

API Tank Standards Update

2009 API Storage Tank Conference
October 7 – 8, 2009
Dallas, Texas

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API Standards

API Tank Standards Update

From - PETROLEUM FACTS AT A GLANCE –
September 2009

- U.S. deliveries from primary storage of motor gasoline in August 2009: 9,230,000 b/d. [API]
- U.S. deliveries from primary storage of distillate fuel oil (home heating and diesel) in August 2009: 3,540,000 b/d. [API]
- Total petroleum products delivered to the domestic market in August 2009: 18,867,000 b/d [API]



API History

1919: API founded as non-profit national trade association, New York City

1980s: API relocates to Washington, DC

1995: API Dallas Standards Office relocates to Washington, DC

2007: Opened first of 3 planned international offices in Beijing, China

Background on API Standards Program

The API Standardization Department was formed in 1923, and the first API standard was published the following year on drilling threads.

All industry segments now active in standardization:

- Exploration and Production
- Pipeline Transportation
- Refining
- Marketing

API Standards

- API now publishes ~500 technical standards covering all aspects of the oil and natural gas industry
- Foundation of Self Supporting Programs
- Basis for Worldwide Operations
- Core of Institute's Technical Authority

Standards Development Process

- API is accredited by the American National Standards Institute (ANSI)
 - Openness, Balance, Consensus, Due Process
 - Regular program audits (conducted by ANSI)
- Transparent process (anyone can comment on any document in process)
 - All comments must be considered

Standards Development Process

- Developed by consensus (does not mean unanimity)
- Committee balance between users, manufacturers and contractors/consultants
- Standards developed using ANSI approved API Standards Development Procedures (available on-line at www.api.org)
- ***API corporate membership is not a requirement for participation on API standardization committees.***
- ***Support from your management to participate is.***

Use of API Standards

- “De facto” international standards
- Adoption by reference common by State and Federal agencies – MMS, BLM, DOT and EPA
 - API does not promote adoption - prefer voluntary use
- Written for flexibility as performance based documents

In 2008, API published 70 new and revised standards.

*In 2009, API plans to publish 75 new and revised standards – **on track to exceed that goal.***

API Standards Committee Structure

**Committee on
Standardization of
Oilfield Equipment
& Materials**

**Committee on
Petroleum
Measurement**

**Committee on
Refinery Equipment**

- **Marketing/Aviation**
- **Pipeline Transportation**
- **Safety & Fire Protection**
- **Regulatory & Scientific Affairs**

To support the Standards there are Certification programs, which include: API Monogram Program, Individual Certification Programs and others,

Certifications: www.api.org/certifications

AST Standards

API publishes over 70 standards, recommended practices, and bulletins covering various aspects of tank operations

- Design & Construction
- Inspection
- Measurement
- Emissions
- Safety & Fire Protection - Safe Entry, Overfill Protection
- Environmental - Leak detection, Release Prevention, Emissions
- Research

AST Standards - History

From 653 - Annex A: Background on Past Editions of API Welded Storage Tank Standards

- API published a specification for welded steel storage tanks in July 1936 entitled API Standard 12C, *All-Welded Oil Storage Tanks*. *Fifteen editions and seven supplements to API 12C were published between 1936 and 1958.*
- *API 12C was replaced by API Standard 650, Welded Tanks for Oil Storage in December 1961; 11 editions and 21 supplements, revisions or addenda to API 650 have been issued since.*

Design & Construction

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

- Construction code for larger low-pressure AST's
- Covers material, design, fabrication, erection, and testing requirements

Current Edition of API 620

API 620, Design and Construction of Large, Welded, Low-pressure Storage Tanks, 11th Edition.

Addendum 1 to the 11th Edition was published March 2009.

Approved Changes to API 620

Agenda Item 620-289: Add visual acuity requirements for visual examination in 620, 7.15.5, Visual Examination.

620-295: Provide alternate leak testing method for compression ring welds when rotation of the weld joint is restrained.

Tank Design & Construction

API 650, *Welded Tanks for Oil Storage*

- Primary construction code for refinery and storage terminal AST's
- Covers material, design, fabrication, erection and testing requirements
- For tanks whose entire bottom is uniformly supported

Current Edition of API 650

API 650, *Welded Tanks for Oil Storage*, 11th Ed, Addendum 1, published November, 2008.

We are planning to publish an Addendum 2 to API 650, 11th Ed.

The goal is to complete that by ***Fall 2009 – very soon.***

Approved Changes to API 650 - 1

Agenda Item 650-570: To clarify manufacturer responsibility for engineering design of the product provided (dome OR tank).

650-599: Provide sample calculations for a variable point design with various corrosion allowances. Clarifies use of corrosion allowance

650-609: Clarify that shell nozzles greater than NPS 48, but not larger than NPS 60 may be used as long as the nozzle and flange are properly designed.

650-628: Add visual acuity requirements for visual examination in 650, 6.5, Visual Examination.

Approved Changes to API 650 - 2

650-631: Clarify requirements on controlled-rolled plates and remove all controlled-rolled requirements from API 650.

650-635: To clarify the existing wording on shell opening reinforcement and to allow shell alternate shell fittings.

650-640: Clarify use of the words “coating”, “liner”, and “lining” throughout API 650.

650-641: Clarify nozzle weld spacing and modify the material toughness requirements in Appendix J, Shop-Assembled Storage Tanks.

Approved Changes to API 650 - 3

650-644: To provide an additional flange type to be used for aboveground storage tanks shell nozzles.

650-655: To add commonly used welding terms into Section 3, Definitions - of 650.

650- 657: Provide clear guidance in defining F_p = pressure combination factor – used in Appendix R – Load Combinations.

650-659: To state or refer to information contained in Appendix E commentary (EC) as an aid in clarifying design requirements.

Approved Changes to API 650 - 4

650-660: Revise the corner radius (r_1) in for the 36" x 48" Flush Type Clean-Outs from 18" to 24" - so that it can be used for all material groups.

650-672: Delete references to Joint Efficiency in design of stiffeners for vacuum pressure

Tank Inspection

API 653, Tank Inspection, Repair, Alteration, and Reconstruction

- Referenced or adopted in at least seven US states
- Minimum requirements for maintaining the integrity of tanks after they are placed in service
- Applicable to welded, riveted, nonrefrigerated, and atmospheric pressure AST's

Current Edition of API 653

API 653, Tank Inspection, Repair, Alteration, and Reconstruction –

4th Ed., published April 2009.

Changes to API 653

653-157: Define the requirements for replacing nameplates.

653-185: Revise the API-653 requirements for floating roof leg pads on new bottoms to be consistent with API-650.

653-229: To allow a reinforcing plate to be removed and re-installed on a PWHT nozzle.

Proposed Changes to Tank Standards for 2009

- Controlled-Rolled
- Add EN 10025 Materials
- Definition of "Nominal Thickness"
- Clarifying the use of thicker material for non-shell components
- Address Atmospheric Tank Vent Design to Prevent Blockage from Freezing
- Clarification for Provisions for Using Backing Bars on Wind Girders
- Foam Dam Clarification

Proposed Changes to Tank Standards for 2009

- Foam Dam Clarification
- Alignment of Vertical Welds for door sheets
- Inspection and repair of Appendix SC mixed material tanks
- Revise F.2.3 of API 653
- Add Fitness-for-Service to Acceptance of Existing Welds
- Expansion of External Floating Roof Repair Guidelines
- CSB Proposed Revisions to Enhance Safety of API 653

API Standard 625 - Tank Systems for Refrigerated, Liquified Gas Storage

Scope -These general requirements address issues common to all of these tank systems, ...coordination of the components of the tank system, ...tank system acting in an integrated way

ACI 376 Reference – *currently being discussed:*

Concrete container materials, design, inspection, examination, and testing shall be in accordance with ACI 376...

Pending further discussions and coordination

API Standard 625 - Tank Systems for Refrigerated, Liquified Gas Storage

Ongoing Balloting and efforts:

API 620: Appendices Q & R revised to cross reference new API 625

API 625: Balloted to SCAST

- pending reference issues.

Inspection Codes

API 570, Piping Inspection Code

- First published in 1993
- Minimum requirements for inspection, repair, alteration, and rerating of in-service process piping systems
- Complements API Standards 510 and 653

Additional API Inspection Codes

RP 574 - Inspection of Piping, Tubing, Valves, and Fittings

RP 575 - Inspection of Aboveground Storage Tanks

RP 576 - Inspection of Pressure-Relieving Devices

RP 578 - Material Verification Program for New and Existing
Alloy Piping Systems

RP 579 - Fitness-for-Service

Release Prevention & Leak Detection

Pub. 306 - An Engineering Assessment of Volumetric Methods of Leak Detection in Aboveground Storage Tanks

Pub. 307 - An Engineering Assessment of Acoustic Methods of Leak Detection in Aboveground Storage Tanks

Pub. 315 - Assessment of Tankfield Dike Lining Materials and Methods

Pub. 322/323 - An Engineering Assessment of Volumetric/Acoustic Methods of Leak Detection in Aboveground Storage Tanks

Release Prevention & Leak Detection - 2

Pub. 334 A - Guide to Leak Detection for Aboveground Storage Tanks

Pub. 340 - Liquid Release Prevention and Detection Measures for Aboveground Storage Facilities

Pub. 341 - A Survey of Diked-Area Liner Use at Aboveground Storage Tank Facilities

RP 652 - Lining of Aboveground Petroleum Storage Tank Bottoms

Pub. 4716 - Buried Pressurized Piping Systems Leak Detection Guide

Marketing Operations

RP 1004 - Bottom Loading and Vapor Recovery for MC-306 & DOT-406 Tank Motor Vehicles

RP 1007 - Loading and Unloading of MC-306/DOT-406 Cargo Tank Motor Vehicles

RP 1525 - Bulk Oil Testing, Handling, and Storage Guidelines

RP 1621 - Bulk Liquid Stock Control at Retail Outlets

RP 1637 - Using the API Color-Symbol System to Mark Equipment and Vehicles for Product Identification at Service Stations and Distribution Terminals

Std 2610 - Design, Construction, Operation, Maintenance & Inspection of Terminal and Tank Facilities

Measurement

MPMS Chap 2 - Tank Calibration

MPMS Chap 3 - Tank Gauging

MPMS Chap 4 - Proving Systems

MPMS Chap 16 - Measurement of
Hydrocarbon Fluids by Weight or Mass

Chap 191 - Evaporative Loss from Fixed Roof
Tanks

Measurement

MPMS Chap 191 A - Evaporation Loss from Low-Pressure Tanks

MPMS Chap 192 - Evaporative Loss from Floating Roof Tanks

MPMS Std 2551 - Measurement and Calibration of Horizontal Tanks

MPMS Std 2555 - Liquid Calibration of Tanks

Emissions

MPMS Chap 193 Part D - Fugitive Emissions Test Method of Deck-Seam Loss Factors for Floating Roof Tanks

MPMS Chap 194 - Recommended Practice for Speciation of Evaporative Losses

Pub. 2557 - Vapor Collection and Control Operations for Storage and Transfer Operations in the Petroleum Industry

Pub. 4588 - Development of Fugitive Emission Factors and Emission Profiles for Petroleum Marketing Terminals, Volume 1

Safety & Fire Protection

RP 2003 - Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents

Pub. 2009 - Safe Welding and Cutting Practices in Refineries, Gasoline Plants, and Petrochemical Plants

Std 2015 - Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks

RP 2016 - Guidelines and Procedures for Entering and Cleaning Petroleum Storage Tanks

RP 2021 - Management of Atmospheric Storage Tank Fires

RP 2023 - Guide for Safe Storage and Handling of Heated Petroleum-Derived Asphalt Products and Crude Oil Residual

Safety & Fire Protection

Pub. 2026 - Safe Access/Egress Involving Floating Roofs of Storage Tanks in Petroleum Service

Pub. 2201 - Procedures for Welding or Hot Tapping on Equipment in Service

Pub. 2207 - Preparing Tank Bottoms for Hot Work

RP 2210 - Flame Arresters for Vents of Tanks Storing Petroleum Products

Pub. 2217A - Guidelines for Work in Inert Confined Spaces in the Petroleum Industry

RP 2350 - Overfill Protection for Petroleum Tanks in Petroleum Facilities

Other Related Publications

Std 2000 - Venting Atmospheric and Low-Pressure Storage Tanks: Nonrefrigerated and Refrigerated

RP 651 - Cathodic Protection of Aboveground Storage Tanks

STD 2510 - Design and Construction of Liquefied Petroleum Gas Installations (LPG)

API Tank Standards Update

Thank you!

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