NFPA® 496

Standard for Purged and Pressurized Enclosures for Electrical Equipment

2008 Edition

NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
An International Codes and Standards Organization

Documents
Document Sharing Hub

Full document details: NFPA 496 2008

IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA DOCUMENTS

NOTICE AND DISCLAIMER OF LIABILITY CONCERNING THE USE OF NFPA DOCUMENTS

NFPA codes, standards, recommended practices, and guides, of which the document contained herein is one, are developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on fire and other safety issues. While the NFPA administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in its codes and standards.

The NFPA disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this document. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making this document available, the NFPA is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the NFPA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The NFPA has no power, nor does it undertake, to police or enforce compliance with the contents of this document. Nor does the NFPA list, certify, test or inspect products, designs, or installations for compliance with this document. Any certification or other statement of compliance with the requirements of this document shall not be attributable to the NFPA and is solely the responsibility of the certifier or maker of the statement.

AVA Documents
Document Sharing Hub

Full document details: NFPA 496 2008

ADDITIONAL NOTICES AND DISCLAIMERS

Updating of NFPA Documents

Users of NFPA codes, standards, recommended practices, and guides should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of Tentative Interim Amendments. An official NFPA document at any point in time consists of the current edition of the document together with any Tentative Interim Amendments and any Errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of Tentative Interim Amendments or corrected through the issuance of Errata, consult appropriate NFPA publications such as the National Fire Codes® Subscription Service, visit the NFPA website at www.nfpa.org, or contact the NFPA at the address listed below.

Interpretations of NFPA Documents

A statement, written or oral, that is not processed in accordance with Section 6 of the Regulations Governing Committee Projects shall not be considered the official position of NFPA or any of its Committees and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

Patents

The NFPA does not take any position with respect to the validity of any patent rights asserted in connection with any items which are mentioned in or are the subject of NFPA codes, standards, recommended practices, and guides, and the NFPA disclaims liability for the infringement of any patent resulting from the use of or reliance on these documents. Users of these documents are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

NFPA adheres to applicable policies of the American National Standards Institute with respect to patents. For further information contact the NFPA at the address listed below.

Law and Regulations

Users of these documents should consult applicable federal, state, and local laws and regulations. NFPA does not, by the publication of its codes, standards, recommended practices, and guides, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

This document is copyrighted by the NFPA. It is made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of safe practices and methods. By making this document available for use and adoption by public authorities and private users, the NFPA does not waive any rights in copyright to this document.

Use of NFPA documents for regulatory purposes should be accomplished through adoption by reference. The term “adoption by reference” means the citing of title, edition, and publishing information only. Any deletions, additions, and changes desired by the adopting authority should be noted separately in the adopting instrument. In order to assist NFPA in following the uses made of its documents, adopting authorities are requested to notify the NFPA (Attention: Secretary, Standards Council) in writing of such use. For technical assistance and questions concerning adoption of NFPA documents, contact NFPA at the address below.

For Further Information

All questions or other communications relating to NFPA codes, standards, recommended practices, and guides and all requests for information on NFPA procedures governing its codes and standards development process, including information on the procedures for requesting Formal Interpretations, for proposing Tentative Interim Amendments, and for proposing revisions to NFPA documents during regular revision cycles, should be sent to NFPA headquarters, addressed to the attention of the Secretary, Standards Council, NFPA, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

For more information about NFPA, visit the NFPA website at www.nfpa.org.

Documents
Document Sharing Hub

Full document details: NFPA 496 2008

Copyright © 2008 National Fire Protection Association®. All Rights Reserved.

NFPA® 496

Standard for

Purged and Pressurized Enclosures for Electrical Equipment

2008 Edition

This edition of NFPA 496, *Standard for Purged and Pressurized Enclosures for Electrical Equipment,* was prepared by the Technical Committee on Electrical Equipment in Chemical Atmospheres. It was issued by the Standards Council on December 11, 2007, with an effective date of December 31, 2007, and supersedes all previous editions.

This edition of NFPA 496 was approved as an American National Standard on December 31, 2007.

Origin and Development of NFPA 496

This standard was developed in two parts by the Technical Committee on Electrical Equipment in Chemical Atmospheres. The first part, addressing purged enclosures for electrical equipment in Class I hazardous (classified) locations, was adopted as a tentative standard at the 1966 NFPA Annual Meeting and as an official standard at the 1967 NFPA Annual Meeting. The second part, addressing pressurized enclosures for electrical equipment in Class II hazardous (classified) locations, was tentatively adopted at the 1970 NFPA Annual Meeting and officially adopted at the 1971 NFPA Annual Meeting.

The Technical Committee on Electrical Equipment in Chemical Atmospheres presented a complete revision of the entire standard in 1974. In 1980, the committee began another complete revision. This work culminated in the 1982 edition.

In 1983, the Technical Committee on Electrical Equipment in Chemical Atmospheres recognized the need for specific requirements applicable to process control analyzers that have internal sources of a flammable or combustible material, such as a direct connection to the process stream. Two chapters were added to address analyzer enclosures and analyzer rooms or buildings. Additional changes were also made to certain existing portions of the text specifically to address problems in the interpretation of the existing text. The 1986 edition of NFPA 496 was the result of this effort.

In 1987, the Technical Committee on Electrical Equipment in Chemical Atmospheres recognized a need for editorial revisions to the figures in Chapter 2 as well as some minor editorial changes in Chapters 2 and 9 and Appendix A. The 1989 edition was the result of this effort.

Beginning in 1990, an ad hoc committee consisting of members of the Technical Committee on Electrical Equipment in Chemical Atmospheres started a major rewrite of this document to develop a more comprehensive standard and to reduce redundancy in the text. Definitions were added for further clarity, and references to Class III were deleted, since the standard did not cover this application and could create some confusion. References to *purging* were replaced with *pressurizing*, and *protective gas* was introduced as a new term. The requirements based on gross internal volume were deleted and replaced with general and specific requirements for all pressurized enclosures used in Class I and Class II locations. The result of this rewrite was the 1993 edition.

In 1997, the Technical Committee on Electrical Equipment in Chemical Atmospheres entered NFPA 496 in the revision cycle to update the requirements. The standard was updated to include definitions and references to Article 505 in NFPA 70, *National Electrical Code*, which deals with Class I, Zone 1, and Zone 2 locations. It also was changed to provide an exception for control rooms where doors and other openings used solely for equipment relocation are permitted to be excluded from the calculation for outward air velocity from the central room.

In 2001, the Technical Committee on Electrical Equipment in Chemical Atmospheres entered NFPA 496 into the May 2003 revision cycle. The 2003 edition was significantly revised and reorganized for conformance with the 2000 *Manual of Style for NFPA Technical Committee Documents*. These organizational and editorial changes enhanced the standard's usability.

NFPA and National Fire Protection Association are registered trademarks of the National Fire Protection Association, Quincy, Massachusetts, 02169.

Documents Document Sharing Hub

Full document details: NFPA 496 2008

Additionally, technical changes included revision of the term *alarm* to clarify its function with protected enclosures, and a revision that permits the use of a means other than a timing device to ensure that electrical equipment within a protected enclosure is not energized until the specified amount of protective gas has passed through the enclosure.

The 2008 edition is the culmination of a revision cycle that began with the document being entered into cycle in January 2006. NFPA 496 contains requirements on a protection technique for electrical and electronic equipment recognized by NFPA 70, *National Electrical Code*, for installations in hazardous (classified) locations. To ensure correlation with revisions occurring in the 2008 NEC, the Technical Committee on Electrical Equipment in Chemical Atmospheres requested and was granted permission by the NFPA Standards Council to enter into a three-year (Fall 2007) revision cycle. Significant revisions to the 2008 edition include: (1) a new requirement to mark purged and pressurized enclosures with an asphyxiation hazard warning where the protective gas is other than air and (2) deletion of 6.2.5, Table 6.2.5, and A.6.2.5 on Class II temperatures because the temperature class ratings for equipment in 4.5.3 correlate with the current temperature rating requirements for new equipment in Class I and Class II locations contained in 500.8(D)(1) and 500.8(D)(2) of the NEC.

Documents
Document Sharing Hub
Full document details: NFPA 496 2008

Technical Committee on Electrical Equipment in Chemical Atmospheres

James G. Stallcup, *Chair*
Grayboy, Inc., TX [SE]

A. W. Ballard, Crouse-Hinds, NY [M]
Rep. National Electrical Manufacturers Association
Edward M. Briesch, Underwriters Laboratories Inc., IL [RT]
Steven R. Carlson, Pfizer, Inc., MI [U]
Mark Driscoll, Swiss Re, Global Asset Protection Services, MA [I]
William T. Fiske, Intertek Testing Services NA, Inc., NY [RT]
Bradley G. Lapp, Expo Technologies, Inc., TX [M]
William G. Lawrence, Jr., FM Global, MA [I]
Robert Malanga, Fire and Risk Engineering, NJ [SE]
Joseph V. Saverino, Air Products and Chemicals, Inc., PA [U]
Richard F. Schwab, Honeywell, Inc., NJ [U]
Sukanta Sengupta, FMC Corporation, NJ [U]
David B. Wechsler, The Dow Chemical Company, TX [U]
Rep. American Chemistry Council
Jack H. Zewe, Electrical Consultants Inc., LA [SE]

Alternates

Donald W. Ankele, Underwriters Laboratories Inc., IL [RT]
(Alt. to E. M. Briesch)
Samuel A. Rodgers, Honeywell, Inc., VA [U]
(Alt. to R. F. Schwab)
James W. Stallcup Jr., Grayboy, Inc., TX [SE]
(Alt. to J. G. Stallcup)

Nonvoting

George H. St. Onge, Bernardsville, NJ
(Member Emeritus)

Jeffrey S. Sargent, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on (1) developing data on the properties of chemicals enabling proper selection of electrical equipment for use in atmospheres containing flammable gases, vapors, or dusts; (2) making recommendations for the prevention of fires and explosions through the use of continuously purged, pressurized, explosion-proof, or dust-ignition-proof electrical equipment where installed in such chemical atmospheres.

Documents
Document Sharing Hub

Full document details: NFPA 496 2008

Contents

Chapter 1 Administration **496–** 5
1.1 Scope **496–** 5
1.2 Purpose **496–** 5
1.3 Application **496–** 5
1.4 Equivalency **496–** 5
1.5 Units of Measurement **496–** 5
1.6 Mandatory Rules, Permissive Rules, and Explanatory Material **496–** 5

Chapter 2 Referenced Publications **496–** 6
2.1 General **496–** 6
2.2 NFPA Publications **496–** 6
2.3 Other Publications **496–** 6
2.4 References for Extracts in Mandatory Sections **496–** 6

Chapter 3 Definitions **496–** 6
3.1 General **496–** 6
3.2 NFPA Official Definitions **496–** 6
3.3 General Definitions **496–** 6
3.4 NEC Extracted Definitions **496–** 6

Chapter 4 General Requirements for Pressurized Enclosures **496–** 7
4.1 Applicability **496–** 7
4.2 Enclosure **496–** 7
4.3 Pressurizing System **496–** 8
4.4 Protective Gas System **496–** 8
4.5 Determination of Temperature Marking **496–** 8
4.6 Ventilated Equipment **496–** 8
4.7 Power Equipment **496–** 8
4.8 Type Z Pressurizing **496–** 9
4.9 Type Y Pressurizing **496–** 9
4.10 Type X Pressurizing **496–** 9
4.11 Markings **496–** 9

Chapter 5 Pressurized Enclosures for Class I **496–**10
5.1 Applicability **496–**10
5.2 General Requirements **496–**10
5.3 Markings **496–**10
5.4 Additional Requirements for Type Y or Type Z Pressurizing **496–**10
5.5 Additional Requirements for Type X Pressurizing **496–**10

Chapter 6 Pressurized Enclosures for Class II **496–**11
6.1 Applicability **496–**11
6.2 General Requirements **496–**11
6.3 Markings **496–**11
6.4 Marking Information **496–**11
6.5 Additional Requirements for Type X Pressurizing **496–**11
6.6 Additional Requirements for Ventilated Equipment **496–**11

Chapter 7 Pressurized Control Rooms **496–**11
7.1 Applicability **496–**11
7.2 Protective Gas **496–**11
7.3 Considerations Relating to Positive Pressure Ventilation **496–**11
7.4 Requirements for Positive Pressure Air Systems **496–**11

Chapter 8 Pressurized Enclosures Having an Internal Source of Flammable Gas or Vapor **496–**12
8.1 Applicability **496–**12
8.2 General Requirements **496–**12
8.3 Specific Requirements **496–**12

Chapter 9 Pressurized Analyzer Rooms Containing a Source of Flammable Gas, Vapor, or Liquid **496–**13
9.1 Applicability **496–**13
9.2 General **496–**13
9.3 Specific Requirements **496–**14

Annex A Explanatory Material **496–**14

Annex B Informational References **496–**18

Index **496–**20

Documents
Document Sharing Hub
Full document details: NFPA 496 2008

NFPA 496

Standard for

Purged and Pressurized Enclosures for Electrical Equipment

2008 Edition

IMPORTANT NOTE: This NFPA document is made available for use subject to important notices and legal disclaimers. These notices and disclaimers appear in all publications containing this document and may be found under the heading "Important Notices and Disclaimers Concerning NFPA Documents." They can also be obtained on request from NFPA or viewed at www.nfpa.org/disclaimers.

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

Changes other than editorial are indicated by a vertical rule beside the paragraph, table, or figure in which the change occurred. These rules are included as an aid to the user in identifying changes from the previous edition. Where one or more complete paragraphs have been deleted, the deletion is indicated by a bullet (•) between the paragraphs that remain.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex B. Editorial changes to extracted material consist of revising references to an appropriate division in this document or the inclusion of the document number with the division number when the reference is to the original document. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex B.

Chapter 1 Administration

1.1 Scope.

1.1.1 This standard applies to purging and pressurizing for the following:

(1) Electrical equipment located in areas classified as hazardous by Article 500 or Article 505 of NFPA 70
(2) Electrical equipment containing sources of flammable vapors or gases and located in either classified or unclassified areas
(3) Control rooms or buildings located in areas classified as hazardous by Article 500 or Article 505 of NFPA 70
(4) Analyzer rooms containing sources of flammable vapors or gases and located in areas classified as hazardous by Article 500 or Article 505 of NFPA 70

1.1.2* This standard does not apply to electrical equipment located in:

(1) Areas classified as Class I, Zone 0
(2) Areas classified as Class III
(3) Areas where flammable liquids may be splashed or spilled on the electrical equipment

1.2 Purpose. This standard provides information on the methods for purging and pressurizing enclosures to prevent ignition of a flammable atmosphere. Such an atmosphere may be introduced into the enclosure by a surrounding external atmosphere or by an internal source. By these means, electrical equipment that is not otherwise acceptable for a flammable atmosphere may be utilized in accordance with Article 500 or Article 505 of NFPA 70.

1.3 Application.

1.3.1 Chapters 4, 5, and 6 of this standard apply to electrical instrument and process control equipment, motors, motor controllers, electrical switchgear, and similar equipment that is installed in Class I or Class II locations and that does not contain an internal source of flammable vapor, gas, or liquid.

1.3.2 Chapter 7 of this standard applies to control rooms that are located in Class I or Class II locations and that do not contain an internal source of flammable vapor, gas, or liquid.

1.3.3* Chapter 8 of this standard applies to electrical instrument and process control equipment and similar enclosed equipment, such as a gas chromatograph or a gas analyzer, that does contain an internal source of flammable vapor, gas, or liquid.

1.3.4 Chapter 9 of this standard applies to analyzer rooms and buildings.

1.4 Equivalency. Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard.

1.4.1 Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

1.4.2 The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.5 Units of Measurement.

1.5.1 SI Units. Metric units of measurement in this standard are in accordance with the modernized metric system known as the International System of Units (SI).

1.5.2 Compliance. Compliance with the numbers shown in either the SI system or the inch-pound system shall constitute compliance with this standard.

1.6 Mandatory Rules, Permissive Rules, and Explanatory Material.

1.6.1 Mandatory Rules. Mandatory rules of this standard are those that identify actions that are specifically required or prohibited and are characterized by the use of the terms *shall* or *shall not.*

1.6.2 Permissive Rules. Permissive rules of this standard are those that identify actions that are allowed but not required, are normally used to describe options or alternative methods, and are characterized by the use of the terms *shall be permitted* or *shall not be required.*

1.6.3 Explanatory Material. Explanatory material is located in Annex A. The information contained in Annex A is explanatory only and is not enforceable as part of this standard.

AVA Documents Document Sharing Hub
2008 Edition
Full document details: NFPA 496 2008

Chapter 2 Referenced Publications

2.1* General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 70™, National Electrical Code®, 2008 edition.

2.3 Other Publications.

2.3.1 ISA Publications. ISA-Instrumentation, Systems, and Automation Society, 67 Alexander Drive, P.O. Box 12277, Research Triangle Park, NC 27709.

ANSI/ISA 12.13.01-2000, *Performance Requirements for Combustible Gas Detectors.*

2.3.2 Other Publications. *Merriam-Webster's Collegiate Dictionary,* 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections.

NFPA 70™, National Electrical Code®, 2008 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.3 General Definitions.

3.3.1* Alarm. A piece of equipment that generates a visual or audible signal that is intended to attract attention.

3.3.2 Analyzer Room or Building. A specific room or building containing analyzers, one or more of which is piped to the process.

3.3.3 Enclosure Volume. The volume of the empty enclosure without internal equipment. The enclosure volume for motors, generators, and other rotating electric machinery is the volume within the enclosure minus the volume of the internal components, e.g., rotors, stators, and field coils.

3.3.4 Ignition-Capable Equipment. Equipment that, under normal operation, produces sparks, hot surfaces, or a flame that can ignite a specific flammable atmosphere.

3.3.5* Ignition Temperature. The autoignition temperature of a flammable gas or vapor or the lower of either the layer ignition temperature or cloud ignition temperature of a combustible dust.

3.3.6 Indicator. A piece of equipment that shows flows or pressure and is monitored periodically, consistent with the requirement of the application.

3.3.7 Power Equipment. Equipment that utilizes power greater than 2500 VA or switches loads greater than 2500 VA.

3.3.8 Pressurization. The process of supplying an enclosure with a protective gas with or without continuous flow at sufficient pressure to prevent the entrance of a flammable gas or vapor, a combustible dust, or an ignitible fiber.

3.3.8.1 ***Type X Pressurizing.*** Reduces the classification within the protected enclosure from Division 1 or Zone 1 to unclassified.

3.3.8.2 ***Type Y Pressurizing.*** Reduces the classification within the protected enclosure from Division 1 to Division 2 or Zone 1 to Zone 2.

3.3.8.3 ***Type Z Pressurizing.*** Reduces the classification within the protected enclosure from Division 2 or Zone 2 to unclassified.

3.3.9* Pressurizing System. A grouping of components used to pressurize and monitor a protected enclosure.

3.3.10 Protected Enclosure. An enclosure pressurized by a protective gas.

3.3.11 Protected Equipment. The electrical equipment internal to the protected enclosure.

3.3.12 Protective Gas. The gas used to maintain pressurization or to dilute a flammable gas or vapor.

3.3.13 Protective Gas Supply. The compressor, blower, or compressed gas container that provides the protective gas at a positive pressure. The supply includes inlet (suction) pipes or ducts, pressure regulators, outlet pipes or ducts, and any supply valves not adjacent to the pressurized enclosure.

3.3.14 Purging. The process of supplying an enclosure with a protective gas at a sufficient flow and positive pressure to reduce the concentration of any flammable gas or vapor initially present to an acceptable level.

3.3.15* Specific Particle Density. The density of individual dust particles, as opposed to the bulk density of the material.

3.3.16 Ventilated Equipment. Equipment, such as motors, that requires airflow for heat dissipation as well as pressurization to prevent entrance of flammable gases, vapors, or dusts.

3.4 NEC Extracted Definitions.

3.4.1 Class I, Division 1. A Class I, Division 1 location is a location: (1) In which ignitible concentrations of flammable gases, flammable liquid–produced vapors, or combustible liquid–produced vapors can exist under normal operating conditions, or (2) In which ignitible concentrations of such flammable gases, flammable liquid–produced vapors, or combustible liquids above their flash points may exist frequently because of repair or maintenance operations or because of leakage, or (3) In which breakdown or faulty operation of equipment or processes might release ignitible concentrations of flammable gases, flammable liquid–produced vapors, or combustible liquid–produced vapors and might also cause simultaneous failure of electrical equipment in such a way as to directly cause the electrical equipment to become a source of ignition. [**70:**500.5(B)(1)]

Documents
Document Sharing Hub
Full document details: NFPA 496 2008