

Standard for Spray Application Using Flammable or Combustible Materials

2018



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NFPA[®] 33

Standard for

Spray Application Using Flammable or Combustible Materials

2018 Edition

This edition of NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*, was prepared by the Technical Committee on Finishing Processes. It was issued by the Standards Council on November 10, 2017, with an effective date of November 30, 2017, and supersedes all previous editions.

This edition of NFPA 33 was approved as an American National Standard on November 30, 2017.

Origin and Development of NFPA 33

NFPA 33, Standard for Spray Application Using Flammable or Combustible Materials, originally titled Standard on Paint Spraying and Spray Booths, was initiated in 1921. The first edition was published in 1922 as part of the Standard on Dip Tanks (now NFPA 34, Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids). Revised editions were published in 1926, 1928, 1935, 1937, 1941, 1946, 1950, 1953, 1954, 1955, 1957, 1959, 1960, 1961, 1963, 1966, 1969, 1973, 1977, 1982, 1985, 1987, 1989, 1995, 2000, 2003, 2006, and 2010.

The following major changes were incorporated into the 2003 edition:

- (1) The arrangement of the text was modified to comply with the *Manual of Style for NFPA Technical Committee Documents*, including relocation of Chapter 17, Referenced Publications, to a new Chapter 2 and the addition of a new Chapter 3, Definitions, which incorporated all the definitions previously located in Chapter 1.
- (2) Chapter 6 (formerly Chapter 4), Electrical and Other Sources of Ignition, was extensively revised to recognize the Zone concept of area classification. Changes included the addition of appropriate definitions and revisions of the figures illustrating the area classifications in and around spray areas, spray booths, spray rooms, and equipment.
- (3) Chapter 9 (formerly Chapter 7), Protection, was extensively revised to more effectively and more clearly present the requirements for fire protection in spray areas. In addition, the requirements for interlocking were clarified and requirements for automated electrostatic spray systems were modified to reflect current operational practices, including extending these concepts to powder application systems.
- (4) A new chapter was added that included several changes: Section 10.5 (formerly Section 8.5), Waste Containers, was to provide more specific guidance on the handling of waste materials. Section 10.7 (formerly Section 8.7), Cleaning Operations, was revised to allow the use of any suitable solvent for cleaning of spray equipment, provided it is used safely. The requirements were also applied to spray apparatus cleaning systems. Finally, a new Section 10.8 was added to address the hazards of solvent distillation units.
- (5) The fire protection requirements formerly located in Section 9.5, Exception No. 2, of the 2000 edition, were incorporated into Section 9.7 and Section 9.8.
- (6) Subsection 14.3.5 (formerly 12.3.5) was revised to incorporate the Zone concept of area classification for use with limited finishing workstations.

The following major changes were adopted in the 2007 edition:

- (1) In Chapter 3, the definition of *spray area* was revised to more clearly define the extent of the spray area and to identify those parts of the process that are not considered part of the spray area.
- (2) In Section 5.5, the allowable materials for vision and observation panels were expanded to include laminated glass and other listed assemblies. Also, vision and observation panels for powder spray booths are now allowed to be of fire retardant combustible materials.
- (3) Chapter 6 was amended with text extracted from *NFPA 70*[®], *National Electrical Code*[®], to reflect changes in *NFPA 70* to hazardous locations.

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- (4) Definitions were extracted from *NFPA 70, National Electrical Code,* and added to Chapter 6 to recognize Class II, Zones 20, 21, and 22 hazardous (classified) locations.
- (5) Section 7.7 was revised to allow fire retardant combustible materials for ducts connected to powder coating booths.
- (6) In Chapter 8, the maximum quantities of flammable and combustible liquids were changed to correlate with changes to NFPA 30, *Flammable and Combustible Liquids Code*.
- (7) In Chapter 9, the requirements for protection of spray area exhaust ducts were revised, expanded, and clarified.
- (8) In Chapters 11, 12, and 15, 11.3.6, 12.5.4, and 15.13.4 were added to designate certain highly resistive workpieces as grounded, if they meet certain criteria of surface conductivity.
- (9) In Chapter 13, more restrictive requirements for high temperature limit switches and interlocks were added for spray booths and spray rooms that are also used for drying and curing operations.
- (10) In Chapter 14, more definitive requirements were added for drying, curing, and fusion apparatus used in limited finishing workstations.

The following major changes were adopted in the 2011 edition:

- (1) In Section 1.1, the scope was amended to exempt certain small quantity operations, and a decision tree was added to Annex A (A.1.1.1) to assist the user in determining whether NFPA 33 is applicable to a particular spray application process.
- (2) The definition of *spray area* in 3.3.1.3 was amended to more clearly identify which parts of the spray system are not considered to be part of the spray area.
- (3) Chapter 6 was revised to recognize the Zone 21 and Zone 22 hazardous (classified) area classifications for combustible dusts. This correlated with NFPA 70, National Electrical Code, with respect to the latter's recognition of Zones 21 and 22 for electrical systems.
- (4) Section 7.7 was amended to allow concrete as a material of construction for spray area exhaust plenums and ducts, thus allowing a formed concrete exhaust plenum in the floor beneath a spray booth or room.
- (5) Section 8.2 was completely revised to recognize the concept of maximum allowable quantities (MAQs) of flammable and combustible liquids and to establish quantity limits based on MAQs. This correlated with NFPA 30, *Flammable and Combustible Liquids Code*.
- (6) Section 13.2 was revised to clarify that, if a spray area is used for drying or curing at a temperature above that at which the spray application takes place, the provisions of Section 13.3 must be followed. In addition, *ambient* was defined in Chapter 3 as the temperature range in the spray booth or room at which the spray application process takes place.
- (7) A new paragraph, 13.3.1.9, was added to exempt spray booths and spray rooms that are also used for drying and curing from the requirement for explosion relief venting, if certain conditions are met.
- (8) Subsection 13.3.2 was replaced with a new Section 13.5, which addressed installations where the spray booth or spray room is directly connected to the drying/curing oven by an enclosed vestibule.
- (9) Subsection 15.8.1 was amended to require that the concentration of combustible powder in the exhaust from a powder coating booth be based on the actual minimum explosive concentration of the powder being used.
- (10) Section 17.3 was amended by replacing the requirement for an automatic sprinkler system with a requirement that resin application areas be protected in accordance with Chapter 9, thus allowing other types of fire protection systems.
- (11) Subsection 17.5.2 was amended to replace the requirement for Division 1/Zone 1 electrical equipment with Division 2/Zone 2.

In the 2016 edition, terms and definitions were modified to be consistent with other NFPA documents and to mirror terms and definitions used in NFPA 34. Exceptions and vague and unenforceable language were removed from the document to comply with *Manual of Style for NFPA Technical Committee Documents*. The 2016 edition also contained the following changes:

- (1) Chapter 1 was revised to indicate that the standard now applies to spray application processes and operations that are conducted indoors or outdoors within temporary membrane enclosures.
- (2) Definitions of various types of spray booths and membrane enclosures were added to coordinate with changes made in other chapters of the document.
- (3) Chapter 4 was revised to address egress and accessibility concerns for spray operations that occur in basement.
- (4) The figures in Chapter 6 were revised to improve consistency and to clarify electrical classification requirements in the document.
- (5) Clarifications to mixing room requirements were made in Chapter 8.
- (6) Chapter 9 was revised to allow the use of water mist systems and to clarify the sprinkler design area requirement. Annex material was added to provide guidance in determining the water supply requirements for sprinklers likely to open in a fire incident. Duct protection requirements were revised to indicate that a sprinkler head should be located at the top of a vertical duct.

- (7) Chapter 9 also was revised to include fire protection for newer technology spray booths and scrubbers.
- (8) The figure in Chapter 14 was revised to improve consistency and to clarify the electrical classification requirements in the document.
- (9) Chapter 15 was completely revised to incorporate requirements for combustible dusts that are present in operations such as bag dump stations, pneumatic conveying systems, and other operations that generate dust.
- (10) The Committee added a new Chapter 18 on the use of temporary membrane enclosures for spraying workpieces that cannot be sprayed in traditional spray booths or rooms.
- (11) Table C.2.1 in Annex C was updated with current test data.

The following changes have been made for the 2018 edition:

- (1) Chapter 1, Administration, added clarification to document application. For example, Chapter 14 shall apply only to miscellaneous spray operations, and Chapter 18 shall apply only to spray application processes or operations that are conducted in temporary membrane enclosures both inside and outside buildings and structures.
- (2) Chapter 3, Definitions, was modified to include application definitions as well as to be consistent with other NFPA documents. New or revised definitions for applications including *automated spray application operations, basement, control area, dry particulate scrubber spray booth,* and *workstation* are provided. In addition, definition changes made to liquids and materials are consistent with other NFPA documents placing noncombustible material, limited-combustible material, and classification of liquids and determination of flash points in a General Requirements section. Changes to definitions are consistent with NFPA 1, NFPA 30, and *NFPA 5000*.
- (3) Chapter 4, General Requirements, is applicable to all spray operations. It has been revised to clarify definitions and spraying location, making them consistent with Chapter 5 requirements.
- (4) Chapter 5, Construction and Design of Spray Areas, Spray Rooms, and Spray Booths, has been revised to address the confusion between spray rooms and spray booths. It provides requirements for each type of spray location.
- (5) Chapter 6, Electrical and Other Sources of Ignition, has been revised. In addition, the figures in Chapter 6 were revised to improve consistency and to clarify electrical classification requirements in the document. The movement power vehicles in spray areas has also been clarified.
- (6) Chapter 7, Ventilation, has been revised to provide clarification of the heating of recirculated air and the manifolding of exhaust ducts.

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