



Canadian Standards Association
Mississauga, Ontario
To the Part I Committee

Subject No. 3177

Chair: VG Rowe

Date: September 28, 2004

Title: Adequate Ventilation, Rules 18-002 and 18-006, Appendix B Notes to Rules 18-000, 18-002 and 18-006

Submitted by: Vince Rowe of Marex Canada Limited, 13750 Forest Hill Dr, Winfield, BC,
Tel: No. (250) 766-9065 on April 23, 2004.

Proposal:

Change Rule 18-006 and associated appendix as outlined on the attached word file. Remove the definition for "adequate ventilation" in Rule 18-002.

Reasons for Request:

When the changes to Section 18 were made in the 1998 edition of the Code, the IEC definitions for the three Zones was added and a portion of the definitions for Division 1 and Division 2 was retained in Zone 1 and Zone 2. This caused confusion, particularly in the use of "adequate ventilation" to achieve a Zone 2 classification. The confusion became apparent in early 2001. There was insufficient time to process a subject to change the definitions so an Appendix B Note was added to explain the proper use of Rule 18-006(c)(iii) with the intention of modifying the definitions in Rule 18-006 in the 2006 Code. This proposed change is being made to remove the confusing parts of the definitions and to provide guidance in the use of the definitions in Appendix B.

As the existing Rule 18-006(c)(iii) has been removed, there is no longer a use of the term "adequate ventilation" in the body of the Code. Reference to the definitions of "adequate ventilation" in the API references in Appendix B will connect the user to the definition for "adequate ventilation".

Supporting Information:

The proposed changes more closely align the CEC definitions with the IEC definitions for Zones 0, 1 and 2 and remove the confusion around the requirements for Zone 2 classification in particular. The Appendix B Notes connect the user to the Industry Recommended Practices and Standards typically used for classifying Class I Hazardous Locations.

Subcommittee Deliberations:

There were seven members voting affirmative, one voting affirmative with comments and one member voting negative. The member voting negative pointed out that the definition for "adequate ventilation" is used in section 20 and there would be a problem in that section if we deleted the definition in section 18. He has agreed to withdraw his negative if we initiate a

subject to make the necessary changes to section 20 to deal with the removal of the definition in section 18. A subject has now been initiated for section 20. The member voting affirmative with comments pointed out that section 18 should initiate the necessary change to section 20.

Subcommittee Recommendation:

Accept the proposal to:

1. Modify the definition for Class I locations as outlined in the following.
2. Delete the definition for adequate ventilation from Rule 18-002
3. Modify the appendix B notes to Rules 18-006 as outlined in the following

18-006 Division of Class I Locations (see Appendices B and J)

Class I locations shall be further divided into three Zones based upon frequency of occurrence and duration of an explosive gas atmosphere as follows:

- (a) Zone 0, comprising Class I locations in which explosive gas atmospheres are present continuously or are present for long periods;
- (b) Zone 1, comprising Class I locations in which:
 - (i) Explosive gas atmospheres are likely to occur in normal operation; or
 - ~~(ii) Explosive gas atmospheres may exist frequently because of repair or maintenance operations or because of leakage; or~~
 - (iii) The location is adjacent to a Class I, Zone 0 location, from which explosive gas atmospheres could be communicated.
- (c) Zone 2, comprising Class I locations in which:
 - (i) Explosive gas atmospheres are not likely to occur in normal operation and, if they do occur, they will exist for a short time only; or
 - ~~(ii) Flammable volatile liquids, flammable gases, or vapours are handled, processed, or used, but in which liquids, gases, or vapours are normally confined within closed containers or closed systems from which they can escape only as a result of accidental rupture or breakdown of the containers or systems or the abnormal operation of the equipment by which the liquids or gases are handled, processed, or used; or~~
 - ~~(iii) Explosive gas atmospheres are normally prevented by adequate ventilation but may occur as a result of failure or abnormal operation of the ventilation system; or~~
 - (iv) The location is adjacent to a Class I, Zone 1 location from which explosive gas atmospheres could be communicated, unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

Appendix B notes to 18-006

- 18- ~~The 1998 Edition of the Canadian Electrical Code changed Class I locations from Division~~
000 ~~1 and 2 to Zone 0, 1, and 2 for the purpose of global harmonization of area classification.~~
- 18- ~~The Zone and Division systems of area classification are deemed to provide equivalent~~
006 ~~levels of safety; however, the Code has been written to give preference to the Zone~~
~~system of area classification. It is important to understand that while the Code gives~~
~~preference to the Zone system of area classification, it does not give preference to the~~
~~IEC type of equipment. Equipment approved as Class I, or Class I, Division 1 will be~~
~~acceptable in Zone 1 and Zone 2, and equipment marked Class I, Division 2 will be~~
~~acceptable only in Zone 2. See Rules 18-100, 18-150, and the Table in Appendix J,~~
~~Section J1.2 .~~
~~The Scope of this Section recognizes that there are cases where renovations or additions~~
~~will occur on existing installations employing the Class/Division system of classification. It~~
~~is expected that such installations will comply with the requirements for Class I~~
~~installations as found in Appendix J .~~
- △ 18- Reference material for area classification can be found in the following documents:
002 (a) IEC Standard 60079-10, Area Classification ;
18- (b) Institute of Petroleum (British), Model Code of Safe Practice — Part 15: Area
006 Classification Code for Petroleum Installations ;
(c) American Petroleum Institute RP505, Recommended Practice for Classification of
Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0,
Zone 1, and Zone 2 ;
(d) American Petroleum Institute RP500, Recommended Practice for Classification of

Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2 ;

(e) See also references in this Appendix, note to Rule 18-064;

(f) NFPA 497A, Recommended Practice for Classification of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas.

18-
006

~~When applying Subparagraph 18-006(c)(iii), users are reminded that adequate ventilation applies to normal operation only. It is also necessary to provide means to limit the exposure time of equipment to explosive concentrations of gas that occur as the result of abnormal gas releases or loss of ventilation. In unattended and unmonitored facilities, it is often not possible to use a Zone 2 classification as the length of exposure time to flammable concentrations of gas, as the result of an abnormal gas release or a loss of ventilation, cannot be limited to a short time as outlined in Subparagraph 18-006 (c)(i). Guidance for the maximum exposure time to explosive gas atmospheres for Zone 2 classification can be found in the references listed above.~~

~~Typical situations leading to a Zone 0 area classification are:~~

- ~~the interiors of storage tanks which are vented to atmosphere and which contain flammable liquids stored above their flash point.~~
- ~~Enclosed sumps containing flammable liquids stored above their flash point continuously or for long periods~~
- ~~The area immediately around atmospheric vents which are venting from a Zone 0 Hazardous Area~~

~~Typical situations requiring a Class I, Zone 1 Hazardous Locations are:~~

- ~~Inadequately ventilated buildings or enclosures~~
- ~~Adequately ventilated buildings or enclosures, such as remote unattended and unmonitored facilities, which have insufficient means of limiting the duration of explosive gas atmospheres when they do occur.~~
- ~~Enclosed sumps containing flammable liquids stored above their flash point during normal operation~~

~~Typical situations leading to a Zone 2 area classification are:~~

- ~~Areas where flammable volatile liquids, flammable gases, or vapours are handled, processed, or used, but in which liquids, gases, or vapours are normally confined within closed containers or closed systems from which they can escape only as a result of accidental rupture or breakdown of the containers or systems or the abnormal operation of the equipment by which the liquids or gases are handled, processed, or used~~
- ~~Adequately ventilated buildings which have means of ensuring the length of time abnormal operation resulting in the occurrence of explosive gas atmospheres exist will be limited to a "short time"~~
- ~~Most outdoor areas except those around open vents, or open vessels or sumps containing flammable liquids~~

~~API RP505 defines "adequate ventilation" as "Ventilation (natural or artificial) that is sufficient to prevent the accumulation of significant quantities of vapor-air or gas-air mixtures in concentrations above 25 percent of their lower flammable (explosive) limit, LFL, (LEL)." Appendix B of API RP505 outlines a method for calculating the ventilation requirements for enclosed areas based on fugitive emissions.~~

~~Note industry documents such as API RP505 give guidance as to how Industry interprets~~

a "short time".

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