

Standard for Solvent Extraction Plants





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## NFPA<sup>®</sup> 36

#### Standard for

# Solvent Extraction Plants

### 2021 Edition

This edition of NFPA 36, *Standard for Solvent Extraction Plants*, was prepared by the Technical Committee on Solvent Extraction Plants. It was issued by the Standards Council on October 5, 2020, with an effective date of October 25, 2020, and supersedes all previous editions.

This edition of NFPA 36 was approved as an American National Standard on October 25, 2020.

### **Origin and Development of NFPA 36**

This standard was developed at the request of the solvent extraction industry in an effort to achieve greater uniformity in fire protection practices for extraction plants. The purpose of the standard is to provide reasonable standards for the design and operation of solvent extraction processes and extraction plants.

In the development of this standard, the Technical Committee on Solvent Extraction Plants recognized some fundamental differences between the operation of solvent extraction plants and the processing of solvents in other facilities. Many extraction plants are relatively small units in isolated locations; they operated without the benefit of overall fire protection measures, which are customary in large solvent processing facilities.

The operator of a solvent extraction plant must establish and maintain fire safety esprit de corps

among a small number of employees, as opposed to relying on the established customs of large-scale operations.

There are certain hazards in the combining and separating of solids and solvents that are peculiar to the solvent extraction industry. Also serving as a complicating problem is the potential dust explosion hazard in some areas of the typical plant. Therefore, the technical committee determined that it would be desirable to give consideration to practices applicable to both dust-laden and flammable vapor–laden atmospheres.

NFPA 36 was tentatively adopted at the 1957 Annual Meeting of the association. A revision of this tentative edition was adopted at the 1958 Annual Meeting. NFPA 36 was officially adopted by the association at its 1959 Annual Meeting. Amendments were adopted in 1962, 1964, 1967, 1972, 1973, 1974, 1978, 1983, 1985, 1988, 1993, 1997, 2001, 2004, and 2008.

The 1997 edition of NFPA 36 incorporated the following amendments:

- New appendix text to 1.1.1 to refer the user to NFPA 30, *Flammable and Combustible Liquids Code*, for solvent extraction processes not covered by NFPA 36
- (2) New 1.1.6, extending the scope of NFPA 36 to any preparation or meal finishing area that is connected to the solvent extraction process by a conveyor, thus establishing a boundary between those operations governed by NFPA 36 and those that might be governed by NFPA 61, Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Products Facilities
- (3) Revision of 5.2.5 to require compliance with all stated measures for preventing vapors from migrating beyond the controlled or restricted areas
- (4) New appendix text to 5.5.1 to provide guidance to the user in applying requirements for hazardous (classified) locations
- (5) New 5.8.1.7, which established specific requirements for actions to be taken to remove vapors from the extractor, especially during emergencies
- (6) New 5.8.9.6, which established a requirement for means to automatically sense excess pressure in the extractor or in the desolventizer-toaster and to automatically reduce the excess pressure to a safe level

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(7) Numerous editorial and minor technical improvements

The 2001 edition of NFPA 36 incorporated the following amendments:

- (1) A revised definition of *flame arrester*
- (2) A revision to 2.1.4 to require written authorization for repairs involving hot work
- (3) A revision of 4.1.2 to clarify which provisions do not apply when the liberation of dust is adequately controlled
- (4) A revision of Section 4.5 to better describe when repairs, including those involving hot work, can be performed without shutting down the entire process
- (5) A revision to 5.8.1.1 to clarify the requirements for venting of process equipment
- (6) A new 5.8.1.5 that stated that a flame arrester is not required in the discharge line from an emergency pressure relief valve
- (7) A new 5.8.1.7 that prohibited installing a shutoff valve in the overflow line from a tank or vessel
- (8) A revision to 5.8.1.9 to clarify the means of exhausting vapors from plant equipment

The 2004 edition of NFPA 36 was a complete editorial rewrite of the previous edition to comply with NFPA's Manual of Style for Technical Committee Documents and incorporated the following technical amendments:

- (1) Revised definitions of the terms extraction process, flame arrester, flammable liquid (to correlate with NFPA 30, Flammable and Combustible Liquids Code), inert gas, lower flammable limit, and upper flammable limit
- (2) Addition of a definition for noncombustible material, extracted from NFPA 220, Standard on Types of Building Construction
- (3) Revised procedures in 4.5.3 for transfer of solvent, to correlate with NFPA 30
- (4) Revision of 5.3.2 to require the design and construction of solvent storage tanks to comply with NFPA 30
- (5) Revision of Section 7.4, Drainage and Spill Control, to provide more specific design requirements for the separation sump
- (6) Addition of Figure 7.5.2 to illustrate typical locations for providing vent openings in the conveying system
- (7) Revision of Section 7.6, Cooling Towers, allowing flexibility in locating the various types of cooling towers relative to the extraction process
- (8) Addition of an exception to 8.2.6 that allowed a shutoff value in a normal vent line or an emergency vent line if the shutoff value meets specified criteria
- (9) Addition of physical property data for isohexane to Annex B to recognize its use as an extraction solvent

The 2009 edition of NFPA 36 incorporated the following technical amendments:

(1) Revised definitions of the terms *flame arrester*, *inert gas*, and *lower flammable limit* 

- (2) Addition of exceptions to 6.2.4 and to 7.9.2 to allow the use of electric space heaters that are approved for Class I, Division 1, Group D or Class II, Division 1, Group G locations
- (3) Revision to Figure 7.2.1 to show correct dimension reference lines for the extent of the hazardous location above a process vent
- (4) Revision to 7.4.2.3 to provide more detailed requirements for the separation sump
- (5) Addition of a new figure, Figure 7.4.2.3, to illustrate a typical separation sump design
- (6) Addition of a new annex item, A.7.4.2.4, to provide suggested means to provide emergency control of outflow from the separation sump, if the liquid seal fails
- (7) Deletion of existing 7.5.3, because it conflicted with 7.5.2
- (8) Removal of an erroneously placed line in Figure 7.7.1
- (9) Addition of requirements to 8.10.4 and 8.10.5 to monitor the discharge of oil for conditions that might present a significant hazard
- (10) Revision of 8.10.6 to correlate with changes made to 8.10.4 and 8.10.5
- (11) Correction to Table B.2(a)
- (12) Deletion of Table B.2(b), because it conflicted with Table B.2(a)

The 2013 edition of NFPA 36 incorporated the following technical amendments:

- (1) Referenced documents in Chapter 2 were updated to current editions.
- (2) Subsection 4.11.1 was expanded to address hand tools and power tools.
- (3) An annex discussion was added to provide guidance on determining whether special tools were needed.
- (4) Subsection 6.4.2 was revised to correlate with NFPA 61, *Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities*, by providing exceptions for dust collectors, centrifugal separators, and bin vent dust collectors located inside buildings.
- (5) Subsection 6.4.3 was broadened to apply to all types of filter media and to require explosion protection if there is a risk of a dust explosion in the enclosure.
- (6) Section 7.7 was revised to include guidance for use of the zone system for electrical area classification.

The 2017 edition of NFPA 36 incorporated the following technical amendments:

- (1) A new subsection was added to address trenches for solid-collecting conveyors.
- (2) A new Annex A subsection provided references to assessment methods for determining the need for lightning protection.
- (3) Section 8.2 was revised to maintain consistency with NFPA 30 and to clarify the normal and emergency venting requirements.
- (4) All exceptions were rewritten in enforceable, mandatory language.

The 2021 edition contains only minor changes to the standard. An alternate standard for spark-resistant construction has been added to aid users in applying mechanical ventilation requirements, portable fire extinguishers are required to be listed (a change from "approved"), and language regarding fixed combustible gas monitoring systems is clarified.

2021 Edition

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