Second Revision No. 435-NFPA 30-2022 [Global Comment]

[SEE GLOBAL REVISIONS FOR STATIC ELECTRICITY IN CHAPTERS 18 AND 28].

18.5.2.2

Means that meet the requirements of 6.5.4shall be provided to minimize generation of and safely dissipate static electricity. ~~Such means shall meet the requirements of 6.5.4.~~

28.3.1 Bonding and Grounding and Stray Currents.

28.3.1.1*

Bonding and grounding in accordance with 6.5.4for the control of static electricity shall not be required where ~~the following conditions exist:~~the tank cars and tank vehicles are only loaded or unloaded with Class II and Class III liquids [FP ≥ 100°F (37.8°C)] at temperatures below their flash points and Class I liquids [FP < 100°F (37.8°C)] are not handled at the loading facility.

~~(1) Where tank cars and tank vehicles are loaded exclusively with products that do not have static-accumulating properties, such as asphalts (including cutback asphalts), most crude oils, residual oils, and water-soluble ignitible (flammable or combustible) liquids~~

~~(2) Where no Class I liquids [FP < 100°F (37.8°C)] are handled at the loading facility and where the tank cars and tank vehicles loaded are used exclusively for Class II and Class III liquids [FP ≥ 100°F (37.8°C)] at temperatures below their flash points~~

~~(3) Where tank cars and tank vehicles are loaded or unloaded through closed connections~~

A.28.3.1.1

If local ambient weather conditions bring the liquid temperature above the flash point of the liquid, the user should handle the liquid as a Class I liquid [FP < 100°F (37.8°C)].

28.3.1.2*

Loading and unloading facilities that are used to load ~~ignitible (flammable or combustible)~~ liquids not excluded by 28.3.1.1into tank vehicles through open domes shall be provided with a means for electrically bonding and grounding the fill pipe to protect against static electricity hazards.

28.3.1.2.1

Such means shall consist of a metallic ~~bond~~bonding wire that is permanently electrically connected to the fill pipe assembly or to some part of the rack structure that is in electrical contact with the fill pipe assembly.

28.3.1.2.2

~~The free end of this wire shall be provided with a clamp or an equivalent device for~~

~~convenient attachment to some metallic part that is in electrical contact with the cargo tank of the tank vehicle.~~The other end of the bonding wire shall be provided with an opposed-point-type clamp, or an equivalent device, for convenient attachment to the tank compartment being loaded.

28.3.1.2.3

All parts of the fill pipe assembly, including, but not limited to, the drop tube, rack structure and piping, shall form a continuous electrically conductive path that is directed to ground through the rack assembly or by conductive wiring.

28.3.1.3

~~Loading and unloading facilities that are used to transfer ignitible (flammable or combustible) liquids into and from tank cars through open domes shall be protected against stray currents by permanently bonding the fill pipe to at least one rail and to the facility structure, if of metal.~~Stray current protection shall be provided by permanently bonding the fill pipe to at least one rail and to an available metal facility component at loading and unloading facilities where liquids are transferred into and from tank cars through open domes.

28.3.1.3.1

Multiple pipelines that enter the area shall be permanently bonded together.

28.3.1.3.2

In areas where excessive stray currents are known to exist, all pipelines entering the area shall be provided with insulating sections to electrically isolate them from the facility piping.

~~28.3.1.3.2.1~~

~~The requirement in 28.3.1.3.2 shall not be required where only Class II or Class III liquids [FP ≥ 100°F (37.8°C)], at temperatures below their flash points, are handled and where there is no probability that tank cars will contain vapors from previous cargoes of Class I liquids [FP < 100°F (37.8°C)].~~

28.11.1.2

Before loading tank liquids not excluded by 28.3.1.1 into vehicles through open domes, a bonding connection shall be made to the vehicle or tank before dome covers are raised and ~~shall~~ remain in place until filling is completed and all dome covers have been closed and secured~~, unless one of the conditions of 28.3.1 exists~~.

28.11.1.5*

Filling through open domes into tank vehicles that contain vapor–air mixtures within the flammable range or where the ~~ignitible (flammable or combustible)~~ liquid being filled can form such a mixture shall be by means of a downspout that extends to within 6 in. (150 mm) of the bottom of the tank unless the liquid is conductive, or the operation is performed with the end of the downspout submerged in liquid.

A.28.11.1.5

NFPA 77 provides additional information on static electricity protection and defines conductive liquids as liquids possessing a conductivity greater than 10^4 picosiemens per meter (pS/m).

~~28.11.1.5.1~~

~~Liquids that do not accumulate static electric charges shall not be required to comply with 28.11.1.5.~~

~~28.11.1.5.2~~

~~Operations with a downspout that is submerged in liquid shall not be required to comply with 28.11.1.5.~~

28.11.1.10*

Metal or conductive objects, such as gauge tapes, sample containers, and thermometers, shall not be lowered into or suspended in a compartment while the compartment is being filled or immediately after ~~cessation of pumping, in order~~ to permit the relaxation of charge.

A.28.11.1.10

Relaxation time is dependent on the conductivity of the liquid. See NFPA 77 for guidance on determining appropriate relaxation times.

28.11.2.2*

Filling through open domes into tank cars that contain vapor–air mixtures within the flammable range, or where the ~~ignitible (flammable or combustible)~~ liquid being filled can form such a mixture, shall be by means of a downspout that extends to within 6 in. (150 mm) of the bottom of the tank unless the liquid is conductive, or the operation is performed with the end of the downspout submerged in liquid.

A.28.11.2.2

NFPA 77 provides additional information on static electricity protection and defines conductive liquids as liquids possessing a conductivity greater than 10^4 picosiemens per meter (pS/m).

~~28.11.2.2.1~~

~~Liquids that do not accumulate static electric charges shall not be required to comply with 28.11.2.2.~~

~~28.11.2.2.2~~

~~Operations with a downspout that is submerged in liquid shall not be required to comply with 28.11.2.2.~~

28.11.2.4*

Metal or conductive objects, such as gauge tapes, sample containers, and thermometers, shall not be lowered into or suspended in a compartment while the compartment is being filled or immediately after ~~cessation of pumping, in order~~ to permit the relaxation of charge.

A.28.11.2.4

Relaxation time is dependent on the conductivity of the liquid. See NFPA 77 for guidance on determining appropriate relaxation times.

28.11.3* Switch Loading.

To prevent hazards due to a change in ~~FP~~flash point of liquids, any tank car or tank vehicle that has previously contained a Class I liquid [FP < 100°F (37.8°C)] shall ~~not be loaded with~~ atreat the loading of Class II or Class III liquids [FP ≥ 100°F (37.8°C)] ~~unless proper precautions are taken~~as Class I liquids.

Supplemental Information

File Name	Description	Approved
30_SR-435_Static_Electricity_Global_OPS.docx	for staff use	

Submitter Information Verification

Committee: FLC-OPS

Submittal Date: Fri Aug 05 18:04:39 EDT 2022

Committee Statement

Committee Statement: Several revisions were made to better align with NFPA 77 and to provide quantitative guidance on the conductivity of materials. It is important to highlight the need to safely dissipate static in addition to the current requirements to minimize generation. Changes in chapters 18 and 28 align with the revision of 6.5.4. The static control requirements in 28.3.1.1 and 28.3.1.2 were revised for clarification. Also, the exclusions that were in 28.3.1.1 (1) and (3) were deleted as they oversimplify a complicated static hazard.

Response Message: SR-435-NFPA 30-2022

Public Comment No. 33-NFPA 30-2022 [Section No. 28.11.1.2]

Public Comment No. 37-NFPA 30-2022 [Section No. 28.11.1.10]

Public Comment No. 41-NFPA 30-2022 [Section No. 28.11.3]

Public Comment No. 30-NFPA 30-2022 [Sections 28.3.1.1, 28.3.1.2]

Public Comment No. 31-NFPA 30-2022 [Section No. 28.3.1.3 [Excluding any Sub-Sections]]

Public Comment No. 34-NFPA 30-2022 [Section No. 28.11.1.5]

Public Comment No. 39-NFPA 30-2022 [Section No. A.28.11.2.2]

Public Comment No. 29-NFPA 30-2022 [Section No. 18.5.2.2]

Public Comment No. 40-NFPA 30-2022 [Section No. 28.11.2.4]

Public Comment No. 36-NFPA 30-2022 [Section No. A.28.11.1.5]

Public Comment No. 38-NFPA 30-2022 [Section No. 28.11.2.2]

Public Comment No. 32-NFPA 30-2022 [Section No. 28.3.1.3.2.1]

Second Revision No. 455-NFPA 30-2022 [Global Comment]

[SEE CONTAINMENT, DRAINAGE AND SPILL CONTROL CHANGES FOR THE FLC-OPS TC.]

17.10 Containment, Drainage, and Spill Control.

17.10.1

A facility shall be designed and operated to prevent the discharge of ignitible (flammable or combustible) liquids to public waterways, public sewers, or adjoining property.

17.10.2

~~Emergency drainage systems shall be provided to direct ignitible (flammable or combustible) liquid leakage and fire protection water to a safe location.~~Where spill control is used, it shall comply with the requirements of Section 6.12 and any additional requirements of this section.

17.10.3*

~~Emergency drainage systems, if connected to public sewers or discharged into public waterways, shall be equipped with traps or separators.~~Where containment is used, it shall comply with the requirements of Section 6.12, and any additional requirements of this section.

A.17.10.3

This might require curbs, scuppers, or special drainage systems to control the spread of fire. Annex A of NFPA 15 provides information on this subject.

17.10.4

Where used, drainage shall comply with Section 6.12.

17.10.5

Where only Class IIIB liquids [FP ≥ 200°F (93°C)] are handled, spill control, secondary containment, and drainage shall not be required.

17.10.6

Where only unsaturated polyester resins (UPRs) containing not more than 50 percent by weight of Class IC, Class II, or Class IIIA liquid [73°F (22.8°C) ≤ FP < 200°F (93°C)] constituents are handled and are protected in accordance with 16.5.3.11, spill control, secondary containment, and drainage shall not be required.

18.5.6

Areas in which ignitible (flammable or combustible) liquids are transferred from one tank or container to another container shall be provided with the following:

(1) Separation from other operations where potential ignition sources are present by distance or by fire-resistant construction

(2) Drainage or other means to control spills, in accordance with Section 6.12

(3) *Natural or mechanical ventilation that meets the requirements of

Section 17.11

28.9* Containment, Drainage, and Spill Control.

Loading and unloading facilities shall be provided with drainage systems or other means to contain spills *(see Section 6.12).*

Supplemental Information

File Name	Description	Approved
30_SR-455_Drainage_Global_OPS.docx	for staff use	

Submitter Information Verification

Committee: FLC-OPS

Submittal Date: Wed Aug 17 11:28:25 EDT 2022

Committee Statement

Committee Statement: NFPA 30 applies to a broad range of occupancies and facilities which vary in size from the "mom and pop" mercantile occupancies to large industrial complexes. Users need clear guidance as to when these requirements apply and are asking for better information on how to meet the requirements when applicable. Containment, drainage, and spill control are methods of fire risk mitigation.

Section 6.12 includes the common requirements in NFPA 30 which are used in the occupancy specific chapters and allows any occupancy specific requirements to remain in the containment, drainage, and spill control sections of chapters 9, 10, 12, 13, 15, 16, 17, 18, and 24. This section also aligns drainage, containment, and spill control requirements in NFPA 30 with those found in NFPA 400 Hazardous Materials Code, and NFPA 5000 Building Construction and Safety Code, where deemed appropriate. (See SR-470).

Response Message: SR-455-NFPA 30-2022

Public Comment No. 77-NFPA 30-2022 [Section No. 17.10.3]

Public Comment No. 76-NFPA 30-2022 [Section No. 17.10.2]

Public Comment No. 78-NFPA 30-2022 [New Section after 18.5.6]

Public Comment No. 75-NFPA 30-2022 [Section No. 17.10.1]

Second Revision No. 456-NFPA 30-2022 [Global Comment]

[SEE REVISIONS TO EXPLOSION CONTROL WITHIN THE FLC-OPS TC SCOPE.]

17.12 Explosion Control.

The extent of required explosion control shall be determined in accordance with ~~6.4.1.2~~6.4.1.2.3.

17.15.3

The extent of fire and explosion prevention and risk control that is provided shall be determined in accordance with ~~6.4.1.2~~6.4.1.2.3.

19.4.7.1*

Operations involving heat transfer fluid systems and equipment shall be reviewed in accordance with 6.4.1.2.3to ensure that the fire and explosion hazards resulting from loss of containment of the fluid or failure of the system are provided with corresponding fire prevention and emergency action plans.

19.5.7.7 Explosion Protection.

~~Where used, explosion protection systems shall comply with NFPA 69.~~The extent of required explosion control shall be determined in accordance with 6.4.1.2.3.

Supplemental Information

File Name	Description	Approved
30_SR-456_Explosion_Control_Global_OPS.docx	for staff use	

Submitter Information Verification

Committee: FLC-OPS
Submittal Date: Wed Aug 17 13:03:47 EDT 2022

Committee Statement

Committee Statement: The engineering evaluation to address facility specific explosion hazards has been created in 6.4.1.2.3 to improve visibility and reflect its importance in the overall process; throughout the document instances of explosion control have new pointers to this section. The requirements in 6.4.1.2.3 are intended to trigger an evaluation on what, if anything, is required for explosion control, not to mandate explosion control if any of the stated conditions do or could exist. The trigger for 1-gallon containers of Class IA liquids has been moved from 9.16 to 6.4.1.2.3 for consolidation. With respect to heated Class II and III liquids, an appropriate middle ground is to mandate the evaluation when heated above flash point and in quantities greater than the MAQ, or when heated above boiling point in any quantity. All other thresholds that trigger the evaluation were established at the First Draft or in prior editions of the code and are thresholds which can be reasonably expected to result in an explosion hazard. Since the thresholds for evaluating whether explosion control is required have been moved to 6.4.1.2.3, each chapter covering specific ignitible liquid applications should redirect there in a consistent fashion.

Response Message: SR-456-NFPA 30-2022

Second Revision No. 457-NFPA 30-2022 [Global Comment]

[SEE REMOVAL OF UNSTABLE LIQUIDS FROM NFPA 30 SCOPE IN CHAPTERS UNDER FLC-OPS.]

Table 17.4.3 Location of Process Vessels with Respect to Property Lines, Public Ways, and the Nearest Important Building on the Same Property — Protection for Exposures Is Provided

Vessel Maximum Operating Liquid Capacity (gal)	Minimum Distance (ft)			
	From Property Line that Is or Can Be Built upon, Including Opposite Side of Public Way		From Nearest Side of Any Public Way or from Nearest Important Building on Same Property that Is Not an Integral Part of the Process	
	~~Stable Liquid~~ Emergency Relief*	~~Unstable Liquid~~ Emergency Relief*	~~Stable Liquid~~ Emergency Relief*	~~Unstable Liquid~~ Emergency Relief*

	Not Over	Over	~~Not Over~~	~~Over~~	Not Over	Over	~~Not Over~~	~~Over~~
	2.5 psi	2.5 psi	~~2.5 psi~~	~~2.5 psi~~	2.5 psi	2.5 psi	~~2.5 psi~~	~~2.5 psi~~
275 or less	5	25	~~50~~	~~100~~	5	25	~~50~~	~~100~~
276 to 750	10	25	~~50~~	~~100~~	5	25	~~50~~	~~100~~
751 to 12,000	15	25	~~50~~	~~100~~	5	25	~~50~~	~~100~~
12,001 to 30,000	20	30	~~50~~	~~100~~	5	25	~~50~~	~~100~~
30,001 to 50,000	30	45	~~75~~	~~120~~	10	25	~~50~~	~~100~~
50,001 to 100,000	50	75	~~125~~	~~200~~	15	25	~~50~~	~~100~~
Over 100,000	80	120	~~200~~	~~300~~	25	40	~~65~~	~~100~~

For SI units, 1 gal = 3.8 L; 1 ft = 0.3 m; 1 psi = a gauge pressure of 6.9 kPa.

Note: Double all of above distances where protection for exposures is not provided.

*Gauge pressure.

Table 17.6.1 Minimum Separation Distances for Buildings or Structures Used for Ignitible (Flammable or Combustible) Liquid Handling and Operations

		Minimum Separation	
		Distance (ft)	
Liquid Class	Minimum	To Street,	To Adjacent

	Type of Construction*	Alley, or Public Way	Property Line that Is or Can Be Built Upon
	II (222)	5	10
Class I liquids [FP < 100°F (37.8°C)]; ~~unstable liquids of any class;~~ liquids of any class heated above their flash points†	II (111)	5	25
	II (000)	10	50
Class II liquids [100°F (37.8°C) ≤ FP < 140°F (60°C)]	II (111)	5	10
	II (000)	5	25
Class III [FP ≥ 140°F (60°C)]	II (000)	5	10

For SI units, 1 ft = 0.3 m.

Note: Distances apply to properties that have protection for exposures, as defined in this code. If there are exposures for which protection does not exist, the distances should be doubled, in accordance with 17.6.3.

*Construction types are defined in NFPA 220.

†For stable liquids of any class heated above their flash points, see 6.4.1.3 and A.6.4.1.3.

~~**19.6.3.1**~~

~~Unstable or reactive liquids or materials shall not be processed unless they have been specifically listed on the system's markings or contained within the manufacturer's literature.~~

Supplemental Information

File Name	Description	Approved
30_SR-457_Unstable_Liquids_Global_OPS.docx	for staff use	

Submitter Information Verification

Committee: FLC-OPS

Submittal Date: Wed Aug 17 13:13:45 EDT 2022

Committee Statement

Committee Statement: This revision correlates with the removal of unstable liquids from NFPA 30 scope.

Response Message: SR-457-NFPA 30-2022

Public Comment No. 13-NFPA 30-2022 [Global Input]

Second Revision No. 460-NFPA 30-2022 [Section No. 17.7]

17.7* Fire Protection. ~~(Reserved)~~

A.17.7

At a minimum, a hazard analysis in accordance with Chapter 6 *(see also, 17.15.3)* should be conducted to determine the proper fire suppression system.

Historically, extra hazard (Group 2) (EH2) has been used as a design basis for process areas with ignitible (flammable and combustible) liquids. However, NFPA 13 data for EH2 sprinkler protection should be used with caution. These data were first introduced in the 1978 edition of NFPA 13 , and no substantiation or fire test data was provided for its basis. An occupancy definition for EH2 is provided in NFPA 13 , which states, “Occupancies or portions of other occupancies with moderate to substantial amounts of flammable or combustible liquids or occupancies where shielding of combustibles is extensive.” Recognizing there is no definition quantifying “moderate to substantial amounts of flammable or combustible liquids,” this lack of clarity presents a dilemma for users of this provision.

The following items can impact the size of a fire event and the effectiveness of the sprinkler system, and should be included in the hazard analysis:

(1) Protection goals and objectives

(2) Maximum liquid pool size as influenced by potential spill volume, drainage systems, interlocks, and other liquid containment methods

(3) Water miscibility

(4) Operating temperature of the liquid

(5) Amount of storage in area *(see Chapter 16 for design criteria)*

(6) Ceiling/roof height

(7) Sprinkler characteristics

(8) Anticipated fire size (i.e., area and intensity) and duration

(9) Important buildings or exterior processes, and liquid storage areas adjacent to buildings or exterior processes

(10) Exposure limits to adjacent buildings, process areas, or storage

(11) Response time and capabilities of onsite fire brigade or local fire department

(12) Layer of protection analysis that could include the following mitigations:

- (a) Hard-piped liquid transfer systems
- (b) Air-operated fail closed valves interlocked in the event of a spill or fire
- (c) Liquid level control interlocks on production vessels
- (d) Overpressure protection of processing equipment and piping
- (e) Process control systems
- (f) Process safety systems

The following references can be consulted when conducting the hazard analysis:

(1) NFPA 13

(2) NFPA 15

(3) FM Global Property Loss Prevention Data Sheet 7-14, *Fire Protection for Chemical Plants*

(4) FM Global Property Loss Prevention Data Sheet 7-32, *Ignitable Liquid Operations*

(5) API RP 2001, *Fire Protection in Refineries*

(6) API RP 2030, *Application of Fixed Water Spray Systems for Fire Protection in the Petroleum and Petrochemical Industries*

(7) National Fire Protection Research Foundation, *International Foam-Water Sprinkler*

Research Project, Task 1 Technical Report: Literature Search & Technical Analysis

(8) Also see A.17.4.3 for further references

A couple examples of how to design sprinkler protection criteria for process area protection are FM Global Property Loss Prevention Data Sheets 7-32 and 7-14. Data sheet 7-32 looks at roof height, sprinkler characteristics, automatic isolation of liquid holdup, drainage, and other factors to limit potential pool size. The protection criteria use the operation of automatic sprinklers over large sprinkler operating areas, but not assuming that all sprinklers will operate. Data sheet 7-14, on the other hand, assumes the ability to control or shut down ignitible (flammable and combustible) liquid flow is limited, requiring the use of deluge sprinkler designs. Both documents have used various types of fire tests to frame out the protection approaches that are recommended.

Sprinklered fire test data relevant to operations areas, and released into the public domain, are very limited. Several sprinklered pool fire tests data for aircraft hangars generated in the 1970s have been released into the public domain . These tests used automatic sprinkler systems. A selection of fire tests conducted on small volume spills and pool fires illustrated they are the easiest type of liquid fires to control or extinguish. Had these fires involved much larger volumes typically found in production facilities the area of operating sprinklers could have been much larger. Additionally, if the fire type would have also involved flowing spills, pressurized releases, or obstructed fires those factors would have magnified the associated fire risk.

The discharge of plain water onto an ignitible (flammable or combustible) liquid fire can expect to spread the fire involving low viscosity liquids having a specific gravity less than water. Therefore, the merits of spill containment and drainage features vertically aligned with ceiling mounted draft curtains should not be overlooked.

17.7.1 Interior.

17.7.1.1

A hazard analysis shall be performed in accordance with Section 6.4 to determine the facility's fixed fire protection systems.

17.7.1.1.1

Where required by the AHJ, or indicated by the hazard analysis, automatic sprinkler protection shall be provided in accordance with the requirements in 17.7.1.1.1.1 and 17.7.1.1.1.2 .

17.7.1.1.1.1

The demand area shall be based on the credible area of spill determined in the hazard analysis.

17.7.1.1.1.2

Areas that have chemicals incompatible with water shall be provided with an alternative fire extinguishing system as determined in the hazard analysis.

17.7.2 Exterior.

A hazard analysis shall be performed in accordance with Section 6.4 to determine the exterior fire protection system requirements.

Submitter Information Verification

Committee: FLC-OPS

Submittal Date: Thu Aug 18 09:37:37 EDT 2022

Committee Statement

Committee Statement:	Section 17.7 on Fire Protection has been reserved in the code for several cycles, and it was appropriate to provide guidance in this area. Given the variability and complexity of process area fire scenarios, a risk-based approach is recommended over prescriptive requirements. The annex provides guidance and references to be considered during a hazard analysis.
Response Message:	SR-460-NFPA 30-2022

Public Comment No. 44-NFPA 30-2022 [New Section after 17.7]

Second Revision No. 431-NFPA 30-2022 [Section No. 17.8]

17.8* Emergency Control Systems. ~~(Reserved)~~

A.17.8

Most industrial processes have control systems intended to maintain the normal and proper operation of the process. An emergency control system should ideally be a system that is reliable and separate from the normal process control system with set points that represent a situation that is no longer something that can be brought back to the target operation level. This system is designed to act to shut down the process, or elements thereof, to attempt to make the situation “safe.” The emergency control system should be fail-safe. Examples of fail-safe include: (1) loss of critical utilities would result in a shutdown of the process, (2) reactor emergency shutdown system, or (3) emergency shut down valves will fail in a safe condition (fail-closed or fail-open depending on what was deemed safe).

Submitter Information Verification

Committee: FLC-OPS

Submittal Date: Tue Jul 26 10:51:45 EDT 2022

Committee Statement

Committee Statement: Section 17.8 on Emergency Control Systems has been reserved in the code for several cycles, and this was deemed as an omission by the Technical Committee on Operations. Given the vast potential for this topic, a general explanation was provided in A.17.8 for emergency control systems.

Response Message: SR-431-NFPA 30-2022