



API INDUSTRY STANDARDS
API Standards Development and Tank
Standards Update

API Inspector Summit
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Galveston Island Convention Center
Galveston, Texas

Steve Crimauado, API Standards

API

- Is the only national trade association representing all segments of the oil and natural gas industry
- Represents members on legislative, regulatory, and other policy issues impacting the industry
- Speaks on behalf of the industry in a variety of forums and public events, including the media
- Provides services to members at both the national and state level, with 280 staff located in Washington, D.C. and in 33 state capitals

API Mission

To influence public policy in support of a strong and viable U.S. oil and natural gas industry essential to meet the energy needs of consumers in an efficient and environmentally responsible manner

API Roles

Work with Government - Advocacy

Develop Industry Standards

Conduct Research

Gather Statistics

Inform Government and Public

Publish Technical Industry Information

Provide Education

Oversee Quality Programs

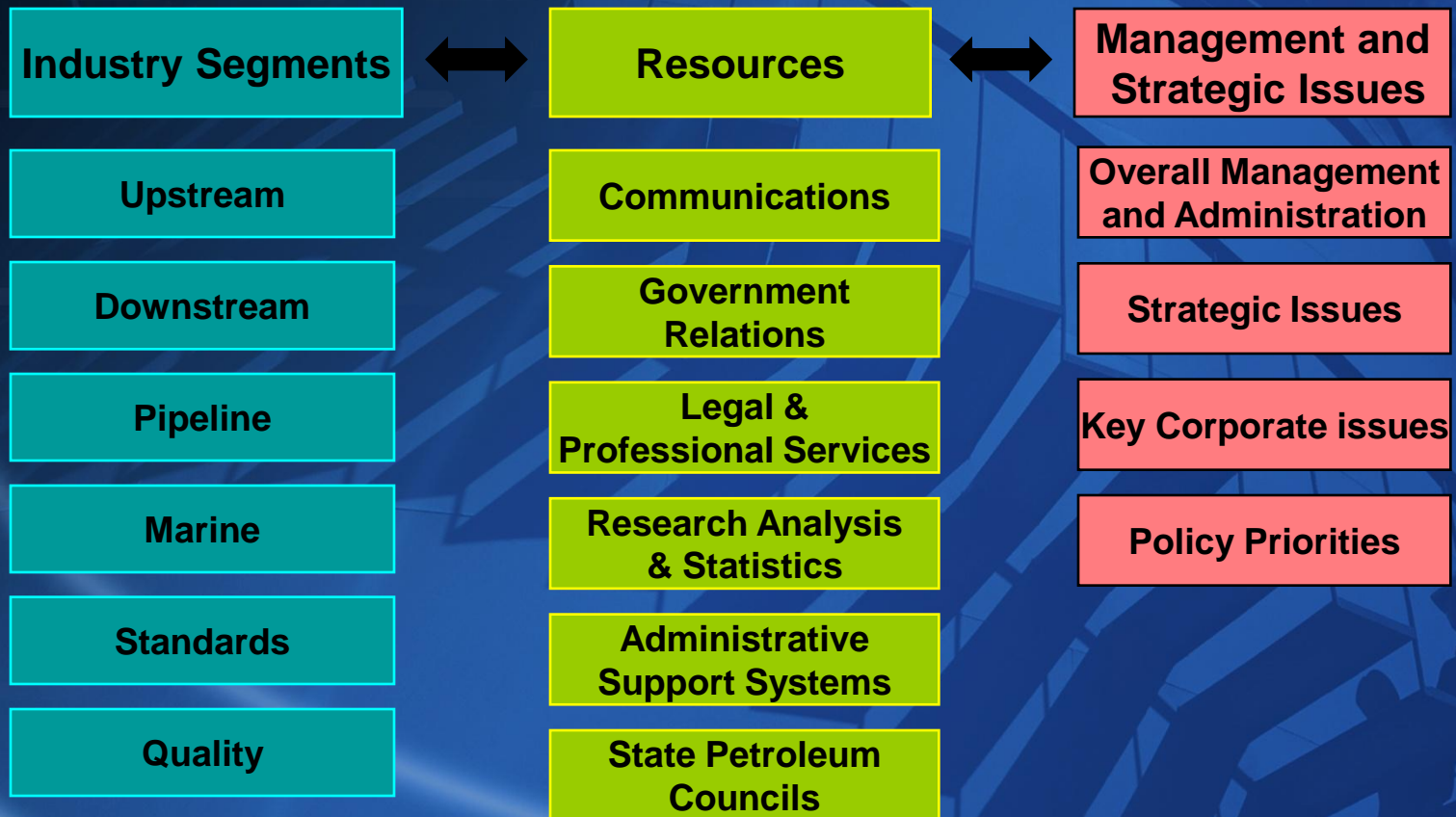
API Structure

Over 400 member companies involved in all aspects of the oil and natural gas industry

Over 700 committees and task forces covering various advocacy and technical issues

Staff of 300 led by board of directors made up of member company CEO's

API Organizational Structure



API Standards Committee Structure

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

**Committee on
Petroleum
Measurement**

**Committee on
Refinery Equipment**

- **Marketing**
- **Safety & Fire Protection**
- **Regulatory & Scientific Affairs**

API Standards Development Process

- API is accredited by the American National Standards Institute (ANSI)
- Regular program audits
- Open and transparent process
- All comments and objections must be considered

API Standards

500 industry standards and technical reports covering:

- Exploration & Production
- Refining
- Marketing
- Pipeline
- Measurement
- Safety and Fire Protection
- Petroleum E-commerce

Developed under an ANSI accredited process by industry members with technical expertise

One third of all API standards are referenced in the U.S. Code of Federal Regulations

Standards Development Process

- Developed by consensus (does not mean unanimity)
- Balance between tank operators and manufacturers
- API corporate membership is not a requirement for participation on API standardization committees

Requirements for Standards Committee Membership

- Be technically proficient in tank design, construction, operation, or inspection
- Attend two committee meetings per year
- Agree to work on committee business such as standards revisions and technical inquiries
- Have the support of company management to participate

Value to Industry

API standards add value:

- Standards reduce procurement costs
- Standards improve equipment interchangeability
- Standards reduce compliance costs
- Standards improve safe operations
- Foundation for company standards

Basis for many ISO standards

Value to Industry

- Basis for API's quality programs (Monogram, Individual Certification, Engine Oil, etc.)
- A means to comply with federal and state regulations (SPCC, PSM)
- Periodic revisions issued to reflect state-of-the-art
Construction and Inspection Codes - annually
Recommended Practices - every five years

Use of API Standards

- “De facto” international standards
- Increased adoption by federal agencies - MMS and DOT
- API does not promote adoption - prefer voluntary use
- Written for flexibility
- Not a “cookbook” approach!

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

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, published on Feb. 14, 2008.

Addendum 1 to the 11th Ed. Currently in API editing - goal is to publish by January - February 2009.

Approved Changes to API 620

620-287: Appendix L - Seismic Design Of API 620 Storage Tanks

620-290: Inclusion of automatic welding into API Standard 620

620-291: Remove the contradiction now present in API 620 piping limitation provide consistency with API 650

620-294: Modification of Compression Bar Internal Projection Limits which were considered to restrictive

Design & Construction

API 650, *Welded Steel 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

Addendum 1 to the 11th Edition was published
November 2008.

Approved Changes to API 650

650-597: To clarify F.7.3 statement “Design and welding of roofs and the reinforcement and welding of roof manholes and nozzles shall be in accordance with API 620”

650-599: To provide sample calculations for a variable point design with various corrosion allowances.

650-602: To add rules for the marking of nameplates when PWHT is applied to shell openings.

Approved Changes to API 650

650-608: To allow reduced live loads for tank roofs where allowed by load standards and to include unbalanced snow loads on tank roofs

650-610: To permit larger than NPS 2" openings in clean out cover plates

650-623: To clarify reinforcing of roof manholes and openings.

Approved Changes to API 650

650-624: To clarify “t” in 5.9.7.6.2 is the as built thickness of the shell. To make as built thickness the consistent basis for all wind analysis.

650-639: To revise table 5-2 , material strengths and allowable stresses for thicker plate.

650-645: To improve the roof-to-shell requirements for steel self-supporting cones (5.10.5) and self-supporting domes (5.10.6).

Approved Changes to API 650

650-646: Clarification of design pressure to be used when determining anchor bolt loads. Plus modification of formula for uplift load due to wind.

650-658: To use a more linear change of stability factor ψ in Appendix V.

Changes to API 650 - Under Consideration

650-554: To determine acceptable methods of corrosion prevention of underside surfaces of tank bottoms.

650-570: To clarify manufacturer responsibility for engineering design of product provided.

650-609: To Develop guidelines to permit use of shell nozzles larger than NPS 48.

650-621: To allow use of ASTM A240, Type 201 to Appendix S.

650-640: Clarify Coating, Liner, and Lining.

Changes to API 650 - Under Consideration

650-644: Add Lap Type Joint Flange Detail

650-652: The deletion of tank uplift requirements of F.4.2 to eliminate redundancy and conflict with 5.11

650-659: Additional Clarification Notes within Appendix E

650-661: Appendix P Sample Problem # 3 Corrections

Inspection

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

- Referenced or adopted in 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*

3rd Edition, Addendum 3, published February 2008.
Errata published April 2008

4th Edition in API editing - goal is to publish January -
February 2009.

Changes to API 653

653-150: Revise current API 653 Appendix B methodology for evaluating the FFS of a storage tank for out-of-plane settlement .

Currently under consideration:

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

653-209: Improve and extend the guidance in Appendix G based on feedback from field inspections and examinations.

Changes to API 653

Currently under consideration:

653-211: To add duplex stainless steels to the allowable materials for storage tank construction per A 653.

653-226: Make appropriate changes to existing text of Section 12 and Appendix G to correlate with proposed additions to Appendix G under 653-209.

653-228: Clarification of Owner/Operator Responsibility for Cable Suspended Roof.

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

Scope - *Low pressure, aboveground, vertical, cylindrical, tank systems storing liquefied gases requiring refrigeration....*

ACI 376 Reference:

....requirements applicable to the metallic and concrete containers respectively are contained in the standards named in 1.4 (API 620) and 1.5. (ACI 376). It is a mandatory requirement of this standard that the applicable portions of these named standards are satisfied...

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

Ongoing Balloting:

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

API 625: currently being balloted to SCAST

- Comments to be resolved at Fall 2008 CRE meeting.

Inspection

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

Inspection

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

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

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)

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Thank you!

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***committees.api.org/standards/cre/index.html
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