First Revision No. 12-NFPA 75-2018 [Section No. 1.3]

1.3* Application.

The application of this standard is based on the risk considerations outlined in Chapter 4.

1.3.1

A documented risk assessment shall be the basis for implementation of this standard.

1.3.2

The mere presence of the ITE shall not constitute the need to invoke the requirements of this standard.

1.3.3

If applied, the requirements of this standard shall include the installation of ITE in modular data centers, fabricated containers, and other groupings.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 09:09:20 EDT 2018

Committee Statement

Committee Statement: This revision clarifies that if the risk consideration outlined in Chapter 4 indicate that it is appropriate to apply the standard, NFPA 75 can be applied to modular data centers.

Response Message:

First Revision No. 15-NFPA 75-2018 [Section No. 2.2]

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1, *Fire Code,* 2018 edition.

NFPA 10, *Standard for Portable Fire Extinguishers,* ~~2013~~ 2018 edition.

NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems,* ~~2015~~ 2018 edition.

NFPA 12A, *Standard on Halon 1301 Fire Extinguishing Systems,* ~~2015~~ 2018 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems,* ~~2016~~ 2019 edition.

~~NFPA 14, *Standard for the Installation of Standpipe and Hose Systems,* 2016 edition.~~

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems,* ~~2014~~ 2020 edition.

NFPA 70®, National Electrical Code®, ~~2014~~ 2020 edition.

NFPA 72®, National Fire Alarm and Signaling Code®, ~~2016~~ 2019 edition.

NFPA 76, *Standard for the Fire Protection of Telecommunications Facilities,* ~~2016~~ 2020 edition.

NFPA 80, *Standard for Fire Doors and Other Opening Protectives,* ~~2016~~ 2019 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems,* ~~2015~~ 2018 edition.

NFPA *101®, Life Safety Code®,* ~~2015~~ 2018 edition.

NFPA 105, *Standard for Smoke Door Assemblies and Other Opening Protectives,* ~~2016~~ 2019 edition.

NFPA 220, *Standard on Types of Building Construction,* ~~2015~~ 2018 edition.

NFPA 232, *Standard for the Protection of Records,* ~~2012~~ 2017 edition.

NFPA 259, *Standard Test Method for Potential Heat of Building Materials,* ~~2013~~ 2018 edition.

NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response,* 2017 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems,* ~~2015~~ 2019 edition.

NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems,* ~~2015~~ 2018 edition.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 09:59:52 EDT 2018

Committee Statement

Committee Statement: Update of referenced NFPA standards to include all those referenced within the mandatory portions of the standard and to reference the most current editions.

Response Message:

Public Input No. 58-NFPA 75-2018 [Section No. 2.2]

First Revision No. 16-NFPA 75-2018 [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 E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, ~~2014~~ 2018 .

ASTM E136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, ~~2012~~ 2016a .

ASTM E814, *Standard Method of Fire Tests of Through-Penetration Fire Stops*, 2013a, reapproved 2017 .

ASTM E1354, *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*, ~~2013~~ 2017 .

ASTM E1537, *Standard Test Method for Fire Testing of Upholstered Furniture*, ~~2013~~ 2016 .

ASTM E2652, *Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-Shaped Airflow Stabilizer, at 750°C*, ~~2012~~ 2016 .

2.3.2 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/UL 72, *Standard for Tests for Fire Resistance of Record Protection Equipment*, ~~2001, including revisions through November 6, 2009~~ 2015 .

ANSI/UL 242, *Nonmetallic Containers for Waste Paper,* 2015.

ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*, 2008, ~~including revisions through September 13, 2010~~ revised 2010 .

ANSI/UL 900, *Standard for Air Filter Units,*~~2004, including revisions through February 12, 2012~~ 2015 .

ANSI/UL 1315, *Metal Waste Paper Containers,* 2017.

ANSI/UL 1479, *Standard for Fire Tests of Penetration Fire Stops,* 2015.

ANSI/UL 1564, *Standard for Industrial Battery Chargers,* 2014.

ANSI/UL 1973, *Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications,* 2007.

ANSI/UL 9540, *Outline of Investigation for Energy Storage Systems and Equipment,* 2016.

ANSI/UL 60950, *Safety of Information Technology Equipment*, 2000, including revisions through October 30, 2007.

ANSI/UL 60950-1, *Information Technology Equipment — Safety — Part 1: General Requirements*, 2007.

ANSI/UL 62368-1, *Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements*, ~~2012~~ 2014 .

2.3.3 Other Publications.

California Technical Bulletin 133, *Flammability Test Procedure for Seating Furniture for Use in Public Occupancies*, State of California, Department of Consumer Affairs, ~~3485 Orange Grove Avenue, North Highlands, CA 95660–5595~~ 1625 North Market Boulevard, Suite N-119, Sacramento, CA 95834 .

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

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 10:02:59 EDT 2018

Committee Statement

Committee Statement: Referenced standards have been updated to include all those that are referenced within the mandatory sections of the code and to include the most current editions.

Response Message:

Public Input No. 20-NFPA 75-2018 [Section No. 2.3.2]

First Revision No. 17-NFPA 75-2018 [Section No. 2.4]

2.4 References for Extracts in Mandatory Sections.

NFPA 1, *Fire Code,* 2018 edition.

NFPA 70®, National Electrical Code®, ~~2014~~ 2017 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems,* ~~2015~~ 2018 edition.

NFPA *101®*, *Life Safety Code®,* ~~2015~~ 2018 edition.

NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems,* 2019 edition.

Submitter Information Verification

Submitter Full Name: Jonathan Hart
Committee:
Submittal Date: Tue May 08 10:14:25 EDT 2018

Committee Statement

Committee Statement: update
Response Message:

First Revision No. 2-NFPA 75-2018 [Section No. 3.3.13]

3.3.13* ITE Area.

An area of a building where the ITE room is located, including support rooms served by the same special air-conditioning/air-handling equipment as the ITE room.

A.3.3.13 ITE Area.

Areas that support ITE equipment and the ITE room are subject to fires as well. ITE support rooms could contain primary, emergency, and backup power systems; cooling, heating, and air handling equipment; wide area network connections; and network control and operation rooms. Fires in these rooms could affect the operation of the ITE; therefore, the risk in these spaces should be considered.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Mon May 07 09:30:51 EDT 2018

Committee Statement

Committee Statement: Annex material has been added to provide context to ITE areas for users of the code to better understand how auxiliary spaces relate to the ITE room.

Response Message:

Public Input No. 26-NFPA 75-2018 [New Section after 3.3.13]

First Revision No. 14-NFPA 75-2018 [New Section after 3.3.16]

3.3.17 Modular Data Center.

Prefabricated units, rated 1000 volts or less, consisting of an outer enclosure housing multiple racks or cabinets of information technology equipment (ITE) (e.g., servers) and various support equipment, such as electrical service and distribution equipment, HVAC systems, and the like. [**70:** 646.2]

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 09:55:12 EDT 2018

Committee Statement

Committee Statement: Adds the definition for modular data center from NFPA 70. Sections addressing this technology have been added to this edition of the code.

Response Message:

First Revision No. 31-NFPA 75-2018 [New Section after 3.3.24]

3.3.26 Uninterruptible Power Supply (UPS).

A device or system that provides quality and continuity of ac power through the use of a stored-energy device as the backup power source during any period when the normal power supply is incapable of performing acceptably. [**111,** 2019]

Submitter Information Verification

Submitter Full Name: Jonathan Hart
Committee:
Submittal Date: Tue May 08 13:53:27 EDT 2018

Committee Statement

Committee Statement: Adds definition for UPS which has expanded requirements in this edition of NFPA 75.
Response Message:

First Revision No. 1-NFPA 75-2018 [Section No. 3.3.24]

3.3.25* Support Equipment.

Permanently installed equipment that is essential to the operation of ITE, as well as equipment temporarily used for maintenance, installation, or de-installation of ITE.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Mon May 07 09:03:36 EDT 2018

Committee Statement

Committee Statement: Additional language clarifies that support equipment is essential to the operation of the ITE.

Public Input No. 31-NFPA 75-2018 [Section No. 3.3.24]

First Revision No. 18-NFPA 75-2018 [Section No. 4.2.3]

4.2.3*

The following elements shall be considered to determine the level of acceptable fire risk documented as part of the fire risk assessment *(see also Annex C)*:

(1) Life safety aspects of the function (e.g., process controls, air traffic controls)

(2) Fire threat of the installation to occupants or exposed property

(3) Continuity of service, operation, and data access

(4) Size and value of the ITE areas

(5) Economic loss from loss of function or loss of records

(6) Economic loss from value of equipment

(7) Loss of customer data hosted on ITE

(8) Regulatory impact

(9) Reputation impact

(10) Construction and compartmentation of the ITE areas

(11) Fire suppression and detection features provided for the ITE areas

(12) Response time to an alarm

(13) Local fire-fighting capabilities

(14) Redundant infrastructure, including off-site processing systems

(15) Life safety of occupants of ITE areas and adjacent spaces, emergency responders, and general public

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 10:36:35 EDT 2018

Committee Statement

Committee Statement: Delivery of computing has changed to a structure where many end-users of the data or computing power allow their data and processes to reside in a data center not fully under their control (e.g. managed hosting, co-location data centers, and cloud computing). The fire risk assessment elements should be updated to add "loss of customer data" to reflect this change and new risk for users of computing power in today's data centers.

Public Input No. 27-NFPA 75-2018 [Section No. 4.2.3]

First Revision No. 26-NFPA 75-2018 [Section No. 5.4]

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.

A.5.4

The SFPE *Guidelines for Peer Review in the Fire Protection Design Process* provides guidance concerning the peer review process for fire protection designs.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 13:09:08 EDT 2018

Committee Statement

Committee Statement: The SFPE Guidelines address issues such as when to use a peer reviewer that is suggested in Section 5-4, the choice of reviewer, the scope of the review, the agreements needed, and the documentation of the peer review

Response Message:

Public Input No. 52-NFPA 75-2018 [New Section after A.5.3]

First Revision No. 19-NFPA 75-2018 [Section No. 6.6.1]

6.6.1

Cable penetrations or other penetrations through required fire-rated assemblies shall be firestopped with a listed ~~firestopping material~~ firestop system that has a ~~fire resistance~~ rating ~~equal to the fire resistance rating of the penetrated barrier~~ as specified in 6.6.1.1 and 6.6.1.2 where tested with ~~a~~ minimum positive furnace pressure differential of 2.5 Pa (0.01 in. of water) under ASTM E814, *Standard Method of Fire Tests of Through-Penetration Fire Stops* or ANSI/UL 1479, *Standard for Fire Tests of Penetration Firestops* .

6.6.1.1 F Ratings.

Firestop systems and devices shall have an F rating of not less than 1 hour, and not less than the required fire resistance rating of the barrier penetrated. [***101:*** 8.3.4.2.3]

6.6.1.2 T Ratings.

Penetrations in fire resistance–rated horizontal assemblies shall have a T rating of not less than 1 hour, and not less than the fire resistance rating of the horizontal assembly. [***101:*** 8.3.4.2.4.1]

6.6.1.2.1

A T rating shall not be required for either of the following:

(1) Floor penetrations contained within the cavity of a wall assembly

(2) Penetrations through floors or floor assemblies where the penetration is not in direct contact with combustible material

[***101:*** 8.3.4.2.4.2]

Supplemental Information

File Name	Description	Approved
FR-19_6.6.1_Legislative_Changes.docx	For Staff Use	

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 11:07:13 EDT 2018

Committee Statement

Committee Statement: This revision includes the requirements from NFPA 101 for addressing penetrations in fire-rated assemblies. It is extracted here to provide for easy reference for the users of the standard.

Response Message:

Public Input No. 19-NFPA 75-2018 [Section No. 6.6.1]

First Revision No. 20-NFPA 75-2018 [Section No. 6.7]

6.7* Aisle Containment and Hot Air Collar Systems for ITE.

A.6.7

The principles of Section 6.7 should be followed if an existing ITE room has aisle containment systems added after construction of the room.

6.7.1

Aisle containment and hot air collar systems shall be permitted to be one of the following:

(1) Factory-packaged and aftermarket: systems designed, provided, and installed in accordance with the manufacturer's instructions

(2) Field-constructed: systems designed and constructed using common construction materials

6.7.2

Both types of aisle containment systems shall comply with 6.7.3 through 6.7.10.1.

6.7.3

Elements of aisle containment and hot air collars shall be constructed of materials that have a maximum flame spread index of 50 and a maximum smoke development of 450 in accordance with one or more of the following:

(1) ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*

(2) ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*

6.7.4*

Aisle containment systems and hot air collars shall not be considered to be plenums.

6.7.5

Aisle containment systems shall be permitted to be applied to hot aisles or cold aisles of ITE.

6.7.6*

Detection and suppression components within aisle containment systems shall be rated for the intended temperatures of hot aisles when installed in those locations.

6.7.7

Where aisle containment systems are installed, the existing suppression and detection systems shall be evaluated, modified, and tested as necessary to maintain compliance with the applicable codes and standards.

6.7.8

Where automatic sprinklers are present and the application of aisle containment systems or hot air collars creates obstructions to proper operation of sprinkler systems, the sprinkler system shall be modified as necessary to comply with NFPA 13.

6.7.8.1*

Sprinkler system modifications shall not be required where all of the following conditions are met:

(1)* An automatic means of smoke detection initiates the removal of the obstruction prior to operation of the suppression system.

(2) Removing the obstruction or a portion thereof does not compromise means of egress per NFPA *101*.

(3) The design and installation of removable obstruction elements does not diminish the level of protection ~~below~~ that ~~which~~ existed prior to the installation of the aisle containment or hot air collar.

(4)* The releasing devices are listed for the application.

(5) All removable obstructions are removed for the entire suppression zone.

6.7.9

Where gaseous suppression systems are present, they shall be designed to develop the required concentration of agent for the entire volume they serve, in accordance with NFPA 2001.

6.7.10

If the aisle containment prevents the gaseous suppression system, where present, from producing the required design concentrations ~~throughout the entire volume served~~ , the gaseous suppression system shall be modified to produce the required concentration throughout the volume served.

6.7.10.1*

Gaseous suppression system modifications shall not be required where all the following conditions are met:

(1)* An automatic means of smoke detection initiates the removal of the obstruction prior to the suppression system operation.

(2) Removing the obstruction or portion thereof does not compromise means of egress per NFPA *101*.

(3) The design and installation of removable obstruction elements does not diminish the level of protection ~~below~~ that ~~which~~ existed prior to the installation of the aisle containment or hot air collar.

(4)* The releasing devices are listed for the application.

(5) All removable obstructions are removed for the entire suppression zone.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 11:14:41 EDT 2018

Committee Statement

Committee Statement: Additional annex has been included to clarify the fact that the requirements of 6.7 are meant to be applied to existing facilities adding aisle containment.

Response Message:

Public Input No. 28-NFPA 75-2018 [New Section after 6.7.7]

First Revision No. 21-NFPA 75-2018 [Section No. 7.1.2]

7.1.2

Small work areas shall be permitted within the ITE room provided all the following conditions are met:

(1) Areas are not occupied on a full-time basis.

(2) Case furniture, including desks, is constructed of noncombustible material (e.g., metal). The construction can include a high-pressure laminate veneer on the desktop.

(3) Space dividers and system furniture panels and chairs with upholstered assemblies exhibit a maximum rate of heat release not exceeding 80 kW and a maximum total heat release not exceeding 25 MJ within the first 10 minutes of test where tested in accordance with one of the following:

(a) ASTM E1537, *Standard Test Method for Fire Testing of Upholstered Furniture*

(b) California Technical Bulletin 133, *Flammability Test Procedure for Seating Furniture for Use in Public Occupancies*

(4) Paper records, manuals, drawings, and all other combustible materials are stored in fully enclosed noncombustible cabinets or cases.

(5) The quantity of records, manuals, drawings, and all other combustible materials kept in the room are limited to the absolute minimum required for essential and efficient operation.

(6) Trash receptacles, where provided, ~~shall be~~ are listed, provided with tight-fitting or self-closing lids, and constructed of materials that are either noncombustible or meet a peak heat release rate not exceeding 300 kW/m^2 where tested in accordance with ASTM E1354, *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter,* at an incident heat flux of 50 kW/m^2 in the horizontal orientation, ANSI/UL 242, *Nonmetallic Containers for Waste Paper,* or ANSI/UL 1315, *Metal Waste Paper Containers* .

Supplemental Information

File Name	Description	Approved
FR-21_7.1.2_Legislative_Changes.docx	For Staff Use	

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 11:18:43 EDT 2018

Committee Statement

Committee Statement: The UL standards added to item (6) meet the the testing and listing requirements and have been added to specifically include trash receptacles meeting the criteria.

Response Message:

Public Input No. 21-NFPA 75-2018 [Section No. 7.1.2]

First Revision No. 6-NFPA 75-2018 [New Section after 9.2.2]

9.2.2.1

Smoke detectors or sampling ports installed on return air openings shall have a coverage area of no more than 0.4 m^2 (4 ft^2).

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Mon May 07 14:08:46 EDT 2018

Committee Statement

Committee Statement: This section has been added so that the standard includes requirements for spacing of detectors or ports on return air grills. It also aligns NFPA 75 with NFPA 76.

Response Message:

Public Input No. 10-NFPA 75-2017 [New Section after 9.2.2]

First Revision No. 7-NFPA 75-2018 [New Section after 9.2.2]

9.2.3*

Where detection is used for the monitoring of fire in individual ITE cabinets, the following shall be met:

(1) Detectors or sampling ports shall be located in the main airflow at the exhaust vents, downstream of the airflow distribution path, or in accordance with the manufacturer's published instructions.

(2) Multiple detectors or ports shall be provided when the cabinet has multiple outlet vents.

(3) If the cabinet is compartmentalized, each compartment shall have a detector or port.

(4) Where cabinets are fitted with in-cabinet suppression systems, the detection system shall provide an alarm signal for each cabinet or group of cabinets if the suppression system is to be released into several cabinets simultaneously.

A.9.2.3

Sampling ports or spot-type detectors should be located where smoke is more likely to migrate. For example, in an unventilated (i.e., sealed) cabinet, detection should be within the top 10 percent of the cabinet, whereas in a ventilated cabinet, detection should be provided where the ventilation exits the cabinet. In a naturally vented cabinet, this will be the upper ventilation vent.

9.2.4

Where detection is used for the monitoring of fire in ITE equipment with close-coupled cooling units, detectors or sampling ports shall be provided at the return inlets.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Mon May 07 14:30:06 EDT 2018

Committee Statement

Committee Statement: The standard already requires detection in the return air stream. In some cases, the return air stream may be in an electrical cabinet. This public input provides basic guidance on installation in electrical cabinets.

Response Message:

Public Input No. 12-NFPA 75-2017 [New Section after A.9.2.2]

Public Input No. 11-NFPA 75-2017 [New Section after 9.2.2]

First Revision No. 22-NFPA 75-2018 [Section No. 9.3]

9.3 Portable Extinguishers ~~and Hose Lines~~ .

9.3.1

Listed portable fire extinguishers of the carbon dioxide type or a halogenated agent type shall be provided for the protection of electronic equipment. The extinguishers shall be maintained in accordance with NFPA 10.

9.3.2*

Listed extinguishers with a minimum rating of 2-A shall be provided for use on fires in ordinary combustible materials, such as paper and plastics. Dry chemical extinguishers shall not be permitted.

9.3.3

A sign shall be located adjacent to each portable extinguisher and shall plainly indicate the type of fire for which it is intended.

~~**9.3.4**~~

~~Where provided, inside hose shall meet the following requirements:~~

~~It shall be 3.81 cm (1 ½ in.) rubber-lined hose with shutoff and combination solid-stream and water-spray nozzles.~~

~~It shall be installed and maintained in accordance with NFPA 14 .~~

~~**9.3.4.1**~~

~~Inside hose supplied from a sprinkler system in accordance with NFPA 13 shall be permitted.~~

~~**9.3.5**~~

~~The requirement of 9.3.4 shall be permitted to be evaluated as part of the fire risk assessment as outlined in Chapter 4 .~~

~~**9.3.6**~~

~~Where carbon dioxide hand hose lines are provided, the lines shall be installed and maintained in accordance with NFPA 12 .~~

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 11:49:50 EDT 2018

Committee Statement

Committee Statement: Hand hose lines are not usually present in IT spaces, they require on-going maintenance, and the responding fire department will typically bring in their own hoses - not relying on the building hose. Deleting the guidance on maintaining these systems might help support building owners who are looking for approval from the AHJ to remove old installations.

Response Message:

Public Input No. 1-NFPA 75-2017 [Section No. 9.3.4]

First Revision No. 23-NFPA 75-2018 [Section No. 9.4.3]

9.4.3*

Hot aisle or cold aisle containment systems shall not obstruct the free flow of gaseous clean agent suppression systems to the ~~IT equipment~~ ITE or cooling system serving the contained aisle within an ITE room or zone.

Submitter Information Verification

Submitter Full Name: Jonathan Hart
Committee:
Submittal Date: Tue May 08 12:01:27 EDT 2018

Committee Statement

Committee Statement: ITE is a defined term.
Response Message:

Public Input No. 38-NFPA 75-2018 [Section No. 9.4.3]

First Revision No. 24-NFPA 75-2018 [Section No. 10.2.2]

10.2.2

The installation of portable extinguishing equipment ~~and hose lines~~ shall be in accordance with Section ~~9.3.1~~ 9.3 ~~through~~ ~~9.3.6~~ .

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 12:03:37 EDT 2018

Committee Statement

Committee Statement: Revised to reflect that hose lines are no longer addressed in Chapter 9.

Response Message:

Public Input No. 39-NFPA 75-2018 [Section No. 10.2.2]

First Revision No. 4-NFPA 75-2018 [Section No. 11.3.1]

11.3.1*

Installation of all electrical equipment and wiring and all optical fiber cabling shall conform to *NFPA 70*.

A.11.3.1

For the installation of electrical equipment and wiring and optical fiber cabling to conform to *NFPA 70*, the applicable articles in the *NEC* need to be identified. The ~~2014 edition added Article 646, Modular Data Centers. Consequently, the~~ first step in applying the *NEC* is to review the definition of ~~a~~ *modular data center* in Section 646.2. If the data center is determined to be modular, then the installation is required to conform to Article 646, Modular Data Centers, and all other sections of the *NEC* that are referenced therein.

If the data center is not modular, the next step is to determine if Article 645, Information Technology Equipment, applies. Since Article 645 covers ITE in an ITE room, the definitions of *ITE* and *ITE room* in Section 645.2 should be reviewed. If the installation comprises ITE in an ITE room, Article 645 could be applicable to the installation.

Article 645 is permissive. Section 645.4 states: “This article shall be permitted to provide alternate wiring methods to the provisions of Chapter 3 and Article 708 for power wiring, Parts I and III of Article 725 for signaling wiring, and Parts I and V of Article 770 for optical fiber cabling where all of the following conditions are met.”

There are six conditions. See Section 645.4 of the *NEC* to review the conditions.

If an installation does not meet the six conditions, then Article 645 is not permitted to be used, ~~and~~ the provisions of Chapter 3 must be followed for power wiring, and the provisions of Article 725 and Article 770 must be followed for data wiring and optical fiber cabling. Even if a data center meets the six conditions, it is permissible to opt out of Article 645 and follow all the rules in Chapter 3, Article 725, and Article 770.

Regardless of whether Article 645 is used, installations of power wiring must comply with Chapters 1, 2, and 4 of the *NEC*, and installations of communications wiring must comply with Chapter 8 of the *NEC*.

The bonding requirements in the product standards governing this listed equipment ensure that it complies with Article 250 [of *NFPA 70*]. [**70:** 645.15 Informational Note 1]

Where isolated grounding-type receptacles are used, see 250.146(D) and 406.3(D) [of *NFPA 70*]. [**70:** 645.15 Informational Note 2]

Supplemental Information

File Name	Description	Approved
FR_4_Annex_Material.docx	Annex changes - for staff use	

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Mon May 07 13:37:06 EDT 2018

Committee Statement

Committee Statement: Explicitly adding “equipment” to 11.3.1 adds clarity to the basic requirement that all electrical installations must comply with the NFPA 70, National Electrical Code.

Annex material previously linked to a section on bonding (which has been deleted) was added within this annex note to retain useful references for users of the standard.

Response Message:

Public Input No. 15-NFPA 75-2017 [Section No. A.11.3.1]

Public Input No. 16-NFPA 75-2017 [Section No. 11.3.1]

First Revision No. 5-NFPA 75-2018 [Section No. 11.4.4]

~~**11.4.4** Securing in Place.~~

~~Power cables, communications cables, connecting cables, interconnecting cables, and associated boxes, connectors, plugs, and receptacles that are listed as part of, or for, ITE shall not be required to be secured in place.~~

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Mon May 07 13:59:01 EDT 2018

Committee Statement

Committee Statement: Section 11.4.4 almost correlates with Section 645.5(F) of NFPA 70, National Electrical Code. Section 645.5(F) is restricted to the wiring under raised floors in installations that comply with all the conditions in 645.4. Section 645.5(F) states:

(F) Securing in Place. Power cables; communications cables, connecting cables, interconnecting cables, and associated boxes, connectors, plugs, and receptacles that are listed as part of, or for, information technology equipment shall not be required to be secured in place where installed under raised floors.

Section 11.4.1 applies generally, not just to wiring under raised floors. Because it applies generally it conflicts with sections 300.11(A) and 314.23 of the NEC (shown below).

300.11 Securing and Supporting.

(A) Secured in Place. Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place.

314.23 Supports. Enclosures within the scope of this article shall be supported in accordance with one or more of the provisions in 314.23(A) through (H).

Section 11.4.4 should be deleted to remove the conflicts with the NEC.

Response Message:

Public Input No. 17-NFPA 75-2017 [Section No. 11.4.4]

First Revision No. 11-NFPA 75-2018 [Section No. 11.4.7]

11.5 Uninterruptible Power Supplies (UPSs).

11.5.1 UPS Systems.

~~Except for installations and constructions covered in 11.4.7(1) or 11.4.7(2) ,~~ UPS systems installed within the ~~ITE~~ information technology equipment [ITE] room, and their supply and output circuits, shall comply with ~~11.4.6~~ 11.4.5 ~~. The disconnecting means shall also disconnect the battery from its load.~~ , except for the following installations and constructions:

(1) Installations ~~qualifying under the provisions of~~ complying with Article 685 ~~*NFPA 70* , Article 685~~

(2) Power sources limited to 750 volt-amperes or less derived either from UPS equipment or from battery circuits integral to electronic equipment

[**70:**645.11]

11.5.1.1

The disconnecting means shall also disconnect the battery from its load. [**70:** 645.11]

11.5.1.2

Storage battery systems in the ITE area shall comply with the requirements of *NFPA 70*, Article 480.

~~**A.11.4.7.1**~~

~~The installation of certain types of storage battery systems can create concerns about hydrogen gas generation, which can accumulate if not ventilated properly and present a fire hazard. Certain types of storage battery systems can also present an acid spill hazard. For these installations, the design of the facilities to mitigate these hazards is appropriate.~~

11.5.2 Batteries.

Batteries used in ITE UPS systems exceeding the quantities in 11.5.3.1 and 11.5.4.2 shall comply with this chapter.

11.5.2.1 Location and Occupancy Separation.

[**1:** 52.2.2.3]

11.5.2.1.1

Battery systems shall be permitted in the same room as the equipment that they support. [**1:** 52.2.2.3.1]

11.5.2.1.2

Battery systems shall be housed in a noncombustible, locked cabinet or other enclosure to prevent access by unauthorized personnel unless located in a separate equipment room accessible only to authorized personnel. [**1:** 52.2.2.3.2]

11.5.2.1.3

Battery systems shall be located in a room separated from other portions of the building by a minimum of a 1-hour fire barrier.

11.5.2.1.4

Where ITE equipment is located in a structure or building housing multiple tenants or occupancies that include assembly, educational, detention, and correction facilities; health care, ambulatory health care, and day care centers; and residential board and care and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 2-hour fire barrier.

11.5.2.2 Environment.

The battery environment shall be controlled or analyzed to maintain temperature in a safe operating range for the specific battery technology used. [**1:** 52.2.2.7]

11.5.2.3 Labels.

Battery cabinets shall be provided with exterior labels that identify the manufacturer and model number of the system and electrical rating (i.e., voltage and current) of the contained battery system. [**1:** 52.2.2.8.4]

11.5.2.4 Signs.

Signs shall be provided within battery cabinets to indicate the relevant electrical, chemical, and fire hazard. [**1:** 52.2.2.8.5]

11.5.2.5 Seismic Protection.

Battery systems shall be seismically braced in accordance with the building code. [**1:** 52.2.2.9]

11.5.2.6 Smoke Detection.

An approved automatic smoke detection system shall be installed in rooms containing stationary battery storage systems in accordance with *NFPA 72* . [**1:** 52.2.2.10]

11.5.3 Lead-Acid and Nickel-Cadmium Batteries.

11.5.3.1 General.

UPS systems having an electrolyte capacity of more than 100 gal (378.5 L) in sprinklered buildings or 50 gal (189.3 L) in unsprinklered buildings for flooded lead-acid, nickel-cadmium, and valve-regulated lead–acid (VRLA) batteries shall be in accordance with 11.5.3 and Table 11.5.3.1 . [**1:** 52.2.1]

Table 11.5.3.1 Lead-Acid and Nickel-Cadmium Battery Requirements [1:Table 52.2.1]

	Nonrecombinant Batteries		**Recombinant Batteries**
Requirement	**Flooded Lead-Acid**	**Flooded Nickel-Cadmium (Ni-Cd)**	**Valve-Regulated Lead–Acid (VRLA)**
Safety caps	Venting caps	Venting caps	Self-resealing flame-arresting caps
Thermal runaway management	Not required	Not required	Required
Spill control	Required	Required	Not required
Neutralization	Required	Required	Required
Ventilation	Required	Required	Required
Signage	Required	Required	Required
Seismic control	Required	Required	Required
Fire detection	Required	Required	Required

11.5.3.2 Safety Features.

[**1:** 52.2]

11.5.3.2.1 Safety Venting.

Batteries shall be provided with safety venting caps per 11.5.3.2.1.1 and 11.5.3.2.1.2 . [**1:** 52.2.2.1]

11.5.3.2.1.1 Nonrecombinant Batteries.

Vented lead-acid and nickel-cadmium shall be provided with safety venting caps. [**1:** 52.2.2.1.1]

11.5.3.2.1.2 Recombinant Batteries.

VRLA shall be equipped with self-resealing flame-arresting safety vents. [**1:** 52.2.2.1.2]

11.5.3.2.2 Thermal Runaway.

VRLA systems shall be provided with a listed device or other approved method to preclude, detect, and control thermal runaway. [**1:** 52.2.2.2]

11.5.3.2.3 Spill Control.

[**1:** 52.2.2.4]

11.5.3.2.3.1

Rooms, buildings, or areas containing free-flowing liquid electrolyte in individual vessels having a capacity of more than 55 gal (208 L) or multiple vessels having an aggregate capacity exceeding 1000 gal (3785 L) shall be provided with spill control to prevent the flow of liquids to adjoining areas. [**1:** 52.2.2.4.1]

11.5.3.2.3.2*

An approved method and materials for the control of a spill of electrolyte shall be provided that will be capable of controlling a spill from the single largest vessel. [**1:** 52.2.2.4.2]

A.11.5.3.2.3.2

Methods of achieving this protection can include, but are not limited to, the following:

(1) Liquidtight sloped or recessed floors in indoor locations or similar areas in outdoor locations

(2) Liquidtight floors in indoor locations or similar areas in outdoor locations provided with liquidtight raised or recessed sills or dikes

(3) Sumps and collection systems

(4) Spill containment systems such as that described in A.11.5.3.2.4.1

[**1:** A.52.2.2.4.2]

11.5.3.2.3.3

VRLA batteries with immobilized electrolyte shall not require spill control. [**1:** 52.2.2.4.3]

11.5.3.2.4 Neutralization.

11.5.3.2.4.1*

An approved method to neutralize spilled electrolyte shall be provided. [**1:** 52.2.2.5.1]

A.11.5.3.2.4.1

One method to determine compliance with the neutralization requirements of this subsection is found in Underwriters Laboratories Subject 2436, *Outline of Investigation for Spill Containment for Stationary Lead Acid Battery Systems* . Subject 2436 investigates the liquid tightness, level of electrolyte absorption, pH neutralization capability, and flame spread resistance of spill containment systems. [**1:** A.52.2.2.5.1]

11.5.3.2.4.2

For VRLA batteries, the method shall be capable of neutralizing a spill from the largest battery to a pH between 7.0 and 9.0. [**1:** 52.2.2.5.2]

11.5.3.2.5* Ventilation.

For flooded lead-acid, flooded nickel-cadmium, and VRLA batteries, ventilation shall be provided for rooms and cabinets in accordance with the mechanical code and one of the following:

(1) The ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room during the worst-case event of simultaneous “boost” charging of all the batteries, in accordance with nationally recognized standards.

(2) Continuous ventilation shall be provided at a rate of not less than 1 ft^3 /min/ft^2 (5.1 L/sec/m^2) of floor area of the room or cabinet.

[**1:** 52.2.2.6]

A.11.5.3.2.5

Information on battery room ventilation can be found in IEEE 1635/ASHRAE 21, *Guide to Battery Room Ventilation and Thermal Management* . [**1:** A.52.2.2.6]

11.5.3.2.6 Signs.

11.5.3.2.6.1

Doors or accesses into the following shall be provided with approved signs:

(1) Rooms containing stationary storage battery systems

(2) Other areas containing stationary storage battery systems

11.5.3.2.6.2

For rooms that contain VRLA batteries, the signs required by 11.5.3.2.6.1 shall state the following:

This room contains:

(1) Stationary storage battery systems

(2) Energized electrical circuits

[**1:** 52.2.2.8.2]

11.5.3.2.6.3

For rooms that contain lead-acid or flooded Ni-Cd batteries, the signs required by 11.5.3.2.6.1 shall state the following:

This room contains:

(1) Stationary storage battery systems

(2) Energized electrical circuits

(3) Corrosive battery electrolyte

[**1:** 52.2.2.8.3]

11.5.4 Lithium Batteries.

11.5.4.1 General.

UPS systems having an electrolyte capacity of more than 20 KWh (18.0 Mega joules) shall be in accordance with 11.5.4 .

11.5.4.1.1

For batteries and capacitors rated in amp-hours, KWh shall equal rated voltage times amp-hour rating divided by 1000.

11.5.4.2 Maximum Allowable Quantities.

11.5.4.2.1

Fire areas within buildings containing lithium battery UPS systems exceeding the maximum allowable quantity of 600 KWh (2160 mJ) shall comply with all applicable ordinary-hazard and high-hazard requirements as identified in 6.2.2 of NFPA *101* and the building code.

11.5.4.2.2

Where approved by the AHJ, areas containing lithium battery UPS systems that exceed 600 KWh (2160 mJ) shall be permitted to be treated as an ordinary-hazard and not a high-hazard classification based on a hazardous mitigation analysis in accordance with 11.5.4.4 and large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory.

11.5.4.3* Battery Arrays.

A.11.5.4.3

A stationary battery array is an arrangement of individual stationary storage batteries in close proximity to each other, mounted on storage racks or in modules, battery cabinets, or other enclosures. [**1:** A.52.3.2.3]

11.5.4.3.1

Battery arrays shall comply with 11.5.4.3.2 and 11.5.4.3.3 unless otherwise permitted by 11.5.4.3.4 or 11.5.4.3.5 . [**1:** 52.3.2.3.1]

11.5.4.3.2

Lithium batteries, prepackaged lithium battery UPS systems, and pre-engineered lithium battery UPS systems shall be segregated into arrays not exceeding 50 KWh (180 Mega joules) each. [**1:** 52.3.2.3.2]

11.5.4.3.3

Each array shall be spaced a minimum 3 ft (914 mm) from other arrays and from walls in the storage room or area. The storage arrangements shall comply with the egress provisions in NFPA *101* . [**1:** 52.3.2.3.3]

11.5.4.3.4

Listed pre-engineered lithium battery UPS systems and prepackaged lithium battery UPS systems shall not exceed 250 KWh (900 Mega joules) each. [**1:** 52.3.2.3.4]

11.5.4.3.5

The AHJ shall be permitted to approve listed pre-engineered lithium battery UPS systems and prepackaged lithium battery UPS systems with larger capacities or smaller battery array spacing if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving one array will not propagate to an adjacent array, and be contained within the room for a duration equal to the fire resistance rating of the room separation required by 11.5.2.1.3 . [**1:** 52.3.2.3.5]

11.5.4.4 Hazard Mitigation Analysis.

A failure mode and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided to the AHJ when any of the following conditions are present:

(1) More than one stationary storage battery technology is provided in a room or indoor area where there is a potential for adverse interaction between technologies.

(2) When allowed as a basis for increasing maximum allowable quantities as specified in 11.5.4.2.2 .

11.5.4.4.1

The analysis shall evaluate the consequences of the following failure modes, and others deemed necessary by the AHJ. Only single failure modes shall be considered for each mode:

(1) Thermal runaway condition in a single module or array

(2) Failure of a battery management system

(3) Failure of a required ventilation system

(4) Voltage surges on the primary electric supply

(5) Short circuits on the load side of the stationary battery storage system

(6) Failure of the smoke detection, fire suppression, or gas detection system

[**1:** 52.3.2.4.1]

11.5.4.4.2

The AHJ shall be permitted to approve the hazardous mitigation analysis provided the consequences of the FMEA demonstrate the following:

(1) Fires or explosions will be contained within unoccupied stationary storage battery system rooms for the minimum duration of the fire resistance rated specified in 11.5.2.1.3 or 11.5.2.1.4 , as applicable

(2) Fires and explosions in stationary storage battery system cabinets in occupied work centers allow occupants to safely evacuate

(3) Toxic and highly toxic gases released during charging, discharging, and normal operation shall not exceed the permissible exposure limit (PEL)

(4) Toxic and highly toxic gases released during fires and other fault conditions shall not reach concentrations in access of IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area

(5) Flammable gases released from batteries during charging, discharging, and normal operation shall not exceed 25 percent of the lower flammable limit (LFL)

[**1:** 52.3.2.4.2]

11.5.4.4.3

Construction, equipment, and systems that are required for the lithium battery UPS system to comply with the hazardous mitigation analysis shall be installed, maintained, and tested in accordance with nationally recognized standards and specified design parameters. [**1:** 52.4.2.4.3]

11.5.4.5 Listings.

Lithium batteries used in UPS systems shall be listed in accordance with UL 1973, *Standard for Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications* . Prepackaged and pre-engineered lithium battery UPS systems shall be listed in accordance with UL 9540, *Outline of Investigation for Energy Storage Systems and Equipment* . [**1:** 52.3.2.5]

11.5.4.5.1* Prepackaged and Pre-engineered Systems.

Prepackaged and pre-engineered lithium battery UPS systems shall be installed in accordance with their listing and the manufacturer's instructions. [**1:** 52.3.2.5.1]

A.11.5.4.5.1

A prepackaged stationary storage battery system is designed and investigated as a single unit, assembled in a factory, and shipped to the site. A pre-engineered stationary storage battery system is designed and investigated as a single unit, but is shipped in modular form for assembly at the site. [**1:** A.52.3.2.5.1]

11.5.4.5.2 Environment.

The lithium battery UPS system environment shall be controlled to maintain temperatures and conditions within the battery manufacturer's specifications. [**1:** 52.3.2.5.2]

11.5.4.6 Installation.

11.5.4.6.1 Battery Management System.

An approved battery management system shall be provided for monitoring and balancing cell voltages, currents, and temperatures within the manufacturer's specifications. The system shall transmit an alarm signal to an approved location if potentially hazardous temperatures or other conditions including short circuits, overvoltage (i.e., overcharge) or under voltage (i.e., over discharge) are detected. [**1:** 52.3.2.6.1]

11.5.4.6.2 Battery Chargers.

Battery chargers shall be compatible with the battery manufacturer's electrical ratings and charging specifications. Battery chargers shall be listed in accordance with the UL 1564, *Standard for Industrial Battery Chargers* , or provided as part of a listed pre-engineered or prepackaged lithium battery UPS system. [**1:** 52.3.2.6.2]

11.5.4.6.3 Combustible Storage.

11.5.4.6.3.1

Combustible materials not related to the lithium battery UPS system shall not be stored in battery rooms, cabinets, or enclosures. [**1:** 52.3.2.6.4.1]

11.5.4.6.3.2

Combustible materials in occupied work centers shall comply with NFPA 1 , Section 10.18 and shall not be stored within 3 ft (915 mm) of lithium battery UPS system cabinets. [**1:** 52.3.2.6.4.2]

11.5.4.6.4 Signage.

11.5.4.6.4.1

Approved signage shall be provided on doors or in approved locations near entrances to lithium battery UPS system rooms. [**1:** 52.3.2.6.5.1]

11.5.4.6.4.2

New signage installations shall require the following items:

(1) Hazard identification markings in accordance with NFPA 704

(2) “This room contains energized battery systems,” or the equivalent

(3) Lithium Batteries

(4) AUTHORIZED PERSONNEL ONLY

(5) Any potential hazards associated with the batteries

11.5.4.6.4.3

Where the lithium battery UPS system disconnecting means is not within sight of the main service disconnect, placards or directories shall be installed at the locations of the main service disconnect to indicate the location of all lithium battery UPS system disconnecting means in accordance with *NFPA 70* . [**1:** 52.3.2.6.5.3]

11.5.4.6.4.4

Existing lithium battery UPS systems shall be permitted to include the signage required at the time it was installed. [**1:** 52.3.2.6.5.4]

11.5.4.6.4.5

Lithium battery UPS system cabinets shall be provided with exterior labels that identify the manufacturer and model number of the system and electrical rating (i.e., voltage and current) of the contained battery system. [**1:** 52.3.2.6.5.5]

11.5.4.6.4.6

Signs shall be provided within lithium battery UPS system cabinets to indicate the relevant electrical, chemical, and fire hazard. [**1:** 52.3.2.6.5.6]

11.5.4.6.4.7

Fire command centers in buildings containing lithium battery UPS systems shall include signage or readily available documentation that describes the location of lithium battery UPS systems, operating voltages, and location of electrical disconnects. [**1:** 52.3.2.6.5.7]

11.5.4.6.5* Mixed Battery Systems.

Different types of batteries shall not be installed in the same room or cabinet if there is a potential for unsafe interaction between them, as determined by the AHJ. [**1:** 52.3.2.6.8]

A.11.5.4.6.5

This section is intended to address unique situations where the installation of different types of batteries in the same room or cabinet could create a situation where there is unacceptable chemical, thermal, or other interaction between them, or where the surrounding environment is not within the battery manufacturers' specifications. The AHJ has the option to require a hazard mitigation analysis, conducted in accordance with 52.3.2.4 of NFPA 1 , to identify hazards and potential solutions that will mitigate the hazards. [**1:** A.52.3.2.6.8]

11.5.4.7 Suppression and Detection.

11.5.4.7.1 Fire Suppression.

Rooms containing lithium battery UPS systems shall be protected by an automatic sprinkler system installed in accordance with NFPA 1 , Section 13.3. [**1:** 52.3.2.7.1]

11.5.4.7.1.1

Commodity classifications for lithium battery UPS systems shall be in accordance with Chapter 5 of NFPA 13 . [**1:** 52.3.2.7.1.1]

11.5.4.7.2 Smoke Detection.

An approved automatic smoke detection system shall be installed in rooms containing lithium battery UPS systems in accordance with *NFPA 72* and the required automatic smoke detection system shall be supervised by an approved central, proprietary, or remote station service or a local alarm that will give an audible signal at a constantly attended location. [**1:** 52.3.2.7.2]

11.5.4.8 Thermal Runaway.

Lithium battery UPS systems shall be provided with a listed device or other approved method shall be provided to preclude, detect, and control thermal runaway. [**1:** 52.3.2.10]

11.5.4.9 Testing, Maintenance, and Repairs.

11.5.4.9.1

Lithium battery UPS systems and associated equipment and systems shall be tested and maintained in accordance with the manufacturer's instructions. [**1:** 52.3.2.12.1]

11.5.4.9.2

Any lithium batteries or system components used to replace existing units shall be compatible with the battery charger, battery management systems, other storage batteries, and other safety systems. [**1:** 52.3.12.2]

11.5.5 Other Battery Types.

Other battery types not addressed in 11.5.3 or 11.5.4 shall be in accordance with Chapter 52 of NFPA 1 .

Supplemental Information

File Name	Description	Approved
FR_11_Batteries_.docx	For Staff Use	

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 09:07:03 EDT 2018

Committee Statement

Committee This new section addresses battery requirements pertinent to facilities addressed by NFPA 75.

Statement: The material is taken from Chapter 52 of NFPA 1. The increased use of batteries is a major concerns to the fire services. The fire issues associated with batteries and UPS equipment should be included in NFPA 75.

Response Message:

Public Input No. 43-NFPA 75-2018 [New Section after 11.4.7.1]

Public Input No. 23-NFPA 75-2018 [Section No. 11.4.7.1]

First Revision No. 3-NFPA 75-2018 [Section No. 11.4.8]

~~**11.4.6***~~ ~~Grounding.~~

~~System grounding and equipment grounding and bonding of ITE shall be in accordance with *NFPA 70* .~~

~~**A.11.4.6**~~

~~The bonding requirements in the product standards governing this listed equipment ensure that it complies with Article 250 [of *NFPA 70*]. [**70:** 645.15 Informational Note 1]~~

~~Where isolated grounding-type receptacles are used, see 250.146(D) and 406.3(D) [of *NFPA 70*]. [**70:** 645.15 Informational Note 2]~~

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Mon May 07 13:29:57 EDT 2018

Committee Statement

Committee Statement: Section 11.4.8 is redundant. Section 11.3.1 requires compliance with NFPA 70, National Electrical Code.

Response Message:

Public Input No. 18-NFPA 75-2017 [Section No. 11.4.8]

First Revision No. 13-NFPA 75-2018 [New Section after 12.3]

Chapter 13 Modular Data Centers

13.1 General.

The construction, location, and fire protection and detection equipment for modular data centers shall be permitted to be evaluated as part of the fire risk assessment as outlined in Chapter 4 .

Supplemental Information

File Name	Description	Approved
FR_13.docx	For Staff Use	

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 09:39:34 EDT 2018

Committee Statement

Committee Statement: Modular data centers are addressed by NFPA 75. A task group will be reviewing the application of the standard to provide additional guidance to modular data centers. Public comment is encouraged.

Response Message:

First Revision No. 25-NFPA 75-2018 [Section No. A.3.3.12]

A.3.3.12 ITE.

The term ITE is widely used in the industry to designate electronic equipment such as computers, servers, and data storage devices. It designates equipment both for manipulating and transmitting the signals. It ~~may~~ can also include close-coupled associated power and cooling systems located in, on, or on top of the lineups.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 13:06:48 EDT 2018

Committee Statement

Committee Statement: The added text emphasizes that the centralized power and cooling systems are not considered ITE.

Response Message:

Public Input No. 47-NFPA 75-2018 [Section No. A.3.3.12]

First Revision No. 27-NFPA 75-2018 [Section No. A.6.3.1]

A.6.3.1

Steam, water, or horizontal drain piping, other than for sprinkler system use, should not be in the space above the suspended ceiling and over ITE.

The ITE area should be located to minimize exposure to fire, water, corrosive fumes, heat, and smoke from adjoining areas and activities. Battery ~~rooms~~ installations , if constructed and ventilated in accordance with ~~NFPA 1~~ 11.5.2 , can be adjacent to or incorporated into the ITE room.

Basement areas should not be considered for the location of an ITE area. If ITE is located in a basement, precautions should be taken to facilitate smoke venting and to prevent flooding from interior and exterior sources that can occur, including a fire on an upper floor.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 13:11:12 EDT 2018

Committee Statement

Committee Statement: The reference is made to the new materials proposed under PI 43.

Other codes and standards (NFPA 1, IFC, NFPA 76, draft of NFPA 855) allow for batteries to be installed in the same room as the supported equipment and NFPA 76 annex information should reflect this.

Response Message:

Public Input No. 50-NFPA 75-2018 [Section No. A.6.3.1]

First Revision No. 8-NFPA 75-2018 [Section No. A.9.2.2]

A.9.2.2

The following outline provides smoke detector sensitivity and spacing guidance for protection of ITE in high airflow areas:

General.

For smoke detection systems to detect products of combustion, the products must travel from the source to a sensor or port and arrive there in sufficient density to be detectable.

Products of combustion follow forced air streams early in the development of a fire, or overheat condition where the influence of mechanical systems is greater than the buoyant forces of the fire or overheat condition. Detection system sensors or ports installed in the paths of cooling air exhaust from the cooled equipment can be expected to respond to a small fire in the equipment sooner than sensors or ports located outside of the ventilation air envelope. To be effective, the detection equipment installed within the ventilation air envelope should be suitable to meet the required sensitivity objectives and for the temperatures, air velocities, and other conditions present. If suitable detection equipment cannot be installed within the exhaust ventilation air envelope, a fire in the cooled equipment should be expected to grow to a size at which its energy is sufficient to overcome the mechanical forces of the HVAC containment system.

In the presence of aisle containment systems used to enhance the effectiveness of cooling ITE, sensors or ports located in hot aisles or in the above ceiling plenum ~~might be effective~~ are required .

Regardless, sensors or ports located on the ceiling in ITE areas are a basic requirement and contribute to effective detection over a broad range of ITE area configurations.

Listed ITE has inherent fire-resistant characteristics. Failing or overheated components or connections can lead to smoldering events that produce smoke but tend to remain small ~~due to the very low electrical voltages present at the board level in the ITE. Exceptions can occur where a source of energy external to the ITE drives increasing involvement of the materials present~~ . In ~~such~~ exceptional cases, flaming fires can result.

Automatic fire and smoke detection systems installed to detect smoldering events and/or flaming fires in ITE areas are more effective in detecting flaming fires than smoldering events due to the respective release rates of combustion products and the effects of forced air flow on the products of combustion. The greater the air flow, which dilutes and channels detectable products of combustion, the less effective will be the performance of the detection system. Damage or losses that could result from smoldering events or flaming fires in ITE prior to detection are likely to be greater in the presence of greater forced air flow due to the likely decrease in detection system performance.

Smoke Detection Systems for ~~Very~~ Early ~~Warning~~ Detection . Where a smoke detection system is installed for the primary purpose of summoning responsible people to the presence of a small ITE fire or electrical event that produces smoke (known as “pre-alarm”) , the system should be arranged with high sensitivity and close spacing to achieve response to low-density products of combustion suspended in air with reasonable stability and tolerance of the environment.

Smoke Detection Systems to Initiate Operation of HVAC Dampers or to Close Openings in Fire-Rated Walls. Where a smoke detection system is installed for the primary purpose of initiating operation of dampers, shutters, doors, or other closures in the event of a fire in an ITE area, the system should be arranged with medium sensitivity and spacing less than listed spacing to assure the integrity of fire-resistive barriers.

Smoke Detection Systems to Initiate Release of a Fire Suppression Agent. Where a smoke detection system is installed for the primary purpose of initiating the release of a fire suppression agent into an ITE area, the system should be arranged with low sensitivity, spacing less than listed spacing, and should include a form of logical confirmation of the presence of products of combustion to assure that a single indication does not release the agent.

Sensitivity and Spacing Ranges. The following is guidance for sensitivity and spacing ranges for different locations in high airflow areas:

(1) Smoke sensor and port spacing on ceilings in the presence of high air movement should follow the requirements of 17.7.6.3 of *NFPA 72*.

(2) Where air changes per hour (ACH) in the room served by the ventilation system exceeds 60, and where the supply air is delivered to the room through a raised floor, studies show that smoke sensors or ports under the floor might not be effective in detecting a fire originating under the floor without abnormally close spacing . ~~They might, however,~~ Experience has shown that smoke sensors or ports under the floor can be effective in detecting a fire originating in an air-handling unit supplying air to

the underfloor space, even in high airflow areas .

(3) In applying the sensor or port spacing, it is recommended that sensors and ports be located at strategic points where smoke is likely to pass; for example, in hot air return streams and at return air registers.

(4) For sensors and ports installed in the exhaust/return air stream in hot aisles or above ceiling plenums, the spacing and sensitivities listed in Table A.9.2.2 should be used. The guidance in Table A.9.2.2 comes partly from a study sponsored by the Fire Protection Research Foundation. That guidance is conservative because it is based on testing using airflow without recirculation into the volume being studied.

Table A.9.2.2 Recommended Sensitivity and Spacing of Smoke Sensors or Ports in Exhaust/Return Air Streams in ITE Areas with High Air ~~Flow~~ flow

	Low ACH — Up to 30		High ACH — Greater Than 30	
Intended Function	Sensitivity	Spacing	Sensitivity	Spacing
~~Very early warning~~ Early detection	≤0.2%/ft	≤200 ft^2	≤0.1%/ft	≤100 ft^2
Operating dampers, doors, and shutters	≤1.5%/ft	≤400 ft^2	≤0.75%/ft	≤200 ft^2
Suppression agent release	>2.5% ≤4%/ft	≤400 ft^2	>1.5% ≤3%/ft	≤200 ft^2

Notes:

(1) See Fire Protection Research Foundation reports "Validation of Modeling Tools for Detection Design in High Air Flow Environments," and "Validation of Modeling Tools for Detection Design in High Air Flow Environments — Phase II," and FM Global report "Experimental Data for Model Validation of Smoke Transport in Data Centers."

(2) It is essential that the user understand the material in A.9.2.2 prior to the application of the recommended sensitivity and spacing in this table.

(3) The sensitivity levels for early detection should be considered to be pre-alarm levels.

(4) The sensitivity levels in the table should be considered to be above the ambient obscuration level. The listed sensitivity level should be added to the recorded average peak level in the ambient environment.

Supplemental Information

File Name	Description	Approved
FR-8_A.9.2.2_Legislative_Changes.docx	For Staff Use	

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Mon May 07 15:09:58 EDT 2018

Committee Statement

Committee Statement: Multiple small changes to the Annex material to provide additional guidance and add clarity. The selected detection technology has to be capable of meeting the needed sensitivity. The use of the phrase "might be effective" seems contradictory since we are requiring detection in those locations. There are cases when aisle containment systems are used where detectors are not installed on a solid surface. In those cases, a traditional ceiling jet may not be able to form. In order to intercept smoke, denser spacing may be required. The phrase "very early warning" should be avoided since it has a specific meaning from its use in NFPA 76. The table is clarified that the listed sensitivities are considered alert levels and not alarm levels. The sensitivity levels are above ambient.

Response Message:

Public Input No. 13-NFPA 75-2017 [Section No. A.9.2.2]

Public Input No. 54-NFPA 75-2018 [Section No. A.9.2.2]

Public Input No. 53-NFPA 75-2018 [Section No. A.9.2.2]

First Revision No. 9-NFPA 75-2018 [Section No. A.9.2.2(3)]

A.9.2.2(3)

Products of combustion follow forced air streams early in the development of a fire or overheat condition when the influence of mechanical systems is greater than the buoyant forces of the fire or overheat condition. Detection system sensors or ports installed in the paths of cooling air exhaust from the cooled equipment can be expected to respond to a small fire in the equipment sooner than sensors or ports located outside of the cooling air exhaust stream. To be effective, the detection equipment installed within the cooling air exhaust stream should be suitable to meet the required sensitivity objectives and for the temperatures, air velocities, and other conditions present. If suitable detection equipment cannot be installed within the cooling air exhaust stream, a fire in the cooled equipment should be expected to grow to a size at which its energy is sufficient to overcome the mechanical forces of the HVAC containment system.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Mon May 07 16:19:05 EDT 2018

Committee Statement

Committee Statement: Specifically mentioning sensitivity highlights the need to select detection equipment that is capable of achieving the required sensitivity levels.

Response Message:

Public Input No. 14-NFPA 75-2017 [Section No. A.9.2.2(3)]

First Revision No. 28-NFPA 75-2018 [Section No. A.12.1.1.2]

A.12.1.1.2

Fire service orientation and information might include the review of the ITE placement, depowering issues, and how to perform depowering. Additionally, it might be in the best interest of the facility manager to initiate the fire service orientation. Figure A.12.1.1.2 is an example of a pre-fire plan drawing.

Figure A.12.1.1.2 Pre-Fire Plan Drawing.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 13:38:35 EDT 2018

Committee Statement

Committee Statement: Revise the figure to better differentiate the 1-hour and 2-hour partition markings as the legend markings did not match those used on the figure.

Response Message:

Public Input No. 55-NFPA 75-2018 [Section No. A.12.1.1.2]

First Revision No. 10-NFPA 75-2018 [Section No. D.3]

D.3 Agent Discharge.

When the stored energy of compressed gases is released, high-velocity discharges can result. These discharges can move ceiling tiles, cause undue turbulence, and so forth. Proper system selection arrangement and design that minimizes these effects should be used.

The rapid introduction of gas can cause a pressure buildup in a confined space. This rapid pressure buildup can be a concern for well-sealed spaces, and venting might be needed. When released, some gases, especially carbon dioxide, will rapidly expand in a room or enclosure, causing significant cooling of air and small-mass material. Where significant cooling can be a problem, techniques to minimize this cooling should be employed.

Hard disk drives can be damaged by vibrations including those created by loud noise. There are a variety of sources of loud noise in an ITE area. For example, fire suppression agent discharges have damaged hard disk drives because of noise. Techniques to reduce noise or design considerations can minimize this risk.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Mon May 07 16:31:30 EDT 2018

Committee Statement

Committee Statement: Presentation at Fire Protection Research Foundation SUPDET 2017 contained information on the damage to hard disk drives caused by acoustic energy from gasseous agent discharges in a ITE environment. This effect should be noted in the Annex.

Response Message:

Public Input No. 56-NFPA 75-2018 [Section No. D.3]

First Revision No. 29-NFPA 75-2018 [Section No. D.7]

D.7 Compatibility to Facility Operation.

Gaseous systems work best where the power can be turned off to eliminate all electrical faults that could serve as a continuing ignition source. If a facility is arranged so that power cannot be shut off, then ~~normal gaseous agent system designs can be inadequate. A higher gas concentration and the ability to hold that concentration~~ Class C design concentrations from NFPA 2001 should be used and the concentration should be held long enough to allow operator intervention to isolate and eliminate the continuing ignition source ~~are required~~ .

Similarly, if a protected space does not have a dedicated air-conditioning system and ventilation of the protected space cannot be shut down, then these conditions should be considered in the system design.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 13:42:34 EDT 2018

Committee Statement

Committee Statement: The problem posed in D.7 requiring higher concentrations of gaseous agents was addressed in NFPA 2001 in the 2012 edition. The language here is modified to reflect that change in the other standard.

Response Message:

Public Input No. 29-NFPA 75-2018 [Section No. D.7]

First Revision No. 30-NFPA 75-2018 [Chapter F]

Annex F Informational References

F.1 Referenced Publications.

The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

F.1.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1, *Fire Code*, ~~2015~~ 2018 edition.

NFPA 10, *Standard for Portable Fire Extinguishers*, ~~2013~~ 2018 edition.

NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*, ~~2015~~ 2018 edition.

NFPA 12A, *Standard on Halon 1301 Fire Extinguishing Systems*, ~~2015~~ 2018 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, ~~2016~~ 2019 edition.

NFPA 70®, *National Electrical Code®*, ~~2014~~ 2017 edition.

NFPA 72®, *National Fire Alarm and Signaling Code®*, ~~2016~~ 2019 edition.

NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*, ~~2012~~ 2017 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, ~~2015~~ 2018 edition.

NFPA 220, *Standard on Types of Building Construction,*~~2015~~ 2018 edition.

NFPA 259, *Standard Test Method for Potential Heat of Building Materials,*~~2013~~ 2018 edition.

NFPA 551, *Guide for the Evaluation of Fire Risk Assessments*, ~~2016~~ 2019 edition.

NFPA 730, *Guide for Premises Security*, ~~2014~~ 2020 edition.

NFPA 731, *Standard for the Installation of Electronic Premises Security Systems*, ~~2015~~ 2020 edition.

NFPA 780, *Standard for the Installation of Lightning Protection Systems*, ~~2014~~ 2020 edition.

NFPA 1600®, *Standard on Disaster/Emergency Management and Business Continuity Programs*, ~~2013~~ 2019 edition.

NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*, ~~2015~~ 2018 edition.

FPRF, “Validation of Modeling Tools for Detection Design in High Air Flow Environments,” 2012.

FPRF, “Validation of Modeling Tools for Detection Design in High Air Flow Environments,” Phase II, 2014.

F.1.2 Other Publications.

F.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,* ~~2014~~ 2018 .

F.1.2.2 BMS CAT Publications.

BMS CAT, Inc., International Headquarters, 303 Arthur Street, Fort Worth, TX 76107.

“Electronics & Magnetic Media Recovery,” n.d.

F.1.2.3 FM Publications.

FM Global, ~~1301 Atwood~~ 270 Central Avenue, P.O. Box 7500, Johnston, RI 02919.

Thumuluru, Sai, Benjamin Ditch, Prateep Chatterjee, and Marcos Chaos, 'Experimental Data for Model Validation of Smoke Transport in Data Centers,' 2014.

F.1.2.4 SFPE Publications.

Society of Fire Protection Engineers, ~~7315 Wisconsin Avenue~~ 9711 Washingtonian Boulevard , Suite 380, ~~Bethesda~~ Gaithersburg , MD ~~20814~~ 20878 .

Engineering Guide to Performance-Based Fire Protection, Second Edition, 2007.

Guidelines for Peer Review in the Fire Protection Design Process, 2009.

Bukowski, Richard W. 2013. *Risk Considerations for Data Center Fire Protection*, Proceedings, SFPE Engineering Conference and Expo, Austin TX, October 26–30.

F.1.2.5 Telcordia Publications.

Telcordia Technologies, Inc., One Ericsson Drive, RRC 4A-1060, Piscataway, NJ 08854-4156.

Telcordia GR-63-CORE, *Network Equipment Building System (NEBS)™ Requirements: Physical Protection*, 2017 .

F.1.2.6 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*, 2008, ~~including revisions through September 13,~~ revised 2010.

ANSI/UL 60950, *Safety of Information Technology Equipment*, ~~2000, including revisions through October 30,~~ 2007.

F.2 Informational References. (Reserved)

F.3 References for Extracts in Informational Sections.

NFPA 70®, *National Electrical Code*®, ~~2014~~ 2017 edition.

NFPA *101* ®, *Life Safety Code*®, ~~2015~~ 2018 edition.

Submitter Information Verification

Submitter Full Name: Jonathan Hart

Committee:

Submittal Date: Tue May 08 13:49:25 EDT 2018

Committee Statement

Committee Statement: update

Response Message:

Public Input No. 51-NFPA 75-2018 [Section No. F.1.2.4]