



Public Comment No. 6-NFPA 318-2019 [Section No. 2.3.2]

2.3.2 ASTM Publications.

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

ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, 2019a 2019b .

ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, 2018 2019 .

ASTM E136, *Standard Test Method for Assessing Combustibility of Materials in Using a Vertical Tube Furnace at 750°C*, 2019.

Statement of Problem and Substantiation for Public Comment

date updates

Related Item

- FR18

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler

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Submittal Date: Tue Oct 29 19:07:18 EDT 2019

Committee: SCR-AAA

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-3-NFPA 318-2020

Statement: Updating referenced documents to their most recent editions.



Public Comment No. 3-NFPA 318-2019 [Section No. 3.3.22]

3.3.22 Liquid.

A material that has a melting point that is equal to or less than 20°C (68°F) and a boiling point that is greater than 20°C (68°F) at 101.3 kPa (14.7 psia). When not otherwise identified, the term liquid shall mean both flammable and combustible liquids. [1, -2018]

(See 4.1.2.1)

3.3.22.1 Combustible Liquid.

A liquid that has a closed-cup flash point at or above 37.8°C (100°F).

(see 4.1.2.2)

3.3.22.2 Flammable Liquid.

A liquid that has a closed-cup flash point that is below 37.8°C (100°F) and a maximum vapor pressure of 2068 mm Hg (absolute pressure of 40 psi) at 37.8°C (100°F).

(see 4.1.2.3)

Statement of Problem and Substantiation for Public Comment

I agree with the technical committee that the definitions being proposed for movement into the body of the standard contain requirements and are, thus, both not definitions and not in compliance with the manual of style. That is the reason they are proposed to be moved. At present they are contained in the section on definitions and that is inappropriate.

Related Item

- pi8

Submitter Information Verification

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Submission Date: Tue Oct 29 18:56:31 EDT 2019

Committee: SCR-AAA

Committee Statement

Committee Action: Rejected

Resolution: The current definitions in Chapter 3 do not contain requirements, so they are appropriate to keep in Chapter 3. Changes to the definitions of flammable and combustible liquids will be reviewed in the next cycle of NFPA 318 to correlate with the 2021 edition of NFPA 30.



Public Comment No. 4-NFPA 318-2019 [Section No. 3.3.23]

3.3.23 Noncombustible ²

~~In semiconductor fabrication facilities, a material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat. Materials that are reported as passing ASTM E136, *Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C*, shall be considered noncombustible materials.~~

~~material [see 4.1.1]~~

Statement of Problem and Substantiation for Public Comment

I agree with the technical committee that the definition proposed to be moved to the body of the standard contains requirements and is thus not a definition and in contravention with the manual of style. That is the reason that the inappropriate definition is proposed to be moved, to also be consistent with the location of the requirements for noncombustible materials in many other NFPA codes and standards, including NFPA 1, 101 and 5000.

Note also (in relation to other public comments) that compliance with ASTM E136 is what determines whether a material used in NFPA 318 environments is noncombustible.

Related Item

- pi9

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Submission Date: Tue Oct 29 18:59:46 EDT 2019
Committee: SCR-AAA

Committee Statement

Committee Action: Rejected
Resolution: The current definitions in Chapter 3 do not contain requirements, so they are appropriate to keep in Chapter 3. Changes to the definitions of flammable and combustible liquids will be reviewed in the next cycle of NFPA 318 to correlate with the 2021 edition of NFPA 30.



Public Comment No. 5-NFPA 318-2019 [Section No. 4.1]

4.1 General.

4.1

– General: ~~4.1.1 –Occupied~~

~~1 Noncombustible materials [NFPA 5000; 7.1.4.1]~~

A material that complies with any one of the following shall be considered a noncombustible material:

(1) The material, in the form in which it is used, and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.

(2) The material is reported as passing ASTM E136, Standard Test Method for Assessing Combustibility of Materials using a Vertical Tube Furnace at 750 Degrees C.

(3) The material is reported as complying with the pass/fail criteria of ASTM E136 when tested in accordance with the test method and procedure in ASTM E2652, Standard

Test Method for Assessing Combustibility of Materials using a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750 Degrees C.

~~4.1.2 Liquids~~

~~4.1.2.1 Liquid [NFPA 30; 4.2.5]~~

Any material that 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 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 for Determining Whether a Material is a Liquid or a Solid.

~~4.1.2.2 Combustible liquid [NFPA 30; 4.2.2]~~

Any liquid that has a closed-cup flash point at or above 100°F (37.8°C), as determined by the test procedures and apparatus set forth in Section 4.4 of NFPA 30. Combustible liquids are classified according to Section 4.3 of NFPA 30.

~~4.1.2.3 Flammable liquid [NFPA 30; 4.2.3]~~

Any liquid that has a closed-cup flash point below 100°F (37.8°C), 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 40 psi (276 kPa) at 100°F (37.8°C), as determined by ASTM D323, Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method). Flammable liquids are classified according to Section 4.3 of NFPA 30.

~~4.1.3 Occupied Levels of Fabrication Areas.~~

Normally, occupied levels of fabrication areas handling HPM shall be located at or above grade.

~~4.1.~~

~~2 Fabrication~~

~~4 Fabrication Areas.~~

Floors of fabrication areas separating fabrication areas from other uses shall be liquid-tight.

~~{ 5000: 34.3.7.2.1.4(B)}~~

(The newly referenced standards, namely AASTM D5/D5M, ASTM D323 and ASTM E2652, must be added into section 2)

Statement of Problem and Substantiation for Public Comment

This simply moves the requirements from the section on definitions (where they do not belong) to the body of the standard. Note that the newly referenced standards need to be added to section 2 on referenced standards.

Related Item

- pi7 • pi8
- pi9

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler
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Submittal Date: Tue Oct 29 19:03:02 EDT 2019
Committee: SCR-AAA

Committee Statement

Committee Action: Rejected
Resolution: The current definitions in Chapter 3 do not contain requirements, so they are appropriate to keep in Chapter 3. Changes to the definitions of flammable and combustible liquids will be reviewed in the next cycle of NFPA 318 to correlate with the 2021 edition of NFPA 30.



Public Comment No. 11-NFPA 318-2019 [Section No. 7.1.4]

7.1.4 Purge Panels.

7.1.4.1 *

Purge panels shall be provided at the cylinders for all hazardous production material gases when in use. (See 7.6.2 for silane and silane mixes.)

7.1.4.2

Purge panels shall be labeled with the type of gas, and the type of purge gas.

7.1.4.3 *

Purge panels shall be constructed of materials compatible with gases conveyed, minimize leakage potential, provide for control of excess flow, and be equipped with an appropriate emergency shutoff.

7.1.4.4

Purge panels shall be designed to prevent backflow and cross-contamination of purge gas or other process gases.

7.1.4.5

Check valves shall not be exposed to cylinder pressure if a cylinder has a pressure greater than 552 kPa (80 psi).

7.1.4.6

A manual isolation valve shall be provided on the process delivery line at the purge panel to permit removal of the purge panel for repair and maintenance.

7.1.4.7

Hazardous production material gas cylinder purge panels shall be provided with dedicated purge gas cylinders.

7.1.4.7.1

Only purge panels serving compatible gases shall be permitted to share a purge cylinder.

7.1.4.8

Bulk gas systems shall not be used as the purge source for hazardous production material gas cylinder purge panels.

7.1.4.8.1

In the case of hazardous production material gas cylinders no greater than 103 kPa (15 psi) cylinder pressure, bulk gas purge sources shall be permitted to be used in place of cylinders.

7.1.4.8.2

Regulation of cylinder pressure shall not be an acceptable means to meet the 103 kPa (15 psi) threshold.

7.1.4.9

Purge panels shall only be permitted to serve HPM cylinders containing compatible gases.

Statement of Problem and Substantiation for Public Comment

A new section 7.1.4.9 was added. This item is to ensure that incompatible gases are not serviced from the same purge gas panel. There are documented cases of back flowing incompatible gases into cylinders which had a common purge panel. There have also been fatalities as a result of this. Only allowing compatible gases on the same purge panel is not clearly spelled out in 7.1.4.

Related Item

- First draft report.

Submitter Information Verification

Submitter Full Name: Ronald Fuhrhop
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Submittal Date: Thu Nov 14 15:12:54 EST 2019
Committee: SCR-AAA

Committee Statement

Committee Action: Rejected

Resolution: The language that is proposed to be added is already covered by 7.1.4.7 and 7.1.4.7.1.



Public Comment No. 9-NFPA 318-2019 [Section No. 7.1.4.8.1]

7.1.4.8.1

~~In the case of hazardous production material gas cylinders no greater than 103 kPa (15 psi) cylinder pressure, bulk gas- Bulk gas purge sources shall be permitted to be used in place of purge cylinders , when the pressure at the HPM cylinder valve outlet, is no greater than 103 kPa gauge (15 psig) at operating temperature .~~

Statement of Problem and Substantiation for Public Comment

Section 7.1.4.8.1 has four changes. The first change was to reword to add clarity. The second change was to add gauge pressure to “103 kPa gauge (15 psig)”. This change clarifies that the pressure is “gauge” NOT “absolute”. It is clear from the original proposal, that the author was talking about “gauge” pressure by stating 15 psiG in the proposed text and several times in the Statement of Problem and Substantiation. The “gauge” pressure was also added to section 7.1.4.8.2.

In section 7.1.4.8.1 the third change was adding the text “at the HPM cylinder valve outlet”. This addition was to clarify that the 103 kPa gauge (15 psig) would be measured at the valve outlet, when the cylinder valve is open. SAGS Type 2 may have an internal cylinder pressure greater than 15 psig; however, there is 0 psig at the valve outlet when the cylinder valve is open. SAGS Type 2 already allows bulk source purge gas in section 7.14.2.3 and should not be interpreted to exclude SAGS Type 2 from using bulk source purge gas in section 7.1.4.8.1.

In sections 7.1.4.8.1 the fourth change was to add “at operating temperature”. Most gases <15 psig will be liquified gases and the pressures can exceed 15 psig at higher temperatures. Some cylinders may be heated in order to increase the pressure for delivery to the use point. Some cylinders will operate at higher pressures due to higher ambient temperatures in a gas cabinet. The use of “at operating temperature” considers the variations in the design and operation of the system. The “at operating temperature” was also added to section 7.1.4.8.2.

Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
Public Comment No. 10-NFPA 318-2019 [Section No. 7.1.4.8.2]	<u>Related Item</u>
• First draft report. This item first showed up in the first draft report.	

Submitter Information Verification

Submitter Full Name: Ronald Fuhrhop
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Submission Date: Thu Nov 14 14:34:43 EST 2019
Committee: SCR-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: [SR-1-NFPA 318-2020](#)
Statement: Section 7.1.4.8.1 has four changes. The first change was to reword to add clarity. The second change was to clarify that the pressure is “gauge” NOT “absolute”. It is clear from the original proposal, that the author was talking about “gauge” pressure by stating 15 psig in the proposed text

and several times in the Statement of Problem and Substantiation. This change was also made in section 7.1.4.8.2.

In section 7.1.4.8.1 the third change was adding the text “at the HPM cylinder valve outlet”. This addition was to clarify that the 103 kPa gauge (15 psig) would be measured at the valve outlet, when the cylinder valve is open. SAGS Type 2 may have an internal cylinder pressure greater than 15 psig; however, there is 0 psig at the valve outlet when the cylinder valve is open. SAGS Type 2 already allows bulk source purge gas in section 7.14.2.3 and should not be interpreted to exclude SAGS Type 2 from using bulk source purge gas in section 7.1.4.8.1.

In sections 7.1.4.8.1 the fourth change was to add “at operating temperature”. Most gases <15 psig will be liquified gases and the pressures can exceed 15 psig at higher temperatures. Some cylinders may be heated in order to increase the pressure for delivery to the use point. Some cylinders will operate at higher pressures due to higher ambient temperatures in a gas cabinet. The use of “at operating temperature” considers the variations in the design and operation of the system. The “at operating temperature” was also added to section 7.1.4.8.2.

In section 7.1.4.8.2 “downstream of the cylinder valve outlet” was added to clarify that this section does not apply to SAGS Type 2 cylinder. Without this addition, it could be interpreted that SAGS Type 2 would not qualify for bulk source purge gas because of an internal device that controls pressure before the cylinder valve. SAGS Type 1 and Type 2 already allow bulk source purge gas in section 7.14.2.3. It was determined that bulk source purge gas was safe to use on both SAGS Type 1 and Type 2 HPM gases.



Public Comment No. 10-NFPA 318-2019 [Section No. 7.1.4.8.2]

7.1.4.8.2

Regulation of cylinder pressure downstream of the cylinder valve outlet shall not be an acceptable means to meet the 103 kPa gauge (15 psi psig) threshold at operating temperature threshold .

Statement of Problem and Substantiation for Public Comment

In section 7.1.4.8.2 “downstream of the cylinder valve outlet” was added to clarify that this section does not apply to SAGS Type 2 cylinder. Without this addition, it could be interpreted that SAGS Type 2 would not qualify for bulk source purge gas because of an internal device that controls pressure before the cylinder valve. SAGS Type 1 and Type 2 already allow bulk source purge gas in section 7.14.2.3. It was determined that bulk source purge gas was safe to use on both SAGS Type 1 and Type 2 HPM gases.

In addition, "gauge", "psi" and "at operating temperature" were added as described in the PC for 7.1.4.8.1.

Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
Public Comment No. 9-NFPA 318-2019 [Section No. 7.1.4.8.1]	Some of the proposed changes are the same in 7.1.4.8.1 and 7.1.4.8.2.

Related Item

- First draft report.

Submitter Information Verification

Submitter Full Name: Ronald Fuhrhop
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Submission Date: Thu Nov 14 15:03:28 EST 2019
Committee: SCR-AAA

Committee Statement

Committee Action: Rejected but see related SR

Resolution: [SR-1-NFPA 318-2020](#)

Statement: Section 7.1.4.8.1 has four changes. The first change was to reword to add clarity. The second change was to clarify that the pressure is “gauge” NOT “absolute”. It is clear from the original proposal, that the author was talking about “gauge” pressure by stating 15 psig in the proposed text and several times in the Statement of Problem and Substantiation. This change was also made in section 7.1.4.8.2.

In section 7.1.4.8.1 the third change was adding the text “at the HPM cylinder valve outlet”. This addition was to clarify that the 103 kPa gauge (15 psig) would be measured at the valve outlet, when the cylinder valve is open. SAGS Type 2 may have an internal cylinder pressure greater than 15 psig; however, there is 0 psig at the valve outlet when the cylinder valve is open. SAGS Type 2 already allows bulk source purge gas in section 7.14.2.3 and should not be interpreted to exclude SAGS Type 2 from using bulk source purge gas in section 7.1.4.8.1.

In sections 7.1.4.8.1 the fourth change was to add “at operating temperature”. Most gases <15

psig will be liquified gases and the pressures can exceed 15 psig at higher temperatures. Some cylinders may be heated in order to increase the pressure for delivery to the use point. Some cylinders will operate at higher pressures due to higher ambient temperatures in a gas cabinet. The use of "at operating temperature" considers the variations in the design and operation of the system. The "at operating temperature" was also added to section 7.1.4.8.2.

In section 7.1.4.8.2 "downstream of the cylinder valve outlet" was added to clarify that this section does not apply to SAGS Type 2 cylinder. Without this addition, it could be interpreted that SAGS Type 2 would not qualify for bulk source purge gas because of an internal device that controls pressure before the cylinder valve. SAGS Type 1 and Type 2 already allow bulk source purge gas in section 7.14.2.3. It was determined that bulk source purge gas was safe to use on both SAGS Type 1 and Type 2 HPM gases.



Public Comment No. 1-NFPA 318-2019 [Section No. 8.2.1.2]

8.2.1.2*

Materials listed in accordance with the requirements contained in ANSI/FM 4910, *Standard for Cleanroom Materials Flammability Test Protocol*, or with the requirements contained in UL 2360, *Test Method for Determining the Combustibility Characteristics of Plastics Used in Semiconductor Tool Construction*, for use without internal fire detection and suppression shall be permitted to be used as an acceptable alternative to noncombustible materials ~~only where process concerns or process chemicals require alternatives~~ .

Statement of Problem and Substantiation for Public Comment

As stated in the PI, the materials complying with FM 4910 or UL 2360 have a long history of being acceptable for the application and a separate analysis of their suitability should not be necessary. They perform virtually as well as noncombustible materials. Notice that materials complying with ASTM E136, which is the requirement for a material to be noncombustible, are permitted to ignite and to generate a flame (albeit a small one) and, thus, the difference between FM 4910/UL 2360 materials and noncombustible materials is minimal, at best.

Related Item

- P117

Submitter Information Verification

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Submittal Date: Tue Oct 29 18:45:32 EDT 2019
Committee: SCR-AAA

Committee Statement

Committee Action: Rejected
Resolution: The default is to use noncombustible materials, and only use FM 4910/UL 2360 materials when process chemicals dictate an alternate to noncombustible materials of construction.



Public Comment No. 2-NFPA 318-2019 [Section No. 8.6.2]

8.6.2

Materials listed for use without internal fire detection and suppression, or materials listed per 8.2.1.2, shall be an acceptable alternative to noncombustible materials, where process concerns or process chemicals require alternatives.

Statement of Problem and Substantiation for Public Comment

As stated in the PI, the materials complying with FM 4910 or UL 2360 have a long history of being acceptable for the application and a separate analysis of their suitability should not be necessary. They perform virtually as well as noncombustible materials. Notice that materials complying with ASTM E136, which is the requirement for a material to be noncombustible, are permitted to ignite and to generate a flame (albeit a small one) and, thus, the difference between FM 4910/UL 2360 materials and noncombustible materials is minimal, at best.

Related Item

- PI18

Submitter Information Verification

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Submission Date: Tue Oct 29 18:51:50 EDT 2019
Committee: SCR-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: [SR-2-NFPA 318-2020](#)
Statement: The section has been revised for clarity, because the materials in 8.2.1.2 are the only ones that are listed for use without internal fire detection and suppression.



Public Comment No. 12-NFPA 318-2019 [Chapter A [Excluding any Sub-Sections]]

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.7.1.4.8.1

When using bulk source as a purge gas for HPM gas cylinders at pressures no greater than 103 kPa gauge (15 psig) at operating temperature, the bulk purge gas supply line should be protected against back flow of HPM gases into the bulk gas system and its branches. Once the purge gas inlet valve is opened, there is an opportunity for the HPM gas to migrate into the bulk purge gas distribution line. Methods to mitigate this potential hazard include:

- Bulk gas purge source pressure should have a significantly higher pressure than the HPM source.
- Bulk source gas should have back flow protection at each purge panel.
-
- Check valves should not be the only back flow prevention device. If check valves are used, they should have a high enough cracking pressure to minimize the chance of HPM back flow. Check valves may not reseal when the flow stops and the pressure is equalized on the upstream and downstream sides. Low cracking pressure check valves may require a higher pressure on the downstream side to reseal the check valve properly, which could lead to reverse flow or migration of HPM gas upstream of the check valve.
- A pressure sensing interlock loop may be used to ensure the purge gas pressure is always higher than the HPM manifold pressure and will shut the systems down if conditions are favorable to backflow.

Statement of Problem and Substantiation for Public Comment

The Annex item A.7.1.4.8.1 was added to provide guidance for bulk source gas panel design. There are several practices to help ensure that HPM gases do not migrate into the bulk source supply. Even though 15 psig is a low pressure, the residual HPM gas in the manifold will equalize with the bulk purge gas supply pressure, providing an opportunity for this HPM gas mixture to migrate into the bulk purge gas distribution line during the period that the purge gas inlet valve remains open. Several methods are provided to add protection from back flow of HPM gases.

- The bulk purge gas pressure should be “significantly higher” than the HPM gas. A minimum pressure value was not stated, so the system designer could decide what is appropriate. This was to emphasize that a “significant” pressure differential needs to be considered in the design.
- Check valves are a common back flow prevention device; however, check valves with low cracking pressure (low closing spring force) may not reseal properly unless there is a higher downstream pressure. Check valves may not reseal when the flow stops and the upstream and downstream pressures equalize. For example, some Swagelok check valves with 1/3 or 1 psi cracking pressure can require up to 6 psi “back” (downstream) pressure to reseal the valve properly. Some Swagelok check valves with 10 psi cracking pressure requires about 3 psi higher “inlet” (upstream) pressure to reseal the valve properly. As stated, check valves should not be the only back flow prevention device.

Related Item

- First draft report.

Submitter Information Verification

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Submittal Date: Thu Nov 14 15:17:43 EST 2019

Committee: SCR-AAA

Committee Statement

Committee Action: Rejected

Resolution: The language presented in the proposed annex does not seem like explanatory material, it appears as requirements for mitigation without substantiation or detail.



Public Comment No. 7-NFPA 318-2019 [Section No. D.1.2.2]

D.1.2.2 ASTM Publications.

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

ASTM SI 10, *Standard for Use of the International System of Units (SI): The Modern Metric System*, 2016.

ASTM E1354, *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*, 2017.

ASTM E2058, *Standard Test Methods for Measurement of Synthetic Polymer Material Flammability Using a Fire Propagation Apparatus (FPA)*, 2013a [2019](#) .

Statement of Problem and Substantiation for Public Comment

date update

Related Item

- fr7

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler

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Submittal Date: Thu Nov 07 08:16:08 EST 2019

Committee: SCR-AAA

Committee Statement

Committee Action: Rejected but see related SR

Resolution:

Resolution: [SR-4-NFPA 318-2020](#)

Statement: Updating referenced documents to their most recent editions. Updated title of ANSI/FM 4910 to match Chapter 2.