on area classification.

Informational Note No. 2: Through the exercise of ingenuity in the layout of electrical installations for hazardous (classified) locations, it is frequently possible to locate much of the equipment in reduced level of classification or in an unclassified location and, thus, to reduce the amount of special equipment required.

Refrigerant machinery rooms containing ammonia refrigeration systems that are equipped with adequate mechanical ventilation that operates continuously or is initiated by a detection system that alarms at 1000 ppm may be classified as “unclassified” locations. Rooms and refrigerated areas containing ammonia refrigeration systems that are equipped with adequate mechanical ventilation that operates continuously or is initiated by a detection system that alarms at 1000 ppm may at a concentration not exceeding 150 ppm shall be permitted to be classified as “unclassified” locations.


Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Nov 10 11:09:44 EST 2015

Committee Statement

Committee Statement: This change will correlate the NEC® with applicable ANSI standards that govern ammonia refrigeration systems, ANSI/IIAR 2 and ANSI/ASHRAE 15. Ammonia refrigeration machinery rooms are always required by these standards to have leak detection and ventilation systems and are designated as unclassified locations based on these mitigations. The NEC® is therefore being updated to reflect IIAR 2’s more restrictive 150 ppm ventilation trigger. Other areas where ammonia refrigeration equipment may be present, such as freezers, may have detection, alarms, ventilation or other mitigation measures approved by the AHJ, in accordance with ANSI/ASHRAE 15 and ANSI/IIAR 2 as a basis of assigning an unclassified area designation. The provisions in these standards are too lengthy to warrant duplication in the NEC® for such a special situation. Informational Note 2 provides an appropriate pointer directing NEC® users to ANSI/ASHRAE 15 and ANSI/IIAR 2 for guidance, and these are legally mandated reference standards in adopted fire and mechanical codes.

Response Message:
Ballot Results

✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
14 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.
Wechsler, David B.

This second revision does not reflect the complete action agreed to by both the panel and the submitter (present at the meeting). The panel agreed to delete the inserted words “closed-circuit” and “refrigeration systems” from the Informational Note. While strictly “not enforceable”, because found in an Informational Note, this language has always been more generic and directs the user to these applicable standards, regardless of whether the ammonia source is a refrigeration system or an industrial process using ammonia. Fundamentally, the guidance found in these documents is far more complete than in any other document on the subject, including NFPA 497. These words need to be deleted from the Second Revision and re-balloted by the committee, if needed.
(1) Class I, Zone 0.

A Class I, Zone 0 location is a location in which

(1) Ignitible concentrations of flammable gases or vapors are present continuously, or

(2) Ignitible concentrations of flammable gases or vapors are present for long periods of time.

Informational Note No. 1: As a guide in determining when flammable gases or vapors are present continuously or for long periods of time, refer to ANSI/API RP 505-1997, *Recommended Practice for Classification of Locations for Electrical Installations of Petroleum Facilities Classified as Class I, Zone 0, Zone 1 or Zone 2*; ANSI/ISA-TR12.24.01-1998 (IEC 60079-10 Mod), *Recommended Practice for Classification of Locations for Electrical Installations Classified as Class I, Zone 0, Zone 1, or Zone 2*; IEC 60079-10-1995, *Electrical apparatus for explosive gas atmospheres, classifications of hazardous areas*; ANSI/ISA-60079-10-1-2014, *Explosive Atmospheres — Part 10-1: Classification of Areas — explosive gas atmospheres*; and Area Classification Code for Petroleum Installations, Model Code, Part 15, Institute of Petroleum.

Informational Note No. 2: This classification includes locations inside vented tanks or vessels that contain volatile flammable liquids; inside inadequately vented spraying or coating enclosures, where volatile flammable solvents are used; between the inner and outer roof sections of a floating roof tank containing volatile flammable liquids; inside open vessels, tanks and pits containing volatile flammable liquids; the interior of an exhaust duct that is used to vent ignitible concentrations of gases or vapors; and inside inadequately ventilated enclosures that contain normally venting instruments utilizing or analyzing flammable fluids and venting to the inside of the enclosures.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Nov 10 13:01:04 EST 2015

Committee Statement

Committee Statement: The standard reviewed for the first revision was ASHRAE 15. While the standards organization in question offers a packaged set of ASHRAE 15 and 34, combined, that is not justification to include a reference to ASHRAE 34. Updated reference to the US adoption of IEC 60079-10-1. Also removed the reference to IP 15, see action on PC 160.

Response Message:

Public Comment No. 112-NFPA 70-2015 [Section No. 505.5]

Ballot Results

✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
The statement shows that the reference to the US adoption of 60079-10-1 was updated. However, although the new text was added correctly, the text it replaced “ANSI/ISA-TR12.24.01-1988 (IEC 60079-10 Mod), Recommended Practice for Classification of Locations for Electrical Installations Classified as Class I, Zone 0, Zone 1, or Zone 2” should have been shown as strike-thru text and is not. The statement also shows that the reference to IP 15 was removed. However, the text “Area Classification Code for Petroleum Installations, Model Code, Part 15, Institute of Petroleum” should have been shown as strike-thru text and is not.

Goodman, Mark

Editorial: Delete "ANSI/TR12.24.01-1988 (IEC 60079-10-1 Mod)..." and it's title. This standard reference was replaced, but the removal of the old reference was apparently missed.

The statement shows that the reference to the US adoption of 60079-10-1 was updated. However, although the new text was added correctly, the text it replaced “ANSI/ISA-TR12.24.01-1988 (IEC 60079-10 Mod), Recommended Practice for Classification of Locations for Electrical Installations Classified as Class I, Zone 0, Zone 1, or Zone 2” should have been shown as strike-thru text. Also, the text “Area Classification Code for Petroleum Installations, Model Code, Part 15, Institute of Petroleum” should have been shown as strike-thru text.

Lawrence, Jr., William G.

The statement shows that the reference to the US adoption of 60079-10-1 was updated. However, although the new text was added correctly, the text it replaced “ANSI/ISA-TR12.24.01-1988 (IEC 60079-10 Mod), Recommended Practice for Classification of Locations for Electrical Installations Classified as Class I, Zone 0, Zone 1, or Zone 2” should have been shown as strike-thru text and is not. The statement also shows that the reference to IP 15 was removed. However, the text “Area Classification Code for Petroleum Installations, Model Code, Part 15, Institute of Petroleum” should have been shown as strike-thru text and is not.

Massey, L. Evans

The statement shows that the reference to the US adoption of 60079-10-1 was updated. However, although the new text was added correctly, the text it replaced “ANSI/ISA-TR12.24.01-1988 (IEC 60079-10 Mod), Recommended Practice for Classification of Locations for Electrical Installations Classified as Class I, Zone 0, Zone 1, or Zone 2” should have been shown as strike-thru text and is not. The statement also shows that the reference to IP 15 was removed. However, the text “Area Classification Code for Petroleum Installations, Model Code, Part 15, Institute of Petroleum” should have been shown as strike-thru text and is not.

Neagle, Jeremy

Remove reference to document ANSI/ISA TR12.24.01 as it was replaced by the added text. Remove “Area Classification Code for Petroleum Installations, Model Code, Part 15, Institute of Petroleum” as it was intended to be deleted.
Parks, Ryan

The statement shows that the reference to the US adoption of 60079-10-1 was updated. However, although the new text was added correctly, the text it replaced “ANSI/ISA-TR12.24.01-1988 (IEC 60079-10 Mod), Recommended Practice for Classification of Locations for Electrical Installations Classified as Class I, Zone 0, Zone 1, or Zone 2” should have been shown as strike-thru text and is not. The statement also shows that the reference to IP 15 was removed. However, the text “Area Classification Code for Petroleum Installations, Model Code, Part 15, Institute of Petroleum” should have been shown as strike-thru text and is not.

Simmons, John L.

This second revision has an editorial issue that should be addressed. The statement shows that the reference to the US adoption of 60079-10-1 was updated. However, although the new text was added correctly, the text it replaced “ANSI/ISA-TR12.24.01-1988 (IEC 60079-10 Mod), Recommended Practice for Classification of Locations for Electrical Installations Classified as Class I, Zone 0, Zone 1, or Zone 2” should have been shown as strike-thru text and is not. The statement also shows that the reference to IP 15 was removed. However, the text “Area Classification Code for Petroleum Installations, Model Code, Part 15, Institute of Petroleum” should have been shown as strike-thru text and is not.

Wechsler, David B.

This Second Revision does not reflect the entire action discussed and agreed to by the committee. The statement shows that the reference to the US adoption of 60079-10-1 was updated. However, although the new text was added correctly, the text it replaced “ANSI/ISA-TR12.24.01-1988 (IEC 60079-10 Mod), Recommended Practice for Classification of Locations for Electrical Installations Classified as Class I, Zone 0, Zone 1, or Zone 2” should have been shown as strike-thru text and is not. The last sentence of the Committee Statement reflects the committee’s desire to remove the reference to IP 15 in Informational Note #1, yet this action was not done by staff at the meeting. Thus, the text “Area Classification Code for Petroleum Installations, Model Code, Part 15, Institute of Petroleum” should have been shown as strike-thru text and is not. This needs to be corrected and re-balloted by the committee, if needed.
Second Revision No. 3906-NFPA 70-2015 [ Section No. 505.15(B)(1) ]

(1) General.

In Class I, Zone 1 locations, the wiring methods in 505.15(B)(1)(a) through (B)(1)(i) shall be permitted.

(a) All wiring methods permitted by 505.15(A).

(b) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, and where the cable is not subject to physical damage, Type MC-HL cable listed for use in Class I, Zone 1 or Division 1 locations, with a gas/vaportight continuous corrugated metallic sheath, an overall jacket of suitable polymeric material, and a separate equipment grounding conductor(s) in accordance with 250.122, and terminated with fittings listed for the application. Type MC-HL cable shall be installed in accordance with the provisions of Article 330, Part II.

(c) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, and where the cable is not subject to physical damage, Type ITC-HL cable listed for use in Class I, Zone 1 or Division 1 locations, with a gas/vaportight continuous corrugated metallic sheath and an overall jacket of suitable polymeric material, and terminated with fittings listed for the application. Type ITC-HL cable shall be installed in accordance with the provisions of Article 727.

Informational Note: See 727.4 and 727.5 for restrictions on use of Type ITC cable.

(d) Type MI cable terminated with fittings listed for Class I, Zone 1 or Division 1 locations. Type MI cable shall be installed and supported in a manner to avoid tensile stress at the termination fittings.

(e) Threaded rigid metal conduit, or threaded steel intermediate metal conduit.

(f) Type PVC conduit and Type RTRC conduit shall be permitted where 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 to grade. Threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway. An equipment grounding conductor shall be included to provide for electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.

(g) Intrinsic safety type of protection “ib” shall be permitted using the wiring methods specified in Article 504.

Informational Note: For entry into enclosures required to be flameproof, explosionproof, or of increased safety, see the information on construction, testing, and marking of cables; flameproof and increased safety cable fittings; and flameproof and increased safety cord connectors in ANSI/UL 2225-2011-2013, Cables and Cable-Fittings for Use in Hazardous (Classified) Locations.

(h) Optical fiber cable Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC shall be permitted to be installed in raceways in accordance with 505.15(B). Optical fiber cable shall be sealed in accordance with 505.16.

Informational Note: For entry into enclosures required to be flameproof, explosionproof, or of increased safety, see the information on construction, testing, and marking of cables; flameproof and increased safety cable fittings; and flameproof and increased safety cord connectors in ANSI/UL 2225-2011-2013, Cables and Cable-Fittings for Use in Hazardous (Classified) Locations.

(i) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, for applications limited to 600 volts nominal or less, and where the cable is not subject to physical damage, Type TC-ER-HL cable listed for use in Class I, Zone 1 locations, with an overall jacket and a separate equipment grounding conductor(s) in accordance with 250.122, and terminated with fittings listed for the location, Type TC-ER-HL cable shall be installed in accordance with the provisions of Article 336, including the restrictions of 336.10(7).
Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 09 17:56:45 EST 2015

Committee Statement

Committee Statement: The Panel noted that this change represents the current issue of ANSI/UL 2225.
Response Message:
Public Comment No. 174-NFPA 70-2015 [Section No. 505.15]

Ballot Results

✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
14 Affirmative All
2 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Goodman, Mark
In the current system, this appears to be the only place to comment on the use of TC-ER-HL cable in Zone 1 locations. As indicated in a number of Public Comments rejected by Panel 14, the unrestricted use of this cable type could potentially result in a reduction in safety. API supports Panel 7 actions that are documented in SR 1809 that provide specific requirements for the jacket material, applicable voltages, ampacity restrictions, cable diameter, and labeling requirements. This is illustrated in the second revision in 336.10(11) below: 336.10(11) (11) In hazardous (classified) locations where specifically permitted by other articles in this Code. For Class I, Division 1 and Zone 1 locations only, Type TC cable used for other than flexible connections shall also comply with the following: a. The cable jacket and construction shall be evaluated and listed for the specific hazardous materials present in the location, b. The hazardous material group(s) evaluated shall be marked on the cable, c. The cable diameter shall be limited to 1” or smaller, d. The cable shall be permitted only for voltages of 150 volts to ground or less and currents of 30 amps or less, and e. The cable shall be marked both “-ER” and “-HL” Panel 7 Committee Statement for justification of the above second revision. Revisions are being made in order to correlate the Uses Permitted for Type TC cable with the permitted installations in Sections 501.10(A)(1)(f) and 505.15(B)(1)(i). Many proposals were submitted during the 2014 and 2017 NEC revision cycles requesting and opposing the use of Type TC cable for use in hazardous locations. This resulted in First Revision 3940 expanding the use of tray cable into general wiring for Class I, Division I locations and removing the size restriction for Class I, Zone 1 locations. The Panel has evaluated both the proposals and information provided by manufacturers of Type TC cable, and the added language to 336.10 will provide guidance to users of Type TC for the allowed uses in hazardous locations for the 2017 NEC. Technical substantiation was submitted to the panel indicating that many of the hazardous materials will have an adverse effect on commercially available jacketing materials. Based on the information above, we recommend that for consistency, 505.15(B)(1)(i) be revised as per the following with "Article" removed and reference changed to 336.10 (not the entire article) per 501.10(A)(1) and 336.10(11) added as the correct reference for the specific restrictions for Zone 1: "(i) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, for applications limited to 600 volts nominal or less, and where the cable is not subject to physical damage, Type TC-ER-HL cable listed for use in Class I, Zone 1 locations, with an overall jacket and a separate equipment grounding conductor(s) in accordance with 250.122, and terminated with fittings listed for the location, Type TC-ER-HL cable shall be installed in accordance with the provisions of 336.10, including the restrictions of 336.10(7) and (11)."

Parks, Ryan

No comment.
Second Revision No. 3924-NFPA 70-2015 [ Section No. 505.16(B)(2) ]

**2** Explosionproof Equipment.

Conduit seals shall be provided for each conduit entering explosionproof equipment according to 505.16(B)(2)(a), (B)(2)(b), and (B)(2)(c).

(a) In each conduit entry into an explosionproof enclosure where either of the following conditions apply:

1. The enclosure contains apparatus, such as switches, circuit breakers, fuses, relays, or resistors, that may produce arcs, sparks, or high temperatures that are considered to be an ignition source in normal operation. For the purposes of this section, high temperatures shall be considered to be any temperatures exceeding 80 percent of the autoignition temperature in degrees Celsius of the gas or vapor involved.

   Exception: Conduit Seals shall not be required for conduit entering an enclosure where such switches, circuit breakers, fuses, relays, or resistors comply with one of the following:

   1. Are enclosed within a chamber hermetically sealed against the entrance of gases or vapors.
   2. Are immersed in oil.
   3. Are enclosed within a factory-sealed explosionproof chamber located within the enclosure, identified for the location, and marked “Leads Factory Sealed,” “Factory Sealed,” “Seal not Required,” or equivalent, unless the entry is metric designator 53 (trade size 2) or larger.

(b) The entry is metric designator 53 (trade size 2) or larger and the enclosure contains terminals, splices, or taps.

Factory-sealed enclosures An enclosure, identified for the location, and marked “Leads Factory Sealed,” or “Factory Sealed,” “Seal not Required,” or equivalent shall not be considered to serve as a seal for another adjacent explosionproof enclosure that is required to have a conduit seal.

(b) Conduit seals shall be installed within 450 mm (18 in.) from the enclosure. Only explosionproof unions, couplings, reducers, elbows, capped elbows, and conduit bodies similar to L, T, and cross types that are not larger than the trade size of the conduit shall be permitted between the sealing fitting and the explosionproof enclosure.

(c) Where two or more explosionproof enclosures for which conduit seals are required under 505.16(B)(2) are connected by nipples or by runs of conduit not more than 900 mm (36 in.) long, a single conduit seal in each such nipple connection or run of conduit shall be considered sufficient if located not more than 450 mm (18 in.) from either enclosure.

Supplemental Information

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<td>Revised 505.16(B)(2) <strong>STAFF USE ONLY</strong></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Committee Statement

Committee Statement: Section 505.16(B)(2)(a) was reorganized to comply with the NEC Style Manual and align with 501.15(A)(1). Users of the code should be looking for markings on identified equipment to confirm if the equipment is factory sealed. The revised text clarifies what should be done. A definition for factory sealed equipment is thus not needed and adds no additional value. This corresponds to the action taken on PC #214.

Response Message:

Ballot Results

This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.
506.2 Definitions.

For purposes of this article, the following definitions apply.

Informational Note: Informational Note: For further information, see ANSI/NFPA 496-2013, Standard for Purged and Pressurized Enclosures for Electrical Equipment.

Protection by Encapsulation “m”.

Type of protection where electrical parts that could cause ignition of a mixture of combustible dust or fibers/flyings in air are protected by enclosing them in a compound in such a way that the explosive atmosphere cannot be ignited.


Informational Note No. 2: Encapsulation is designated level of protection “maD” or “ma” for use in Zone 20 locations. Encapsulation is designated level of protection “mbD” or “mb” for use in Zone 21 locations. Encapsulation is designated type of protection “mc” for use in Zone 22 locations.

Protection by Enclosure “t”.

Type of protection for explosive dust atmospheres where electrical apparatus is provided with an enclosure providing dust ingress protection and a means to limit surface temperatures.


Informational Note No. 2: Protection by enclosure is designated level of protection “ta” for use in Zone 20 locations. Protection by enclosure is designated level of protection “tb” or “tD” for use in Zone 21 locations. Protection by enclosure is designated level of protection “tc” or “tD” for use in Zone 22 locations.

Protection by Intrinsic Safety “iD” “i”.

Type of protection where any spark or thermal effect is incapable of causing ignition of a mixture of combustible dust, fibers, or flyings in air under prescribed test conditions.


Informational Note No. 2: Intrinsic safety is designated level of protection “iaD” or “ia” for use in Zone 20 locations. Intrinsic safety is designated level of protection “ibD” or “ib” for use in Zone 21 locations. Intrinsic safety is designated type of protection “ic” for use in Zone 22 locations.

Protection by Pressurization “p”.

Type of protection that guards against the ingress of a mixture of combustible dust or fibers/flyings in air into an enclosure containing electrical equipment by providing and maintaining a protective gas atmosphere inside the enclosure at a pressure above that of the external atmosphere.

Informational Note: For additional information, see ANSI/ISA-61241-2 (12.10.06)-2006, Electrical Apparatus for Use in Zone 21 and Zone 22 Hazardous (Classified) Locations — Protection by Pressurization “pD.”
Committee Statement

Committee Statement: The informational note referencing ANSI/NFPA 496 was deleted as the informational note should have been relocated to Art. 100 with the term 'Pressurized' under FR 3924. The documents referenced in 506.2 have been revised to reflect the correct title, numeric designation, ANSI approval and publication dates. Reference to ANSI/UL 60079-31-2015 was added and replaced the ANSI/ISA 60079-31-2009 standard.

Response Message:

Public Comment No. 161-NFPA 70-2015 [Section No. 506.2]

Ballot Results

✓ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment

Parks, Ryan

No comment.
(2) Zone 21.

A Zone 21 location is a location where one of the following apply:

(1) Ignitible concentrations of combustible dust or ignitible fibers/flyings are likely to exist occasionally under normal operating conditions; or

(2) Ignitible concentrations of combustible dust or ignitible fibers/flyings may exist frequently because of repair or maintenance operations or because of leakage; or

(3) Equipment is operated or processes are carried on, of such a nature that equipment breakdown or faulty operations could result in the release of ignitible concentrations of combustible dust or ignitible fibers/flyings and also cause simultaneous failure of electrical equipment in a mode to cause the electrical equipment to become a source of ignition; or

(4) Adjacent: The location is adjacent to a Zone 20 location from which ignitible concentrations of dust or ignitible fibers/flyings could be communicated, unless communication is prevented.

Exception: When communication from an adjacent Zone 20 location is minimized by adequate positive pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

Informational Note No. 1: As a guide to classification of Zone 21 locations, refer to ANSI/ISA-60079-10-2 (12.10.05)-2013, Explosive Atmospheres — Part 10-2: Classification of areas — Combustible dust atmospheres.

Informational Note No. 2: This classification usually includes locations outside dust containment and in the immediate vicinity of access doors subject to frequent removal or opening for operation purposes when internal combustible mixtures are present; locations outside dust containment in the proximity of filling and emptying points, feed belts, sampling points, truck dump stations, belt dump over points, etc., where no measures are employed to prevent the formation of combustible mixtures; locations outside dust containment where dust accumulates and where due to process operations the dust layer is likely to be disturbed and form combustible mixtures; locations inside dust containment where explosive dust clouds are likely to occur (but neither continuously, nor for long periods, nor frequently) as, for example, silos (if filled and/or emptied only occasionally) and the dirty side of filters if large self-cleaning intervals are occurring.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address:  
City:
State:  
Zip:  
Submittal Date: Mon Nov 09 17:44:19 EST 2015

Committee Statement

Committee Statement: At the direction of the Correlating Committee, the text of 506.5(B)(2)(4) was revised in accordance with the NEC Style Manual.

Response Message:  

Public Comment No. 1809-NFPA 70-2015 [Section No. 506.5(B)(2)]
Ballot Results

- This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
  1 Affirmative with Comments
  0 Negative with Comments
  0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.
Second Revision No. 3905-NFPA 70-2015 [Section No. 506.5(B)(3)]

(3) Zone 22.
A Zone 22 location is a location where one of the following apply:

(1) Ignitible concentrations of combustible dust or ignitible fibers/flyings are not likely to occur in normal operation and, if they do occur, will only persist for a short period; or

(2) Combustible dust or fibers/flyings are handled, processed, or used but in which the dust or fibers/flyings are normally confined within closed containers of closed systems from which they can escape only as a result of the abnormal operation of the equipment with which the dust or fibers/flyings are handled, processed, or used; or

(3) Adjacent. The location is adjacent to a Zone 21 location, from which ignitible concentrations of dust or fibers/flyings could be communicated, unless such communication is prevented.

Exception: When communication from an adjacent Zone 21 location is minimized by adequate positive pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

Informational Note No. 1: As a guide to classification of Zone 22 locations, refer to ANSI/ISA-60079-10-2 (12.10.05)-2013, Explosive Atmospheres — Part 10-2: Classification of areas — Combustible dust atmospheres.

Informational Note No. 2: Zone 22 locations usually include outlets from bag filter vents, because in the event of a malfunction there can be emission of combustible mixtures; locations near equipment that has to be opened at infrequent intervals or equipment that from experience can easily form leaks where, due to pressure above atmospheric, dust will blow out; pneumatic equipment, flexible connections that can become damaged, etc.; storage locations for bags containing dusty product, since failure of bags can occur during handling, causing dust leakage; and locations where controllable dust layers are formed that are likely to be raised into explosive dust–air mixtures. Only if the layer is removed by cleaning before hazardous dust–air mixtures can be formed is the area designated unclassified.

Informational Note No. 3: Locations that normally are classified as Zone 21 can fall into Zone 22 when measures are employed to prevent the formation of explosive dust–air mixtures. Such measures include exhaust ventilation. The measures should be used in the vicinity of (bag) filling and emptying points, feed belts, sampling points, truck dump stations, belt dump over points, etc.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 09 17:49:31 EST 2015

Committee Statement

Committee Statement: At the direction of the Correlating Committee, the text of 506.5(B)(3)(3) was revised in accordance with the NEC Style Manual.
Ballot Results

☑ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.
Second Revision No. 3907-NFPA 70-2015 [Section No. 506.6(A)]

(A) Group IIIC.
Combustible metal dust. Group IIIC is equivalent to Class II, Group E as described in 500.6(B)(1).

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 09 18:07:43 EST 2015

Committee Statement

Committee Statement: The text of 506.6(A) was revised to align with the Group IIIC material classification in ANSI/UL 60079-0 and Article 500.
Response Message:
Public Comment No. 392-NFPA 70-2015 [Section No. 506.6(A)]

Ballot Results

✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

**Affirmative with Comment**

Parks, Ryan

No comment.
(B) Group IIIB.

Combustible dust other than combustible metal dust. Group IIIB is equivalent to Class II, Groups F and G as described in 500.6(B)(2) and 500.6(B)(3), respectively.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 09 18:22:09 EST 2015

Committee Statement

Committee Statement: The text of 506.6(B) was revised to align with the Group IIIB material classification in ANSI/UL 60079-0 and Article 500.

Response Message:

Public Comment No. 394-NFPA 70-2015 [Section No. 506.6(B)]

Ballot Results

✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.
(C) Group IIIA.

Solid particles, including fibers, greater than 500 µm in nominal size, which may be suspended in air and could settle out of the atmosphere under their own weight. Group IIIA is equivalent to Class III.

Informational Note No. 1: Group IIIA is equivalent to Class III.

Informational Note: Examples of flyings include rayon, cotton (including cotton linters and cotton waste), sisal, jute, hemp, cocoa fiber, oakum, and baled waste kapok.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 09 18:24:40 EST 2015

Committee Statement

Committee Statement: The text of 506.6(C) was revised to align with the Group IIIA material classification in ANSI/UL 60079-0 and Article 500.

Response Message:

Ballot Results

✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kines, Haywood</td>
</tr>
<tr>
<td>Lawrence, Jr., William G.</td>
</tr>
<tr>
<td>Massey, L. Evans</td>
</tr>
<tr>
<td>McBride, William E.</td>
</tr>
<tr>
<td>Neagle, Jeremy</td>
</tr>
<tr>
<td>Simmons, John L.</td>
</tr>
<tr>
<td>Wechsler, David B.</td>
</tr>
<tr>
<td>Wirfs, Mark C.</td>
</tr>
</tbody>
</table>

**Affirmative with Comment**

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parks, Ryan</td>
</tr>
</tbody>
</table>

No comment.
Second Revision No. 3911-NFPA 70-2015 [ Section No. 506.9(B) ]

(B) Listing.

Equipment that is listed for Zone 20 shall be permitted in a Zone 21 or Zone 22 location of the same dust or ignitable fiber/flying. Equipment that is listed for Zone 21 may be used in a Zone 22 location of the same dust or ignitable fiber/flying.

(0) Equipment shall be permitted to be listed for a specific dust or ignitable fiber/flying or any specific combination of dusts or ignitable fibers/flyings.

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:

Submittal Date: Mon Nov 09 18:58:20 EST 2015

Committee Statement

Committee Statement: The product standards for equipment do not address certifying for specific dusts or ignitable fiber/flyings. This revision correlates with action taken on PC #1381 for section 506.9(C)(2)(4).

Response Message:

Ballot Results

☑ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

**Affirmative with Comment**
Parks, Ryan
No comment.
Zone Equipment.
Equipment meeting one or more of the protection techniques described in 506.8 shall be marked with the following in the order shown:

1. Zone
2. Symbol “AEx”
3. Protection technique(s) in accordance with Table 506.9(C)(2)(3)
4. Material group in accordance with 506.6 or a specific dust or ignitible fiber/flying or a specific combination thereof
5. Maximum surface temperature in accordance with 506.9(D), marked as a temperature value in degrees C, preceded by “T” and followed by the symbol “°C”
6. Ambient temperature marking in accordance with 506.9(D)

Informational Note: The EPL (or equipment protection level) can appear in the product marking. EPLs are designated as G for gas, D for dust, or M for mining, and are then followed by a letter (a, b, or c) to give the user a better understanding as to whether the equipment provides either (a) a “very high,” (b) a “high,” or (c) an “enhanced” level of protection against ignition of an explosive atmosphere. For example, a Zone 21 AEx pb IIIB T165°C motor can additionally be marked with an EPL of “Db”, Zone 21 AEx p IIIB T165°C Db.

Exception: Associated apparatus NOT suitable for installation in a hazardous (classified) location shall be required to be marked only with 506.9(C)(2)(2) and (3), and where applicable (4), but BOTH the symbol AEx in 506.9(C)(2)(2) and the symbol for the type of protection in 506.9(C)(2)(3) shall be enclosed within the same square brackets; for example, [AEx iaD] or [AEx ia] IIIC.

Table 506.9(C)(2)(3) Types of Protection Designation

<table>
<thead>
<tr>
<th>Designation</th>
<th>Technique</th>
<th>Zone*</th>
</tr>
</thead>
<tbody>
<tr>
<td>iaD</td>
<td>Protection by intrinsic safety</td>
<td>20</td>
</tr>
<tr>
<td>ia</td>
<td>Protection by intrinsic safety</td>
<td>20</td>
</tr>
<tr>
<td>ibD</td>
<td>Protection by intrinsic safety</td>
<td>21</td>
</tr>
<tr>
<td>ib</td>
<td>Protection by intrinsic safety</td>
<td>21</td>
</tr>
<tr>
<td>ic</td>
<td>Protection by intrinsic safety</td>
<td>22</td>
</tr>
<tr>
<td>[iaD]</td>
<td>Associated apparatus</td>
<td>Unclassified**</td>
</tr>
<tr>
<td>[ia]</td>
<td>Associated apparatus</td>
<td>Unclassified**</td>
</tr>
<tr>
<td>[ibD]</td>
<td>Associated apparatus</td>
<td>Unclassified**</td>
</tr>
<tr>
<td>[ib]</td>
<td>Associated apparatus</td>
<td>Unclassified**</td>
</tr>
<tr>
<td>[ic]</td>
<td>Associated apparatus</td>
<td>Unclassified**</td>
</tr>
<tr>
<td>maD</td>
<td>Protection by encapsulation</td>
<td>20</td>
</tr>
<tr>
<td>ma</td>
<td>Protection by encapsulation</td>
<td>20</td>
</tr>
<tr>
<td>mbD</td>
<td>Protection by encapsulation</td>
<td>21</td>
</tr>
<tr>
<td>mb</td>
<td>Protection by encapsulation</td>
<td>21</td>
</tr>
<tr>
<td>mc</td>
<td>Protection by encapsulation</td>
<td>22</td>
</tr>
<tr>
<td>pD</td>
<td>Protection by pressurization</td>
<td>21</td>
</tr>
<tr>
<td>p</td>
<td>Protection by pressurization</td>
<td>21</td>
</tr>
<tr>
<td>pb</td>
<td>Protection by pressurization</td>
<td>21</td>
</tr>
<tr>
<td>tD</td>
<td>Protection by enclosures</td>
<td>21</td>
</tr>
<tr>
<td>ta</td>
<td>Protection by enclosures</td>
<td>20</td>
</tr>
<tr>
<td>tb</td>
<td>Protection by enclosures</td>
<td>21</td>
</tr>
<tr>
<td>tc</td>
<td>Protection by enclosures</td>
<td>22</td>
</tr>
</tbody>
</table>

*Does not address use where a combination of techniques is used.

**Associated apparatus is permitted to be installed in a hazardous (classified) location if suitably protected using another type of protection.
Informational Note: The “D” suffix on the type of protection designation was employed prior to the introduction of Group IIIA, IIIB, and IIIC; which is now used to distinguish between the type of protection employed for Group II (Gases) or Group III (Dusts).

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Nov 09 18:33:59 EST 2015

Committee Statement

Committee Statement: The product standards for Zone 20, 21 and 22 equipment do not permit marking for specific dusts or ignitable fiber/flyings.
Response Message: Public Comment No. 1381-NFPA 70-2015 [Section No. 506.9(C)(2)]

Ballot Results

✔ This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
Ankele, Donald W.
Bernsen, Marc J.
Blais, Steven J.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment
Parks, Ryan
No comment.
515.3 Class I Locations.
Table 515.3 shall be applied where Class I liquids are stored, handled, or dispensed and shall be used to delineate and classify bulk storage plants. The class location shall not extend beyond a floor, wall, roof, or other solid partition that has no communicating openings. [30:7.3, 7.4]

Informational Note No. 1: The area classifications listed in Table 515.3 are based on the premise that the installation meets the applicable requirements of NFPA 30-2015, Flammable and Combustible Liquids Code, Chapter 5, in all respects. Should this not be the case, the authority having jurisdiction has the authority to classify the extent of the classified space.

Informational Note No. 2: See 514.3(C) through (E) for gasoline dispensing stations in marinas and boatyards.

Table 515.3 Electrical Area Classifications

<table>
<thead>
<tr>
<th>Location</th>
<th>Division</th>
<th>Zone</th>
<th>Extent of Classified Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor equipment installed in accordance with Section 7.3 of NFPA 30 where flammable vapor–air mixtures can exist under normal operation</td>
<td>1</td>
<td>0</td>
<td>The entire area associated with such equipment where flammable gases or vapors are present continuously or for long periods of time</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>Area within 1.5 m (5 ft) of any edge of such equipment, extending in all directions</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>Area between 1.5 m and 2.5 m (5 ft and 8 ft) of any edge of such equipment, extending in all directions; also, space up to 900 mm (3 ft) above floor or grade level within 1.5 m to 7.5 m (5 ft to 25 ft) horizontally from any edge of such equipment</td>
</tr>
<tr>
<td>Outdoor equipment of the type covered in Section 7.3 of NFPA 30 where flammable vapor–air mixtures can exist under normal operation</td>
<td>1</td>
<td>0</td>
<td>The entire area associated with such equipment where flammable gases or vapors are present continuously or for long periods of time</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>Area within 900 mm (3 ft) of any edge of such equipment, extending in all directions</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>Area between 900 mm (3 ft) and 2.5 m (8 ft) of any edge of such equipment, extending in all directions; also, space up to 900 mm (3 ft) above floor or grade level within 900 mm to 3.0 m (3 ft to 10 ft) horizontally from any edge of such equipment</td>
</tr>
<tr>
<td>Tank storage installations inside buildings</td>
<td>1</td>
<td>1</td>
<td>All equipment located below grade level</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>Any equipment located at or above grade level</td>
</tr>
<tr>
<td>Tank — aboveground, fixed roof</td>
<td>1</td>
<td>0</td>
<td>Inside fixed roof tank</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>Area inside dike where dike height is greater than the distance from the tank to the dike for more than 50 percent of the tank circumference</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>Within 3.0 m (10 ft) from shell, ends, or roof of tank; also, area inside dike to level of top of dike wall</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0</td>
<td>Area inside of vent piping or opening</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>Within 1.5 m (5 ft) of open end of vent, extending in all directions</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>Area between 1.5 m and 3.0 m (5 ft and 10 ft) from open end of vent, extending in all directions</td>
</tr>
<tr>
<td>Tank — aboveground, floating roof</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Division</td>
<td>Zone</td>
<td>Extent of Classified Area</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------</td>
<td>------</td>
<td>-------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>With fixed outer roof</td>
<td>1</td>
<td>0</td>
<td>Area between the floating and fixed roof sections and within the shell</td>
</tr>
<tr>
<td>With no fixed outer roof</td>
<td>1</td>
<td>1</td>
<td>Area above the floating roof and within the shell</td>
</tr>
<tr>
<td>Tank vault — interior</td>
<td>1</td>
<td>1</td>
<td>Entire interior volume, if Class I liquids are stored within</td>
</tr>
<tr>
<td>Underground tank fill opening</td>
<td>1</td>
<td>1</td>
<td>Any pit, box, or space below grade level, if any part is within a Division 1 or 2, or Zone 1 or 2 classified location</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>Up to 450 mm (18 in.) above grade level within a horizontal radius of 3.0 m (10 ft) from a loose fill connection, and within a horizontal radius of 1.5 m (5 ft) from a tight fill connection</td>
</tr>
<tr>
<td>Vent — discharging upward</td>
<td>1</td>
<td>0</td>
<td>Area inside of vent piping or opening</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>Within 900 mm (3 ft) of open end of vent, extending in all directions</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>Area between 900 mm and 1.5 m (3 ft and 5 ft) of open end of vent, extending in all directions</td>
</tr>
<tr>
<td>Drum and container filling —</td>
<td>1</td>
<td>0</td>
<td>Area inside the drum or container</td>
</tr>
<tr>
<td>outdoors or indoors</td>
<td>1</td>
<td>1</td>
<td>Within 900 mm (3 ft) of vent and fill openings, extending in all directions</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>Area between 900 mm and 1.5 m (3 ft and 5 ft) from vent or fill opening, extending in all directions; also, up to 450 mm (18 in.) above floor or grade level within a horizontal radius of 3.0 m (10 ft) from vent or fill opening</td>
</tr>
<tr>
<td>Pumps, bleeders, withdrawal</td>
<td>2</td>
<td>2</td>
<td>Within 1.5 m (5 ft) of any edge of such devices, extending in all directions; also, up to 900 mm (3 ft) above floor or grade level within 7.5 m (25 ft) horizontally from any edge of such devices</td>
</tr>
<tr>
<td>fittings</td>
<td></td>
<td></td>
<td>Within 900 mm (3 ft) of any edge of such devices, extending in all directions. Also, up to 450 mm (18 in.) above grade level within 3.0 m (10 ft) horizontally from any edge of such devices</td>
</tr>
<tr>
<td>Pits and sumps</td>
<td>1</td>
<td>1</td>
<td>Entire area within a pit or sump if any part is within a Division 1 or 2 or Zone 1 or 2 classified location</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>Entire area within a pit or sump if any part is within a Division 1 or 2 or Zone 1 or 2 classified location</td>
</tr>
<tr>
<td>Drainage ditches, separators,</td>
<td>2</td>
<td>2</td>
<td>Entire pit or sump</td>
</tr>
<tr>
<td>impounding basins</td>
<td></td>
<td></td>
<td>Area up to 450 mm (18 in.) above ditch, separator, or basin; also, area up to 450 mm (18 in.) above grade within 4.5 m (15 ft) horizontally from any edge</td>
</tr>
<tr>
<td>Location</td>
<td>Division</td>
<td>Zone</td>
<td>Extent of Classified Area</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Indoor</td>
<td></td>
<td></td>
<td>Same as pits and sumps</td>
</tr>
<tr>
<td>Tank vehicle and tank car²</td>
<td>1</td>
<td>0</td>
<td>Area inside of the tank</td>
</tr>
<tr>
<td>Loading through open dome</td>
<td>1</td>
<td>1</td>
<td>Within 900 mm (3 ft) of edge of dome, extending in all directions</td>
</tr>
<tr>
<td>Loading through open dome</td>
<td>2</td>
<td>2</td>
<td>Area between 900 mm and 4.5 m (3 ft and 15 ft) from edge of dome, extending in all directions</td>
</tr>
<tr>
<td>Loading through bottom connections with atmospheric venting</td>
<td>1</td>
<td>0</td>
<td>Area inside of the tank</td>
</tr>
<tr>
<td>Loading through bottom connections with atmospheric venting</td>
<td>1</td>
<td>1</td>
<td>Within 900 mm (3 ft) of point of venting to atmosphere, extending in all directions</td>
</tr>
<tr>
<td>Loading through closed dome with atmospheric venting</td>
<td>2</td>
<td>2</td>
<td>Area between 900 mm and 4.5 m (3 ft and 15 ft) from point of venting to atmosphere, extending in all directions; also, up to 450 mm (18 in.) above grade within a horizontal radius of 3.0 m (10 ft) from point of loading connection</td>
</tr>
<tr>
<td>Loading through closed dome with vapor control</td>
<td>1</td>
<td>1</td>
<td>Within 900 mm (3 ft) of open end of vent, extending in all directions</td>
</tr>
<tr>
<td>Loading through closed dome with vapor control</td>
<td>2</td>
<td>2</td>
<td>Area between 900 mm and 4.5 m (3 ft and 15 ft) from open end of vent, extending in all directions; also, within 900 mm (3 ft) of edge of dome, extending in all directions</td>
</tr>
<tr>
<td>Bottom loading with vapor control or any bottom unloading</td>
<td>2</td>
<td>2</td>
<td>Within 900 mm (3 ft) of point of connection of both fill and vapor lines extending in all directions</td>
</tr>
<tr>
<td>Bottom loading with vapor control or any bottom unloading</td>
<td>2</td>
<td>2</td>
<td>Within 900 mm (3 ft) of point of connections, extending in all directions; also up to 450 mm (18 in.) above grade within a horizontal radius of 3.0 m (10 ft) from point of connections</td>
</tr>
<tr>
<td>Storage and repair garage for tank vehicles</td>
<td>1</td>
<td>1</td>
<td>All pits or spaces below floor level</td>
</tr>
<tr>
<td>Storage and repair garage for tank vehicles</td>
<td>2</td>
<td>2</td>
<td>Area up to 450 mm (18 in.) above floor or grade level for entire storage or repair garage</td>
</tr>
<tr>
<td>Garages for other than tank vehicles</td>
<td>Ordinary Unclassified</td>
<td></td>
<td>If there is any opening to these rooms within the extent of an outdoor classified location, the entire room shall be classified the same as the area classification at the point of the opening.</td>
</tr>
<tr>
<td>Outdoor drum storage</td>
<td>Ordinary Unclassified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garages for other than tank vehicles</td>
<td>Ordinary Unclassified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garages for other than tank vehicles</td>
<td>Ordinary Unclassified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piers and wharves</td>
<td>Ordinary Unclassified</td>
<td></td>
<td>See Figure 515.3.</td>
</tr>
</tbody>
</table>

¹The release of Class I liquids can generate vapors to the extent that the entire building, and possibly an area surrounding it, should be considered a Class I, Division 2 or Zone 2 location.
When classifying extent of area, consideration shall be given to the fact that tank cars or tank vehicles can be spotted at varying points. Therefore, the extremities of the loading or unloading positions shall be used. [30:Table 7.3.3]

Figure 515.3 Area Classification for a Marine Terminal Handling Flammable Liquids. [30:Figure 29.3.22]

Supplemental Information

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMP14_SR3929_DV.docx</td>
<td>Revised Table 515.3 <strong>STAFF USE ONLY</strong></td>
</tr>
</tbody>
</table>

Submitter Information Verification

Submitter Full Name: CMP 14
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Nov 11 13:32:01 EST 2015

Committee Statement

Committee Statement: The term ordinary is not a defined area but the term unclassified is. Section 3.2.7.3.2 of the NEC Style Manual allows edits to extracted material to make style consistent with the NEC.

Response Message:

Public Comment No. 1733-NFPA 70-2015 [Section No. 515.3]

Ballot Results

This item has passed ballot

16 Eligible Voters
0 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All
Alexander, Harold G.
| Ankele, Donald W. |
| Bernsen, Marc J. |
| Blais, Steven J. |
| Cahill, Corey |
| Goodman, Mark |
| Jones, Robert A. |
| Kines, Haywood |
| Lawrence, Jr., William G. |
| Massey, L. Evans |
| McBride, William E. |
| Neagle, Jeremy |
| Simmons, John L. |
| Wechsler, David B. |
| Wirfs, Mark C. |

**Affirmative with Comment**

Parks, Ryan

No comment.
Article 516  Spray Application, Dipping, Coating, and Printing Processes Using Flammable or Combustible Materials

Informational Note: Text that is followed by a reference in brackets has been extracted from NFPA 33 - 2015, Standard for Spray Application Using Flammable and Combustible Materials, or NFPA 34 - 2015, Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids. Only editorial changes were made to the extracted text to make it consistent with this Code.

Part I. General

516.1 Scope.

This article covers the regular or frequent application of flammable liquids, combustible liquids, and combustible powders by spray operations and the application of flammable liquids, or combustible liquids at temperatures above their flashpoint, by spraying, dipping, coating, printing, or other means.

Informational Note No. 1: For further information regarding safeguards for these processes, such as fire protection, posting of warning signs, and maintenance, see NFPA 33 - 2016, Standard for Spray Application Using Flammable or Combustible Materials, and NFPA 34 - 2015, Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids. For additional information regarding ventilation, see NFPA 91 - 2010 - 2015, Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids.

Informational Note No. 2: Text that is followed by a reference in brackets has been extracted from NFPA 33 - 2016, Standard for Spray Application Using Flammable and Combustible Materials, or NFPA 34 - 2015, Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids. Only editorial changes were made to the extracted text to make it consistent with this Code.

516.2 Definitions.

For the purpose of this article, the following definitions shall apply.

Limited Finishing Workstation.

An apparatus that is capable of confining the vapors, mists, residues, dusts, or deposits that are generated by a spray application process and that meets the requirements of Section 14.3 of NFPA 33, Standard for Spray Application Using Flammable and Combustible Materials, but does not meet the requirements of a spray booth or spray room, as herein defined. [33:3.3.18.1]

Informational Note: See Section 14.3 of NFPA 33, Standard for Spray Application Using Flammable or Combustible Materials, for limited finishing workstations.

Membrane Enclosure.

A temporary enclosure used for the spraying of workpieces that cannot be moved into a spray booth where open spraying is not practical due to the proximity to other operations, finish quality, or concerns such as the collection of overspray.

Informational Note: See Chapter 18 of NFPA 33 - 2016, Standard for Spray Application Using Flammable or Combustible Materials, for information on the construction and use of membrane enclosures.

Outdoor Spray Area.

A spray area that is outside the confines of a building or that has a canopy or roof that does not limit the dissipation of the heat of a fire or dispersion of flammable vapors and does not restrict fire-fighting access and control. For the purpose of this standard, an outdoor spray area can be treated as an unenclosed spray area. [33:3.3.2.3.1]
Spray Area.
Any fully enclosed, partly enclosed, or unenclosed area in which dangerous quantities of flammable or combustible vapors, mists, residues, dusts, or deposits are present due to the operation of spray processes, including (1) any area in the direct path of a spray application process; (2) the interior of a spray booth, spray room, or limited finishing workstation, as herein defined; (3) the interior of any exhaust plenum, eliminator section, or scrubber section; (4) the interior of any exhaust duct or exhaust stack leading from a spray application process; (5) the interior of any air recirculation path up to and including recirculation particulate filters; (6) any solvent concentrator (pollution abatement) unit or solvent recovery (distillation) unit; and (7) the inside of a membrane enclosure. The following are not part of the spray area: (1) fresh air make-up units; (2) air supply ducts and air supply plenums; (3) recirculation air supply ducts downstream of recirculation particulate filters; and (4) exhaust ducts from solvent concentrator (pollution abatement) units. [33:3.3.2.3]

Informational Note: Unenclosed spray areas are locations outside of buildings or are localized operations within a larger room or space. Such are normally provided with some local vapor extraction/ventilation system. In automated operations, the area limits are the maximum area in the direct path of spray operations. In manual operations, the area limits are the maximum area of spray when aimed at 90 degrees to the application surface.

Spray Booth.
A power-ventilated enclosure for a spray application operation or process that confines and limits the escape of the material being sprayed, including vapors, mists, dusts, and residues that are produced by the spraying operation and conducts or directs these materials to an exhaust system. [33:3.3.15]

Informational Note: A spray booth is an enclosure or insert within a larger room used for spray/coating/dipping applications. A spray booth can be fully enclosed or have open front or face and can include separate conveyor entrance and exit. The spray booth is provided with a dedicated ventilation exhaust with supply air from the larger room or from a dedicated air supply.

Spray Room.
A power-ventilated fully enclosed room used exclusively for open spraying of flammable or combustible materials. [33:3.3.16]

Unenclosed Spray Area.
Any spray area that is not confined by a limited finishing workstation, spray booth, or spray room, as herein defined. [33:3.3.2.3.2]

Part II. Open Containers
516.4 Area Classification.
For open containers, supply containers, waste containers, spray gun cleaners, and solvent distillation units that contain Class I liquids that are located in ventilated areas, electrical area classification shall be in accordance with the following:

1. The area within 915 mm (3 ft) in all directions from any such container or equipment and extending to the floor or grade level shall be classified as Class I, Division 1 or Class I, Zone 1, whichever is applicable. [33:6.5.5.1]

2. The area extending 610 mm (2 ft) beyond the Division 1 or Zone 1 location shall be classified as Class I, Division 2 or Class I, Zone 2, whichever is applicable. [33:6.5.5.1]

3. The area extending 1525 mm (5 ft) horizontally beyond the area described in 516.4(2) up to a height of 460 mm (18 in.) above the floor or grade level shall be classified as Class I, Division 2 or Class I, Zone 2, whichever is applicable. [33:6.5.5.1]

4. The area inside any tank or container shall be classified as Class I, Division 1 or Class I, Zone 0, whichever is applicable. [33:6.5.5.1]

5. Sumps, pits, or below grade channels within 3.5 m (10 ft) horizontally of a vapor source shall be classified as Class I, Division 1 or Zone 1. If the sump, pit, or channel extends beyond 3.5 m (10 ft) from the vapor source, it shall be provided with a vapor stop or it shall be classified as Class I, Division 1 or Zone 1 for its entire length.

For the purposes of electrical area classification, the Division system and the Zone system shall not be intermixed for any given source of release. [33:6.2.3]

Electrical wiring and utilization equipment installed in these areas shall be suitable for the location, as shown in Figure 516.4. [33:6.5.5.2]

Figure 516.4 Electrical Area Classification for Class I Liquid Operations Around Open Containers, Supply Containers, Waste Containers, Spray Gun Cleaners, and Solvent Distillation Units. [33:Figure 6.5.5.2]

Part III. Spray Application Processes

516.5 Area Classification.
For spray application processes, the area classification is based on quantities of flammable vapors, combustible mists, residues, dusts, or deposits that are present or might be present in quantities sufficient to produce ignitable or explosive mixtures with air.

(A) Zone Classification of Locations.
Classification of Locations.

The Zone system of electrical area classification shall be applied as follows:

1. The inside of closed containers or vessels shall be considered a Class I, Zone 0 location.
2. A Class I, Division 1 location shall be permitted to be alternatively classified as a Class I, Zone 1 location.
3. A Class I, Division 2 location shall be permitted to be alternatively classified as a Class I, Zone 2 location.
4. A Class II, Division 1 location shall be permitted to be alternatively classified as a Zone 21 location.
5. A Class II, Division 2 location shall be permitted to be alternatively classified as a Zone 22 location.

Classification Systems.

For the purposes of electrical area classification, the Division system and the Zone system shall not be intermixed for any given source of release.

In instances of areas within the same facility classified separately, Class I, Zone 2 locations shall be permitted to abut, but not overlap, Class I, Division 2 locations. Class I, Zone 0 or Zone 1 locations shall not abut Class I, Division 1 or Division 2 locations.

Equipment.

Open flames, spark-producing equipment or processes, and equipment whose exposed surfaces exceed the autoignition temperature of the material being sprayed shall not be located in a spray area or in any surrounding area that is classified as Division 2, Zone 2, or Zone 22.

Exception: This requirement shall not apply to drying, curing, or fusing apparatus.

Any utilization equipment or apparatus that is capable of producing sparks or particles of hot metal and that is located above or adjacent to either the spray area or the surrounding Division 2, Zone 2, or Zone 22 areas shall be of the totally enclosed type or shall be constructed to prevent the escape of sparks or particles of hot metal.

(B) Class I, Division 1 or Class I, Zone 0 Locations.

The interior of any open or closed container or vessel of a flammable liquid shall be considered Class I, Division 1, or Class I, Zone 0, as applicable:

Informational Note: For additional guidance, see Chapter 6 of NFPA 33-2015,-2016, Standard for Spray Application Using Flammable or Combustible Materials.
(C) Class I, Division 1; Class I, Zone 1; Class II, Division 1; or Zone 21 Locations.

The following spaces shall be considered Class I, Division 1; Class I, Zone 1; Class II, Division 1; or Zone 21 locations, as applicable:

1. The interior of spray booths and rooms except as specifically provided in 516.5(D).
2. The interior of exhaust ducts.
3. Any area in the direct path of spray operations.
4. Sumps, pits, or below grade channels within 7.5 m (25 ft) horizontally of a vapor source. If the sump, pit, or channel extends beyond 7.5 m (25 ft) from the vapor source, it shall be provided with a vapor stop or it shall be classified as Class I, Division 1 for its entire length. [34:6.4.1]
5. All space in all directions outside of but within 900 mm (3 ft) of open containers, supply containers, spray gun cleaners, and solvent distillation units containing flammable liquids.
6. For limited finishing workstations, the area inside the curtains or partitions. [See Figure 516.5(D)(5).]

(D) Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 Locations.

The spaces listed in 516.5(D)(1) through (D)(5) shall be considered Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 as applicable.

1. Unenclosed Spray Processes.

Electrical wiring and utilization equipment located outside but within 6100 mm (20 ft) horizontally and 3050 mm (10 ft) vertically of an enclosed spray area and not separated from the spray area by partitions extending to the boundaries of the area designated as Division 2, Zone 2 or Zone 22 in Figure 516.5(D)(1) shall be suitable for Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 locations, whichever is applicable. For unenclosed spraying, all space outside of but within 6 m (20 ft) horizontally and 3 m (10 ft) vertically of the Class I, Division 1 or Class I, Zone 1 location as defined in 516.5(A) and not separated from it by partitions. [33: 6.5.1] [See Figure 516.5(D)(1).] [33: 6.5.1]

Figure 516.5(D)(1) Electrical Area Classification for Unenclosed Spray Areas. [33:Figure 6.5.1]
(2) Closed-Top, Open-Face, and Open-Front Spray Booths and Spray Rooms.

If spray application operations are conducted within a closed-top, open-face, or open-front booth or room, as shown in Figure 516.5(D)(2), any electrical wiring or utilization equipment located outside of the booth or room but within 915 mm (3 ft) of any opening shall be suitable for Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 locations, whichever is applicable. The Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 locations shown in Figure 516.5(D)(2) shall extend from the edges of the open face or open front of the booth or room.

Figure 516.5(D)(2) Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 Locations Adjacent to a Closed Top, Open Face, or Open Front Spray Booth or Room. [33:Figure 6.5.2]

(3) Open-Top Spray Booths.

For spraying operations conducted within an open top spray booth, the space 915 mm (3 ft) vertically above the booth and within 915 mm (3 ft) of other booth openings shall be considered Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 whichever is applicable. [33:6.5.3]

(4) Enclosed Spray Booths and Spray Rooms.

For spray application operations confined to an enclosed spray booth or room, electrical area classification shall be as follows:[33: 6.5.4]

(1) The area within 915 mm (3 ft) of any opening shall be classified as Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 locations, whichever is applicable, as shown in Figure 516.5(D)(4).

(2) Where automated spray application equipment is used, the area outside the access doors shall be unclassified provided the door interlock prevents the spray application operations when the door is open.

(3) Where exhaust air is permitted to be recirculated, both of the following shall apply:
   a. The interior of any recirculation path from the secondary particulate filters up to and including the air supply plenum shall be classified as Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 locations, whichever is applicable.
   b. The interior of fresh air supply ducts shall be unclassified. [33: 6.5.4]

(4) Where exhaust air is not recirculated, the interior of fresh air supply ducts and fresh air supply plenums shall be unclassified.

[33:6.5.4]
(5) Limited Finishing Workstations.
(a) For limited finishing workstations, the area inside the 915 mm (3 ft) space horizontally and vertically beyond the volume enclosed by the outside surface of the curtains or partitions shall be classified as Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22, as shown in Figure 516.5(D)(5).

(b) A limited finishing workstation shall be designed and constructed to have all of the following:

(1) A dedicated make-up air supply
(2) Curtains or partitions that are noncombustible or limited combustible
(3) A dedicated mechanical exhaust and filtration system
(4) An approved automatic extinguishing system

[33: 14.3.1]

Informational Note: For limited combustible curtains or partitions see NFPA 701 -2015, Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

(c) The amount of material sprayed in a limited finishing workstation shall not exceed 3.8 L (1 gal) in any 8-hour period. [33: 14.3.2]

(d) Curtains or partitions shall be fully closed during any spray operations. [33: 14.3.4]

(e) The equipment within the limited finishing workstation shall be interlocked such that the spray application equipment cannot be operated unless the exhaust ventilation system is operating and functioning properly and spray application is automatically stopped if the exhaust ventilation system fails.

(f) Any limited finishing workstation used for spray application operations shall not be used for any operation that is capable of producing sparks or particles of hot metal or for operations that involve open flames or electrical utilization equipment capable of producing sparks or particles of hot metal. [33: 14.3.6]

(g) Where industrial air heaters are used to elevate the air temperature for drying, curing, or fusing operations, a high limit switch shall be provided to automatically shut off the drying apparatus if the air temperature in the limited finishing workstation exceeds the maximum discharge-air temperature allowed by the standard that the heater is listed to or 93°C (200°F), whichever is less. [33: 14.3.7.1]

(h) A means shall be provided to show that the limited finishing workstation is in the drying or curing mode of operation and that the limited finishing workstation is to be unoccupied. [33: 14.3.7.2]

(i) Any containers of flammable or combustible liquids shall be removed from the limited finishing workstation before the drying apparatus is energized. [33: 14.3.7.3]

(j) Portable spot-drying, curing, or fusion apparatus shall be permitted to be used in a limited finishing workstation, provided that it is not located within the hazardous (classified) location defined in 14.3.5 of NFPA 33, when spray application operations are being conducted. [33: 14.3.8]

(k) Recirculation of exhaust air shall be permitted when the provisions of 516.5(D)(4)(3) are both met. [33: 14.3.9]

Figure 516.5(D)(4) Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 Locations Adjacent to an Enclosed Spray Booth or Spray Room. [33:Figure 6.5.4]
516.5(D)(5) Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 Locations Adjacent to an Enclosed Spray Booth or Spray Room, a Limited Finishing Workstation.

516.6 Wiring and Equipment in Class I Locations.

(A) Wiring and Equipment — Vapors.

All electrical wiring and equipment within the Class I location (containing vapor only — not residues) defined in 516.5 shall comply with the applicable provisions of Article 501 or Article 505, as applicable.

(B) Wiring and Equipment — Vapors and Residues.

Unless specifically listed for locations containing deposits of dangerous quantities of flammable or combustible vapors, mists, residues, dusts, or deposits (as applicable), there shall be no electrical equipment in any spray area as herein defined wherein deposits of combustible residue may readily accumulate, except wiring in rigid metal conduit, intermediate metal conduit, Type MI cable, or in metal boxes or fittings containing no taps, splices, or terminal connections. [33:6.4.2]
(C) Illumination.
Luminaires shall be permitted to be installed as follows:

(1) Luminaires, like that shown in Figure 516.6(C)(a), that are attached to the walls or ceiling of a spray area but that are outside any classified area and are separated from the spray area by glass panels shall be suitable for use in unclassified locations. Such fixtures shall be serviced from outside the spray area. [33:6.6.1]

(2) Luminaires, like that shown in Figure 516.6(C)(a), that are attached to the walls or ceiling of a spray area; that are separated from the spray area by glass panels and that are located within a Class I, Division 2; a Class I, Zone 2; a Class II, Division 2; or a Zone 22 location shall be suitable for such location. Such fixtures shall be serviced from outside the spray area. [33:6.6.2]

(3) Luminaires, like that shown in Figure 516.6(C)(b), that are an integral part of the walls or ceiling of a spray area shall be permitted to be separated from the spray area by glass panels that are an integral part of the fixture. Such fixtures shall be listed for use in Class I, Division 2; Class I, Zone 2; Class II, Division 2; or Zone 22 locations, whichever is applicable, and also shall be listed for accumulations of deposits of combustible residues. Such fixtures shall be permitted to be serviced from inside the spray area. [33:6.6.3]

(4) Glass panels used to separate luminaires from the spray area or that are an integral part of the luminaire shall meet the following requirements.

a. Panels for light fixtures or for observation shall be of heat-treated glass, laminated glass, wired glass, or hammered-wired glass and shall be sealed to confine vapors, mists, residues, dusts, and deposits to the spray area. [33:5.5.1]

   Exception: Listed spray booth assemblies that have vision panels constructed of other materials shall be permitted.

b. Panels for light fixtures shall be separated from the fixture to prevent the surface temperature of the panel from exceeding 93°C (200°F). [33:5.5.2]

c. The panel frame and method of attachment shall be designed to not fail under fire exposure before the vision panel fails. [33:5.5.3]

Figure 516.6(C)(a) Example of a Luminaire that is Mounted Outside of the Spray Area and is Serviced from Outside the Spray Area. [33:Figure 6.6.1]

Figure 516.6(C)(b) Example of a Luminaire that is an Integral Part of the Spray Area and is Serviced from Inside the Spray Area. [33:Figure 6.6.3]
(D) Portable Equipment.

Portable electric luminaires or other utilization equipment shall not be used in a spray area during spray operations.

**Exception No. 1:** Where portable electric luminaires are required for operations in spaces not readily illuminated by fixed lighting within the spraying area, they shall be of the type identified for Class I, Division 1 or Class 1, Zone 1 locations where readily ignitible residues may be present. [33:6.9 Exception]

**Exception No. 2:** Where portable electric drying apparatus is used in spray booths and the following requirements are met:

1. The apparatus and its electrical connections are not located within the spray enclosure during spray operations.
2. Electrical equipment within 450 mm (18 in.) of the floor is identified for Class I, Division 2 or Class I, Zone 2 locations.
3. All metallic parts of the drying apparatus are electrically bonded and grounded.
4. Interlocks are provided to prevent the operation of spray equipment while drying apparatus is within the spray enclosure, to allow for a 3-minute purge of the enclosure before energizing the drying apparatus and to shut off drying apparatus on failure of ventilation system.

(E) Electrostatic Equipment.

Electrostatic spraying or detearing equipment shall be installed and used only as provided in 516.10.

Informational Note: For further information, see NFPA 33-2015, Standard for Spray Application Using Flammable or Combustible Materials.

(F) Static Electric Discharges.

All persons and all electrically conductive objects, including any metal parts of the process equipment or apparatus, containers of material, exhaust ducts, and piping systems that convey flammable or combustible liquids, shall be electrically grounded. [34:6.8.1]

**516.7** Wiring and Equipment Not Within Classified Locations.
Wiring.

All fixed wiring above the Class I and II locations shall be in metal raceways, Type PVC conduit, Type RTRC conduit, or electrical nonmetallic tubing; where cables are used, they shall be Type MI, Type TC, or Type MC cable. Cellular metal floor raceways shall only be permitted to supply ceiling outlets or as extensions to the area below the floor of a Class I or II location. Where cellular metal raceways are used, they shall not have connections leading into or passing through the Class I or II location unless suitable seals are provided.

Equipment.

Equipment that may produce arcs, sparks, or particles of hot metal, such as lamps and lampholders for fixed lighting, cutouts, switches, receptacles, motors, or other equipment having make-and-break or sliding contacts, where installed above a classified location or above a location where freshly finished goods are handled, shall be of the totally enclosed type or be constructed so as to prevent the escape of sparks or hot metal particles.

516.10 Special Equipment.

(A) Fixed Electrostatic Equipment.

This section shall apply to any equipment using electrostatically charged elements for the atomization, charging, and/or precipitation of hazardous materials for coatings on articles or for other similar purposes in which the charging or atomizing device is attached to a mechanical support or manipulator. This shall include robotic devices. This section shall not apply to devices that are held or manipulated by hand. Where robot or programming procedures involve manual manipulation of the robot arm while spraying with the high voltage on, the provisions of 516.10(B) shall apply. The installation of electrostatic spraying equipment shall comply with 516.10(A)(1) through (A)(10). Spray equipment shall be listed. All automatic electrostatic equipment systems shall comply with 516.6(A) through (E).

(1) Power and Control Equipment.

Transformers, high-voltage supplies, control apparatus, and all other electrical portions of the equipment shall be installed outside of the Class I location or be of a type identified for the location.

Exception: High-voltage grids, electrodes, electrostatic atomizing heads, and their connections shall be permitted within the Class I location.

(2) Electrostatic Equipment.

Electrodes and electrostatic atomizing heads shall be adequately supported in permanent locations and shall be effectively insulated from ground. Electrodes and electrostatic atomizing heads that are permanently attached to their bases, supports, reciprocators, or robots shall be deemed to comply with this section.

(3) High-Voltage Leads.

High-voltage leads shall be properly insulated and protected from mechanical damage or exposure to destructive chemicals. Any exposed element at high voltage shall be effectively and permanently supported on suitable insulators and shall be effectively guarded against accidental contact or grounding.

(4) Support of Goods.

Goods being coated using this process shall be supported on conveyors or hangers. The conveyors or hangers shall be arranged (1) to ensure that the parts being coated are electrically connected to ground with a resistance of 1 megohm or less and (2) to prevent parts from swinging.

(5) Automatic Controls.

Electrostatic apparatus shall be equipped with automatic means that will rapidly de-energize the high-voltage elements under any of the following conditions:

(1) Stoppage of ventilating fans or failure of ventilating equipment from any cause

(2) Stoppage of the conveyor carrying goods through the high-voltage field unless stoppage is required by the spray process

(3) Occurrence of excessive current leakage at any point in the high-voltage system

(4) De-energizing the primary voltage input to the power supply
(6) Grounding.

All electrically conductive objects in the spray area, except those objects required by the process to be at high voltage, shall be adequately grounded. This requirement shall apply to paint containers, wash cans, guards, hose connectors, brackets, and any other electrically conductive objects or devices in the area.

Informational Note: For more information on grounding and bonding for static electricity purposes, see NFPA 33-2015 - 2016, Standard for Spray Application Using Flammable or Combustible Materials; NFPA 34-2015, Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids; and NFPA 77-2007 - 2014, Recommended Practice on Static Electricity.

(7) Isolation.

Safeguards such as adequate booths, fencing, railings, interlocks, or other means shall be placed about the equipment or incorporated therein so that they, either by their location, character, or both, ensure that a safe separation of the process is maintained.

(8) Signs.

Signs shall be conspicuously posted to convey the following:

(1) Designate the process zone as dangerous with regard to fire and accident
(2) Identify the grounding requirements for all electrically conductive objects in the spray area
(3) Restrict access to qualified personnel only

(9) Insulators.

All insulators shall be kept clean and dry.

(10) Other Than Nonincendive Equipment.

Spray equipment that cannot be classified as nonincendive shall comply with 516.10(A)(10)(a) and (A)(10)(b).

(a) Conveyors, hangers, and application equipment shall be arranged so that a minimum separation of at least twice the sparking distance is maintained between the workpiece or material being sprayed and electrodes, electrostatic atomizing heads, or charged conductors. Warnings defining this safe distance shall be posted. \[33:11.4.1\]

(b) The equipment shall provide an automatic means of rapidly de-energizing the high-voltage elements in the event the distance between the goods being painted and the electrodes or electrostatic atomizing heads falls below that specified in 516.10(A)(10)(a). \[33:11.3.8\]

(B) Hand-Spraying Electrostatic Equipment.

This section shall apply to any equipment using electrostatically charged elements for the atomization, charging, or precipitation of flammable and combustible materials for coatings on articles, or for other similar purposes in which the charging or atomizing device is hand-held and manipulated during the spraying operation. Electrostatic hand-spraying equipment and devices used in connection with paint-spraying operations shall be of listed types and shall comply with 516.10(B)(1) through (B)(5).

(1) General.

The high-voltage circuits shall be designed so as not to produce a spark of sufficient intensity to ignite the most readily ignitable of those vapor–air mixtures likely to be encountered, or result in appreciable shock hazard upon coming in contact with a grounded object under all normal operating conditions. The electrostatically charged exposed elements of the handgun shall be capable of being energized only by an actuator that also controls the coating material supply.

(2) Power Equipment.

Transformers, power packs, control apparatus, and all other electrical portions of the equipment shall be located outside of the Class I location or be identified for the location.

Exception: The handgun itself and its connections to the power supply shall be permitted within the Class I location.
(3) Handle.
The handle of the spraying gun shall be electrically connected to ground by a conductive material and be constructed so that the operator in normal operating position is in electrical contact with the grounded handle with a resistance of not more than 1 megohm to prevent buildup of a static charge on the operator's body. Signs indicating the necessity for grounding other persons entering the spray area shall be conspicuously posted.

(4) Electrostatic Equipment.
All electrically conductive objects in the spraying area, except those objects required by the process to be at high voltage shall be electrically connected to ground with a resistance of not more than 1 megohm. This requirement shall apply to paint containers, wash cans, and any other electrical conductive objects or devices in the area. The equipment shall carry a prominent, permanently installed warning regarding the necessity for this grounding feature.

Informational Note: For more information on grounding and bonding for static electricity purposes, see NFPA 33-2015, Standard for Spray Application Using Flammable or Combustible Materials; NFPA 34-2015, Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids; and NFPA 77-2007, Recommended Practice on Static Electricity.

(5) Support of Objects.
Objects being painted shall be maintained in electrical contact with the conveyor or other grounded support. Hooks shall be regularly cleaned to ensure adequate grounding of 1 megohm or less. Areas of contact shall be sharp points or knife edges where possible. Points of support of the object shall be concealed from random spray where feasible, and, where the objects being sprayed are supported from a conveyor, the point of attachment to the conveyor shall be located so as to not collect spray material during normal operation.

(C) Powder Coating.
This section shall apply to processes in which combustible dry powders are applied. The hazards associated with combustible dusts are present in such a process to a degree, depending on the chemical composition of the material, particle size, shape, and distribution.

(1) Electrical Equipment and Sources of Ignition.
Electrical equipment and other sources of ignition shall comply with the requirements of Article 502. Portable electric luminaires and other utilization equipment shall not be used within a Class II location during operation of the finishing processes. Where such luminaires or utilization equipment are used during cleaning or repairing operations, they shall be of a type identified for Class II, Division 1 locations, and all exposed metal parts shall be connected to an equipment grounding conductor.

Exception: Where portable electric luminaires are required for operations in spaces not readily illuminated by fixed lighting within the spraying area, they shall be of the type listed for Class II, Division 1 locations where readily ignitable residues may be present.

(2) Fixed Electrostatic Spraying Equipment.
The provisions of 516.10(A) and 516.10(C)(1) shall apply to fixed electrostatic spraying equipment.

(3) Electrostatic Hand-Spraying Equipment.
The provisions of 516.10(B) and 516.10(C)(1) shall apply to electrostatic hand-spraying equipment.
Electrostatic Fluidized Beds.

Electrostatic fluidized beds and associated equipment shall be of identified types. The high-voltage circuits shall be designed such that any discharge produced when the charging electrodes of the bed are approached or contacted by a grounded object shall not be of sufficient intensity to ignite any powder–air mixture likely to be encountered or to result in an appreciable shock hazard.

(a) Transformers, power packs, control apparatus, and all other electrical portions of the equipment shall be located outside the powder-coating area or shall otherwise comply with the requirements of 516.10(C)(1).

Exception: The charging electrodes and their connections to the power supply shall be permitted within the powder-coating area.

(b) All electrically conductive objects within the powder-coating area shall be adequately grounded. The powder-coating equipment shall carry a prominent, permanently installed warning regarding the necessity for grounding these objects.


(c) Objects being coated shall be maintained in electrical contact (less than 1 megohm) with the conveyor or other support in order to ensure proper grounding. Hangers shall be regularly cleaned to ensure effective electrical contact. Areas of electrical contact shall be sharp points or knife edges where possible.

(d) The electrical equipment and compressed air supplies shall be interlocked with a ventilation system so that the equipment cannot be operated unless the ventilating fans are in operation. [33:Chapter 15]

516.16 Grounding.

All metal raceways, the metal armors or metallic sheath on cables, and all non–current-carrying metal parts of fixed or portable electrical equipment, regardless of voltage, shall be grounded and bonded. Grounding and bonding shall comply with 501.30, 502.30, or 505.25, as applicable.

Part IV. Spray Application Operations in Membrane Enclosures

516.18 Membrane Enclosure Use.

Spray application operations within both outdoor and indoor temporary membrane enclosures shall be limited to workpieces that cannot be moved into a spray booth and where open spraying is not practical due to the proximity to other operations, finish quality, or concerns such as the collection of overspray.

(0) Spray application operations and processes within the enclosure shall only be permitted for the workpiece for which the enclosure was erected.

(0) Spray application operations for parts removed from the workpiece shall be conducted in accordance with applicable requirements of this standard.

(0) Membrane enclosures shall be erected for 180 days or less.

(0) Enclosures erected under this chapter shall only be used for the duration of a spray operation at a fixed location which can involve multiple coats for a single workpiece.

(0) Membrane material shall not be reused for any other spray application operations.

(0) Operations conducted within the enclosure other than spray applications shall meet the fire and safety requirements for those operations.

(0) These operations shall not take place while the spray application operation is in progress.

Informational Note: For additional guidance, see Chapter 18 of NFPA 33-2015, Standard for Spray Application Using Flammable or Combustible Materials.

516.20 Location of Temporary Membrane Enclosures.
Temporary membrane enclosures shall be permitted to be located in accordance with 516.20(A) and 516.20(B).

(A) Outside of Buildings.

The spray area shall be separated from permanent structures by a minimum of 4.6 m (15 ft).

(B) Inside of Buildings.

Membrane enclosures for spray painting shall be permitted to be installed in buildings provided all of the requirements 516.21 are met.

516.21 Membrane Material.

Membrane materials shall comply with the following requirements:

1. Material used in a vertical plane for membrane enclosures shall have been tested and passed the NFPA 701 -2010, Standard Methods of Fire Tests for Flame Propagation of Textiles and Films, Test 2 requirements.

2. Other than material in a vertical plane, the membrane material shall be listed for installation beneath sprinklers and in installed to meet the requirements of 8.15.15 of NFPA 13 -2014, Standard for the Installation of Sprinkler Systems.

3. Where a listed membrane material is used, it shall be considered a drop-out ceiling in NFPA 13 -2014, Standard for the Installation of Sprinkler Systems, and follow the applicable requirements for those assemblies.

Informational Note: Buildings in which membrane enclosures are installed are provided with automatic sprinkler systems in accordance with the requirements for indoor membrane enclosures of NFPA 33 -2016, Standard for Spray Application Using Flammable or Combustible Materials.

516.18 Area Classification for Temporary Membrane Enclosures.
The Electrical area classification shall be as given in 516.22(A)(1) through (A)(8) and is illustrated by Figure 516.22. follows:

1. The area within the membrane enclosure shall be considered a Class I, Division 1 area, as shown in Figure 516.18.

2. A 1.5 m (5 ft) zone outside of the membrane enclosure shall be considered Class I, Division 2, as shown in Figure 516.18.

Informational Note No. 1: The risks to people and property are unique when spray painting within the confined spaces of temporary membrane enclosures. See NFPA 33-2016, Standard for Spray Application Using Flammable or Combustible Materials, for information on occupancy, ventilation, fire protection, and permitting for spray application operations in membrane enclosures. NFPA 33-2016 limits spray application operations within both outdoor and indoor temporary membrane enclosures, as well as use and time constraints.


Informational Note No. 3: See 18.3.2.1.1 of NFPA 33-2016, Standard for Spray Application Using Flammable or Combustible Materials, for membrane installation beneath sprinklers. See also 8.15.15 of NFPA 13-2014, Standard for the Installation of Sprinkler Systems, for protection of membrane structures.

Figure 516.18 Electrical Classifications for Temporary Outdoor Membrane Enclosures [33:Figure 18.7.1.1]
(A). Classification of Locations.

The zone system of electrical area classification shall be applied as follows:

(0) A 1.5 m (5 ft) zone outside of the membrane enclosure shall be considered Class I, Division 2, as shown in Figure 516.22.

(0) All lighting, electrical power cords, and any related equipment within the membrane enclosure shall be rated for Class I Division 1 as defined by NFPA 70 when used during spray paint operations.

(0) All lighting, electrical power cords, and any related equipment within the 1.5 m (5 ft) distance horizontally from the exterior of the membrane enclosure shall be listed for Class I Division 2 as defined by NFPA 70 when used during spray paint operations.

(0) All power to the workpiece shall be removed during spray painting.

(0) Workpieces shall be grounded.

(0) Scaffolding shall be bonded to the workpiece and grounded to an appropriate grounding rod or other approved method consistent with 6.2.1 referenced requirements.

(0) Spray paint equipment shall be grounded.

(0) Equipment used to monitor the concentration of solvent vapors shall be calibrated for the solvents used. The calibration frequency shall be per the manufacturer's recommendations.

516.23 Electrical and Other Sources of Ignition.

Electrical wiring and utilization equipment used within the classified areas inside and outside of membrane enclosures during spray painting shall be suitable for the location and shall comply with 516.5(A)(4), all of the following:

(1) All power to the workpiece shall be removed during spray painting.

(2) Workpieces shall be grounded.

(3) Spray paint equipment shall be grounded.

(4) Scaffolding shall be bonded to the workpiece and grounded by an approved method.
516.24 Ventilation.

Each membrane enclosure shall be provided with mechanical ventilation consistent with the following:

(0) The ventilation system shall be designed and installed to ensure that the enclosure is maintained at a pressure that is negative relative to the surrounding environs.

(0) The concentration of the vapors and mists in the exhaust stream of the ventilation system during spray operations and ambient air drying operations shall not exceed 10 percent of the lower flammable limit.

(0) All spray operations within the membrane enclosure shall cease operations when the concentration of the vapors and mists in the exhaust stream of the ventilation system reaches or exceeds 10 percent of the lower flammable limit.

(0) An interlock shall be provided so that the spray apparatus is automatically stopped if the ventilation system fails to maintain the concentration of the vapors and mists in the exhaust stream below 10 percent of the lower flammable limit.

(0) Where interlocks cannot be effectively provided for ventilation equipment that uses plant air, large air storage tanks, or equipment that cannot be instantly shut off, an audible alarm upon loss of ventilation that will alert all spray paint operators shall be permitted with authority having jurisdiction approval.

(0) Exhaust air shall be taken from one or more points within 300 mm (12 in.) of the floor of the enclosure.

(0) An adequate supply of clean make-up air shall be provided per the requirements of NFPA 33 -2015, Standard for Spray Application Using Flammable or Combustible Materials.

(0) The location of both the exhaust and make-up air openings shall be arranged to provide air movement throughout the enclosure and across all portions of the floor to prevent accumulation of flammable vapors.

Each membrane spray enclosure shall be provided with mechanical ventilation that is capable of confining and removing vapors and mists to a safe location and is capable of confining and controlling combustible residues, dusts, and deposits. The concentration of the vapors and mists in the exhaust stream of the ventilation system shall not exceed 25 percent of the lower flammable limit.

(0) Air exhausted from the membrane enclosure shall not be recirculated.

Air exhausted to the atmosphere from liquid spray operations shall be conducted by ducts directly to the outside of the building. Exhaust ducts shall follow the most direct route to the point of discharge but shall not penetrate a fire wall. The exhaust discharge shall be directed away from any fresh air intakes. The exhaust duct discharge point shall be at least 1830 mm (6 ft) from any exterior wall or roof. The exhaust duct shall not discharge in the direction of any combustible construction that is within 7625 mm (25 ft) of the exhaust duct discharge point, nor shall it discharge in the direction of any unprotected opening in any noncombustible or limited-combustible construction that is within 7625 mm (25 ft) of the exhaust duct discharge point.

516.25 Drying.

Membrane enclosures used for spray application of flammable or combustible materials shall not be used for drying, curing, or fusing operations at elevated temperature.

Freshly sprayed workpieces shall be dried only in spaces that are ventilated to prevent the concentration of vapors from exceeding 10 percent of the lower flammable limit.

516.26 Facilities Compliance Permitting.

Spray application within temporary membrane enclosures shall be permitted and approved.

Informational Note: Spray application within temporary membrane enclosures can occur only after the requirements of Chapter 18 of NFPA 33 -2015, Standard for Spray Application Using Flammable or Combustible Materials are met.

Part V. Printing, Dipping, and Coating Processes
516.29 Classification of Locations.
Classification is based on quantities of flammable vapors, combustible mists, residues, dusts, or deposits that are present or might be present in quantities sufficient to produce ignitable or explosive mixtures with air. Electrical wiring and electrical utilization equipment located adjacent to open processes shall comply with the requirements as follows. Examples of these requirements are illustrated in Figure 516.29(a), Figure 516.29(b), Figure 516.29(c), and Figure 516.29(d).


(1) Electrical wiring and electrical utilization equipment located in any sump, pit, or below grade channel that is within 7620 mm (25 ft) horizontally of a vapor source, as defined by this standard, shall be suitable for Class I, Division 1 or Class I, Zone 1 locations. If the sump, pit, or channel extends beyond 7620 mm (25 ft) of the vapor source, it shall be provided with a vapor stop, or it shall be classified as Class I, Division 1 or Class I, Zone 1 for its entire length. [34:6.4.1]

(2) Electrical wiring and electrical utilization equipment located within 1525 mm (5 ft) of a vapor source shall be suitable for Class I, Division 1 or Class I, Zone 1 locations. The space inside a dip tank, ink fountain, ink reservoir, or ink tank shall be classified as Class I, Division 1 or Class I, Zone 0, whichever is applicable.

(3) Electrical wiring and electrical utilization equipment located within 915 mm (3 ft) of the Class I, Division 1 or Class I, Zone 1 location shall be suitable for Class I, Division 2 or Class I, Zone 2 locations, whichever is applicable.

(4) The space 915 mm (3 ft) above the floor and extending 6100 mm (20 ft) horizontally in all directions from the Class I, Division 1 or Class I, Zone 1 location shall be classified as Class I, Division 2 or Class I, Zone 2, and electrical wiring and electrical utilization equipment located within this space shall be suitable for Class I, Division 2 or Class I, Zone 2 locations, whichever is applicable.

(5) This space shall be permitted to be nonclassified for purposes of electrical installations if the surface area of the vapor source does not exceed 0.5 m\(^2\) (5 ft\(^2\)), the contents of the dip tank, ink fountain, ink reservoir, or ink tank do not exceed 19 L (5 gal), and the vapor concentration during operating and shutdown periods does not exceed 25 percent of the lower flammable limit.

**Figure 516.29(a)** Electrical Area Classification for Open Dipping and Coating Processes Without Vapor Containment or Ventilation. [34:Figure 6.4(a)]

**Figure 516.29(b)** Electrical Area Classification for Open Dipping and Coating Processes with Peripheral Vapor Containment and Ventilation — Vapors Confined to Process Equipment. [34:Figure 6.4(b)]
Figure 516.29(c) Electrical Area Classification for Open Dipping and Coating Processes with Partial Peripheral Vapor Containment and Ventilation — Vapors NOT Confined to Process Equipment. [34:Figure 6.4(c)]

Figure 516.29(d) Electrical Area Classification for a Typical Printing Process. [34:Figure 6.4(d)]
516.35 Areas Adjacent to Enclosed Dipping and Coating Processes.

Areas adjacent to enclosed dipping and coating processes are illustrated by Figure 516.35 and shall be classified as follows:

1. The interior of any enclosed dipping or coating process or apparatus shall be a Class I, Division 1 or Class I, Zone 1 location, and electrical wiring and electrical utilization equipment located within this space shall be suitable for Class I, Division 1 or Class I, Zone 1 locations, whichever is applicable. The area inside the dip tank shall be classified as Class I, Division 1 or Class I, Zone 0, whichever is applicable.

2. The space within 915 mm (3 ft) in all directions from any opening in the enclosure and extending to the floor or grade level shall be classified as Class I, Division 2 or Class I, Zone 2, and electrical wiring and electrical utilization equipment located within this space shall be suitable for Class I, Division 2 locations or Class I, Zone 2 locations, whichever is applicable.

3. All other spaces adjacent to an enclosed dipping or coating process or apparatus shall be classified as nonhazardous for purposes of electrical installations.

Figure 516.35 Electrical Area Classification Around Enclosed Dipping and Coating Processes. [34:Figure 6.5]

516.36 Equipment and Containers in Ventilated Areas.

Open containers, supply containers, waste containers, and solvent distillation units that contain Class I liquids shall be located in areas ventilated in accordance with 516.4.

516.37 Luminaires.

For printing, coating, and dipping equipment where the process area is enclosed by glass panels that are sealed to confine vapors and mists to the inside of the enclosure, luminaires that are attached to the walls or ceilings of a process enclosure and that are located outside of any classified area shall be permitted to be of general purpose construction. Such luminaires shall be serviced from outside the enclosure.

Luminaires that are attached to the walls or ceilings of a process enclosure, are located within the Class I, Division 2 or Class I, Zone 2 location, and are separated from the process area by glass panels that are sealed to confine vapors and mists shall be suitable for use in that location. Such fixtures shall be serviced from outside the enclosure.

516.38 Wiring and Equipment Not Within Classified Locations.

(A) Wiring.

All fixed wiring above the Class I and II locations shall be in metal raceways, Type PVC conduit, Type RTRC conduit, or electrical nonmetallic tubing; where cables are used, they shall be Type MI, Type TC, or Type MC cable. Cellular metal floor raceways shall only be permitted to supply ceiling outlets or as extensions to the area below the floor of a Class I or II location. Where cellular metal raceways are used, they shall not have connections leading into or passing through the Class I or II location unless suitable seals are provided.

(B) Equipment.

Equipment that is capable of producing arcs, sparks, or particles of hot metal, such as lamps and lampholders for fixed lighting, cutouts, switches, receptacles, motors, or other equipment having make-and-break or sliding contacts, where installed above a classified location or above a location where freshly finished goods are handled, shall be of the totally enclosed type or be constructed so as to prevent the escape of sparks or hot metal particles.
516.40 Static Electric Discharges.

All persons and all electrically conductive objects, including any metal parts of the process equipment or apparatus, containers of material, exhaust ducts, and piping systems that convey flammable or combustible liquids, shall be electrically grounded.

Provision shall be made to dissipate static electric charges from all nonconductive substrates in printing processes.

Informational Note: For additional guidance on reducing the risk of ignition from electrostatic discharges, see NFPA 77-2014, Recommended Practice on Static Electricity.
Cahill, Corey
Goodman, Mark
Jones, Robert A.
Kines, Haywood
Lawrence, Jr., William G.
Massey, L. Evans
McBride, William E.
Neagle, Jeremy
Simmons, John L.
Wechsler, David B.
Wirfs, Mark C.

Affirmative with Comment

Parks, Ryan
No comment.