

NFPA®

326

**Standard for the
Safeguarding of Tanks
and Containers for Entry,
Cleaning, or Repair**

2020



IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® STANDARDS

NFPA® codes, standards, recommended practices, and guides (“NFPA Standards”), 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 NFPA 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 NFPA Standards. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making NFPA Standards 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 NFPA Standards. 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.

REVISION SYMBOLS IDENTIFYING CHANGES FROM THE PREVIOUS EDITION

Text revisions are shaded. A **Δ** before a section number indicates that words within that section were deleted and a **Δ** to the left of a table or figure number indicates a revision to an existing table or figure. When a chapter was heavily revised, the entire chapter is marked throughout with the **Δ** symbol. Where one or more sections were deleted, a **•** is placed between the remaining sections. Chapters, annexes, sections, figures, and tables that are new are indicated with an **N**.

Note that these indicators are a guide. Rearrangement of sections may not be captured in the markup, but users can view complete revision details in the First and Second Draft Reports located in the archived revision information section of each code at www.nfpa.org/docinfo. Any subsequent changes from the NFPA Technical Meeting, Tentative Interim Amendments, and Errata are also located there.

REMINDER: UPDATING OF NFPA STANDARDS

Users of NFPA codes, standards, recommended practices, and guides (“NFPA Standards”) should be aware that these documents may be superseded at any time by the issuance of a new edition, may be amended with the issuance of Tentative Interim Amendments (TIAs), or be corrected by Errata. It is intended that through regular revisions and amendments, participants in the NFPA standards development process consider the then-current and available information on incidents, materials, technologies, innovations, and methods as these develop over time and that NFPA Standards reflect this consideration. Therefore, any previous edition of this document no longer represents the current NFPA Standard on the subject matter addressed. NFPA encourages the use of the most current edition of any NFPA Standard [as it may be amended by TIA(s) or Errata] to take advantage of current experience and understanding. An official NFPA Standard at any point in time consists of the current edition of the document, including any issued TIAs and Errata then in effect.

To determine whether an NFPA Standard has been amended through the issuance of TIAs or corrected by Errata, visit the “Codes & Standards” section at www.nfpa.org.

ADDITIONAL IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® STANDARDS

Updating of NFPA Standards

Users of NFPA codes, standards, recommended practices, and guides (“NFPA Standards”) should be aware that these documents may be superseded at any time by the issuance of a new edition, may be amended with the issuance of Tentative Interim Amendments (TIAs), or be corrected by Errata. It is intended that through regular revisions and amendments, participants in the NFPA standards development process consider the then-current and available information on incidents, materials, technologies, innovations, and methods as these develop over time and that NFPA Standards reflect this consideration. Therefore, any previous edition of this document no longer represents the current NFPA Standard on the subject matter addressed. NFPA encourages the use of the most current edition of any NFPA Standard [as it may be amended by TIA(s) or Errata] to take advantage of current experience and understanding. An official NFPA Standard at any point in time consists of the current edition of the document, including any issued TIAs and Errata then in effect.

To determine whether an NFPA Standard has been amended through the issuance of TIAs or corrected by Errata, visit the “Codes & Standards” section at www.nfpa.org.

Interpretations of NFPA Standards

A statement, written or oral, that is not processed in accordance with Section 6 of the Regulations Governing the Development of NFPA Standards 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 referenced in, related to, or asserted in connection with an NFPA Standard. The users of NFPA Standards bear the sole responsibility for determining the validity of any such patent rights, as well as the risk of infringement of such rights, and the NFPA disclaims liability for the infringement of any patent resulting from the use of or reliance on NFPA Standards.

NFPA adheres to the policy of the American National Standards Institute (ANSI) regarding the inclusion of patents in American National Standards (“the ANSI Patent Policy”), and hereby gives the following notice pursuant to that policy:

NOTICE: The user’s attention is called to the possibility that compliance with an NFPA Standard may require use of an invention covered by patent rights. NFPA takes no position as to the validity of any such patent rights or as to whether such patent rights constitute or include essential patent claims under the ANSI Patent Policy. If, in connection with the ANSI Patent Policy, a patent holder has filed a statement of willingness to grant licenses under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, copies of such filed statements can be obtained, on request, from NFPA. For further information, contact the NFPA at the address listed below.

Law and Regulations

Users of NFPA Standards 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

NFPA Standards are copyrighted. They are 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 these documents available for use and adoption by public authorities and private users, the NFPA does not waive any rights in copyright to these documents.

Use of NFPA Standards 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 Standards, contact NFPA at the address below.

For Further Information

All questions or other communications relating to NFPA Standards 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 standards 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; email: stds_admin@nfpa.org.

For more information about NFPA, visit the NFPA website at www.nfpa.org. All NFPA codes and standards can be viewed at no cost at www.nfpa.org/docinfo.

Copyright © 2019 National Fire Protection Association®. All Rights Reserved.

NFPA® 326

Standard for the

Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair

2020 Edition

This edition of NFPA 326, *Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair*, was prepared by the Technical Committee on Tank Leakage and Repair Safeguards. It was issued by the Standards Council on April 10, 2019, with an effective date of April 30, 2019, and supersedes all previous editions.

This edition of NFPA 326 was approved as an American National Standard on April 30, 2019.

Origin and Development of NFPA 326

The text of this standard was originally intended as amendments to NFPA 327, *Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers Without Entry*, and would have expanded the scope of NFPA 327 to situations in which tank cleaning or repair required that personnel gain entry to the tank. Recognizing the conflict that would likely result, the Technical Committee on Tank Leakage and Repair Safeguards decided to create a separate standard. An initial draft of NFPA 326, based on the existing text of NFPA 327, was developed by a task group of the committee in January 1990. The draft was revised several times over the following 2 years, when appropriate changes were also made to the text of NFPA 327.

The text of the first edition of NFPA 326 was adopted in 1993.

In May 1999, NFPA 326 was revised to provide safe requirements for the entry, cleaning, and repair of tanks and containers and to provide assistance to the fire service in determining the professional qualifications necessary to perform atmospheric testing of confined spaces, with the goal of issuing hot work permits. Also, all parts of NFPA 327 related to this standard were incorporated into NFPA 326. Consequently, NFPA 327 was withdrawn as an NFPA standard in May 1999.

The 2005 edition of NFPA 326 was the result of a major rewrite to comply with the *Manual of Style for NFPA Technical Committee Documents*. In addition, numerous changes were made to ensure that NFPA 326 correlated with other consensus and industry standards and U.S. government rules and regulations. The intent of the changes was to ensure that NFPA 326 reflected current technology and practices.

The 2010 edition of NFPA 326 was amended to ensure that all referenced documents are listed correctly pertaining to title and edition date.

In the 2015 edition of NFPA 326, referenced publications were updated to current edition dates. In addition, definitions were revised to better describe the terminology used in the standard and, where appropriate, preferred definitions in other NFPA publications were incorporated. The committee revised the requirements for testing to maintain safe conditions of the atmosphere in tanks during the course of work such as entry, cleaning, and repair. References to safety data sheets were updated in accordance with the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) *Hazard Communication Standard*. The numbering of equations was revised to conform to the *NFPA Manual of Style for NFPA Technical Committee Documents*.

In the 2020 edition, the technical committee updated definitions extracted from other publications, made minor editorial revisions, and revised references to other publications.

Technical Committee on Tank Leakage and Repair Safeguards

James R. Rocco, *Chair*

Sage Risk Solutions, LLC, OH [E]

Rep. Petroleum Underground Storage Tank Release Compensation Board

John H. Bagnall, Burns & McDonnell Engineering Company, MO [SE]

Larry Beasley, Robert and Company, GA [SE]

Philip Dovinh, U.S. Marine Chemists & Engineering, WA [SE]
Rep. Marine Chemist Association, Inc.

Scott Gaulke, Shannon & Wilson, Inc., WA [SE]

Wayne B. Geyer, Steel Tank Institute, IL [M]

Richard S. Kraus, Petroleum Safety Consultants, VA [U]
Rep. American Petroleum Institute

Joyce A. Rizzo, JD2 Environmental, Inc., PA [SE]

Adam M. Selisker, Northampton Township Fire Department, PA [E]

Timothy R. Smith, U.S. Environmental Protection Agency, DC [E]

John Tavernit, 3M Company, MN [U]

Robert H. Young, Petroleum Equipment Institute, OK [M]

Alternates

Leslie Blaize, Belay Incorporated, OR [SE]
(Alt. to Philip Dovinh)

Mark Furr, Robert and Company, GA [SE]
(Alt. to Larry Beasley)

Lawrence Russell, 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 safeguarding against fire, explosion, and health hazards associated with entry, cleaning, and repair of tank systems and methods for detecting, controlling, and investigating releases that could cause these hazards.

Contents

Chapter 1 Administration	326- 4	Chapter 7 Control or Removal of Vapors	326- 10
1.1 Scope.	326- 4	7.1 General.	326- 10
1.2 Purpose.	326- 4	7.2 Removal of Flammable Vapors by Displacement with Air (Ventilation).	326- 10
1.3 Application.	326- 4	7.3 Removal of Flammable Vapors by Displacement with Inert Gas.	326- 11
1.4 Retroactivity.	326- 4	7.4 Removal of Flammable Vapors by Displacement with Water, Fuel Oil, or Chemicals.	326- 11
1.5 Equivalency.	326- 4	7.5 Removal of Flammable Vapors by Displacement with Steam.	326- 12
1.6 Units.	326- 4		
1.7 Enforcement Requirements. (Reserved)	326- 4	Chapter 8 Inspection and Certification of Tanks and Containers	326- 12
Chapter 2 Referenced Publications	326- 5	8.1 General.	326- 12
2.1 General.	326- 5	8.2 Designations.	326- 12
2.2 NFPA Publications.	326- 5	Chapter 9 Procedures for Access to and Entry of Tanks	326- 13
2.3 Other Publications.	326- 5	9.1 General.	326- 13
2.4 References for Extracts in Mandatory Sections.	326- 5	9.2 Access to Tanks.	326- 13
Chapter 3 Definitions	326- 5	9.3 Tank Entry.	326- 13
3.1 General.	326- 5	9.4 Closing the Tank Access Opening.	326- 14
3.2 NFPA Official Definitions.	326- 5	Chapter 10 Cleaning Tanks and Containers	326- 14
3.3 General Definitions.	326- 5	10.1 General.	326- 14
Chapter 4 Basic Precautions	326- 7	10.2 Purpose and Extent of Cleaning.	326- 14
4.1 General.	326- 7	10.3 Removal of Residual Liquids and Solids.	326- 14
4.2 Ignition Concerns.	326- 7	10.4 Cleaning Inspection.	326- 14
Chapter 5 Preparation for Safeguarding	326- 8	10.5 Cleaning Methods.	326- 14
5.1 Lockout/Tagout.	326- 8	Annex A Explanatory Material	326- 14
5.2 Removal of Flammable, Combustible, or Other Hazardous Substances, Liquids, or Gases.	326- 8	Annex B Informational References	326- 17
5.3 Isolation.	326- 8	Index	326- 19
Chapter 6 Testing Procedures	326- 8		
6.1 General Procedures.	326- 8		
6.2 Testing for Oxygen Content.	326- 9		
6.3 Testing for Flammable Vapors.	326- 9		
6.4 Testing for Toxic Vapors and Gases.	326- 10		

NFPA 326

Standard for the

Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair

2020 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 Standards." They can also be viewed at www.nfpa.org/disclaimers or obtained on request from NFPA.

UPDATES, ALERTS, AND FUTURE EDITIONS: New editions of NFPA codes, standards, recommended practices, and guides (i.e., NFPA Standards) are released on scheduled revision cycles. This edition may be superseded by a later one, or it may be amended outside of its scheduled revision cycle through the issuance of Tentative Interim Amendments (TIAs). An official NFPA Standard at any point in time consists of the current edition of the document, together with all TIAs and Errata in effect. To verify that this document is the current edition or to determine if it has been amended by TIAs or Errata, please consult the National Fire Codes® Subscription Service or the "List of NFPA Codes & Standards" at www.nfpa.org/docinfo. In addition to TIAs and Errata, the document information pages also include the option to sign up for alerts for individual documents and to be involved in the development of the next edition.

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

A reference in brackets [] following a section or paragraph indicates material that has been extracted from another NFPA document. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

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

Chapter 1 Administration

1.1 Scope.

1.1.1* This standard shall apply to the safeguarding of tanks or containers operating at nominal atmospheric pressure that contain or have contained flammable or combustible liquids or other hazardous substances and related vapors or residues.

1.1.2* This standard shall not apply to tank vehicles or tank cars; tanks, bunkers, or compartments on ships or barges or in a shipyard; gas plant equipment or gas distribution systems for natural or manufactured gas; or compressed or liquefied gas cylinders.

1.1.3* This standard shall not apply to hot tapping.

1.1.4* This standard shall not apply to the entry of a tank or container that contains an inert atmosphere.

1.2 Purpose.

1.2.1 The purpose of this standard shall be to provide minimum procedures for the following:

- (1) The safe opening, entry, and cleaning of a tank or container that contains or has contained flammable, combustible, or other hazardous substance vapors, liquids, or solid residues
- (2) The safe removal of flammable, combustible, or other hazardous substance vapors, liquids, or solid residues from tanks or containers and the safeguarding of these vessels for entry, cleaning, or repair

1.2.2 The purpose of this standard shall also be to provide minimum procedures that permit repair, hot work, or other operations that have the potential to create a fire, an explosion, or another hazard.

1.3 Application. The requirements provided in this standard for safeguarding a tank or container are described in the logical order in which work is typically conducted.

1.4 Retroactivity. The provisions of this standard reflect a consensus of what is necessary to provide an acceptable degree of protection from the hazards addressed in this standard at the time the standard was issued.

1.4.1 Unless otherwise specified, the provisions of this standard shall not apply to facilities, equipment, structures, or installations that existed or were approved for construction or installation prior to the effective date of the standard. Where specified, the provisions of this standard shall be retroactive.

1.4.2 In those cases where the authority having jurisdiction determines that the existing situation presents an unacceptable degree of risk, the authority having jurisdiction shall be permitted to apply retroactively any portions of this standard deemed appropriate.

1.4.3 The retroactive requirements of this standard shall be permitted to be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction, and only where it is clearly evident that a reasonable degree of safety is provided.

1.5 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.

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

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

1.6 Units.

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

1.6.2 If a value for measurement as provided in this standard is followed by an equivalent value in other units, the first stated value is the requirement. A given equivalent value might be an approximation.

1.7 Enforcement Requirements. (Reserved)

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 30, *Flammable and Combustible Liquids Code*, 2018 edition.

NFPA 70®, *National Electrical Code*®, 2017 edition.

2.3 Other Publications.

▲ **2.3.1 ACGIH Publications.** American Conference of Governmental Industrial Hygienists, 1330 Kemper Meadow Drive, Cincinnati, OH 45240-1634.

ACGIH *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*, 2018.

▲ **2.3.2 API Publications.** American Petroleum Institute, 1220 L Street, NW, Washington, DC 20005-4070.

API Standard 2015, *Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks*, 7th edition, 2014.

API Recommended Practice 2016, *Guidelines and Procedures for Entering and Cleaning Petroleum Storage Tanks*, 1st edition, 2001 (reaffirmed May 2006).

API Recommended Practice 2217A, *Safe Work in Inert Confined Spaces in the Petroleum and Petrochemical Industries*, 5th edition, 2017.

■ **2.3.3 ASSP Publications.** American Society of Safety Professionals, 520 N. Northwest Hwy, Park Ridge, IL 60068.

ANSI/ASSP Z117.1, *Safety Requirements for Confined Spaces*, 2016.

▲ **2.3.4 ASTM Publications.** ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM D5/D5M, *Standard Test Method for Penetration of Bituminous Materials*, 2013.

ASTM D323, *Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method)*, 2015a.

ASTM D4359, *Standard Test Method for Determining Whether a Material is a Liquid or a Solid*, 2012.

▲ **2.3.5 NIOSH Publications.** National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, 1600 Clifton Road, Atlanta, GA 30329-4027.

NIOSH *Criteria for a Recommended Standard for Working in Confined Spaces*, 1979.

NIOSH *Pocket Guide to Chemical Hazards*, 2007.

2.3.6 Other Publications.

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

2.4 References for Extracts in Mandatory Sections.

NFPA 30, *Flammable and Combustible Liquids Code*, 2018 edition.

NFPA 77, *Recommended Practice on Static Electricity*, 2019 edition.

NFPA 329, *Recommended Practice for Handling Releases of Flammable and Combustible Liquids and Gases*, 2015 edition.

NFPA 921, *Guide for Fire and Explosion Investigations*, 2017 edition.

NFPA 1451, *Standard for a Fire and Emergency Service Vehicle Operations Training Program*, 2018 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.

3.2.3 Shall. Indicates a mandatory requirement.

3.2.4 Should. Indicates a recommendation or that which is advised but not required.

3.2.5 Standard. An NFPA Standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase "standards development process" or "standards development activities," the term "standards" includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1 Adjacent Spaces. Those spaces in all directions from subject space, including points of contact, internal and external, such as decks, sumps, floating roofs, secondary containment areas, interstitial spaces, under floors, supports, tank tops, and bulkheads.

3.3.2 Attendant. A term used to describe U.S. federally regulated industrial workers who are qualified to be stationed outside one or more confined spaces, who monitor authorized entrants, and who perform all of the following duties: (1) remain outside the confined space during entry operations until relieved by another attendant, (2) summon rescue and other needed resources as soon as the attendant determines that authorized entrants might need assistance to escape from confined space hazards, (3) perform nonentry rescues as specified by the rescue procedure listed on the permit.

3.3.3 Bonding. For the purpose of controlling static electric hazards, the process of connecting two or more conductive objects together by means of a conductor so that they are at the same electrical potential, but not necessarily at the same potential as the earth. [77, 2019]

3.3.4 Combustible Gas Indicator. An instrument that samples air to indicate whether there are combustible vapors or gases present and can also indicate the percentage of the lower explosive limit of the vapor or gas mixture.

3.3.5* Combustible Liquid. Any liquid that has a closed-cup flash point at or above 37.8°C (100°F), as determined by the test procedures and apparatus set forth in Section 4.4 of NFPA 30.

3.3.6 Confined Space. For purposes of tank entry, cleaning, or repair, any tank that meets all three of the following requirements: (1) is large enough and so configured that a person can enter and perform assigned work, (2) has limited or restricted means for entry or exit, (3) is not designed or meant to be continuously occupied. (See also 3.3.20, *Permit Required Confined Space*, and 3.3.18, *Nonconfined Space*.)

3.3.7 Container. For purposes of tank entry, cleaning, or repair, a vessel intended to contain an accumulation of hazardous substances that is too small for human entry or has a capacity that can be effectively and safely cleaned without human entry.

3.3.8 Degassing. The process of collecting, oxidizing, or treating vapors and gases expelled from a tank or vessel to prevent or reduce the amount of organic volatile compounds released into the atmosphere during vapor- and gas-freeing operations. [API Std 2015: 3.2.10]

3.3.9* Flammable Liquid. Any liquid that has a closed-cup flash point below 37.8°C (100°F), as determined by the test procedures and apparatus set forth in Section 4.4 of NFPA 30 and a Reid vapor pressure that does not exceed an absolute pressure of 276 kPa (40 psi) at 37.8°C (100°F), as determined by ASTM D323, *Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method)*.

3.3.10 Flammable Vapor. For purposes of tank entry, cleaning, or repair, any substance that exists in the gaseous state at normal atmospheric temperature and pressure and that is capable of being ignited and burned when mixed with the proper proportions of air, oxygen, or other oxidizer.

3.3.11 Hazardous Substance. A substance, including combustible and flammable liquids and flammable gases, that is capable of creating harm to people, the environment, or property due to the dangers that can arise from, but not limited to, toxicity, reactivity, ignitability, or corrosivity.

3.3.12 Hot Tapping. The technique of welding and drilling on in-service tanks or containers that contain flammable, combustible, or other hazardous substances.

3.3.13 Hot Work. Any work that is a source of ignition, including open flames, cutting and welding, sparking of electrical equipment, grinding, buffing, drilling, chipping, sawing, or other operations that create hot metal sparks or surfaces from friction or impact.

3.3.14 Inert Gas. For purposes of tank entry, cleaning, or repair, a gas that is nonflammable, chemically inactive, noncon-

taminating for the use intended, and oxygen-deficient to the extent required.

3.3.15 Inerting. A technique by which the atmosphere in a tank or container is rendered nonignitable or nonreactive by the addition of an inert gas.

▲ **3.3.16 Liquid.** Any material that (1) has a fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM D5/D5M, *Standard Test Method for Penetration of Bituminous Materials*, or (2) is a viscous substance for which a specific melting point cannot be determined but that is determined to be a liquid in accordance with ASTM D4359, *Standard Test Method for Determining Whether a Material is a Liquid or a Solid*. [30, 2018]

3.3.17* Lower Flammable Limit (LFL). That concentration of a flammable vapor in air below which ignition will not occur. Also known as the lower explosive limit (LEL). [30, 2018]

3.3.18 Nonconfined Space. For purposes of tank entry, cleaning, or repair, a space that previously was a confined space but no longer meets any of the requirements for a confined space or a permit required confined space, such as a tank with a large door sheet cut into the side. (See also 3.3.6, *Confined Space*, and 3.3.20, *Permit Required Confined Space*.)

3.3.19 Oxygen Indicator. A device capable of detecting and measuring concentrations of oxygen in the atmosphere. [329, 2015]

3.3.20 Permit Required Confined Space. For purposes of tank entry, cleaning, or repair, a tank that meets all three of the requirements for a confined space (see 3.3.6) and also has one or more of the following four characteristics: (1) contains or has the potential to contain a hazardous substance, (2) contains a material with the potential to engulf an entrant, (3) has an internal configuration such that an entrant could become trapped or asphyxiated by inwardly converging walls or floor that slope downwards, tapering to small cross sections, (4) contains any other recognized serious safety or health hazard. (See also 3.3.18, *Nonconfined Space*.)

3.3.21 Purging. For purposes of tank entry, cleaning, or repair, the process of displacing vapors or gases from an enclosure or confined space.

3.3.22* Qualified Person. A person who, by possession of a recognized degree, certificate, professional standing, or skill, and who, by knowledge, training, and experience, has demonstrated the ability to deal with problems related to the subject matter, the work, or the project. [1451, 2018]

3.3.23 Static Electric Discharge. A release of static electricity in the form of a spark, corona discharge, brush discharge, bulking brush discharge, or propagating brush discharge that might be capable of causing ignition of a flammable atmosphere under appropriate circumstances. [77, 2019]

3.3.24 Static Electricity. For purposes of tank entry, cleaning, or repair, the electrification of materials through physical contact and separation and the various effects that result from the positive and negative charges so formed.

3.3.25 Tank. A stationary or portable device that is intended to contain an accumulation of hazardous substances.