Public Comment No. 7-NFPA 75-2022 [Section No. 2.3.1]

2.3.1 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*, ~~2021a~~ 2022 .

ASTM E136, *Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C*, ~~2019a~~ 2022 .

ASTM E814, *Standard Test Method for Fire Tests of Penetration Firestop Systems*, 2013a, reapproved 2017.

ASTM E1354, *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*, ~~2022a~~ 2022c .

ASTM E1537, *Standard Test Method for Fire Testing of Upholstered Furniture*, 2022.

ASTM E2652, *Standard Test Method for Assessing Combustibility of Materials Using a Tube Furnace with a Cone-Shaped Airflow Stabilizer, at 750°C*, ~~2018~~ 2022 .

ASTM E2965, *Standard Test Method for Determination of Low Levels of Heat Release Rate for Materials and Products Using an Oxygen Consumption Calorimeter*, 2022.

Statement of Problem and Substantiation for Public Comment

date updates

Related Item

• fr53

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler
Organization: GBH International
Street Address:
City:
State:
Zip:
Submittal Date: Mon Dec 26 15:01:21 EST 2022
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-11-NFPA 75-2023
Statement: Revised to align with the most recent editions of referenced publications.

Public Comment No. 13-NFPA 75-2023 [New Section after 3.3.17]

3.3.X ITE Immersion Cooling Liquid

A dielectric fluid used for the purpose of cooling ITE through direct contact, contained within the ITE System and characterized as a Class IIIB liquid [NFPA 30 4.2.3.2, 2021].

Statement of Problem and Substantiation for Public Comment

Immersion cooling technology that supports thermal management of ITE is rapidly gaining a foothold in the marketplace due to its superior cooling ability and beneficial impact on facility sustainability profiles. Fluids and systems designed and intended for single phase immersion cooling will have unique attributes, requirements, and failure modes when compared to other cooling systems (e.g. air cooling) or insulating fluid applications (e.g. transformer fluids). There is a lack of guidance for safe design and operation of systems and components unique to this area of ITE immersion cooling. Introduction of a definition for an ITE Immersion Cooling Liquid will address this gap and ease the drafting of further guidance for this technology area.

This Public Comment extracts the definition for Class IIIB liquids, as set forth in NFPA 30 (2021) and by doing so, establishes a broad classification for the liquids based on their closed-cup flash point. It is aligned with Committee Input No. 52-NFPA 75-2022 (11.2), wherein immersion cooling was recognized as a distinct system type with unique considerations for safety.

Related Item

• Committee Input No. 52-NFPA 75-2022

Submitter Information Verification

Submitter Full Name: Amy Short
Organization: The Lubrizol Corporation
Street Address:
City:
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Zip:
Submittal Date: Wed Jan 04 11:22:00 EST 2023
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-13-NFPA 75-2023
Statement: There is a lack of guidance for safe design and operation of systems and components unique to this area of ITE immersion cooling. Introduction of a definition for an ITE Immersion Cooling Liquid will address this gap and ease the drafting of further guidance for this technology area.

Public Comment No. 4-NFPA 75-2022 [New Section after 3.3.20]

3.3.21 Off-Gassing.

The event in which the cell case vents due to a rise in internal pressure of the cell.

Statement of Problem and Substantiation for Public Comment

While the term "off gas" is not used in the body of the standard, it is used within the Annex. Manual of Style does not prohibit definitions for terms used solely in the annex. Should be an extract from NFPA 855.

Related Item

• PI 65

Submitter Information Verification

Submitter Full Name: Scott Lang
Organization: Honeywell International
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State:
Zip:
Submittal Date: Wed Dec 14 10:40:15 EST 2022
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-26-NFPA 75-2023
Statement: Adding the definition of Off-Gas to clarify how it is used in the standard. Adjusted the extract for how the term is used within NFPA 75.

Public Comment No. 16-NFPA 75-2023 [Chapter 5]

Chapter 5 Performance-Based Design Approach

5.1 ~~Performance-Based Design Approach~~ **General .**

5.1.1 The requirements of Chapter 5 shall apply to recognize performance-based practices.

5. 1. 2 The performance-based design approach shall include all of the following components:

(1) Goals and objectives specified in Section 5.2

(2) Performance criterion specified in 5.3

(3) Fire risk assessment elements specified in 4.2.3

5.2 Goals and Objectives.

~~5.7.2 Performance~~

The performance-based design shall meet the following goals and objectives:

(1) The performance-based approach allows the alternative means to be utilized for the elements of the ITE systems, ITE rooms, and ITE areas as permitted in this standard.

(2) The risk analysis, design criteria, design brief, system performance, and testing criteria are developed in accordance with this section.

(3) The design meets the scope and purpose of the standard as detailed in Sections 1.1 and 1.2 .

(4) The performance-based design provides equivalent performance to the prescriptive requirements of this standard.

5.3

~~* Qualifications.~~

~~The performance-based design documents shall be prepared by a licensed design professional with experience in fire protection, and acceptable to the AHJ.~~

5.4 ~~* Independent Review.~~

~~The AHJ shall be permitted to require an approved, independent third party to review the proposed design brief based on the documented fire risk assessment accepted by the AHJ to provide an evaluation of the design.~~

5.5 ~~Final Determination.~~

~~The authority having jurisdiction shall make the final determination as to whether the performance objectives have been met.~~

5.6 ~~Maintenance of Design Features.~~

~~The design features required for the ITE area to continue to meet the performance goals and objectives of this standard shall be maintained for the life of the building.~~

5.7 ~~Performance Criteria.~~

5.7.1 – General.

The performance-based design approach shall include all of the following components:

(1) Goals and objectives specified in Section 5.2

(2) Performance criterion specified in 5.7.2

(3) Fire risk assessment elements specified in 4.2.3

Performance Criterion.

ITE systems and ITE areas shall be protected from damage by fire or its associated effects, including smoke, corrosion, heat, and water.

5.

~~7.3~~

4 Stakeholders.

The stakeholders shall be part of the performance-based design approach and include the owner or owner's representative, a licensed design professional experienced in the design of fire and life safety systems for ITE and ITE areas, insurance representatives, the authority having jurisdiction, and representatives of the emergency response entities.

5.

~~7.4~~

5 * Qualifications.

The performance-based design documents shall be prepared by a licensed design professional with experience in fire protection, and acceptable to the AHJ.

5.6 * Design Brief.

5.6.1 The design of the ITE area shall include a design brief that is prepared using recognized performance-based design practices.

5.

~~7.4.1~~

~~Any~~

6.2 Any deviation from a prescriptive requirement shall be detailed in the design brief.

5.

~~7.4.2~~

~~Design~~

6.3 Design specifications and briefs used in the performance-based design shall be clearly stated and shown to be realistic and sustainable.

5.

~~7~~

6 .4

~~.3~~

~~Specific~~

Specific inspection, testing, or maintenance requirements that are necessary to maintain reliable performance of the fire safety features of the ITE area shall be stated in the design brief.

5.7 * Independent Review.

The AHJ shall be permitted to require an approved, independent third party to review the proposed design brief based on the documented fire risk assessment accepted by the AHJ to provide an evaluation of the design.

5.8 Final Determination.

The authority having jurisdiction shall make the final determination as to whether the performance objectives have been met.

5.9 _ Maintenance of Design Features.

The design features required for the ITE area to continue to meet the performance goals and objectives of this standard shall be maintained for the life of the building.

Statement of Problem and Substantiation for Public Comment

Proposed revisions address First Revision Affirmative with Comment ballot to improve readability of section and logically order the requirements within the section.

Related Item

• First Revision No. 54 NFPA 75-2022 [Section No. 5.7]

Submitter Information Verification

Submitter Full Name: Randy Willard
Organization: US Central Intelligence Agency
Street Address:
City:
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Submittal Date: Wed Jan 04 19:36:51 EST 2023
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-10-NFPA 75-2023
Statement: Revisions improve readability of Chapter 5 and logically order the requirements within the chapter.

Public Comment No. 6-NFPA 75-2022 [Section No. 6.5.2]

6.5.2

Decking for raised floors shall be one of the following:

(1) Noncombustible

(2) * Fire-retardant-treated wood complying with the requirements of Chapter 4 of NFPA 703

(3) Pressure-impregnated, fire-retardant-treated lumber having a flame spread index of 25 or less in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or UL 723, *Test for Surface Burning Characteristics of Building Materials*

(4) Wood or similar core material that is encased on the top and bottom with sheet, cast, or extruded metal, with all openings or cut edges covered with metal or plastic clips or grommets so that none of the core is exposed, and that has an assembly flame spread index of 25 or less in accordance with UL 723, *Test for Surface Burning Characteristics of Building Materials*

A.6.5.2 (2) Fire-retardant-treated wood is a listed wood product impregnated with chemicals by a pressure process or other means during manufacture that exhibits a flame spread index not exceeding 25 when tested to ASTM E84 or UL 723. Moreover, when the test is extended from 10 minutes to 30 minutes, the flame front is not allowed to progress more than 3.2 m (10.5 feet) beyond centerline of the burners at any time during the test.

(also add NFPA 703 to chapter 2, on referenced standards)

Statement of Problem and Substantiation for Public Comment

NFPA 703 (Standard for Fire Retardant–Treated Wood and Fire-Retardant Coatings for Building Materials) contains the requirements for a type of wood (fire-retardant-treated wood) that is consistently being required, for example, in wildland urban interface codes.
Building codes (both NFPA 5000 and IBC) describe the requirements for a material to be designated as fire-retardant-treated wood.
Fire-retardant-treated wood (FRTW) is required to be listed and to exhibit a flame spread index not exceeding 25 when tested to ASTM E84 or UL 723 (Steiner tunnel test) and to have a flame front that does not progress more than 10.5 ft (3.2 m) beyond the centerline of the burners at any time during the test when the test is extended from 10 minutes (normal ASTM E84 test duration) to 30 minutes. The type of wood required by the present item 2 is intended to simulate something similar to FRTW. The addition of FRTW wood will not decrease fire safety and has the advantage of providing another option of a material that is already listed and is consistent with what is required in other high fire severity applications.
The proposed annex note indicates the requirements for FRTW from NFPA 703 or codes.

Related Item

• fr63

Submitter Information Verification

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Submittal Date: Mon Dec 26 14:26:56 EST 2022
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but held
Resolution: This is new material. This will be considered by the TC for the next cycle.

Public Comment No. 9-NFPA 75-2022 [Section No. 8.2 [Excluding any Sub-Sections]]

If the design of the unit is such that oil or equivalent liquid is required for lubrication, ~~cooling, or~~ or hydraulic purposes, it shall have a closed-cup flash point of 149°C (300°F) or higher, and the container shall be of a sealed construction, incorporating automatic pressure relief devices.

Informational Note No. 1: Construction for liquid cooling in equipment is covered by section 8.1.1.

Statement of Problem and Substantiation for Public Comment

Construction requirements for cooling liquids used in information technology equipment is covered in UL 62368-1 [UL Standard for Safety Audio/video, information and communication technology equipment – Part 1: Safety requirements]. Recommend removing "cooling" from section 8.2 text. Add Informational Note No. 1: Construction for liquid cooling in equipment is covered by section 8.1.1.

Alternatively this section can be separated into 2 sections 1 for lubrication and hydraulic fluids (current section 8.2 text, minus "cooling") and 1 (new) section for cooling liquids where the text would have similar language to section 8.1.1.

If needed, additional informative information can be provided in Annex A.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 10-NFPA 75-2022 [Section No. 11.2]	

Related Item

- CI-52-NFPA 75-2022

Submitter Information Verification

Submitter Full Name: Will Susiene
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Submittal Date: Wed Dec 28 16:26:18 EST 2022
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-15-NFPA 75-2023
Statement: Removed the term “cooling” as it is covered in the listing standard for ITE equipment.

Public Comment No. 14-NFPA 75-2023 [New Section after 8.2.1]

8.2.2 ITE Immersion Cooling System

8.2.2.X ITE Immersion Cooling Liquid

The liquid shall be Class IIIB and have a closed-cup flash point of 135 °C (275 °F) or higher. Manufacturers' instructions should be carefully followed regarding installation, maintenance and operation for all insulating liquids [NFPA 30 4.2.3.2, 2021].

Statement of Problem and Substantiation for Public Comment

This proposed section defines reasonable criteria to support safe operation of ITE Immersion Cooling systems from the perspective of the cooling liquid and a separate submission focuses on the cooling system/unit. Single phase immersion cooling systems will have unique design attributes, operating conditions, and failure modes when compared to the lubricants or hydraulic fluids currently referenced in 8.2. There is a need to consider immersion cooling systems independently, as unnecessarily limiting design criteria or fluid properties can impede the thermal management ability of the system or fluid itself. Committee Input No. 52-NFPA 75-2022 in Section 11.2 specifically acknowledges the need for further inputs in this technology area.

Substantiation for 8.2.2.X ITE Immersion Cooling Liquid:

There is very little concern for the creation of sufficient ignitable liquid vapor in this use case during routine operation. This is supported in Lubrizol's extensive R&D testing & competitive fluid benchmarking, in third party testing, and is consistent with existing industry standards related to immersion cooling systems.

- This recommended flash point of 135 °C is consistent with that referenced in IEC 62368-1 (3rd Ed. 6.4.9; Audio/Video, Information and Communication Technology Equipment-Part 1: Safety Requirements), IEC 60296 (5th Ed. 2020, Mineral Insulating Oils for Electrical Equipment) and others.
- Although describing different insulating fluid systems, both NFPA 497 and API RP 500 both comment on the low likelihood of Class IIIB liquids to generate ignitable vapor. As described in NFPA 497, “Class IIIB liquids seldom evolve enough vapors to form ignitible mixtures even when heated, and they are seldom ignited by properly installed and maintained general purpose electrical equipment. A Class IIIB liquid will cool below its flash point very quickly when released" [NFPA 497, 2021, 4.2.7.3]. Similarly, API states that “Class III liquids normally do not produce vapors of sufficient quantity to be considered for electrical classification purposes." [API RP 500, 5.2.4, Practice for Classification of Locations for Electrical Installations].
- Flash point is defined as, “the minimum temperature of a liquid at which sufficient vapor is given off to form an ignitible mixture with the air, near the surface of the liquid or within the vessel used” [NFPA 1, 2021]. In other words, for ignition to occur at the temperature designated as the liquid's "flash point," the bulk temperature at the liquid's surface must be sufficiently high to encourage vapor formation. This is notable specifically for single phase immersion systems, wherein ITE hot spots are generally very small in proportion to the high volume of cooling fluid and are fully immersed well below the fluid surface. These systems have very consistent thermal profiles, with typical bulk cooling fluid temperatures during routine operation at ~25-45 °C. Very few known commercial systems operate above those typical temperatures, and certainly <<90 °C where support materials (e.g. cables) are no longer supported.
- Lubrizol has obtained significant experimental data from our own R&D labs as well as in certified third party testing to determine that no significant or meaningful amount of liquid vapor would be present during foreseeable operating conditions (i.e. negligible risk of ignition occurring at the operational bulk and/or surface fluid temperatures in this application). This data spans multiple families of dielectric fluids, as well as a diverse range of formulated multi-component and additized immersion

fluids.
-- As a representative example, a single phase hydrocarbon immersion fluid containing >99% polyalphaolefin-2 (PAO-2) oil has thermophysical characteristics just above the limit proposed herein. It has a measured flash point of 142 °C (ASTM D93) and NO detectable vapor pressure at 25 °C, 50 °C, or even 100 °C (ASTM E1719; <0.0001 psia measured for all three data points; verified at third party test facility). This is significant because sufficient vapor needs to be generated, as measured by vapor pressure, to represent an ignition risk when an ignition source is present. The boiling point of that same fluid was determined by two methods to be 326.3 °C (ASTM D2887; 50% boiling temp) and 316 °C (Thermogravimetric Analysis, TGA) – further confirming that temperatures far exceeding expected operation conditions are needed for significant vapor formation. We would happily provide further explanation or experimental data upon request.
• The "manufacturers' instructions" statement is meant to encourage industry best practices, and is consistent with e.g. NFPA 70B focused on maintenance stating, “Each liquid has definite characteristics, and they should only be mixed after consulting with both manufacturers. Manufacturers' instructions should be carefully followed with all insulating liquids.” [NFPA 70B, 2019, 21.2.1.2]

Comment about inclusion of other fluid properties criteria:
• Other criteria to ensure safe operation of ITE single phase immersion cooling technologies are being actively investigated by ourselves as well as others in this area. We seek to ensure appropriate limits for this use case once a sufficient data basis has been established and look forward to providing additional guidance in years to come.
• We have intentionally not referenced autoignition criteria that may be found in other related NFPA or industry guidance documents (e.g. NEC 70 501.130(B), IEC 62368, API RP 2216) because we feel that there is a need for further investigation for this application before appropriate limits are established.

Related Item

• Committee Input No. 52-NFPA 75-2022

Submitter Information Verification

Submitter Full Name: Amy Short
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Street Address:
City:
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Submittal Date: Wed Jan 04 12:43:30 EST 2023
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-16-NFPA 75-2023
Statement: Added requirements for ITE Immersion cooling systems because there are systems currently in use and under development that are listed, and are necessary to maintain safety standards.

Public Comment No. 15-NFPA 75-2023 [New Section after 8.2.1]

8.2.2 ITE Immersion Cooling System

8.2.2.X ITE Immersion Cooling Unit

A system designed for the purpose of single phase immersion cooling of ITE with Class IIIB liquids shall have a lid or access point, use closed piping, and be constructed in accordance with approved standards or be otherwise approved by the Code official.

Statement of Problem and Substantiation for Public Comment

This proposed section defines reasonable criteria to support safe operation of ITE Immersion Cooling systems from the perspective of the cooling system/unit and a separate submission focuses on the cooling fluid. Single phase immersion cooling systems will have unique design attributes, operating conditions, and failure modes when compared to the lubricants or hydraulic fluids currently referenced in 8.2. There is a need to consider immersion cooling systems independently, as unnecessarily limiting design criteria or fluid properties can impede the thermal management ability of the system or fluid itself. Committee Input No. 52-NFPA 75-2022 in Section 11.2 specifically acknowledges the need for further inputs in this technology area.

Substantiation for 8.2.2.1 ITE Immersion Cooling Unit:

- This conforms to those described in NEC 70 wherein systems were described for the “flammable” liquid class, which is considerably more hazardous than Class IIIB liquid prescribed herein. Class IIIB liquids are known to be significantly less volatile (i.e. prone to form ignitable vapor) than those classified as Flammable. As described in that standard, “liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems or in case of abnormal operation of equipment.” And “locations where volatile flammable liquids or flammable gases or vapors are used but that, in the judgment of the authority having jurisdiction, would become hazardous only in case of an accident or of some unusual operating condition.” [NEC 70, 2023, Chapter 5, 500.5(B)(2)]
- Note that while infrequent, installation and routine maintenance procedures require the system to be briefly opened, thus requiring an access point or lid to be present. The vapor pressure and thermophysical profile of Class IIIB single phase immersion cooling fluids do not warrant a sealed system construction. Manufacturer's instructions should be followed during this process.

Related Item

- Committee Input No. 52-NFPA 75-2022

Submitter Information Verification

Submitter Full Name: Amy Short
Organization: The Lubrizol Corporation
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Submittal Date: Wed Jan 04 16:42:58 EST 2023
Committee: ELT-AAA

Committee Statement

Committee Action:	Rejected but see related SR
Resolution:	SR-16-NFPA 75-2023
Statement:	Added requirements for ITE Immersion cooling systems because there are systems currently in use and under development that are listed, and are necessary to maintain safety standards.

Public Comment No. 1-NFPA 75-2022 [Section No. 9.1.1.4]

9.1.1.4

An automatic fire suppression system shall not be required for the protection of the area below a raised floor in an ITE room or ITE area where combustible material under the floor is limited to the following:

(1) Cables listed for plenum use

(2) Listed plenum communications raceways

(3) Listed equipment power cords up to 4.6 m (15 ft) each

(4) Cables installed in metallic raceways

(5) Installations in compliance with Section 300.22(C) of *NFPA 70*

(6) ~~Listed cooling hoses~~

(7) *Cooling hoses listed or in compliance with Section 4.3.11.5.5.7 or 4.3.11.5.5.8 of *NFPA 90A*

Annex Note: 9.1.1.4 (6)

NFPA 90A Section 4.3.11.5.5.7 specifies the minimum flame and smoke spread performance for plastic pipe and tubing used in plenum spaces based on ASTM E84 and UL 723 tests for building materials. NFPA 90A Section 4.3.11.5.5.8 provides an alternative test based on UL 2846.

Statement of Problem and Substantiation for Public Comment

A listing standard for cooling hoses seems lacking. A senior member of the technical committee researched and found a reference to suitable tests and performance in NFPA 90A that are acceptable for pipes and hoses used in plenums. Lacking a listing standard, hoses with a construction compliant to NFPA 90A should be permitted as an option.

From NFPA 90A:

4.3.11.5 Raised Floor Plenum.

4.3.11.5.5.7 Plastic piping and tubing used in plumbing systems shall be permitted to be used within a raised floor plenum if it exhibits a flame spread index of 25 or less and a smoke developed index of 50 or less when tested in accordance with ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials, or UL 723, Test for Surface Burning Characteristics of Building Materials, at full width of the tunnel and with no water or any other liquid in the pipe during the test, unless otherwise permitted by 4.3.11.5.5.8.

4.3.11.5.5.8 Plastic water distribution piping and tubing listed as having a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.5 m (5 ft) or less when tested in accordance with UL 2846, Fire Test of Plastic Water Distribution Plumbing Pipe for Visible Flame and Smoke Characteristics, and installed in accordance with its listing, shall be permitted to be used within a raised floor plenum.

Related Item

• PI 11

Submitter Information Verification

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Organization: Ericsson
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Zip:
Submittal Date: Fri Nov 11 15:02:20 EST 2022
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but held

Resolution: More research is needed to list the requirements for cooling hoses in raised floors before changing the standard. A task group has been formed to look into this for next cycle.

Public Comment No. 10-NFPA 75-2022 [Section No. 11.2]

11.2 Coolant Systems.

If a separate coolant system is required for operation of an ITE installation, the system shall be provided with an approved alarm to indicate loss of liquid.

Informative Note No.1: For classification of immersion cooling liquids, refer to NFPA 30 and NFPA 400.

Informative Note No.2: For classification of compressed gas or flammable refrigerants, refer to NFPA 55.

Statement of Problem and Substantiation for Public Comment

Add Informative Note No.1: For classification of immersion cooling liquids, refer to NFPA 30 and NFPA 400.
Add Informative Note No.2: For classification of compressed gas or flammable refrigerants, refer to NFPA 55.

UL 62368-1 [UL Standard for Safety Audio/video, information and communication technology equipment – Part 1: Safety requirements] has requirements for immersion cooling and refrigerants used in information technology equipment.

For storage of Immersion cooling, leveraging the NFPA 30 [Flammable and Combustible Liquids Code] & NFPA 400 [Hazardous Materials Code] flammability and toxicity classifications may be helpful when defining facility utilities requirements.

For storage of flammable refrigerants, leveraging NFPA 55 [Compressed Gases and Cryogenic Fluids Code] classifications in alignment with ASHRAE 34 [Designation and Safety Classification of Refrigerants] classifications will be helpful when defining facility utilities requirements. ASHRAE 15 [Safety Standard for Refrigeration Systems] has construction requirements that may be helpful in determining facility utilities requirements.

If needed, additional informative information can be provided in Annex A.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 9-NFPA 75-2022 [Section No. 8.2 [Excluding any Sub-Sections]]	

Related Item

- CI-52-NFPA 75-2022

Submitter Information Verification

Submitter Full Name: Will Susiene
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Submittal Date: Wed Dec 28 16:50:31 EST 2022
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-20-NFPA 75-2023
Statement: Added an annex note to provide additional guidance on coolant systems.

Public Comment No. 12-NFPA 75-2023 [Section No. 11.2]

11.2 Coolant Systems.

If a separate coolant system is required for operation of an ITE installation, the system shall be provided with an approved alarm to indicate loss of liquid.

Additional Proposed Changes

File Name	Description	Approved
OCP_NFPA_75_comments_01-2023_002_.pdf	Immersion Cooling Systems Flashpoint requirements	

Statement of Problem and Substantiation for Public Comment

Proposal covers concerns of immersion cooling liquids currently being used and flashpoint requirements of these fluids. Also includes an collaborative industry requirements document on new immersion cooling systems for IT equipment used in data centers. The link in the document noted as "Rev. 2.0" points to the requirement document.

Related Item

• C1 11.2

Submitter Information Verification

Submitter Full Name: Michael Sakamoto
Organization: Open Compute Project
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Zip:
Submittal Date: Tue Jan 03 22:30:16 EST 2023
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected

Resolution: There were no proposals contained in this comment. A task group will be formed on Immersion Cooling, and the submitter will be invited to participate.

Public Comment No. 2-NFPA 75-2022 [New Section after 11.5.4]

11.5.4.1 Lithium-ion batteries

Listed or approved off-gas detection systems that monitor for electrolyte vapor released prior to thermal runaway shall be installed in accordance with the manufacturer's published instructions.

A.11.5.4.1

Gas detection for the purpose of detecting flammable or explosive levels of gas should not be used as a means to detect thermal runaway. Gases produced during the off-gas event that precedes thermal runaway are flammable. However, during this early off-gas stage, limited amounts of gas are produced that would not register with flammable gas sensors that are meant for preventing explosive atmospheres. During the off-gas phase, specialized detection devices are needed that can detect trace amounts of the vaporized electrolyte that may be present at the low ppm or ppb level. Additional information on explosion protection can be found in NFPA 68 (Standard on Explosion Protection by Deflagration Venting) and NFPA 69 (Standard on Explosion Prevention Systems).

For off-gas detection, the detection devices should be placed near or on the battery rack to detect off-gas events from the rack. While airflow is not required for sensor operation, the air flow patterns should be taken into consideration when positioning the detection devices. Sampling ports in an aspirated gas sensing system should follow similar positioning guidance. Several examples of potential air-flow patterns and their corresponding sensor placement are shown. In any case, manufacturer's published instructions should be followed.

Thermal runaway can also be detected using highly sensitive particulate detection. For example, an aspirated detection system that has sensing technology to allow for the detection of particles given off during the off-gas event prior to thermal runway.

Actions to be taken once the off-gas event has been detected will depend upon a number of factors including the design of the battery management system, lithium-ion cell chemistry, and others.

Additional Proposed Changes

File Name	Description	Approved
NFPA_75_Public_Comment_2024_Edition.docx	off-gas detection proposal with drawing	

Statement of Problem and Substantiation for Public Comment

Lithium-ion battery-based UPSs are becoming more common in data centers and computer rooms. Li-ion batteries have the potential to go into thermal runaway when subjected to electrical, mechanical, or thermal abuse. This Public Input emphasizes the need to follow manufacturer's published instructions for installation of systems that can be used to prevent thermal runaway in li-ion UPSs and provides guidance in the Annex. Furthermore, it is possible that system designers will attempt to use LEL type gas sensors for thermal runaway detection. While the gases that are vented are flammable, they will not be present at sufficient levels to be detected prior to thermal runaway. Higher sensitivity gas sensors are needed for off-gas detection.

Related Item

• PI No. 63

Submitter Information Verification

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City:
State:
Zip:
Submittal Date: Tue Nov 29 09:08:11 EST 2022
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-9-NFPA 75-2023

Statement: Added requirements for electrolyte vapor gas detection, if installed. Electrolyte vapor gas detection is being installed in lithium-ion battery installations associated with UPS systems and these sections give additional guidance on how to install them appropriately.

11.5.4.2 clarifies the need to use replacement batteries that maintain the listing of the UPS system.

Public Comment No. 3-NFPA 75-2022 [New Section after 11.5.4]

11.5.4.2 When end-of-life lithium-ion batteries in a UPS are replaced with new lithium-ion batteries, the user shall confirm that they are compatible and consistent with the certification/listing of the UPS regardless of whether the batteries are of the same general chemistry.

Statement of Problem and Substantiation for Public Comment

This new requirement aims to prevent problems of li-ion batteries being replaced without assuring that they are fully compatible with the batteries being replaced. This goes beyond making sure that the batteries are the same general chemistry (e.g., LFP). This is not generally a problem with older battery technologies like lead acid.

Related Item

• PI No. 67

Submitter Information Verification

Submitter Full Name: Scott Lang
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City:
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Submittal Date: Tue Nov 29 09:27:59 EST 2022
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-9-NFPA 75-2023
Statement: Added requirements for electrolyte vapor gas detection, if installed. Electrolyte vapor gas detection is being installed in lithium-ion battery installations associated with UPS systems and these sections give additional guidance on how to install them appropriately.

11.5.4.2 clarifies the need to use replacement batteries that maintain the listing of the UPS system.

Public Comment No. 11-NFPA 75-2022 [Section No. 11.5.4]

11.5.4 Other Battery Types.

Battery types other than those addressed in 11.5.3 shall comply with Chapter 52 of NFPA 1.

Informational Note No. 1: See 8.3 for information on ITE incorporating integral battery backup.

Statement of Problem and Substantiation for Public Comment

Definitions of Uninterruptible Power Supply (UPS, NFPA 75) and Energy Storage Systems (ESS, NFPA 855) are very similar. With the increased use in facilities and equipment of various storage battery chemistries and capacities, this is making the differentiation between an integral battery backup, an UPS, and an ESS less clear.

Small batteries used for battery backup in information technology equipment should be covered under section 8.3. This should include kitted rack systems with an integral battery, where final assembly is done at time of installation. For example, incorporation of a UL 1778 listed pre-packaged (manufactured) stationary standby battery into a rack or UL 2054/UL 1642 portable battery pack incorporated into individual server.

If needed, additional informative information can be provided in Annex A to differentiate between integral battery backup, UPS, and ESS.

Related Item

• FR-37-NFPA 75-2022

Submitter Information Verification

Submitter Full Name: Will Susiene
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Affiliation: Information Technology Industry Council
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Submittal Date: Wed Dec 28 21:13:32 EST 2022
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but see related SR

Resolution: SR-9-NFPA 75-2023

Statement: Added requirements for electrolyte vapor gas detection, if installed. Electrolyte vapor gas detection is being installed in lithium-ion battery installations associated with UPS systems and these sections give additional guidance on how to install them appropriately.

11.5.4.2 clarifies the need to use replacement batteries that maintain the listing of the

UPS system.

Public Comment No. 17-NFPA 75-2023 [Section No. 11.6]

~~**11.6** – Alternative Energy Systems.~~

~~**11.6.1** * –~~

~~Where provided, alternative energy systems shall comply with applicable codes and standards.~~

~~**11.6.2** –~~

~~If installed in lightning-prone areas, the alternative energy installation shall comply with NFPA 780.~~

Statement of Problem and Substantiation for Public Comment

Delete section in entirety, to include the related Annex section. No reason for NFPA 75 to make references for Alternative Energy Systems. Highly unlikely such systems would be installed within an ITE Area or ITE Room. NFPA 75 makes no similar references to on-site diesel backup generators, so why do so for Alternative Energy Systems? Section as written is outside of NFPA 75 scope.

Related Item

• First Revision No. 48 - NFPA 75-2022 [New Section after 11.5.5]

Submitter Information Verification

Submitter Full Name: Randy Willard
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Submittal Date: Wed Jan 04 20:12:17 EST 2023
Committee: ELT-AAA

Committee Statement

Committee Action: Accepted
Resolution: SR-18-NFPA 75-2023
Statement: Alternative energy systems are outside the scope of NFPA 75.

Public Comment No. 5-NFPA 75-2022 [Section No. A.9.6]

A.9.6

Some ITE facilities are essential elements of the public safety network, providing communities with connectivity to 911 and E911 as well as processing alarms and other signals. ITE equipment might not have been designed or tested for immunity at the power levels and frequencies commonly used in responder radios. ITE rooms are not publicly accessible and the number of incidents requiring responder access ~~are~~ is low compared to many other occupancies. Because these facilities are unique occupancies with such an important function, close cooperation between the facility operator and the emergency response organization(s) should be encouraged to assure responder activities are not unduly impaired and the ITE remains functioning. ~~Two-way radio~~ In-building emergency responder communications enhancement systems deployed in common areas, stairwells, lobbies, and other nonequipment room locations within ITE buildings are less of a concern.

Statement of Problem and Substantiation for Public Comment

Changed "are" to "is" to align with "number" which is singular. Modified language in last sentence to align with NFPA 1225 and terminology used in the body of this standard.

Related Item

• PI-34

Submitter Information Verification

Submitter Full Name: Richard Kluge
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Submittal Date: Wed Dec 14 13:02:59 EST 2022
Committee: ELT-AAA

Committee Statement

Committee Action: Accepted
Resolution: SR-19-NFPA 75-2023
Statement: Changed "are" to "is" to align with "number" which is singular. Modified language in last sentence to align with NFPA 1225 and terminology used in the body of this standard.

Public Comment No. 8-NFPA 75-2022 [Section No. G.1.2.1]

G.1.2.1 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,* ~~2021a~~ 2022 .

Statement of Problem and Substantiation for Public Comment

date update

Related Item

• fr55

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler
Organization: GBH International
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City:
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Submittal Date: Mon Dec 26 15:04:25 EST 2022
Committee: ELT-AAA

Committee Statement

Committee Action: Rejected but see related SR
Resolution: SR-12-NFPA 75-2023
Statement: Updated to align with most recent editions of referenced publications.