NATIONAL FIRE PROTECTION ASSOCIATION
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M E M O R A N D U M

TO: Technical Committee on Classification and Properties of Hazardous Chemical Data

FROM: Yvonne Smith, *Committee Administrator*

DATE: October 2, 2025

SUBJECT: NFPA 704 Second Draft FINAL Ballot Results (A2026)

According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot.

26 **Members Eligible to Vote**
6 **Members Not Returned** *(Hanselka, Koninckx, Lingle, Pelgroms, Platz, Sides)*

The attached report shows the number of affirmative, negative, and abstaining votes as well as the explanation of the vote for **each** revision**.**

To pass ballot, **each** revision requires: (1) a simple majority of those eligible to vote and (2) an affirmative vote of $^{2}/_{3}$ of ballots returned. See Sections 3.3.4.3.(c) and 4.3.10.1 of the ***Regulations Governing the Development of NFPA Standards***.

Second Revision No. 1-NFPA 704-2025 [Section No. 2.3]

2.3 Other Publications.

2.3.1 ASTM Publications.

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

ASTM D92, *Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester*, ~~2018~~ 2024 .

ASTM D6668, *Standard Test Method for Discrimination Between Flammability Ratings of F = 0 and F = 1*, ~~2022~~ 2021 .

2.3.2 UN Publications.

United Nations, 799 United Nations Plaza, New York, NY 10017.

Manual of Tests and Criteria, ~~6~~ 8 th revised edition.

Recommendations on the Transport of Dangerous Goods, Model Regulations, ~~19th~~ 23rd revised edition.

2.3.3 US Government Publications.

US Government Publishing Office, 732 North Capitol Street, NW, Washington, DC ~~20401-0001~~ 20401 .

Title 16, Code of Federal Regulations, “Method for Determining Flammable and Extremely Flammable Contents of Self-Pressurized Containers,” Part 1500.45.

Title 49, Code of Federal Regulations, “Method of Testing for Sustained Combustibility,” Part 173, Appendix H.

2.3.4 Other Publications.

Merriam-Webster’s Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2020.

Submitter Information Verification

Committee: CLA-AAA
Submittal Date: Mon Aug 11 10:57:27 EDT 2025

Committee Statement

Committee Statement: Revisions to update Other Publication edition years.
Response Message: SR-1-NFPA 704-2025

Public Comment No. 5-NFPA 704-2025 [Section No. 2.3.2]

Ballot Results

✔ **This item has passed ballot**

22 Eligible Voters
6 Not Returned

15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Hanselka, Reinhard
Koninckx, Elsa J.
Lingle, William Camden
Pelgroms, Frank
Platz, Christopher M.
Sides, Stephen

Affirmative All

Allen, Christopher
Beam, Jason
Colonna, Guy R.
Hollinger, David W.
Kirsch, Ron A.
Mennella, Michael
Michaels, Robert A.
Nocco, Robert A.
Noles, Christian
Ott, Brian
Primeau, Brian
Robin, Mark L.
Thomson, Bradley
Valerioti, Albert Mark
Vigerust, Jr., James O.

Affirmative with Comment

Britton, Laurence G.
okay

Second Revision No. 4-NFPA 704-2025 [Section No. 3.3.1]

3.3.1 Battery Energy Storage System (BESS).

One or more electrochemical storage devices, assembled together, capable of storing energy to supply electrical energy at a future time.

Submitter Information Verification

Committee: CLA-AAA
Submittal Date: Tue Aug 12 11:51:20 EDT 2025

Committee Statement

Committee Statement: This revision was made to separate the definition of Battery Energy Storage Systems from the Energy Storage System definition in NFPA 855, which is the primary NFPA document covering Energy Storage Systems. Definition now differentiates electrochemical energy storage from other types of storage (thermal, mechanical, etc.).

Response Message: SR-4-NFPA 704-2025

Public Comment No. 1-NFPA 704-2025 [Section No. 3.3.1]

Ballot Results

✔ **This item has passed ballot**

22 Eligible Voters
6 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Hanselka, Reinhard
Koninckx, Elsa J.
Lingle, William Camden
Pelgroms, Frank
Platz, Christopher M.
Sides, Stephen

Affirmative All

Allen, Christopher

Beam, Jason
Colonna, Guy R.
Hollinger, David W.
Kirsch, Ron A.
Mennella, Michael
Michaels, Robert A.
Nocco, Robert A.
Noles, Christian
Ott, Brian
Primeau, Brian
Robin, Mark L.
Thomson, Bradley
Valerioti, Albert Mark
Vigerust, Jr., James O.

Affirmative with Comment

Britton, Laurence G.
okay

Second Revision No. 9-NFPA 704-2025 [Section No. 4.1.6]

4.1.6

The fourth quadrant, at the six o'clock position, shall be reserved for indicating special hazards ~~and shall~~ , be in accordance with Chapter 8~~. No~~ , and not have a special color is associated with ~~this quadrant~~ it .

Supplemental Information

File Name	Description	Approved
704_SR-9_4.1.6.docx		

Submitter Information Verification

Committee: CLA-AAA

Submittal Date: Wed Sep 17 09:45:14 EDT 2025

Committee Statement

Committee Statement: Revision made to reflect editorial correction to reword the requirement in order to eliminate two shall statements.

Response Message: SR-9-NFPA 704-2025

Ballot Results

This item has passed ballot

22 Eligible Voters
6 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Hanselka, Reinhard
Koninckx, Elsa J.
Lingle, William Camden
Pelgroms, Frank
Platz, Christopher M.
Sides, Stephen

Affirmative All

Allen, Christopher

Beam, Jason

Colonna, Guy R.

Hollinger, David W.

Kirsch, Ron A.

Mennella, Michael

Michaels, Robert A.

Nocco, Robert A.

Noles, Christian

Ott, Brian

Primeau, Brian

Robin, Mark L.

Thomson, Bradley

Valerioti, Albert Mark

Vigerust, Jr., James O.

Affirmative with Comment

Britton, Laurence G.

okay

Second Revision No. 7-NFPA 704-2025 [Section No. 6.2]

6.2* Degrees of Hazard.

The degrees of flammability hazard shall be ranked according to the susceptibility of materials to burning detailed in Table 6.2.

Table 6.2 Degrees of Flammability Hazards

Degree of Hazard	Criteria
4 — Materials that rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and burn readily	Flammable gases other than those described below Flammable cryogenic materials Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e., Class IA liquids) Materials that ignite spontaneously when exposed to air Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.
3 — Liquids and solids (including finely divided suspended solids) that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions. See Annex D for more information on ranking of combustible dusts.	Liquids having a flash point below 22.8°C (73°F) and a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (100°F) (i.e., Class IB and Class IC liquids) Finely divided solids, typically less than 75 micrometers (μm) (200 mesh), that present an elevated risk of forming an ignitible dust cloud, such as finely divided sulfur; *NFPA 70*, Group E dusts (e.g., aluminum, zirconium, and titanium); and bis-phenol A Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g., dry nitrocellulose and many organic peroxides) Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

Degree of Hazard	Criteria
Materials in this degree also include flammable gases that exhibit a low fundamental burning velocity. **2** — Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Under normal conditions, these materials would not form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating they could release vapor in sufficient quantities to produce hazardous atmospheres with air. Materials in this degree also include finely divided suspended solids that do not require heating before ignition can occur. See Annex D for more information on ranking of combustible dusts.	Flammable gases that meet all of the following criteria: (1) Ignitible at an absolute pressure of 14.7 psi (101.3 kPa) when in a mixture of 13 percent or less by volume with air or that have a flammable range at an absolute pressure of 14.7 psi (101.3 kPa) with air at least 12 percent regardless of the lower limit (2) Non-pyrophoric and non-chemically unstable (3) Fundamental burning velocity of less than 3.9 in/s (10 cm/s) Liquids having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e., Class II and Class IIIA liquids) Finely divided solids less than 420 µm (40 mesh) that present an ordinary risk of forming an ignitible dust cloud Solid materials in a flake, fibrous, or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal, and hemp Solids and semisolids that readily give off flammable vapors Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.
1 — Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur. Materials in this degree also include finely divided suspended solids that do not require heating before ignition can occur. See Annex D for more information on ranking of combustible dusts.	Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes in accordance with ASTM D6668, *Standard Test Method for Discrimination Between Flammability Ratings of F = 0 and F = 1* Liquids, solids, and semisolids having a flash point at or above 93.4°C (200°F) (i.e., Class IIIB liquids) Liquids with a flash point greater than 35°C (95°F) that do not sustain combustion when tested using the "Method of Testing for Sustained Combustibility," per 49 CFR 173, Appendix H, or the UN publications *Recommendations on the Transport of Dangerous Goods – Model Regulations* and *Manual of Tests and Criteria* Liquids with a flash point greater than 35°C (95°F) in a water-miscible solution or dispersion with a water

Degree of Hazard	Criteria
	noncombustible liquid/solid content of more than 85 percent by weight Liquids that have no fire point when tested by ASTM D92, *Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester*, up to the boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change Combustible pellets, powders, or granules greater than 420 µm (40 mesh) Finely divided solids less than 420 µm (40 mesh) that are nonexplosible in air at ambient conditions, such as low volatile carbon black and polyvinylchloride (PVC) Most ordinary combustible materials Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.
0 — Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.	Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with ASTM D6668, *Standard Test Method for Discrimination Between Flammability Ratings of F = 0 and F = 1*

A.6.2

For water-miscible solutions and liquids that do not sustain combustion in accordance with the hazard rating 1 criteria, the individual performing the hazard evaluation should recognize that in large vapor spaces, evaporation of volatile components of the mixture can create a flammable mixture, which could increase the fire or explosion hazard. This could occur even though the bulk material meets the aforementioned criteria.

In the case of mixtures stored in noninerted tanks where the vapor space can contain ignitible vapor, the flammability rating should be based exclusively on a closed cup flash point test. In some cases, even solutions containing less than 1 percent volatile flammable materials could produce ignitible atmospheres ~~(Britton)~~ .

Determination of fundamental burning velocity is a test used for refrigerants and should be determined in accordance with ASHRAE 34, *Designation and Safety Classification of Refrigerants* .

Supplemental Information

File Name	Description	Approved
704_SR7_Section_6.2_and_Table_6.2_Revisions.docx	Revision to A.6.2 and Table 6.2	

Submitter Information Verification

Committee: CLA-AAA

Submittal Date: Wed Aug 13 10:53:33 EDT 2025

Committee Statement

Committee Statement: Revision made to Section 6.2 to align with NFPA 1 with regard to 1A and 1B flammable gases. Revision to Table 6.2 further clarifies that Category 1B has a lower flammability than Category 1A flammable gases and is considered to be a Category 3 Hazard Rating. Annex material in A.6.2 was added to instruct users on determination of fundamental burning velocity in accordance with ASHRAE 34.

Response Message: SR-7-NFPA 704-2025

Ballot Results

✔ **This item has passed ballot**

22 Eligible Voters
6 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Hanselka, Reinhard
Koninckx, Elsa J.
Lingle, William Camden
Pelgroms, Frank
Platz, Christopher M.
Sides, Stephen

Affirmative All

Allen, Christopher
Beam, Jason
Colonna, Guy R.
Hollinger, David W.
Kirsch, Ron A.
Mennella, Michael
Michaels, Robert A.
Nocco, Robert A.
Noles, Christian
Ott, Brian
Primeau, Brian
Robin, Mark L.

Thomson, Bradley
Valerioti, Albert Mark
Vigerust, Jr., James O.

Affirmative with Comment
Britton, Laurence G.
okay

Second Revision No. 5-NFPA 704-2025 [Chapter B]

Annex B Health Hazard Rating

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 Development of Quantitative Guidelines for Health.

In developing this edition of NFPA 704, the Technical Committee on Classification and Properties of Hazardous Chemical Data determined that the standard should provide quantitative guidelines for determining the numerical health hazard rating of a material *(see Table B.1)*.

Table B.1 Health Hazard Rating Chart

	Gas/Vapor					
Degree of Hazard	Inhalation LC_{50} (ppm-v)	Saturated Vapor Concentration (× LC_{50} in ppm-v)	Dust/Mist Inhalation LC_{50} (mg/L)	Oral LD_{50} (mg/kg)	Dermal LD_{50} (mg/kg)	Skin/Eye Contact
4	0 to 1,000	10 to >10	0.00 to 0.5	0.00 to 5	0 to 40	—
3	1,001 to 3,000	1 to <10	0.51 to 2	5.01 to 50	40.1 to 200	Corrosive, irreversible eye injury; corrosive if pH ≤2 or ≥11.5
2	3,001 to 5,000	0.2 to <1	2.01 to 10	50.1 to 500	201 to 1,000	Severe irritation, reversible injury; sensitizers, lacrimators; frostbite from compressed liquefied gases
1	5,001 to 10,000	0 to <0.2	10.1 to 200	501 to 2,000	1,001 to 2,000	Slight to moderate eye irritation; mild irritation is borderline 0/1
0	>10,000	0 to <0.2	>200	>2,000	>2,000	Essentially nonirritating

Notes:

(1)

$$\text{ppm} = \frac{\text{mg/m}^3 \times 24.45}{\text{molecular weight}} \quad \textbf{[B.1a]}$$

(2) Saturated vapor concentration (ppm) at 20°C and standard atmospheric pressure:

$$\text{SVC} = \frac{\text{Vapor pressure (mmHg)} \times 106}{760} \quad \textbf{[B.1b]}$$

(3) See Section B.3 for definitions of LC_{50} and LD_{50}.

B.1.1 Inhalation Hazard Considerations Using DOT Criteria.

In addition, the Committee agreed that a health hazard rating of 4 or 3 should be assigned to any material classified as a "Poison-Inhalation Hazard" by the US Department of Transportation (DOT). The poison-inhalation hazard classification was adopted by DOT from the United Nations (UN) criteria detailed in the UN publication *Recommendations on the Transport of Dangerous Goods — Model Regulations.*

B.1.2 Inhalation Hazard Considerations Using UN Criteria.

The UN criteria for inhalation toxicity are based on the LC_{50} and saturated vapor concentration of the material.

B.1.3 Oral and Dermal Hazard Considerations Using UN Criteria.

Furthermore, in addition to inhalation toxicity, the UN has established criteria for oral and dermal toxicity, as well as corrosivity. Based on those criteria, the UN assigns materials to categories called Packing Groups. Packing Group I materials represent a severe hazard in transport, Group II materials represent a serious hazard, and Group III materials represent a low hazard.

The Committee decided to adopt the UN criteria for toxicity and corrosivity, and to correlate Packing Groups I, II, and III with the health hazard ratings 4, 3, and 2, respectively.

B.1.4 Adoption of UN Criteria.

Adoption of the UN system has several advantages.

B.1.4.1

First, it addresses hazards in transportation that are similar to the type of emergencies likely to be encountered by ~~fire-fighting~~ firefighting personnel and emergency responders. Most other hazard ranking systems have been developed for occupational exposures.

B.1.4.2

Second, the UN system is well established, and it is presumed that a large number of chemical manufacturers have already classified (or can easily classify) materials into the appropriate packing groups.

B.1.4.3

Finally, users of chemicals can assign a 4, 3, or 2 health hazard rating by establishing whether a chemical has been assigned to a UN packing group due to toxicity or to corrosivity.

B.1.5 Hazard Considerations Using HMIS Criteria.

To establish 1 and 0 health hazard rankings, the Committee utilized criteria for the 1 and 0 ratings contained in the Hazardous Materials Identification System (HMIS) developed by the American Coatings Association (ACA), formerly the National Paint & Coatings Association (NPCA) *(see Hazardous Materials Identification System Revised, Implementation Manual)*. Although the ACA criteria were developed for occupational exposure, the 1 and 0 criteria are on the low end of the hazard spectrum and are fairly consistent with, and complementary to, the 4, 3, and 2 ratings based on the UN criteria. No UN criteria were established for eye irritation, and the Committee adopted ACA 3, 2, 1, and 0 criteria as health hazard ratings for eye irritation.

B.2 Additional Revisions to Health Hazard Rating.

The Committee made a number of revisions to the proposed hazard rating system to provide conformity with existing industrial practice and to recognize the limitations and availability of corrosivity and eye irritation in a single "skin/eye contact" category and to utilize descriptive terms for the health hazard ratings. Minor changes were made to the 2, 1, and 0 criteria for oral toxicity and to the 1 and 0 criteria for dermal toxicity. Specifically, the distinction between solids and liquids in the oral toxicity criteria was eliminated, and the cutoff between 1 and 0 rankings for oral and dermal toxicity was lowered from 5000 to 2000 mg/kg.

In summary, the 4, 3, and 2 health hazard rankings for oral, dermal, and inhalation toxicity are based primarily on UN criteria. The 1 and 0 health hazard rankings for oral, dermal, inhalation toxicity, and all the "skin/eye contact" rankings are based primarily on ACA criteria.

B.3 UN Definitions.

For the user's assistance in utilizing this standard, the following definitions are extracted from Section 6.5 of the UN publication *Recommendations on the Transport of Dangerous Goods — Model Regulations*. In the absence of data for the species defined as follows, the committee currently considers other mammalian species, including human data and professional judgment to assign health ratings. In addition, Table B.1 can be used for guidance.

B.3.1

LD_{50} (median lethal dose) for acute oral toxicity is the statistically derived single dose of a substance that can be expected to cause death within 14 days in 50 percent of young adult albino rats when administered by the oral route. The LD_{50} value is expressed in terms of mass of test substance per mass of test animal (mg/kg).

B.3.2

LD_{50} for acute dermal toxicity is that dose of the substance which, administered by continuous contact for 24 hours with the bare skin of albino rabbits, is most likely to cause death within 14 days in one half of the animals tested. The number of animals tested shall be sufficient to give a statistically significant result and be in conformity with good pharmacological practice. The result is expressed in milligrams per kg body mass.

B.3.3

LC_{50} for acute toxicity on inhalation is that concentration of vapor, mist, or dust which, administered by continuous inhalation to both male and female young adult albino rats for one hour, is most likely to cause death within 14 days in one half of the animals tested. A solid substance shall be tested if at least 10 percent (by mass) of its total mass is likely to be dust in the respirable range (e.g., the aerodynamic diameter of that particle-fraction is 10 microns or less). A liquid substance shall be tested if a mist is likely to be generated in a leakage of the transport containment. Both for solid and liquid substances more than 90 percent (by mass) of a specimen prepared for inhalation toxicity shall be in the respirable range as defined above. The result is expressed in milligrams per liter of air for dusts and mist, or in milliliters per cubic meter of air (part per million) for vapors.

B.4 Inhalation Toxicity Criteria.

The following information extracted from the UN publication, *Recommendations on the Transport of Dangerous Goods — Model Regulations*, also applies:

The criteria for inhalation toxicity of dusts and mists are based on LC_{50} data relating to 1 hour exposures and where such information is available it should be used. However, where only LC_{50} data relating to 4 hour exposures to dusts and mists are available, such figures can be multiplied by four and the product substituted in the above criteria, i.e., LC_{50} (4 hour) × 4 is considered equivalent of LC_{50} (1 hour).

The criteria for inhalation toxicity of vapors are based on LC_{50} data relating to 1 hour exposures, and where such information is available it should be used. However, where only LC_{50} data relating to 4 hour exposures to vapors are available, such figures can be multiplied by two and the product substituted in the above criteria, i.e., LC_{50} (4 hour) × 2 is considered equivalent of LC_{50} (1 hour).

B.5 Occupational Exposure Limits.

The following information is provided to assist users with understanding acute (short-term) and chronic (long-term) exposure values from other standards, regulatory bodies, or advisory bodies. NFPA 704 distinguishes between acute and chronic exposures, and the committee recognizes that acute exposures can have chronic effects.

Exposure limits are often expressed as a limit a worker can be exposed to for a full work shift, eight to ten hours per day, five days per week, for a working year. These occupational limits are not necessarily reflective of the short-term, acute exposure of the type covered by this standard.

The exposure limits can be maximum or “ceiling” limits that should not be exceeded; short-term, acute limits; or skin contact limits. Some organizations publish limits that are expressly for acute exposures.

B.5.1 Immediately Dangerous to Life or Health.

The National Institute for Occupational Safety and Health (NIOSH) in the United States publishes a set of exposure limits [see NIOSH *Pocket Guide to Chemical Hazards* (NPG)] to toxic substances defined as immediately dangerous to life or health (IDLH). IDLH values are more conservative than the LC_{50} and LD_{50} values since those values represent death for some animals and humans and IDLH is an unacceptable danger level.

B.5.2 Other Emergency Exposure Limits.

Many other governmental and non-governmental organizations publish emergency exposure limits with varying levels of severity, actions, and differing time exposures. Some of these include acute exposure guideline levels (AEGLs), temporary emergency exposure limits (TEELs), and military exposure guidelines (MEGs).

Submitter Information Verification

Committee: CLA-AAA
Submittal Date: Tue Aug 12 11:55:02 EDT 2025

Committee Statement

Committee Statement: Revision made to add new information in Annex B for Occupational Exposure Limits. Besides the LC50 and LD50 toxic exposure limits, there are many other regulatory bodies and industry organizations that conduct research and provide other exposure limits. While the LC50 and LD50 are the focus of the NFPA 704 hazard diamond, the NFPA 704 committee thought it wise to include some Annex information that directs users to other exposure limits.

Response Message: SR-5-NFPA 704-2025

Public Comment No. 2-NFPA 704-2025 [Chapter B]

Ballot Results

✔ **This item has passed ballot**

22 Eligible Voters
6 Not Returned
15 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
1 Abstention

Not Returned

Hanselka, Reinhard

Koninckx, Elsa J.

Lingle, William Camden

Pelgroms, Frank

Platz, Christopher M.

Sides, Stephen

Affirmative All

Allen, Christopher

Beam, Jason

Colonna, Guy R.

Hollinger, David W.

Kirsch, Ron A.

Mennella, Michael

Michaels, Robert A.

Nocco, Robert A.

Noles, Christian

Ott, Brian

Primeau, Brian

Robin, Mark L.

Thomson, Bradley

Valerioti, Albert Mark

Vigerust, Jr., James O.

Abstention

Britton, Laurence G.

not my area

Second Revision No. 8-NFPA 704-2025 [Section No. C.3]

~~**C.3** Flash Point Test Methods.~~

~~In the interest of reproducible results, the following procedures are recommended for determining flash point:~~

~~The flash point of liquids having a viscosity less than 5.5 mm^2 /s [5.5 centistokes (cSt)] at 40°C (104°F) or less than 9.5 mm^2 /s (9.5 cSt) at 25°C (77°F) and a flash point below 93.4°C (200°F) can be determined in accordance with ASTM D56, *Standard Method of Test for Flash Point by the Tag Closed Tester* . (In those countries that use the Abel or Abel-Pensky closed cup tests as an official standard, these tests will be equally acceptable to the Tag Closed Cup Method.)~~

~~For liquids having flash points in the range of 0°C (32°F) to 110°C (230°F), the determination can be made in accordance with ASTM D3278, *Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus* , or ASTM D3828, *Standard Test Methods for Flash Point by Small Scale Closed Cup Tester* .~~

~~For viscous and solid chemicals, the determination can be made in accordance with ASTM E502, *Standard Test Method for Selection and Use of ASTM Standards for the Determination of Flash Point of Chemicals by Closed Cup Methods* .~~

~~The flash point of liquids having a viscosity of 5.5 mm^2 /s (5.5 cSt) or greater at 40°C (100°F) or 9.5 mm^2 /s (9.5 cSt) or greater at 25°C (77°F) can be determined in accordance with ASTM D93, *Standard Test Methods for Flash Point by the Pensky-Martens Closed Tester* .~~

C.3 Flash Point Test Methods.

ASTM E502 provides guidance on the use of different ASTM flash point test methods and the correction of flash point data for ambient pressure where this differs from 1 standard atmosphere. The flash point test method standards include the following:

ASTM D56, *Test Method for Flash Point by Tag Closed Cup Tester*

ASTM D92, *Test Method for Flash and Fire Points by Cleveland Open Cup Tester*

ASTM D93, *Test Methods for Flash Point by Pensky-Martens Closed Cup Tester*

ASTM D270, *Methods of Sampling Petroleum and Petroleum Products* (Withdrawn 1984)

ASTM D1310, *Test Method for Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus*

ASTM D3278, *Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus*

ASTM D3827, *Test Method for Estimation of Solubility of Gases in Petroleum and Other Organic Liquids*

ASTM D3828, *Test Methods for Flash Point by Small Scale Closed Cup Tester*

ASTM D3934, *Test Method for Flash/No Flash Test—Equilibrium Method by a Closed-Cup Apparatus*

ASTM D3941, *Test Method for Flash Point by the Equilibrium Method With a Closed-Cup Apparatus*

ASTM E681, *Test Method for Concentration Limits of Flammability of Chemicals (Vapors and Gases)*

ASTM E1232, *Test Method for Temperature Limit of Flammability of Chemicals*

C.4 Flash Point Errors.

Flash point tests require flames to travel downwards into the cup, while flames always exhibit wider flammable limits when traveling upwards. Also, the vapor-air mixture is rarely at vapor-liquid equilibrium (VLE), and the small size of the cup causes loss of heat and radicals from an incipient flame. For these reasons the measured flash points of pure liquids are generally greater than the temperatures at which the lower flammable limit (LFL) mixture should be formed, as calculated from the LFL plus the vapor pressure of the liquid. As shown by Britton and Smith the theoretical flash point can be up to about 5°C less than the measured flash point. To offset the error a safety margin of at least 5°C is often applied to the measured flash points of single component liquids.

The problem is compounded in the case of liquid mixtures. A major problem is that VLE is unobtainable in a vented cup and moreover, some lighter components are lost as the cup is heated to the test temperature. A large effect on both flash point and fire point was demonstrated for acetone-water mixtures by Britton. As discussed in Britton and Smith, a safety margin of at least 11°C is often applied to flash point measurements of petroleum distillate fuels and similar complex mixtures. Smaller flash point testers might be unsuitable for testing liquid mixtures containing small quantities of volatile components. To minimize such errors, a large volume flash point apparatus such as the Pensky-Martens is recommended in ASTM E502, *Standard Test Method for Selection and Use of ASTM Standards for the Determination of Flash Point of Chemicals by Closed Cup Methods* . However, to avoid these problems, a different approach is needed and consequently ASTM E1232, *Test Method for Temperature Limit of Flammability of Chemicals* , was developed.

ASTM E1232 is a relatively new flash point test method. The test equipment resembles that used for measuring the lower flammable limit [ASTM E681, *Test Method for Concentration Limits of Flammability of Chemicals (Vapors and Gases*)] but instead of measuring the minimum fuel concentration at which ignition occurs, the minimum temperature of a pool of liquid in equilibrium with the vapor is measured at the point the vapor-air mixture becomes ignitible. As both liquid and vapor are contained inside a glass flask there is no loss of minor components. The test is relatively expensive compared to flash point tests and is most useful for mixtures whose flash point could be seriously overestimated by cup methods.

As atmospheric pressure varies with time and location and generally declines with elevation, tests not made at 1 standard atmosphere require correction. ASTM E502 provides simple correction equations. These equations were recently verified by Britton and Smith, who also derived equations for the change in flash point with elevation.

[1] ASTM E502, *Standard Test Method for Selection and Use of ASTM Standards for the Determination of Flash Point of Chemicals by Closed Cup Methods* .

[2] Britton, L.G., and J.A. Smith, “Static Hazards of the VAST,” *Journal of Loss Prevention in the Process Industries* 25 (2012), Appendix A “Flammability Considerations”, 322-325.

[3] Britton, L.G., “Survey of Classification Systems for Liquids,” *Process Safety Progress* , Vol. 18, No. 4 (1999).

Supplemental Information

File Name	Description	Approved
704_SR8_New_Section_C.3_and_C.4.docx	New Section C.3 and C.4	
704_SR8_New_Section_C.3_and_C.4.docx	For prod use	

Submitter Information Verification

Committee: CLA-AAA

Submittal Date: Wed Aug 13 11:04:38 EDT 2025

Committee Statement

Committee Statement: Current text in C.3 was deleted as it was out of date and replaced with the current list of flashpoint standards as listed in ASTM E502. The text new Section C.4 was added to provide an explanation of flash point errors and how errors are minimized by using ASTM E1232 on Temperature Limits of Flammability (TLF). C.4 also highlights that ASTM E502 provides correction equations for changes in atmospheric pressures.

Response Message: SR-8-NFPA 704-2025

Ballot Results

✔ **This item has passed ballot**

22 Eligible Voters
6 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Hanselka, Reinhard
Koninckx, Elsa J.
Lingle, William Camden
Pelgroms, Frank
Platz, Christopher M.
Sides, Stephen

Affirmative All

Allen, Christopher
Beam, Jason
Colonna, Guy R.
Hollinger, David W.
Kirsch, Ron A.
Mennella, Michael
Michaels, Robert A.
Nocco, Robert A.
Noles, Christian
Ott, Brian
Primeau, Brian
Robin, Mark L.
Thomson, Bradley
Valerioti, Albert Mark
Vigerust, Jr., James O.

Affirmative with Comment

Britton, Laurence G.

okay

Second Revision No. 6-NFPA 704-2025 [Section No. E.3]

E.3 CHETAH.

CHETAH is a computer program that is useful for several tasks, including the following:

(1) Characterizing materials for their ability to decompose with violence

(2) Estimating heats of reaction or combustion

(3) Predicting lower flammability limits and certain other flammability parameters

(4) Predicting thermochemical properties such as standard enthalpies of formation, heat capacities, and free energies of formation

An extensive database of common chemicals, primarily organics, is included in the program, along with a procedure to predict values for additional chemicals using the Benson group additivity method of describing molecules from molecular fragments.

For hazard evaluation, CHETAH is a conservative screening tool for use during the early stages of compound synthesis or process development. Its use should be integrated within an experimental program for testing reactive chemical hazards. CHETAH was not designed to replace the physical testing of materials. Rather, CHETAH's computational results should be used to complement experimental results to help identify the need for further testing in the areas of impact sensitivity and/or flammability.

The potential hazards associated with handling new chemicals will not, in general, be known a priori. Furthermore, experimentally determined thermochemical data for new chemicals used for process design and to predict hazards will often not be available. CHETAH exists largely to allow users to build compounds using group additivity methods, to predict thermochemical properties for compounds and reactions, and to use these predicted properties for hazard evaluation. Users can then use CHETAH's predictions with results from accelerating rate calorimetry (ARC), differential scanning calorimetry (DSC), drop-weight, or other tests to prepare, use, store, or dispose of new compounds safely. Personnel committed to ensuring the safe operations at sites where research, process development, or manufacturing occur could find CHETAH useful in reactive chemicals evaluation programs.

The user might wish to examine the following list of references for examples illustrating how CHETAH can be used to evaluate instability hazards. A more extensive list of references concerning CHETAH can be found at:

www.astm.org/BOOKSTORE/PUBS/DS51F.htm.CHETAH is distributed by ASTM International Inc.

References:

Britton, L. G. , and D. J. Frurip, "Further Uses of the Heat of Oxidation in Chemical Hazard Assessment," *Process Safety Progress*, 22 (1), 1–19, 2003.

Britton, L. G. and B. K. Harrison, "Minimum Explosible Concentrations of Mist and Dust Clouds," *Process Safety Progress* , Vol. 37(1), 4-17, 2018. doi.org/10.1002/prs.11959

Britton, L. G., and B. K. Harrison, "Using CHETAH to Estimate Lower Flammable Limit, Minimum Ignition Energy, and Other Flammability Parameters," *Process Safety Progress*, Volume 33, No.4, (2014). onlinelibrary.wiley.com/doi/10.1002/prs.11721/abstract;jsessionid=5CA1F9ED992D1F8626D2AE99

Frurip, D., et al., "The Role of ASTM E27 Methods in Hazard Assessment: Part I. Thermal Stability, Compatibility, and Energy Release Estimation Methods," *Process Safety Progress*, Volume 23, No.4 (2004): 266–278.

~~Pasturenzi, C., et al., "Thermochemical stability: A comparison between experimental and predicted data," *Journal of Loss Prevention in the Process Industries* , Volume 28, (2014): 79–91, 2014.~~

Frurip, D., "Selection of the Proper Calorimetric Test Strategy in Reactive Chemicals Hazard Evaluation," *Organic Process Research and Development* , Volume 12, No. 6, 1287-1292, 2008. DOI: 10.1021/op800121x, (2008). pubs.acs.org/doi/abs/10.1021/op800121x

Pasturenzi, C., et al., "Thermochemical stability: A comparison between experimental and predicted data," *Journal of Loss Prevention in the Process Industries* , Volume 28, (2014): 79–91, 2014. doi.org/10.1016/j.jlp.2013.03.011.

Submitter Information Verification

Committee: CLA-AAA
Submittal Date: Tue Aug 12 13:54:45 EDT 2025

Committee Statement

Committee Statement: Revision to E.3 to add more references for information on CHETAH.
Response Message: SR-6-NFPA 704-2025

Ballot Results

✔ **This item has passed ballot**

22 Eligible Voters
6 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned
Hanselka, Reinhard
Koninckx, Elsa J.
Lingle, William Camden
Pelgroms, Frank
Platz, Christopher M.
Sides, Stephen

Affirmative All
Allen, Christopher
Beam, Jason
Colonna, Guy R.
Hollinger, David W.
Kirsch, Ron A.
Mennella, Michael
Michaels, Robert A.
Nocco, Robert A.
Noles, Christian
Ott, Brian
Primeau, Brian
Robin, Mark L.
Thomson, Bradley
Valerioti, Albert Mark

Vigerust, Jr., James O.

Affirmative with Comment

Britton, Laurence G.

okay

Second Revision No. 10-NFPA 704-2025 [Section No. H.1]

H.1

NFPA frequently receives requests for permission to use the NFPA 704 diamond in safety and emergency response publications and training materials. This annex is provided as an example of labels and text that can be used within publications and training documents that summarizes the NFPA 704 label system. *[See Figure H.1(a) and Figure H.1(b).]*

Figure H.1(a) NFPA Sample Placard 1.

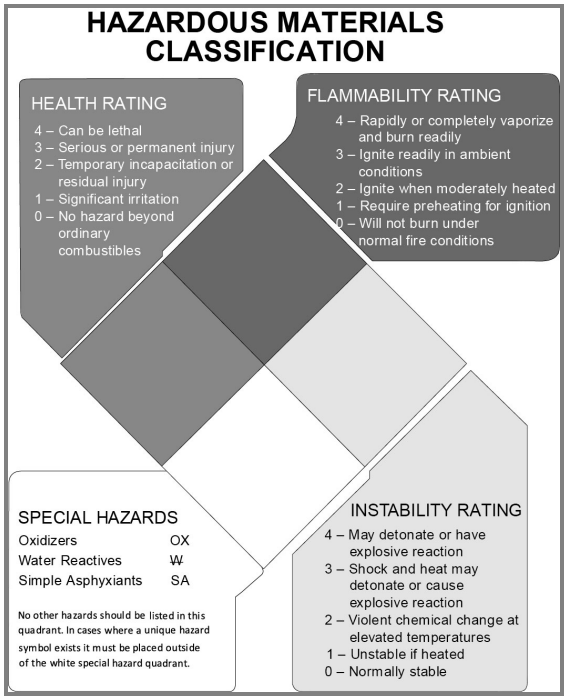
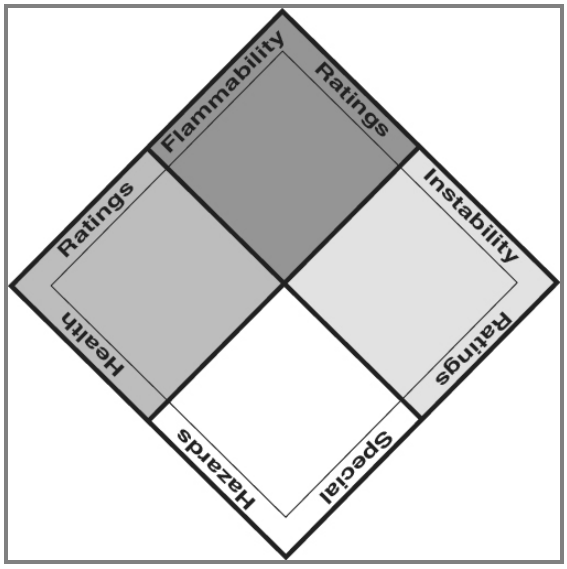


Figure H.1(b) Hazardous Materials Classification.



The following text should accompany the placard examples published in any document:

NFPA 704 provides a simple, readily recognizable, and easily understood system of markings that provides a general idea of the hazards of a material and the severity of these hazards as they relate to emergency response. The standard does not tell you when such labels are required but provides the criteria for labeling when such labels are required by another code, standard, regulation, or jurisdiction.

The ratings shown in Figure H.1(a) and Figure H.1(b) are in summary form only. The current edition of NFPA 704 should be consulted for the detailed criteria used to determine the correct numbers to be placed in the quadrants for a specific material.

~~Reprinted with permission from NFPA 704-2017, System for the Identification of the Hazards of Materials for Emergency Response, Copyright © 2016, National Fire Protection Association.~~ This reprinted material is not the complete and official position of the NFPA on the referenced subject, which is represented solely by the standard in its entirety. The classification of any particular material within this system is the sole responsibility of the user and not the NFPA. NFPA bears no responsibility for any determinations of any values for any particular material classified or represented using this system.

Supplemental Information

File Name	Description	Approved
704_SR-10_H.1.docx		

Submitter Information Verification

Committee: CLA-AAA

Submittal Date: Wed Sep 17 09:50:45 EDT 2025

Committee Statement

Committee Statement: Editorial revision made to the informational text below Figure H.1(a) and Figure H.1(b) to remove text that contained copyright information related to the edition year of the standard.

Response Message: SR-10-NFPA 704-2025

Ballot Results

✔ **This item has passed ballot**

22 Eligible Voters
6 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Hanselka, Reinhard
Koninckx, Elsa J.
Lingle, William Camden
Pelgroms, Frank
Platz, Christopher M.
Sides, Stephen

Affirmative All

Allen, Christopher
Beam, Jason

Colonna, Guy R.
Hollinger, David W.
Kirsch, Ron A.
Mennella, Michael
Michaels, Robert A.
Nocco, Robert A.
Noles, Christian
Ott, Brian
Primeau, Brian
Robin, Mark L.
Thomson, Bradley
Valerioti, Albert Mark
Vigerust, Jr., James O.

Affirmative with Comment

Britton, Laurence G.
okay

Second Revision No. 2-NFPA 704-2025 [Section No. I.1.2]

I.1.2 Other Publications.

I.1.2.1 ASTM Publications.

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

ASTM D56, *Standard Method of Test for Flash Point by the Tag Closed Tester*, ~~2022~~ 2021a .

ASTM D86, *Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure*, 2023.

ASTM D92, *Test Method for Flash and Fire Points by Cleveland Cup Tester* , 2024.

ASTM D93, *Standard Test Methods for Flash Point by the Pensky-Martens Closed Tester*, 2020.

ASTM D1310, *Test Method for Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus* , 2021.

ASTM D2879, *Standard Test Method for Vapor Pressure–Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope*, 2023.

ASTM D3278, *Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus*, 2021.

ASTM D3827, *Test Method for Estimation of Solubility of Gases in Petroleum and Other Organic Liquids* , 2020.

ASTM D3828, *Standard Test Methods for Flash Point by Small Scale Closed Cup Tester*, 2016a, reapproved 2021.

ASTM D3934, *Test Method for Flash/No Flash Test—Equilibrium Method by a Closed-Cup Apparatus* , 2020.

ASTM D3941, *Test Method for Flash Point by the Equilibrium Method with a Closed-Cup Apparatus* , 2020.

ASTM E502, *Standard Test Method for Selection and Use of ASTM Standards for the Determination of Flash Point of Chemicals by Closed Cup Methods*, 2021a.

ASTM E537, *Standard Test Method for the Thermal Stability of Chemicals by Differential Scanning Calorimetry*, 2024.

ASTM E681, *Test Method for Concentration Limits of Flammability of Chemicals (Vapors and Gases)* , 2023.

ASTM E698, *Standard Test Method for Kinetic Parameters for Thermally Unstable Materials Using Differential Scanning Calorimetry and the Flynn/Wall/Ozawa Method*, 2023.

ASTM E1226, *Standard Test Method for Explosibility of Dust Clouds*, 2019.

ASTM E1232, *Standard Test Method for Temperature Limit of Flammability of Chemicals*, 2019.

ASTM E1515, *Standard Test Method for Minimum Explosible Concentration of Combustible Dusts*, 2014, reapproved 2022.

ASTM E1981, *Standard Guide for Assessing Thermal Stability of Materials by Methods of Accelerating Rate Calorimetry*, 2022.

I.1.2.2 OSHA Publications.

Occupational Safety and Health Administration, 200 Constitution Avenue, NW, Washington, DC 20210.

"Combustible Dust." osha.gov/Publications/combustibledustposter.pdf.

"OSHA Fact Sheet: Hazard Alert: Combustive Dust Explosions," 2015. osha.gov/OshDoc/data_General_Facts/OSHAcombustibledust.html.

OSHA 3644, *Combustible Dust: Firefighting Precautions at Facilities with Combustible Dust*, 2013. osha.gov/Publications/OSHA_3644.pdf.

OSHA 3674, *Combustible Dust: Precautions for Firefighters to Prevent Dust Explosions QuickCard*, 2013. osha.gov/Publications/OSHA_3674.pdf.

OSHA, *Hazard Communication Standard*, 2012.

OSHA, "Comparison of NFPA 704 and HazCom 2012 Labels," 2013. osha.gov/Publications/OSHA3678.pdf.

I.1.2.3 UN Publications.

United Nations, 799 United Nations Plaza, New York, NY 10017.

Recommendations on the Transport of Dangerous Goods – Model Regulations, 19th revised edition.

I.1.2.4 Other Publications.

American Coatings Association, *Hazardous Materials Identification System Revised, Implementation Manual*, 1981.

ASHRAE 34, *Designation and Safety Classification of Refrigerants* , 2022.

Bretherick, L., *Handbook of Reactive Chemicals*, 7th edition, Boston: Butterworths, 2006.

Britton, L. G., "Survey of Fire Hazard Classification Systems for Liquids," *Process Safety Progress*, Vol. 18, No. 4, Winter, 1999.

Britton, L. G. and D. J. Frurip,"Further Uses of the Heat of Oxidation in Chemical Hazard Assessment," *Process Safety Progress*," 22(1), 1–19, 2003.

Britton, L. G. and B.K. Harrison, "Minimum explosible concentrations of mist and dust clouds," *Process Safety Progress* , 37(1), 4-17, 2018. doi.org/10.1002/prs.11959

Britton, L. G. and B. K. Harrison, "Using CHETAH to Estimate Lower Flammable Limit, Minimum Ignition Energy, and Other Flammability Parameters", *Process Safety Progress*, Volume 33, No.4, (2014). Pages 314–328. DOI: 10.1002/prs.11721, onlinelibrary.wiley.com/doi/10.1002/prs.11721/abstract;jsessionid=5CA1F9ED992D1F8626D2AE99

Britton, L.G., and J. A. Smith, "Static Hazards of the VAST," *Journal of Loss Prevention in the Process Industries* , 25 (2012), Appendix A "Flammability Considerations", 322-325.

Frurip, D., et al., "The Role of ASTM E27 Methods in Hazard Assessment: Part I. Thermal Stability, Compatibility, and Energy Release Estimation Methods, Process Safety Progress," 23(4), 266–278, 2004.

Frurip, D., "Selection of the Proper Calorimetric Test Strategy in Reactive Chemicals Hazard Evaluation," *Organic Process Research and Development* , 12(6), 1287-1292, 2008. DOI: 10.1021/op800121x, (2008). pubs.acs.org/doi/abs/10.1021/op800121x

~~General Chemical Corporation, Reference 13, "Heat of Dilution, Sulfuric Acid with Water (Liq.) at 77 degrees F", 1991.~~

Hanley, B., "A Model for the Calculation and the Verification of Closed Cup Flash Points for Multicomponent Mixtures," *Process Safety Progress*, Summer 1998: 86–97.

Hofelich, T. C., B. A. Prine and N. E. Scheffler, "A Quantitative Approach to Determination of NFPA Reactivity Hazard Rating Parameters," *Process Safety Progress*, Volume 16, No. 3 (1997):121.

Hofelich, T. C., D. J. Frurip, and J. B. Powers, "The Determination of Compatibility via Thermal Analysis and Mathematical Modeling," *Process Safety Progress*, Volume 13, No. 4 (1994): 227–233.

Hofelich, T. C. and M. S. LaBarge,, "On the Use and Misuse of Detected Onset Temperature of Calorimetric Experiments for Hazardous Chemicals," *Journal of Loss Prevention in the Process Industries*, Volume 15 (2002): 163–168.

ISO 7010, *Graphic symbols — Safety colours and safety signs — Registered safety signs,* 2019.

Laidler, K. L., *Chemical Kinetics*, Chapter 3, New York: McGraw-Hill, 1965.

NIOSH 2023-149, *Pocket Guide to Chemical Hazards (NPG)* .

Pasturenzi, C., et al., "Thermochemical stability: A comparison between experimental and predicted data," *Journal of Loss Prevention in the Process Industries*, Volume 28 (2014):79–91. ISSN 0950-4230 (2014). doi.org/10.1016/j.jlp.2013.03.011.

~~Rumble, John R., *CRC Handbook of Chemistry and Physics* , 105th edition, CRC Press, 2024.~~

Stull, D. R., "Fundamentals of Fire and Explosion," *AIChE Monograph Series*, Volume 73,No. 10, 1977.

Supplemental Information

File Name	Description	Approved
704_SR2_Section_I.1.2.4.docx	Updates to Other Publications.	

Submitter Information Verification

Committee: CLA-AAA
Submittal Date: Tue Aug 12 10:45:21 EDT 2025

Committee Statement

Committee Statement: Revision to update references under Other Publications. Edition year of ASTM D56 updated, NIOSH Pocket Guide to Chemical Hazards (NPG) added, and other references added from updates to Section E.3.

Response Message: SR-2-NFPA 704-2025

Public Comment No. 3-NFPA 704-2025 [Section No. I.1.2.4]

Ballot Results

✔ **This item has passed ballot**

22 Eligible Voters
6 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Hanselka, Reinhard
Koninckx, Elsa J.
Lingle, William Camden
Pelgroms, Frank
Platz, Christopher M.
Sides, Stephen

Affirmative All

Allen, Christopher
Beam, Jason
Colonna, Guy R.
Hollinger, David W.
Kirsch, Ron A.
Mennella, Michael
Michaels, Robert A.
Nocco, Robert A.

Noles, Christian
Ott, Brian
Primeau, Brian
Robin, Mark L.
Thomson, Bradley
Valerioti, Albert Mark
Vigerust, Jr., James O.

Affirmative with Comment

Britton, Laurence G.
okay

Second Revision No. 3-NFPA 704-2025 [Section No. I.2]

I.2 Informational References.

The following documents or portions thereof are listed here as informational resources only. They are not a part of the requirements of this document.

I.2.1 ASTM Publications.

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

ASTM D235, *Standard Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)*, 2022.

ASTM D6668, *Standard Test Method for the Discrimination Between Flammability Ratings of F = 0 and F = 1*, ~~2022~~ 2021 .

Submitter Information Verification

Committee: CLA-AAA
Submittal Date: Tue Aug 12 10:46:33 EDT 2025

Committee Statement

Committee Statement: Revision to update edition year of ASTM D6668.
Response Message: SR-3-NFPA 704-2025

Ballot Results

✔ **This item has passed ballot**

22 Eligible Voters
6 Not Returned
15 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Hanselka, Reinhard
Koninckx, Elsa J.
Lingle, William Camden
Pelgroms, Frank
Platz, Christopher M.
Sides, Stephen

Affirmative All

Allen, Christopher

Beam, Jason

Colonna, Guy R.

Hollinger, David W.

Kirsch, Ron A.

Mennella, Michael

Michaels, Robert A.

Nocco, Robert A.

Noles, Christian

Ott, Brian

Primeau, Brian

Robin, Mark L.

Thomson, Bradley

Valerioti, Albert Mark

Vigerust, Jr., James O.

Affirmative with Comment

Britton, Laurence G.

okay