

AGENDA ITEM: 650-1102

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TO: Review (05/2022), SC Ballot (11/2021)

REVISION: 5 (11/2022)

05/2022 - Comments addressed for review

11/2021 - SG Design approved for CRE SCAST Ballot with References, Terms & Definitions moved to the front of Standard 650, along with deletion of reference to Terms and Definitions under Agenda Item 1003. Notes were also deleted. Document was also submitted 3/16/2022 to API COPM COMET and 3/17/2022 to CELE & for review / comment only (their SCAST Members may Ballot). This Ballot is to align Terms and Definitions contained in the API Manual of Petroleum Measurement Standards (MPMS) Chapter 19 and US EPA AP42 with Terms / Definitions used AST Standards.

PURPOSE: Update API Standard 650 Annex C and H terminology to align with API CELE Manual of Petroleum Measurement Standards Chapter 19 (the basis for US EPA AP42).

INDUSTRY IMPACT: Standards Alignment, no cost impact.

EDIT LEGEND:

Unchanged text

~~Deleted text~~ (deleted from the document – single line through)

New text (Bold underlined)

EDITOR NOTE (Bold Italics)

API Standard 650

SECTION 2—NORMATIVE REFERENCES

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API Manual of Petroleum Measurement Standards, Chapter 19.2 Evaporative Loss From Floating-Roof Tanks

API Standard 620, *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*

API Standard 2000, *Venting Atmospheric and Low-Pressure Storage Tanks: Non-refrigerated and Refrigerated*

API Specification 5L, *Specification for Line Pipe*

EDITOR NOTE: Balance of this section remains unchanged.

SECTION 3—TERMS AND DEFINITIONS

EDITOR NOTE, RENUMBER “X” AS REQUIRED, Except for new or referenced Terms and Definitions, others are not shown.

3.X Domed (aka: “Covered”) External Floating Roof Tank (DEFRT)

A floating-roof tank that results from covering an external floating roof with a fixed roof at the top of the tank shell. This effectively converts the external floating roof to an internal floating roof, while retaining the external-type of floating-roof design. These floating roofs are typically designed in accordance with Annex C of API Standard 650, Welded Steel Tanks for Oil Storage.

3.X Deck

That part of a floating roof that provides buoyancy and structure, and which covers the majority of the liquid surface in a bulk liquid storage tank. The deck has an annular space around its perimeter to allow it to rise and descend (as the tank is filled and emptied) without binding against the tank shell. This annular space is closed by a flexible device called a rim seal. The deck may also have penetrations, closed by deck fittings, that accommodate some functional or operational feature of the tank.

3.X. Deck Fitting

A device that substantially closes or seals a penetration in the deck of a floating-roof tank. Such penetrations are typically for the purpose of accomodating some functional or operational feature of the tank. Typical deck fittings are described in the API Manual of Petroleum Measurement Standards Chapter 19.2.

3.X Deck Seam

The joint attaching adjacent sheets or panels in the floating-roof deck or at the floating-roof rim.

3.44 3.X double-deck floating roof

The entire roof is constructed of closed-top flotation compartments.

3.X External Floating Roof Tank (EFRT)

A floating-roof tank that does not have a fixed roof at the top of the shell and is exposed to ambient environmental conditions. The EFRT is are thus distinguished from internal floating-roof tank (IFRT) and covered floating-roof

tanks (CFRT), both of which do have a fixed roof to protect the floating roof from environmental loads. An external floating roof is are typically designed in accordance with Appendix Annex C of API Std. 650.

3.X Floating Roof

A device that floats on the surface of the stored liquid in a bulk liquid storage tank. A floating roof substantially covers the liquid product surface, thereby reducing its potential for evaporation. Floating roofs are comprised of a deck, a rim seal, and miscellaneous deck fittings.

3.X. Internal Floating Roof Tank (IFRT)

A floating-roof tank that has a fixed roof at the top of the tank shell, and a lightweight floating roof designed in accordance with Appendix Annex H of the API Std. 650. Internal floating-roof tanks are thus distinguished from external floating-roof tanks and covered floating-roof tanks, both of which have the heavier type of floating roof (designed in accordance with Appendix Annex C of API Std. 650).

3.X. Peripheral (Rim) Seal

A flexible device on a floating roof that closes the annular space between the deck and the tank shell.

~~3.34~~ 3.X **single-deck pontoon floating roof**

The outer periphery of the roof consists of closed-top pontoon compartments, with the inner section of the roof constructed of a single deck without flotation means.

3.X Welding Terms

The terms defined in 3.33.1 through 3.33.21 are commonly used welding terms mentioned in this standard. See 5.1.5.2 for descriptions of fusion-welded joints.

EDITOR NOTE: Balance of this section remains unchanged.

Annex C (normative) External Floating Roofs

C.1 Scope

C.1.1 This Annex provides minimum requirements for **an external floating roof tank (EFRT)** that, unless otherwise qualified in the text, apply to single-deck pontoon-type and double-deck-type floating roofs. See Section 3 for the definition of these roof types. This Annex is intended to limit only those factors that affect the safety and durability of the installation and that are considered to be consistent with the quality and safety requirements of this standard. Numerous alternative details and proprietary appurtenances are available; however, agreement between the Purchaser and the Manufacturer is required before they are used.

C.1.2 A “covered” (also known as “domed external”) floating roof is a type designed as an external floating roof, except it is covered with a fixed roof and may include drain system modification or deletion. See API Manual of Petroleum Measurement Standards, Chapter 19.2 Evaporative Loss From Floating-Roof Tanks for further means to evaluate evaporation / emission loss for various types of floating roof tanks and their respective fittings.

C.1.2 The type of roof and seal to be provided shall be as specified on the Data Sheet, Line 30. If the type is not specified, the Manufacturer shall provide a roof and seal that is cost-effective and suitable for the specified service.

Pan-type floating roofs shall not be used.

C.1.3 The Purchaser is required to provide all applicable jurisdictional requirements that apply to external floating roofs (see 1.3).

C.1.4 See Annex W for bid requirements pertaining to external floating roofs.

C.2 Material

The material requirements of Section 4 shall apply unless otherwise stated in this Annex. Castings shall conform to any of the following specifications:

- a) ASTM A27M, grade 405-205 (ASTM A27, grade 60-30), fully annealed;
- b) ASTM A27M, grade 450-240 (ASTM A27, grade 65-35), fully annealed or normalized and tempered, or quenched and tempered;
- c) ASTM A216M (ASTM A216) WCA, WCB, or WCC grades annealed and normalized, or normalized and tempered.

C.3 Design

C.3 1 General

C.3 1.1 The roof and **accessories deck fittings** shall be ...

Annex H (normative) Internal Floating Roofs

H.1 Scope

H.1.1 This Annex provides minimum requirements that apply to **an internal floating roof tank (IFRT)** ~~a tank with an internal floating roof and a fixed roof at the top of the tank shell~~, and to the tank appurtenances. This Annex is intended to limit only those factors that affect the safety and durability of the installation and that are considered to be consistent with the quality and safety requirements of this standard. Types of internal floating roofs (listed under H.2) and materials (listed under H.3) are provided as a basic guide and shall not be considered to restrict the Purchaser option of employing other commonly accepted or alternative designs, as long as all design loading is documented to meet the minimum requirements herein, and all other criteria are met (except alternative materials and thicknesses as permitted by H.3.1). The requirements apply to the internal floating roof of a new tank and may be applied to an existing fixed-roof tank. Section 5.10 of this standard is applicable, except as modified in this Annex.

H.1.2 The Purchaser is required to provide all applicable jurisdictional requirements that apply to internal floating roofs (see 1.3).

H.1.3 See Annex W for bid requirements pertaining to internal floating roofs.

H.2 Types of Internal Floating Roofs

H.3 Material

H.4 Requirements for All Types

H.4.1 General

H.4.1.1 An internal floating roof (**deck with peripheral rim seal**) and its **accessories deck fittings** shall be designed and constructed to allow the roof to operate throughout its normal travel without manual attention and without damage to any part of the fixed roof, the internal floating roof, internal floating roof seals (except for normal wear), the tank, or their appurtenances. The internal floating roof and seals shall be designed to operate in a tank constructed within the dimensional limits defined in 7.5 of this standard.

H.4.1.2 The internal floating roof shall be designed and built to float and rest in a uniform horizontal plane (no drainage slope required).

H.4.1.3 All seams in the internal floating roof (**including deck seams**) that are exposed to product vapor or liquid shall be vapor-tight in accordance with H.4.3.1.

H.4.4 Peripheral (**Rim**) Seals

(ED NOTE: no text change for balance of this Section)