2025 Edition

API STANDARDS: INTERNATIONAL USAGE REPORT

American Petroleum Institute

TABLE OF CONTENTS

INTRODUCTION AND EXECUTIVE SUMMARY

Standards and technical regulations drive economic growth, technology development, and global trade. In the energy sector, industry standards are crucial for the development and spread of technologies and products used globally to enhance environmental, health, safety, and sustainability performance. Established in 1919, API leads in uniting subject matter experts to establish, maintain, and distribute over 800 voluntary-consensus standards for the natural gas and oil industry and has expanded into the standardization of low carbon technologies. With a standard development process that is accredited by the American National Standards Institute (ANSI), not only are API standards recognized for their technical rigor, but also the consensus-driven development process garners acceptance by state, federal, and international policymakers to adopt in technical regulations.

Numerous standards developing organizations (SDOs) exist globally, leading to potential duplication and lack of alignment in the natural gas and oil industry, which can cause inefficiencies and barriers in industry practices and technical regulations. API works internationally to collaborate and partner with governments and standards bodies to promote the adoption and reference of API standards and harmonize with existing international standards. While API standards are used voluntarily by industry parties in more than 140 countries, this report assesses the reliance and international influence of API standards in publicly accessible policies and technical regulations. The number of countries that use API standards continues to increase as they rely on API's expertise to enhance worker safety, strengthen environmental protection, and advance sustainability around the world.

This Report offers a qualitative and quantitative assessment of 40 markets oil and gas regulatory framework and details the use of API standards by national regulators and standards bodies across 40 markets and the International Organization for Standardization (ISO), including:

- **EUROPE:** Italy, Netherlands, Norway, United Kingdom
- **AMERICAS:** Argentina, Brazil, Canada, Chile, Colombia, Ecuador, Guyana, Mexico, Trinidad & Tobago
- **CENTRAL ASIA AND MIDDLE EAST:** Azerbaijan, Bahrain, Egypt, Iraq, Israel, Kuwait, Oman, Qatar, Saudi Arabia, Turkey, UAE
- **INDO-PACIFIC:** Australia, China, India, Indonesia, Japan, Malaysia, New Zealand, Singapore, South Korea, Thailand, Vietnam
- **SUB-SAHARAN AFRICA:** Angola, Equatorial Guinea, Ghana, Nigeria, South Africa

These 40 markets were selected based on the industry's presence, expected growth, and legislative considerations regarding the use of standards in technical regulations. This report builds on the 2020 and 2022 versions of this report that analyzed 31 markets. Significant industry growth and development have occurred since 2020, especially in emerging markets and in addition to API references found in regulations in the 40 markets, the 2025 version of the report also includes API references found in ISO standards.

For each market, API reviewed publicly available laws, regulations, national standards databases, and industry practices to identify specific uses of API standards. This Report emphasizes the use of API standards across all segments — in national laws, policy guidance, national standards, technical manuals, and industry practices.

MAIN FINDINGS OF THE REPORT

Natural gas and oil operators, manufacturers, and policymakers heavily use and rely upon API standards around the globe. The analysis of the 40 markets identified 1,395 references to API standards through an open-source examination of laws, regulations, national standards, technical guidance, and operational manuals – an approximately 27% increase from the 2022 analysis.. This assessment likely underestimates reliance on API standards in these markets since a substantial portion of these markets' standard-setting references are not openly available, and use of API standards in some markets is guided by industry practice, rather than government mandated.

REFERENCES IN ISO STANDARDS

In addition, this report includes an assessment of references to API standards in ISO standards, further underscoring API's international impact. This analysis found 379 references to API standards in ISO standards, **totaling 1,774 references to API standards when aggregating ISO references to the references in the 40 analyzed markets.**

REFERENCES IN NATIONAL STANDARDS AND TECHNICAL REGULATIONS

More than three-quarters of the references to API standards identified were found within national standards and technical regulations.

References to API standards the national standards and technical regulations of: Indonesia (149), Canada (106), Brazil (99), India (90), Mexico (86), Equatorial Guinea (84), South Korea (64), Viet Nam (42), Colombia (40), China (35), Guyana (33), Malaysia (26), Chile (23), Ghana (19), Argentina (18), Norway (17), United Kingdom (17), Azerbaijan (17), Singapore (14), Nigeria (13), Italy (9), Angola (9), South Africa (8), New Zealand (8), Kuwait (6), Iraq (6), Netherlands (3), Thailand (3), Egypt (2), Ecuador (2) Turkey (2), and Israel (1).

These figures likely understate the use of API standards in national standards because many countries do not specify when they adopt or model national standards after global standards, and this report examined only the national standards catalogues maintained by relevant authorities, rather than each standard individually.

REFERENCES IN BEST PRACTICES OR TECHNICAL AND OPERATIONAL MANUALS

Less than a quarter of references to API standards identified were found within best practices or technical and operational manuals issued by regulators or national oil companies, indicating that API standards have widespread practical application.

References to API standards were identified in guidance issued in Mexico (113), Nigeria (58), Argentina (30), India (20), Oman (13), Malaysia (13), Saudi Arabia (11), Indonesia (9), Qatar (8), Australia (4), Israel (3), Japan (1), and New Zealand (1).

Beyond the textual references identified, API standards are widely used in industry practice in India and in the Gulf Cooperation Council member countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates). Industry reports, corroborated by sales data for API standards, indicate the uptake of API standards in India and the GCC countries is among the highest for the markets examined in this report.

References to and use of API standards are not limited to a particular segment—they are widely used in regulations across upstream, midstream, and downstream sectors in the 40 markets:

37% of API standards referenced pertained to upstream activities (exploration and production)

29% pertained to downstream activities (refining, storage, or marketing)

17% pertained to midstream and transportation

17% pertained to petroleum measurements

For 16 of the 40 markets, API standards adoptions overwhelmingly applied to one of the major segments, underscoring industry trends and operations in the country.

• Canada, Equatorial Guinea, Italy, Ghana, Malaysia, Saudi Arabia, Turkey, and Qatar mostly adopted API upstream standards.

• Azerbaijan, Chile, Viet Nam, South Africa, South Korea, Singapore, Brazil, and Colombia adopted mostly downstream standards.

• The remaining countries adopted and reference API standards at a roughly equivalent rate across segments.

ISO REFERENCES TO API STANDARDS

The International Organization for Standardization (ISO), one of the world's principal international standards development bodies, has issued over 25,000 technical standards covering all industrial sectors. These standards are developed with input from the ISO's 172 member national standards bodies from around the world and are relied on for harmonization of the vast majority of cross-border trade and economic activities.

ISO has a number of technical committees that address the natural gas and oil sectors, notably Technical Committee (TC) 67, *Oil and gas industries including lower carbon energy*. Many ISO standards for the oil and gas sector reference and rely on API standards. A total of 379 references to API standards were identified in 75 ISO standards in this report, demonstrating the contributions of API standards development to worldwide standardization initiatives.

CONCLUSION

The extensive adoption of API standards in all examined markets highlights their importance to both regulators and companies. These standards help improve environmental, health, safety, and worker performance while promoting economic growth, technological advancements, and trade, following good regulatory practices. In the global energy sector, they are crucial for harmonizing regulations across borders and reducing economic inefficiencies. With the continuing expansion of the global market for natural gas and oil products and services, the industry has opportunities to work with international companies, standards development organizations, and governance agencies to further harmonize the use, technical cooperation, and implementation of API standards.

EUROPE

ITALY

REGULATORY OVERVIEW

The Ministry of the Environment and Energy Security (MEES) is the government agency charged with setting the policy direction for the oil and gas sector in Italy. Under this ministry, the Energy Department manages policies directly related to oil and gas, including the issuance of licenses for exploration and production.

For downstream activities, the Regulatory Authority for Energy, Networks, and Environment (ARERA) governs Italy's electricity and gas markets. Italy's downstream natural gas market aligns with the European Union's internal market regulations, as Italy is an EU member.

Italy also has several state-owned companies involved in the oil and gas sector, such as ENI S.p.A. (a publicly traded company with significant government shareholding) in the upstream sector, and SNAM S.p.A. (partially state-owned), which operates the national gas pipeline network.

The primary standards organization in Italy is the Italian National Unification Body (UNI), which formulates and issues standards, including for oil and gas. UNI is private non-profit association, but it works with both industry and government to develop high standards across all sectors.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

The Directorial Decree of 29 November 2004 issued by MEES, Safety requirements for special types of installations in drilling activities, references eight API standards, recognizing them as supporting the health and safety of workers in extractive industries:

- API SPEC 4F, Drilling and Well Servicing Structures
- API RP 4G, Operation, Inspection, Maintenance, and Repair of Drilling and Well Servicing Structures
- API 6A, Wellhead and Christmas Tree Equipment
- API SPEC 16A, Drill Through Equipment
- API 16D, Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment
- API RP 7L, Procedures for Inspection, Maintenance, Repair, and Remanufacture of Drilling Equipment
- API Series 8, Hoisting Equipment
- API Series 9, Wire Rope

Additionally, EN ISO 3183:2019, Steel pipe for pipeline transportation systems, which has been adopted as a UNI standard, references API SPEC 5L, Line Pipe.

NETHERLANDS

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Directorate for Climate and Energy within the Ministry of Economic Affairs directs oil and gas policy on a national level in the Netherlands. However, the Dutch State Supervision of Mines (SodM) is mandated with regulating the operational activities for the upstream sector sector, including the health, safety and environmental aspects of oil and gas activities.

Meanwhile, the Authority for Consumers and Markets (Autoriteit Consument & Markt, ACM) regulates the electricity and downstream gas market.

The Mining Act (Mijnbouwwet), as amended, is the main statute governing for oil and gas activities in the Netherlands. This legislation grants exploration and production rights and establishes guidelines for the development and maintenance of oil and gas infrastructure.

In addition to the Mining Act, the Mining Decree of the Netherlands (Mijnbouwbesluit) and the Mining Regulation of the Netherlands (Mijnbouwregeling) also govern upstream activities. Netherland's Gas Act (amended 2021) governs midstream and downstream gas operations.

The Netherlands Standardization Institute (NEN), a private non-profit organization, develops national standards. NEN has established numerous standards for the oil and gas sector. These standards are voluntary unless explicitly mandated by Dutch regulations.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

The Dutch Mining Regulation (Mijnbouwregeling) refers to two API standards: API SPEC 17J, Unbonded Flexible Pipe; and API RP 17B, Flexible Pipe.

In addition, NEN has adopted API 610, Data Sheets for Centrifugal Pumps for Petroleum, Petrochemical, and Natural Gas Industries, as a national standard in its standards catalogue.

NORWAY

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Energy in Norway sets the overall policy direction for the oil and gas sector and directs policies for upstream oil and gas activities. Under the Ministry, the Petroleum Directorate administers oil and gas policies, including for licensing of exploration and production, and is the technical advisor to the Ministry.

For downstream activities in the gas sector, the Norwegian Energy Regulatory Authority (RME-NVE), is the chief regulator and supervises the country's electricity and gas markets. As Norway is part of the European Economic Area (EEA), the downstream natural gas market operates in alignment with the European Union's internal market rules surrounding natural gas.

The Norwegian Ocean Industry Authority (NOIA), formerly known as the Petroleum Safety Authority Norway (PSA), sits under the Ministry of Labour and Social Inclusion and is charged with regulating the health, safety and emergency preparedness aspects of all petroleum activities. Norway also has three state-owned companies participating in the oil and gas sector: Equinor ASA (a publicly listed company for which the government owns a 67% stake), an upstream operator; Petoro AS (wholly state-owned), which manages the State's Direct Financial Interest (SDFI) of exploration and production licenses; and Gassco (wholly owned), the operator of Norway's gas pipeline network.

Meanwhile the Ministry of Climate and the Environment and the Norwegian Environment Agency play key roles in assessing and regulating the environmental impacts of oil and gas operations.

The main standards body in Norway is Standards Norway, a non-governmental body that develops and issues standards for all sectors except for the electrotechnical and telecommunications (those sectors are covered by two other bodies—the Norwegian Electrotechnical Committee and the Norwegian Communications Authority respectively). Standards Norway manages and issues standards for the oil and gas sector; however, the Norwegian Oil and Gas Association, the Federation of Norwegian Industries, and the Norwegian Shipowners' Association all contribute to their development. These standards are referred to as NORSOK standards and are widely used in the global industry.

Finally, the Norwegian Oil and Gas Association, which is made up of oil and gas companies operating in Norway, has also issued a series of voluntary guidelines for the oil and gas sector.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Guidelines and regulations issued by the NOIA and NPD refer to API, NORSOK, and other international standards. Three Guidelines issued by the PSA reference six API standards:

PSA Guideline	API Standards Referenced
Technical and Operation Regulations (2022)	API 520, Sizing, Selection, and Installation of Pressure Relieving Devices in Refineries API 521, Pressure-Relieving and Depressurizing Systems
Facilities Regulations (2023)	API SPEC 17J, Unbonded Flexible Pipe API 520, Sizing, Selection, and Installation of Pressure Relieving Devices in Refineries API 521, Pressure-Relieving and Depressurizing Systems
Activities Regulations (2023)	API RP 17B, Flexible Pipe

Moreover, the NPD has also issued guidance entitled Standards Relating to Measurement of Petroleum For Fiscal Purposes And For Calculation Of CO2-Tax, which refers to 10 chapters of the API Manual of Petroleum Measurement Standards (MPMS), including:

- Chapter 4
- Chapter 5
- Chapter 7
- Chapter 8
- Chapter 9
- Chapter 10
- Chapter 11
- Chapter 12
- Chapter 13
- Chapter 14

The guidance also refers to API MPMS RP 86, Recommended Practice for Measurement of Multiphase Flow.

UNITED KINGDOM

REGULATORY FRAMEWORK

The UK Oil and Gas Authority (OGA) serves as the main regulatory body overseeing upstream oil and gas activities, with the objective of maximizing economic recovery of oil and gas resources while maintaining high standards for health, safety, and environmental practices. Additionally, the OGA manages the decommissioning of oil and gas infrastructure.

Health and safety regulation for the UK's oil and gas sector is managed by the Health and Safety Executive (HSE). The HSE enforces the Health and Safety at Work Act 1974, ensuring companies meet stringent safety standards to protect both workers and the public. HSE has issued a number of regulations and guidance documents for the oil and gas sector, including the Offshore Installations (Safety Case) Regulations 2005, and the Pipelines Safety Regulations 1996, which require operators to have effective safety management systems, and others.

Environmental regulation falls under the jurisdiction of the Environment Agency in England, the Scottish Environment Protection Agency (SEPA) in Scotland, and Natural Resources Wales in Wales. These agencies implement environmental laws, including the Environmental Protection Act 1990 and the Marine and Coastal Access Act 2009, which address issues such as

emissions, waste management, and marine environment protection.

In addition, the Defence Infrastructure Organisation (DIO) of the UK Ministry of Defence (MOD) has issued technical guidance for oil and gas operations taking place on MOD property.

The British Standards Institution (BSI) is the national standards development organization for the United Kingdom and is well-known for developing standards relevant to the oil and gas sector.

REFERENCES TO API STANDARDS

The UK Oil and Gas Authority's Measurement Guidelines 2020 reference the API Manual of Petroleum Measurement, Chapter 17.

In addition, the UK Ministry of Defence references 16 API standards in its guidelines for oil- and gas- related operations taking place on its property:

Guidelines	References
Technical Standard 1: **Specialist Works on Petroleum installations on MOD Property**	**API SPEC 5L, Line Pipe** **API SPEC 6D, Pipeline Valves** **API RP 520, Sizing, Selection, and Installation of Pressure-Relieving. Devices in Refineries** **API 599, Metal Plug Valves—Flanged, Threaded, and Welding Ends** **API 610, Design and Construction of Large, Welded, Low-Pressure Storage Tanks** **API 2000, Venting Atmospheric and Low-pressure Storage Tanks** **API 1584, Four Inch Hydrant System Components and Arrangements**
Technical Standard 3: **Professional Inspection of Fuel Infrastructure and Flammable Dangerous Goods Stores**	**API RP 575, Inspection Practices for Atmospheric and Low-Pressure Storage Tanks** **API 2000, Venting Atmospheric and Low-pressure Storage Tanks** **API 610, Design and Construction of Large, Welded, Low-Pressure Storage Tanks** **API 620, Design and Construction of Large Welded Low Pressure Storage Tanks** **API 653, Tank Inspection, Repair, Alteration, and Reconstruction** **API/EI 1550, Handbook on Equipment Used for the Maintenance and Delivery of Clean Aviation Fuel**
Technical Standard 2: **Inspection, Maintenance and Testing of Equipment Installed at Petroleum Installations on MOD Property**	**API 653, Tank Inspection, Repair, Alteration, and Reconstruction** **API 576, Inspection of Pressure-Relieving Devices** **API/EI 1550, Handbook on Equipment Used for the Maintenance and Delivery of Clean Aviation Fuel**

AMERICAS

ARGENTINA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The primary regulator at the federal level in Argentina is the Secretariat of Energy within the Ministry of Energy and Mining, which enacts nationwide measures to regulate oil and gas activity. However, oil and gas rights can also belong to the provincial territories where the reserves are located, permitting resource-controlling provincial governments to negotiate and set the terms of upstream activities. In some cases, provincial governments have also enacted regulations governing local oil and gas operations. For example, the provincial Ministry of Energy and Natural Resources of Nequén oversees regulation of the Neuquén and Vaca Muerta production areas.

For transportation and distribution of natural gas specifically, the Federal Gas Regulatory Entity (ENARGAS) is the chief regulator. Environmental aspects of oil and gas activities are also overseen by both the Federal Ministry of Environment and Sustainable Development and the provincial environmental regulators.

The Law of Hydocarbons No. 17319, as amended, is the primary legal authority for oil and gas activities in Argentina. It provides holders of concession rights with the authority to conduct exploration and production activities "according to the most rational and efficient techniques" and also authorizes holders of concession rights to develop and maintain oil and gas transportation infrastructure "subject to the general legislation and technical standards in force."

The federal Secretariat of Energy has issued at least three technical regulations pertaining to the transport of oil and gas that refer to international standards:

• Resolution No. 571/2019, Specific Rules and Technical Conditions for the Transport of Liquid Oil by Pipeline and Through Maritime and River Terminals

• Resolution No. 120-E/2017, Technical Regulations for Transport of Liquid Hydrocarbons by Pipeline

• Resolution No. 951/2015, Technical Regulations for Transport of Liquid and Gaseous Hydrocarbons by Submarine Pipelines

While it typically does not issue regulation specific to the oil and gas sector, Argentina's Ministry of Production and Labor is responsible for overseeing overall industrial production in Argentina and is authorized to issue technical regulations for certain industrial products. It has issued Resolution 92/2019, the Specific Technical Regulation that Establishes the Technical Quality and Safety Requirements for Products Identified as Industrial Valves, Including Their Bodies and Covers, which incorporates international oil and gas standards.

Argentina's national standards development organization is the private, non-profit Argentine Institute of Standardization and Certification (IRAM). For the oil and gas sector, IRAM collaborates with the Argentinean Institute for Oil and Gas (IAPG) to develop and issue standards. Together they have developed 172 standards currently in force (coded as IRAM IAPG A). These are voluntary unless specifically cited and made mandatory by Argentinian regulations. IRAM has also issued 16 recommended practices, some of which cite other international standards.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Resolution No. 120-E/2017, Technical Regulations for Transport of Liquid Hydrocarbons by Pipeline, permits the use of 5 API standards:

- API 1110, Pressure Testing of Steel Pipelines For The Transportation of Gas, Petroleum Gas, Hazardous Liquids, Highly Volatile Liquids or Carbon Dioxide
- API RP 1160, Managing System Integrity for Hazardous Liquid Pipelines
- API 570, Piping Inspection Code
- API RP 579, Fitness-For-Service
- API RP 2200, Repairing Hazardous Liquid Pipelines

Resolution No. 571/2019, Specific Rules and Technical Conditions for the Transport of Liquid Oil by Pipeline and Through Maritime and River Terminals, requires relevant measurement procedures to be conducted according to the API Manual of Petroleum Standards.

Resolution 92/2019, the Specific Technical Regulation that Establishes the Technical Quality and Safety Requirements for Products Identified as Industrial Valves, permits the use of 11 API standards:

- API SPEC 6A, Wellhead and Christmas Tree Equipment
- API SPEC 6D, Pipeline and Piping Valves
- API 594, Check Valves: Flanged, Lug, Wafer, and Butt-welding
- API 598, Valve Inspection and Testing
- API 599, Metal Plug Valves—Flanged, Threaded, and Welding Ends
- API 600, Steel Gate Valves - Flanged and Butt-welding Ends, Bolted Bonnets
- API 602, Gate, Globe, and Check Valves for Sizes DN 100 (NPS 4) and Smaller for the Petroleum and Natural Gas Industries
- API 623, Steel Globe Valves—Flanged and Butt-welding Ends, Bolted Bonnets
- API SPEC 20A, Carbon Steel, Alloy Steel, Stainless Steel, and Nickel Base Alloy Castings for Use in the Petroleum and Natural Gas Industry
- API SPEC 20B, Open Die Shaped Forgings for Use in the Petroleum and Natural Gas Industry
- API SPEC 20C, Closed Die Forgings for Use in the Petroleum and Natural Gas Industry

Resolution 557/2022, Technical Regulations for Hydrocarbon Measurement, also references the API Manual of Petroleum Standards.

The catalogue of standards published by IRAM and IAPG does not indicate the normative references included in each standard, but companies have reported that some are modeled on API or other international standards. Some pertaining to the safety electrical apparatuses used for explosive gas atmospheres are adopted from IEC standards, as indicated by their titles (i.e., IRAM-IAPG-IEC 79-4, Electrical apparatus for explosive gas atmospheres, Part 4: Method of test ignition Temperature).

However, 8 of the 27 voluntary recommended practices issued by IAPG reference 30 API standards. They are:

IAPG Recommended Practice	API Standard Referenced
PR IAPG-SCo-14-2017-00, Use of ERFV pipes (Epoxy Reinforced with Fiberglass) in Surface Installations	API 15 LR Specification for Low Pressure Fiberglass Line Pipe API 15 HR Specification For High Pressure Fiberglass Line Pipe API 15TL4, Recommended Practice for Care and Use of Fiberglass Tubulars
PR IAPG-SC-12-2015-00, Energy Monitoring of Process Furnaces	API 560, Fired Heaters for General Refinery Service API 530, Calculation of Heater-tube Thickness in Petroleum API RP 535, Burners for Fired Heaters in General Refinery Services API RP 573, Inspection of Fired Boilers and Heaters API RP 556, Instrumentation, Control, and Protective Systems for Gas Fired Heaters
PR IAPG-SCo-05-2011–00, Basic Requirements for Assembly and Maintenance of Individual Pumping Devices (AIB)	API SPEC 11E, Specifications for Pumping Units API SPEC 11ER, Guarding of Pumping Units API RP 11G, Recommended Practice for Installation, Maintenance, and Lubrication of Pumping Units
PR IAPG - SC 20 - 2020 – 00, Taking Inventories of Greenhouse Gases in Hydrocarbon Exploration and Production Activities and Gas Processing	API Compendium of Greenhouse Gas Emissions Estimation Methodologies for the Oil and Gas Industry (August 2009)
PR IAPG-SC-18-2020-00 Surgence Control Systems in Tower Equipment	API SPEC 6A, Wellhead and Tree Equipment API 53, Well Control Equipment Systems for Drilling Wells API RP 54, Occupational Safety and Health for Oil and Gas Well Drilling and Servicing Operations. API RP 59, Recommended Practice for Well Control Operations API SPEC 16A, Drill-Through Equipment API 16AR, Repair and Remanufacture of Drill-through Equipment API SPEC 16C, Choke and Kill Equipment API SPEC 6D, Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment
PR IAPG - SC - 26 - 2021 – 00, Selection of Instruments, Patterns and Maximum Allowable Errors	API Manual of Petroleum Measurement Standards (MPMS), Chapter 7 API MPMS, Chapter 5 API MPMS, Chapter 9 API MPMS, Chapter 21
PR IAPG - SC - 24 - 2021 – 00, Technical Verification, Inspection and Care of Structures of Drilling Equipment and Well Service	API SPEC 4F, Drilling and Well Servicing Structures API RP 4G, Operation, Inspection, Maintenance, and Repair of Drilling and Well Servicing Structures API RP 54, Occupational Safety and Health for Oil and Gas Well Drilling and Servicing API SPEC Q2, Quality Management for Service Supply Organizations for the Petroleum and Natural Gas Industry
PR IAPG - SC - 22 - 2021 – 00, Tolerances for Product Custody Transfer and Plant Balances	API MPMS, Chapter 13 API MPMS, Chapter 19

BRAZIL

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The National Council for Energy Policy (CNPE), an inter-ministerial council that advises the President of Brazil on energy policies, sets broad guidelines and makes high level decisions for Brazil's oil and gas sector. Additionally, the Ministry of Mines and Energy and its National Petroleum, Natural Gas and Biofuels Agency (ANP) issue regulations and directly oversee upstream and downstream oil and gas activities in Brazil.

Brazilian law also requires the involvement of the state-owned national oil company, Petrobras, in some types of exploration and production activities. Petrobras also participates in downstream operations. The environmental impacts of oil and gas activities are subject to regulation by the Federal Environmental Protection Agency (IBAMA).

Brazil's government standards and certification agency is the National Institute of Metrology, Standardization and Industrial Quality (INMETRO) within the Ministry of Development, Industry and Foreign Trade. INMETRO requires compliance with certain mandatory standards and technical regulations, including those for the oil and gas sector. Current mandatory standards and technical regulations for the oil and gas sector are:

- Conformity Requirements for Transportable Containers for Liquefied Petroleum Gas – LPG
- Conformity Requirements for Low Pressure Regulators for Liquefied Petroleum Gases (LPG) with Flow Capacity up to 4 kg / h
- Conformity Requirements for Transportable Liquefied Petroleum Gas (LPG) Reclassifier Service
- Conformity Requirements for Aerial Storage Tanks for Petroleum Products and Other Fuels
- Conformity Requirements for Plasticized PVC Liquefied Petroleum Gas (LPG) Hoses

INMETRO's relevant voluntary standards and technical regulations include:

- Conformity Requirements for Industrial Valves for Oil Exploration, Production, Refining and Transportation Installations

Brazil's national private, non-profit standards development organization, Brazilian Association of Technical Standards (ABNT), also contributes significantly to standards development. While ABNT's standards are voluntary, many are referenced by INMETRO's compulsory standards and technical regulations. Within ABNT are the technical committees responsible for developing standards; this includes the Committee on Materials, Equipment and Ocean Structures for the Oil and Natural Gas Industry, whose technical secretariat is the Pontifical Catholic University of Rio de Janeiro. ABNT has issued over 400 standards relevant to the oil and gas sector.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Four regulations issued by ANP reference 48 API standards:

Regulation	API Standard
RESOLUÇÃO ANP Nº 810, DE 16.03.2020, DOU 17 DE MARÇO DE 2020 (Technical Regulation of Terminals for the Handling and Storage of Oil, Petroleum Products, Natural Gas, and Biofuels)	**API 620 – Design and Construction of Large Welded Low Pressure Storage Tanks. API 650 – Welded Steel Tanks for Oil Storage. API 653 – Tank Inspection, Repair, Alteration, and Reconstruction. API 2000 – Venting Atmospheric and Pressure Storage Tanks: Non-Refrigerated and Refrigerated.**
RESOLUÇÃO ANP Nº 52, DE 26.12.2013, DOU 27.12.2013 (Technical Regulation for the Implementation of Results of Physicochemical Analyses for Subsequent Measurements of Oil and Natural Gas)	**API MPMS 14.1/2006. Manual of Petroleum Measurement Standards Chapter 14-Natural Gas Fluids Measurement Section 1-Collecting and Handling of Natural Gas Samples for Custody Transfer, Washington D. C, 2006.**
RESOLUÇÃO CONJUNTA ANP/INMETRO Nº 1, DE 10.6.2013, DOU 12.6.2013- RETIFICADA DOU 17.6.2013 (Measurements of oil and natural gas)	**API/MPMS 3.1A/1994. Manual Gauging of Petroleum and Petroleum Products. Washington, 1994. API/MPMS 3.1B/2001. Standard Practice for Level Measurement of Liquid Hydrocarbons in Stationary Tanks by Automating Tank Gauging. Washington D. C, 2001 API/MPMS 4.1/2005. Introduction, Second Edition. Washington D. C, 2005. API/MPMS 4.3/1988. Small Volume Provers. Washington D. C, 1988. API/MPMS 4.4/1988. Tank Provers. Washington D. C, 1988. API/MPMS 4.5/2000. Master-Meter Provers. Washington D. C, 2000 API/MPMS 4.7/2009. Field-Standard Test Measures. Washington D. C, 2009. 30 p. API/MPMS 4.8/1995. Operation of Proving Systems. Washington D. C, 1995 API/MPMS 5.1/2005. General Consideration for Measurement by Meters. Washington D. C, 2005. 8 p. API/MPMS 5.2/2005. Measurement of Liquid Hydrocarbons by Displacement Meters. Washington D. C, 2005. API/MPMS 5.3/2005. Measurement of Liquid Hydrocarbons by Turbine Meters. Washington D. C, 2005. API/MPMS 5.3/2009 Addendum 1. Addendum 1 to Metering: Measurement of Liquid Hydrocarbons by Turbine Meters. Washington D. C, 2009. API/MPMS 5.4/2005. Accessory Equipment for Liquid Meters. Washington D. C, 2005.**

Regulation	API Standard
(cont.) RESOLUÇÃO CONJUNTA ANP/INMETRO Nº 1, DE 10.6.2013, DOU 12.6.2013- RETIFICADA DOU 17.6.2013 (Measurements of oil and natural gas)	API/MPMS 5.5/2005. Fidelity and security of Flow Measurement Pulsed - Data Transmission Systems. Washington D. C, 2005. API/MPMS 5.6/2002. Measurement of Liquid Hydrocarbons by Coriolis Meters. Washington D. C, 2002. API/MPMS 5.8/2005. Measurement of Liquid Hydrocarbons by Ultrasonic Flowmeters Using Transit Time Technology. Washington D. C, 2005. API/MPMS 7/2001. Temperature Determination. Washington D. C, 2001. API/MPMS 7.2/2001 Temperature-Dynamic Temperature Determination. Washington D. C, 2001. API/MPMS 8.1/95. Standard Practice for Manual Sampling of Petroleum and petroleum Products (ANSI/ASTM D4057). Washington D. C, 2006. API/MPMS 8.2/1995. Standard Practice for Automatic Sampling of Petroleum and Petroleum Products (ANSI/ASTM D4177). Washington D. C, 1995. API/MPMS 8.3/95. Mixing and Handling of Liquid Samples of Petroleum and Petroleum Products (ASTM D5854). Washington D. C, 2005. API/MPMS 9.1/2002. Hydrometer Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products (ANSI/ASTM D 1298) (IP 160). Washington D. C, 2002. API/MPMS 9.3/2002. Standard Test Method for Density, Relative Density, and API Gravity of Crude Petroleum and Liquid Petroleum Products by Thermohydrometer Method. Washington D. C, 2002. API/MPMS 10.1/2002. Standard Test Method for Sediment in Crude Oils and Fuel Oils by the Extraction Method, Second Edition. Washington D. C, 2002. 5 p. API/MPMS 10.4/1999. Determination of Water and Sediment in Crude Oil by Centrifuge Method (Field Procedure). Washington D. C, 1999 API/MPMS 10.7/2002. Standard Test Method for Water in Crude Oil by Karl Fischer. Titration (Potentiometric) (ANSI/ASTM D4377) (IP 356). Washington D. C, 2002. API/MPMS 11.1/2007. Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils. Washington D. C, 2007. 187 p. API/MPMS 11.2.1M/1984. Compressibility Factors for Hydrocarbons: 638-1074 Kilograms per Cubic Meter Range. Washington D. C, 1984 API/MPMS 12.1.1/01. Calculation of Static Petroleum Quantities, Part 1 (Includes Addendum dated August 2007), Upright Cylindrical Tanks and Marine Vessels. Washington D. C, 2007. API/MPMS 13.1/1985. Statistical Concepts and Procedures in Measurement. Washington D. C, 1985. API/MPMS 13.2/1984. Statistical Aspects of Measuring and Sampling. Washington D. C, 1984. API/MPMS 14.1/2001. Collecting and Handling of Natural Gas Samples for Custody Transfer. Washington D. C, 2001. API/MPMS 14.3-1/1993. Concentric, Square-Edged Orifice Meters (A.G.A. Report nº 3) (GPA 8185-90). Washington D. C, 1993. API/MPMS 14.3-2/2000. Specification and Installation Requirements, Reaffirmed May 1996 (ANSI/API 2530). Washington D. C, 2000. API/MPMS 14.3-3/1992. Natural Gas Fluids Measurement: Concentric, Square-Edged Orifice Meters - Part 3: Natural Gas Applications. Washington D. C, 1992. API/MPMS 20.1/1993. Allocation Measurement of Oil and Natural Gas. Washington D. C, 1993. API/MPMS 21.1/1993. Electronic Gas Measurement. Washington D. C, 1993. API/MPMS 21.2/1998. Flow Measurement-Electronic Liquid Measurement. Washington D. C, 1998. API/MPMS 21.2-A1/2000. Flow Measurement-Electronic Liquid Measurement. Addendum 1 to Flow-Electronic Liquid Measurement. Washington D. C, 2000. API/MPMS 14.6/2006. Continuous Density Measurement, Washington D.C, reaffirmed 2006.
RESOLUÇÃO ANP Nº 6, DE 3 DE FEVEREIRO DE 2011 (Technical Regulation for Onshore Pipelines for the Transportation of Oil, Derivatives, and Natural Gas)	API STD 1160 - Managing System Integrity for Hazardous Liquid Pipelines, API PUBL 1161 - Guidance Document for the Qualification of Liquid Pipeline Personnel API RP 1162 - Public Awareness Programs for Pipeline Operators

ABNT's voluntary standards for the oil and gas sector make normative reference to API standards as well as other international standards, including ISO, ASME, and EN standards. 20 ABNT standards make 51 references to API standards, including the API Manual of Petroleum Measurement Standards (MPMS):

ABNT Standard	API Standards Referenced
ABNT NBR 15273:2021, Induction curves for oil, by-products and natural gas transportation system through pipelines	API SPEC 5L, Line Pipe
ABNT NBR 16799:2019, Storage of Flammable and Combustible Liquids - Management of Fires in Atmospheric Storage Tanks	API RP 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents API RP 2023, Guide for Safe Storage and Handling of Heated Petroleum-Derived Asphalt Products and Crude-Oil Residua API SPEC 12B:1995, Bolted Tanks for Storage of Production. Liquids
ABNT NBR 15358:2017, Fuel gas internal network in non-residential use installations until 400 kPa — Design and construction	API SPEC 5L, Seamless Line Pipe API 1104, Standard for Welding Pipelines and Related Facilities
ABNT NBR 16165:2017 Induction bends for process piping - Requirements	API SPEC 6A, Specification for Wellhead and Tree Equipment
ABNT NBR 15280-1:2017, Onshore pipeline Part 1: Design	API RP 1102, Steel Pipelines Crossing Railroads and Highways API SPEC 5L, Seamless Line Pipe API SPEC 6D, Specification for Pipeline Valves API 594, Check Valves: Flanged, Lug, Wafer, and Butt-welding API 599, Metal Plug Valves-Flanged, Threaded and Welding Ends API 600, Steel Gate Valves - Flanged and Butt-welding Ends, Bolted Bonnets API 602, Gate, Globe, and Check Valves for Sizes DN 100 (NPS 4) and Smaller for the Petroleum and Natural Gas Industries
ABNT NBR 15827:2018, Industrial valves for installations of exploration, production, refining and transport of petrol products - Requirements for design and prototype test	API 594, Check Valves: Flanged, Lug, Wafer, and Butt-welding API 598, Valve Inspection and Testing API 599, Metal Plug Valves-Flanged, Threaded and Welding Ends API 600, Steel Gate Valves - Flanged and Butt-welding Ends, Bolted Bonnets API 602, Gate, Globe, and Check Valves for Sizes DN 100 (NPS 4) and Smaller for the Petroleum and Natural Gas Industries API 609, Butterfly Valves: Double Flanged, Lug- and Wafer-Type API SPEC 6D, Pipeline Valves
ABNT NBR 13523:2019 , Liquefied petroleum gas central storage - LPG	API SPEC 5L, Seamless Line Pipe
ABNT NBR 15280-2:2015 Versão Corrigida:2016 , Onshore pipeline Part 2: Construction and installation	API RP 1110, Recommended Practice for the Pressure Testing of Steel Pipelines for the Transportation of Gas, Petroleum Gas, Hazardous Liquids, Highly Volatile Liquids, or Carbon Dioxide API 1104, Standard for Welding Pipelines and Related Facilities
ABNT NBR 15793:2016	API RP 5C6, Pipe with Welded Connectors API SPEC 8C, Drilling and Production Hoisting Equipment
ABNT NBR 17505-7:2015, Storage of flammable and combustible liquids Part 7: Fire protection for parks with stationary storage tanks	API 620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks
ABNT NBR 16381:2015 EN, Onshore and offshore pipelines - Pig-trap ABNT NBR 16381:2015 Onshore and offshore pipelines — Scraper-trap	API SPEC 6D, Specification for Pipeline Valves
ABNT NBR 17505-5:2015 Storage of flammable and combustible liquids Part 5: Operations	API 2016, Guidelines and Procedures for Entering and Cleaning Petroleum Storage Tanks API RP 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents API 2015, Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks

ABNT Standard	API Standards Referenced
ABNT NBR 17505-2:2015 , Storage of flammable and combustible liquids Part 2: Tank and recipient storage	API 2000, Venting Atmospheric and Low-Pressure Storage Tanks API 620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks API SPEC 12B, Specification for Bolted Tanks for Storage of Production Liquids API SPEC 12F, Specification for Shop Welded Tanks for Storage of Production Liquids API 2350, Overfill Protection for Storage Tanks in Petroleum Facilities API 653, Tank Inspection, Repair, Alteration, and Reconstruction
ABNT NBR 16020:2011, Electronic liquid measurement — Flow computers	API MPMS
Measurement of gas by multipath ultrasonic meters	API MPMS Chapter 14
ABNT NBR 15216:2010, Storage of flammable and combustible liquids—Quality control on storage, transportation and supply in aviation fuels	API/IP SPEC 1581, Specifications and Qualification Procedures for Aviation Jet Fuel Filter Separators API/IP STD 1542, Identification Markings for Dedicated Aviation Fuel Manufacturing and Distribution Facilities API 1529, Aviation Fueling Hose
ABNT NBR 15921-4:2011, Petroleum and natural gas industries - Composite piping Part 4: Fabrication, installation and operation	API SPEC 5B, Threading, Gauging, and Inspection of Casing, Tubing, and Line Pipe Threads
ABNT NBR 15600:2010, Compressed natural gas storage and decompressing station - Design, construction and operation	API 1104, Standard for Welding Pipelines and Related Facilities API 600, Cast Steel Valves
ABNT NBR 12236:1994, Criteria of project, building and operation of compressed fuel gas filling station - Procedure	API 618, Reciprocating Compressors for Petroleum, Chemical, and Gas Industry Services API RP 520, Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries API RP 550, Manual on Installation of Refinery Instruments and Control Systems API SPEC 11P, Specification for packaged Reciprocating Compressors for Oil and Gas Production Services API 601, Metallic Gaskets For Raised-face Pipe Flanges And Flanged Connections API 605, Large-Diameter Carbon Steel Flanges

CANADA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

Regulation of natural gas and oil in Canada takes place primarily at the provincial level. The federal government, through the Canadian Energy Regulator (CER), has responsibility over interprovincial pipelines and trade, as well as some authority over offshore reserves and in frontier areas (Northwest Territories, Nunavut and the territorial sea), pursuant to the Canadian Energy Regulator Act (CER Act).

Each province has jurisdiction over its resources and is responsible for approval of natural gas and oil project applications and oversight and regulation. Provincial regulators in Canada include:

- the Alberta Energy Regulator (AER)
- the British Columbia Energy Regulator (BCER)
- the Saskatchewan Ministry of Energy and Resources (ER)
- the Petroleum Branch of the Manitoba provincial government
- the Department of Energy and Mines (DEM) of New Brunswick
- the Ontario Ministry of Natural Resources (MNR)

Federal and provincial authorities share jurisdiction over offshore petroleum reserves. Legislation has been introduced to establish cooperation between the different levels of government. The Canada-Newfoundland and Labrador Offshore Petroleum Board and the Canada-Nova Scotia Offshore Petroleum Board, both consisting of federal and provincial representatives, regulate every aspect of offshore development.

The Standards Council of Canada (SCC) is an independent body designated to promote the participation of Canadians in standards activities. SCC serves as Canada's national standards organization and provides accreditation to standards development bodies. Accredited standards development bodies include the Canadian Standards Association (CSA), which has issued over 3,000 standards; and the Canadian General Standards Board, a body within the government of Canada that has developed over 350 standards including for petroleum.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Individual provinces have jurisdiction over natural resources and the regulation of natural gas and oil activities. Accordingly, provincial governments have issue laws and accompanying regulatory guidance for industry that incorporate international standards, including a total of 137 references to API standards.

ALBERTA	
Measure	**References to API Standards**
Manual 012: Energy Development Applications (2024)	API SPEC 5L, Line Pipe
Manual 011: How to submit volumetric data to the AER (2024)	API Manual of Petroleum Measurement Standards (MPMS)
Directive 008: Surface Casing Depth Requirements	API RP 64: Recommended Practices for Diverter Systems Equipment and Operations
Directive 010: Minimum Casing Design Requirement (2022)	API RP 5C1: Recommended Practice for Care and Use of Casing and Tubing API SPEC 5CT: Specification for Casing and Tubing API Bulletin 5C3: Formulas and Calculations for Casing, Tubing, Drill Pipe and Line Pipe Properties
Directive 017: Measurement Requirements for Oil and Gas Operations (2022)	API Manual of Petroleum Measurement Standards
Directive 046: Production Audit Handbook – January 2003	API Manual of Petroleum Measurement Standards
Directive 036: Drilling Blowout Prevention Requirements and Procedures – March 2019	API SPEC 6A: Wellhead and Christmas Tree Equipment API RP 5C1: Care and Use of Casing and Tubing API RP 5A3: Thread Compounds for Casing, Tubing, and Line Pipe
Directive 055: Storage Requirements for the Upstream Petroleum Industry	API 2610: Design, Construction, Operation, Maintenance, and Inspection of Terminal and Tank Facilities API 653: Tank Inspection, Repair, Alteration, and Reconstruction API Standard 2350: Overfill Protection for Storage Tanks in Petroleum Facilities, Fourth Edition API RP 1604: Closure of Underground Petroleum Storage Tanks API RP 575: Inspection Practices for Atmospheric and Low-Pressure Storage Tanks API RP 652: Linings of Aboveground Petroleum Storage Tank Bottoms
Directive 060: Upstream Petroleum Industry Flaring, Incinerating, and Venting	API 521: Pressure-relieving and Depressuring Systems
Directive 073: Requirements for Inspection and Compliance of Oil Sands Mining and Processing Plant Operations in the Oil Sands	API Manual of Petroleum Measurement Standards

BRITISH COLUMBIA	
Measure	**References to API Standards**
Oil and Gas Activity Operations Manual – Version 1.39: July 2024	API Standard 521: Pressure-relieving and Depressuring Systems API 53, Well Control Equipment Systems for Drilling Wells API 620: Design and Construction of Large Welded Low-Pressure Storage Tanks API 650: Welded Steel Tanks for Oil Storage API 651: Cathodic Protection for Above-Ground Petroleum Storage Tanks API 652: Lining of Above-Ground Petroleum Storage Tanks API 653: Tank Inspection, Repair, Alteration, and Reconstruction API RP 1604, Closure of Underground Petroleum Storage Tanks API 2000: Venting Atmospheric and Low-Pressure Storage Tanks API 2015: Cleaning Petroleum Storage Tanks API 2350: Overfill Protection for Petroleum Storage Tanks API 2550: Measurements and Calibration of Petroleum Storage Tanks API RP 14B: Design, Installation, Repair and Operation of Subsurface Safety Valve Systems

SASKATCHEWAN	
Measure	**References to API Standards**
Directive PNG017: Measurement Requirements for Oil and Gas Operations	API Manual of Petroleum Measurement Standards
Guidelines for the Construction and Monitoring of Oily Byproduct Storage Structures in Saskatchewan	API 620, Design and Construction of Large, Welded, Low Pressure Storage Tanks API 650, Welded Tanks for Oil Storage
Directive S-01: Saskatchewan Upstream Petroleum Industry Storage Standards	API Publication 351: Overview of Soil Permeability Test Methods API 620: Design and Construction of Large Welded Low-Pressure Storage Tanks API Standard 650: Welded Steel Tanks for Oil Storage API SPEC 12D: Field-welded Tanks for Storage of Production Liquids API SPEC 12F: Shop-welded Tanks for Storage of Production Liquids API SPEC 12P: Fiberglass Reinforced Plastic Tanks
Directive PNG034: Saskatchewan Pipelines Code	API RP 573, Inspection of Fired Boilers and Heaters

MANITOBA	
Measure	**References to API Standards**
The Oil and Gas Act (C.C.S.M. c. 034)	API RP 4G, Operation, Inspection, Maintenance, and Repair of Drilling and Well Servicing Structures

NEW BRUNSWICK	
Measure	**References to API Standards**
NB Reg 87-97: Petroleum Product Storage and Handling Regulation	API Standard 620: Recommended Rules for Design and Construction of Low-Pressure Storage Tanks API Standard 650: Welded Steel Tanks for Oil Storage API 2000: Venting Atmospheric and Low-Pressure Storage Tanks API Specification 5L: Specification for Line Pipe API Specification 12B: Specification for Bolted Production Tanks API Specification 12D: Specification for Large Field Welded Production Tanks API Specification 12F: Specification for Shop Welded Tanks for Storage of Production Liquids

NEWFOUNDLAND & LABRADOR / NOVA SCOTIA	
Measure	**References to API Standards**
Data Acquisition and Reporting Guidelines	API RP 13-B-1: Recommended Practice for Field Testing Water-Based Drilling Fluid API RP 13B-2: Recommended Practice for Field Testing Oil-Based Drilling Fluid API RP 31A: Standard Form for Hardcopy Presentation of Downhole Well Log Data API RP 40: Recommended Practice for Core Analysis API RP 44: Recommended Practice for Sampling Petroleum Reservoir Fluids API RP 45: Recommended Practice for Analysis of Oilfield Waters API RP 66: Recommended Digital Log Interchange Standard (DLIS)
Drilling and Production Guidelines	API Standard 53: BOP Equipment Systems for Drilling API Standard 65: Isolating Potential Flow Zones API SPEC 4F: Drilling and Well Servicing Structures API SPEC 6A: Wellhead and Christmas Tree Equipment API SPEC 6FA: Fire Test for Valves API SPEC 7-1: Rotary Drilling Stem Elements API SPEC 8A, 8C: Drilling and Production Hoisting Equipment API SPEC 9A: Wire Rope API SPEC 10A: Cements and Materials for Well Cementing API SPEC 13A: Drilling Fluid Materials API SPEC 14A: Subsurface Safety Valve Equipment API SPEC 16A: Drill-through Equipment API SPEC 16C: Choke and Kill Equipment API SPEC 16D: Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment API SPEC 16F: Marine Drilling Riser Equipment API SPEC 16R: Design, Rating and Testing of Marine Drilling Riser Couplings API SPEC 17D: Design and Operation of Subsea Production systems – Subsea Wellhead and Tree Equipment API RP 5C7: Recommended Practice for Coiled Tubing Operations in Oil and Gas Well Services API RP 8B: Inspection, Maintenance, Repair, and Remanufacture of Hoisting Equipment API RP 9B: Application, Care and Use of Wire Rope for Oilfield Service API RP 10B: Testing Well Cements API RP 13-B-1: Field Testing Water-Based Drilling Fluid API RP 13B-2: Field Testing Oil-Based Drilling Fluid API RP 14B: Design, Installation, Operation, Test, and Redress of Subsurface Safety Valve Systems API RP 16Q: Design, Selection, Operation and Maintenance of Marine Drilling Riser Systems API RP 17A: Design and Operation of Subsea Production Systems API RP 17G: Design and Operation of Completion/Workover Riser Systems API RP 64: Diverter Systems Equipment and Operations API RP 90: Annular Casing Pressure Management for Offshore Wells API RP 131: Laboratory Testing Drilling Fluids
Offshore Waste Treatment Guidelines	API RP 13B-2: Procedure for Field Testing Oil Based Drilling Fluid
Measurement Guidelines under the Newfoundland and Labrador and Nova Scotia Offshore Areas Drilling and Production Regulations	API Manual of Petroleum Measurement Standards
	Data Acquisition and Reporting Guidelines – October 2011 API RP 13B-1: Field Testing Water-Based Drilling Fluid API RP 13B-2: Field Testing Oil-Based Drilling Fluid API RP 31A: Standard Form for Hardcopy Presentation of Downhole Well Log Data API RP 40: Core Analysis API RP 44: Sampling Petroleum Reservoir Fluids API RP 45: Analysis of Oilfield Waters API RP 66: Recommended Digital Log Interchange Standard
Offshore Waste Treatment Guidelines – December 2010	API RP 13B-2: Field Testing Oil-Based Drilling Fluid

NEWFOUNDLAND & LABRADOR / NOVA SCOTIA	
Measure	**References to API Standards**
Safety Directive: Security of Offshore Installations and Facilities	API 70: Security for Worldwide Offshore Oil and Natural Gas Operations
Canada-Nova Scotia Offshore Marine Installations and Structures Occupational Health and Safety Transitional Regulations	API SPEC 8A, 8C: Drilling and Production Hoisting Equipment API SPEC 2C, 2D: Offshore Pedestal-mounted Cranes API RP 8B: Inspections, maintenance, repair and remanufacture of hoisting equipment
Canada-Newfoundland and Labrador Offshore Marine Installations and Structures Occupational Health and Safety Transitional Regulations	API SPEC 8A: Drilling and Production Hoisting Equipment API RP 8B: Inspections, Maintenance, Repair and Remanufacture of Hoisting Equipment API SPEC 8C: Specification for Drilling and Production Hoisting Equipment (PSL 1 and PSL 2) API SPEC 2C: Off-shore Pedestal-mounted cranes API RP 2D: Operation and Maintenance of Off-shore Cranes

ONTARIO	
Measure	**References to API Standards**
Oil, Gas and Salt Resources of Ontario, Provincial Operating Standards	API SPEC 5CT: Specifications for Casing and Tubing API RP 5A5: Field Inspection of New Casing, Tubing, and Plain End Line Pipe API RP 5C1: Care and Use of Casing and Tubing API RP 500, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2 API RP 651, Cathodic Protection of Aboveground Petroleum Storage Tanks API Bulletin 5C2: Bulletin on Performance Properties of Casing and Tubing API Technical Report 5C3, Calculating Performance Properties of Pipe Used as Casing or Tubing API Bulletin 5C4: Bulletin on Round Threat Casing Joint Strength with Combined Internal Pressure and Bending API SPEC 5CT, Casing and Tubing API SPEC 6A: Wellhead and Christmas Tree Equipment API SPEC 10: Class of Cement API SPEC 10A: Materials and Testing for Oil Well Cements API SPEC 12B, Bolted Tanks for Storage of Production Liquids API SPEC 12D, Field Welded Tanks for Storage of Production Liquids API SPEC 12F, Shop Welded Tanks for Storage of Production Liquids API SPEC 12P, Fiberglass Reinforced Plastic Tanks API 12R1: Installation, Operation, Maintenance, Inspection, and Repair of Tanks in Production Service API 521, Pressure-relieving and Depressuring Systems API 650, Welded Tanks for Oil Storage API 653, Tank Inspection, Repair, Alteration, and Reconstruction

CHILE

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Energy is the primary government body that oversees all energy resources in Chile. The National Energy Commission is a public and decentralized body that advises the Ministry of Energy on all matters related to the energy sector and its development. The National Energy Commission's main functions are to analyze the prices and tariffs of goods and services, fix technical and quality norms, monitor, and project current and anticipated functioning of the energy sector, and to monitor and propose legal and regulatory norms.

Since the 1970s, Chile's national oil company, Empresa Nacional del Petróleo (ENAP), has been entitled to explore Chile's oil and gas reservoirs. Chile authorizes third parties to explore its oil and gas reservoirs on behalf of ENAP through special operations contracts (CEOPs), which operate as licenses issued by the Ministry of Energy. In other words, though all hydrocarbon reservoirs are owned by the state, exploration and exploitation can be performed by ENAP or a private party with a CEOP. CEOPs can also set rules on how to operate activities in the upstream sector.

Beyond the Ministry of Energy, the Ministry of Economy, Development, and Tourism and the Ministry of Health have also issued regulations related to safety of midstream and downstream oil and gas operations. For the downstream gas sector, Chile's electricity regulator, the Superintendency of Electricity and Fuels (SEC) also supervises the management of operations and certification of electrical and gas products, including setting specific standards for gas products.

The National Institute for Standardization (Instituto Nacional de Normalización (INN) is a member of the International Organization for Standardization (ISO) and is the only organization charged with creating Chile's national standards. The INN is a private foundation created by Corporación de Fomento de la Producción (CORFO), Chile's economic development agency. The INN's main functions are to develop technical standards at national leve; manage the National Accreditation System and the coordination of a National Metrological Network; and promote sales of standards, training activities, and technical publications.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

The Ministry of Energy and the National Energy Commission, the Ministry of Economy, and the Ministry of Health have all issued decrees that reference a total of 23 API standards.

Regulation	Issuer	API Standard Referenced
Safety Regulation for Liquefied Petroleum Gas Storage, Transportation and Distribution Facilities and Associated Operations (Decree 108, 2014)	Ministry of Energy	API 2510, Design and Construction of Liquefied Petroleum Gas (LPG) Installations API 2510A, Fire-Protection Considerations for the Design and Operation of Liquefied Petroleum Gas (LPG) Storage Facilities API RP 580, Risk-Based Inspection API RP 581, Risk-Based Inspection Methodology API RP 579-1, Fitness for Service API 510, Pressure Vessel Inspection Code API RP 570, Piping Inspection Code & Inspector Certification
Safety Regulation for Facilities and Operations of Production and Refining, Transportation, Storage, Distribution and Supply of Liquid Fuels (Decree 160, 2020)		API 500, Classification of Locations for Electrical Installations at Petroleum Facilities API 570, Piping Inspection Code & Inspector Certification API 620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks API 650, Welded Tanks for Oil Storage API 653, Tank Inspection, Repair, Alteration, and Reconstruction API RP 750, Management of Process Hazards API 1104, Welding of Pipelines and Related Facilities API 1160, Managing System Integrity for Hazardous Liquid Pipelines API 2000, Venting Atmospheric and Low-Pressure Storage Tanks API RP 1004, Bottom Loading and Vapor Recovery for MC-306 & DOT-406 Tank Motor Vehicles API RP 1615, Installation of Underground Petroleum Storage Systems API RP 2001, Fire Protection in Refineries
Regulation of Interior Installations and Gas Meters (Decree 66, 2007)		API 1104, Welding of Pipelines and Related Facilities API SPEC 5L, Line Pipe
Safety Regulation for the Transportation and Distribution of Network Gas (Decree 280, 2010)		API RP 570, Piping Inspection Code & InspectorCertification
Regulation for the Storage of Hazardous Substances (Decree 43, 2016)		API 650, Welded Tanks for Oil Storage

COLOMBIA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Mines and Energy (MME) in Colombia is the chief regulator in charge of issuing general upstream and downstream rules for the oil and gas sector, while the National Hydrocarbons Agency (ANH) executes contracts and agreements with private parties to allow participation in exploration and production. For midstream and downstream operations involving gas, the Commission on Regulation of Energy and Gas (CREG) is the primary regulator.

Colombia's Ministry of Environment and Sustainable Development ensures that oil and gas activities comply with environmental laws and regulations. Unlike many other Latin American countries, however, Colombia's national state-owned oil and gas company, Ecopetrol does not generally possess regulatory authority.

MME has issued Resolution 181495 of 2009 (subsequently updated by Resolution 40098 of 2015), which requires that "national and international technical standards and norms must be applied" to oil and gas exploration and production, "especially those recommended by AGA, API, ASTM, NFPA, NTC-ICONTEC, RETIE or their modified forms…used in the oil industry." Similarly, Resolution 40066 of 2022 regulating flaring and fugitive methane emissions incorporates similar language requiring the use of international standards "especially those recommended by AGA, API, ASTM, NFPA, NTCICONTEC, and RETIE or their modifications or substitutes."

In addition, MME has also issued regulations that include technical regulations and procedures, that may be modeled on or reference international standards, including:

- Resolution 72145 of 2014, which governs the transport of crude oil via pipeline; and
- Resolution 09341, which governs exploration and production of unconventional reservoirs.

Similarly, for the natural gas sector, CREG has issued Resolution 071, providing technical rules for the transport of natural gas resources.

Colombia's national standards development organization is the non-profit, private Colombian Institute of Technical Standards and Certification (ICONTEC). ICONTEC is active in developing and issuing Colombian national standards, coded as NTC. For the oil and gas sector, ICONTEC has issued over 140 standards, which are mostly voluntary but may be made mandatory by regulation.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Many Colombian technical regulations and standards reference API standards.

MME Resolution 181495 of 2009 directly requires compliance with international standards for exploration and production, "especially those recommended by AGA, API, ASTM, NFPA, NTC-ICONTEC, RETIE or their modified forms…used in the oil industry." However, Resolution 181495 does not refer to or require compliance to any specific standards.

Additionally, Article 17 of Resolution 72145 governing pipeline transport of crude oil requires that operators "install equipment and implement the necessary procedures for the measurement and quality determinations of crude oil, in accordance with current international standards, such as API, ASME, and ASTM." Resolution 72145 also does not refer to any specific standards.

MME Resolution 40066 of 2022, one of the first pieces of national regulation covering control and reduction of methane emissions, requires compliance with international standards, naming specifically API standards among others. Two specific API standards referenced by Resolution 40066 include:

- API 537, Flare Details for Petroleum, Petrochemical, and Natural Gas Industries
- API Compendium of Greenhouse Gas Emissions 2009

The national standards issued by ICONTEC incorporate as normative references international standards such as API, ISO, ASTM, and NFPA standards. Most of those that reference API involve steel pipes for wells, transport and distribution of gas, or handling of aviation fuel. According to ICONTEC's database of national standards, 19 national standards refer directly to 62 API standards. They are:

Colombian National Standard	API Standard Referenced
NTC 4713: Steel Pipes for Use as Casing or Tubing For Wells in Petroleum and Natural Gas Industries	API RP 5A3: Recommended Practice on Threat Compounds for Casing, Tubing and Line Pipe and Drill Stem Elements API TR 5C3: Technical Report on Equations and Calculations for Casing, Tubing and Line Pipe Used as Casing or Tubing; and Performance Properties Tables for Casing and Tubing API Spec 5B: Specification for Threading, Gauging and Thread Inspection of Casing, Tubing and Line pipe Threads
NTC 4713: Steel Pipes For Use As Casing Or Tubing For Wells In Petroleum And Natural Gas Industries	API RP 5A3: Recommended Practice On Thread Compounds For Casing, Tubing And Line Pipe and Drill Stem Elements API RP 5C3: Technical Report on Equations and Calculations for Casing, Tubing, and Line pipe Used as Casing or Tubing; and Performance Properties Tables for Casing and Tubing API SPEC 5B: Specifications for Threading, Gauging and Thread Inspection of Casing, Tubing and Line Pipe Threads
NTC 6276: Production, Storage, and Handling of Liquefied Natural Gas (LNG)	API 6D: Specification for Pipeline Valves, 2007 API 620: Design and Construction of Large, Welded, Low-Pressure Storage Tanks, 2008 API 625: Tank Systems for Refrigerated Liquefied Gas Storage, 2010 API 2510: Design and Construction of Liquefied Petroleum Gas (LPG) Installations, 2010
NTC 5897: Load and Unload Stations of Compressed Natural Gas	API RP 520: Sizing, Selection and Installation of Pressure-Relieving Devices in Refineries API RP 521: Guide for Pressure-Relieving and Depressuring systems API STD 526: Flanged Steel Pressure Relief Valves API SPEC 12K: Specification for Indirect Type Oil-Field Heaters
NTC 5773: Terrestrial Transport Systems for Compressed Natural Gas	API RP 520: Recommended Practice for the Design and Installation of Pressure-Relieving Systems in Refineries API RP 576: Recommended Practice for the Inspection of Pressure Relieving Devices
NTC 5716: Lubricating Oils for Internal Combustion Engines For Four—Stroke Motorcycles	API 1509: Engine Oil Licensing and Certification System
NTC 5261: Handling of Aviation Gasoline Supply	API 1529: Aviation Fueling Hose API / IP 1542: Airport Marking for Fuel Identification API / IP 1581: Specification and Qualification Procedures for Aviation Jet Fuel Filter / Separators API / IP 1583: Specification and Qualification Procedures for Aviation Fuel Filter Monitors with Absorbent Type Elements API / IP 1590: Specification and Qualification Procedures for Aviation Fuel Microfilters
NTC 5011: Handling of Aviation Fuel in Mobile Containers	API / IP 1542: Airport Equipment Making for Fuel Identification API IP 1581: Specifications and Qualification Procedures for Aviation Jet Fuel API / IP 1583: Specifications and Qualification Procedures for Aviation Fuel Filter Monitors with Absorbent Type Elements API / IP 1590: Specification and Qualification Procedures for Aviation Fuel Microfilters
NTC 4643: Handling of Aviation Turbo Fuel	API 1529: Aviation Fueling Hose API / IP 1542: Airport Equipment Making for Fuel Identification API IP 1581: Specifications and Qualification Procedures for Aviation Jet Fuel API / IP 1583: Specifications and Qualification Procedures for Aviation Fuel Filter Monitors with Absorbent Type Elements API / IP 1590: Specification and Qualification Procedures for Aviation Fuel Microfilters
NTC 4643: Handling of Turbofuel for Aviation Storage	API / IP 1529: Aviation Fueling Hose and Hose Assemblies API / IP 1542: Airport Equipment Making for Fuel Identification API IP 1581: Specifications and Qualification Procedures for Aviation Jet Fuel API / IP 1590: Specification and Qualification Procedures for Aviation Fuel Microfilters

Colombian National Standard	API Standard Referenced
NTC 1295: Petroleum And Petroleum Products. Lubricants Oils For Carter In Gasoline, Operation Dual Natural Gasoline/Gas For Vehicles (Four Times) And Diesel (Four And Two Times) Internal Combustion Engines	API 1509: Engine Oil Licensing and Certification System, 2002
NTC 5897: Load and Unload Stations of Compressed Natural Gas	API RP 520: Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries API RP 521: Guide for Pressure-Relieving and Depressuring Systems API STD 526: Flanged steel Pressure Relief Valves API SPEC 12K: Specification for Indirect Type of Oil-Field Heaters
NTC 5773: Terrestrial Transport Systems For Compressed Natural Gas	API RP 520: Recommended Practice for the Design and Installation of Pressure—Relieving Systems in Refineries API RP 576: Recommended Practice for the Inspection of Pressure Relieving Devices
NTC 5716: Lubricating Oils For Internal Combustion Engines, For Four-Stroke Motorcycles	API 1509: Engine Oil Licensing and Certification System
NTC 5261: Handling Of Aviation Gasoline (Avgas) Supply	API 1529: Aviation Fueling Hose API / IP 1542: Airport Equipment Marking for Fuel identification API IP 1581: Specifications and Qualification Procedures for Aviation Jet Fuel API / IP 1583: Specifications and Qualification Procedures for Aviation Fuel Filter Monitors with Absorbent Type Elements API / IP 1590: Specification and Qualification Procedures for Aviation Fuel Microfilters
NTC 5011: Handling Of Aviation Fuel In Mobile Containers	API / IP 1542: Airport Equipment Marking for Fuel Identification API IP 1581: Specifications and Qualification Procedures for Aviation Jet Fuel API / IP 1583: Specifications and Qualification Procedures for Aviation Fuel Filter Monitors with Absorbent Type Elements API / IP 1590: Specification and Qualification Procedures for Aviation Fuel Microfilters
NTC 4643: Handling Of Aviation Turbo Fuel. Refueling	API 1529: Aviation Fueling Hose API / IP 1542: Airport Equipment Marking for Fuel Identification API IP 1581: Specifications and Qualification Procedures for Aviation Jet Fuel API / IP 1583: Specifications and Qualification Procedures for Aviation Fuel Filter Monitors with Absorbent Type Elements API / IP 1590: Specification and Qualification Procedures for Aviation Fuel Microfilters
NTC 4642: Handling Of Turbofuel For Aviation. Storage	API 1529: Aviation Fueling Hose API / IP 1542: Airport Equipment Marking for Fuel Identification API IP 1581: Specifications and Qualification Procedures for Aviation Jet Fuel API / IP 1590: Specification and Qualification Procedures for Aviation Fuel Microfilters
NTC 1295: Petroleum And Petroleum Products. Lubricants Oils For Carter In Gasoline, Operation Dual Natural Gasoline/Gas For Vehicles (Four Times) And Diesel (Four And Two Times) Internal Combustion Engines	API 1509: Engine Oil Licensing and Certification System, 2002

ECUADOR

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Energy and Non-Renewable Natural Resources (MENNR) is the chief regulator for oil and gas in Ecuador, granting licensing and mining rights to private sector participants. Additionally, the Agency for Hydrocarbon Regulation and Control (ARCH) oversees all upstream and downstream oil and gas operations, and the Ministry of Environment plays a role in ensuring operations comply with environmental laws and regulations.

Ecuador has two state-owned oil companies, Empresa Pública de Exploración y Explotación de Hidrocarburos (Petroamazonas) and Empresa Pública de Hidrocarburos del Ecuador (Petroecuador) which generally have preferential access to Ecuador's oil and gas resources and that partner with suppliers and contractors on relevant projects. The two companies are expected to merge by the end of 2020, according to Executive Decree 723, issued on April 24, 2019

Ecuador's Law on Hydrocarbons provides MENNR the legal authority to promote exploration, production, industrialization, and transport of hydrocarbons according to "the best international practices." MENNR's Operational Regulation for Hydrocarbon Activities, which sets out the terms for conducting upstream and downstream activities, requires oil and gas operators to "apply the norms, standards, procedures, and best practices of the national and international hydrocarbon industry."

Ecuador's national standards development organization is the Ecuadorean Institute of Standardization (INEN) under the Ministry of Industry and Productivity, which develops and issues voluntary standards (coded as NTE INEN) and mandatory technical regulations (coded as PRTE INEN or RTE INEN). According to INEN's website, there are five mandatory technical regulations relevant to the oil and gas sector:

- RTE INEN 028, Combustibles
- RTE INEN 008 Welded Steel Tanks and Cylinders for Liquefied Petroleum Gas and its Technical Assemblies
- RTE INEN 024, Transport, Storage, Packaging, and Distribution of Liquefied Petroleum Gas (LPG) in Cylinders and Tanks
- RTE INEN 039, Function of Vehicles with Liquefied Petroleum Gas (LPG)
- RTE INEN 207, Steel Pipes Used in Oil and Gas Industries for Coating and Production of Wells

Moreover, INEN has issued over 230 national voluntary standards (NTE INEN) relevant to the oil and gas sector, some of which are cited by mandatory technical regulations.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

The INEN mandatory technical standards refer to a wide variety of international standards, including API, NTE INEN, ISO, IEC, EN, and ANSI. One of them, RTE INEN, 207, Steel Pipes Used in Oil and Gas Industries for Coating and Production of Wells, refers to two API standards. They are:

- API 5B, Threading, Gauging, and Inspection of Casing, Tubing, and Line Pipe Threads
- API SPEC 5CT, Specification for Casing and Tubing

GUYANA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The discovery of new resources in Guyana in the mid-2010s spurred the development of a stronger regulatory framework for the natural gas and oil sector, a process which is still ongoing. At the time of publication, the Department of Energy within the Ministry of the Presidency has been charged with overseeing the sector, including exploration and production (the country does not yet have capacity for many downstream activities, such as refining). The Guyana Energy Agency has also historically regulated many midstream and downstream activities, including the import/export, transport, storage, wholesale, and retail of natural gas and oil.

Given the ongoing reform process for the energy sector, other government agencies, including the Department of the Environment (also within the Ministry of the Presidency), the Guyana Environmental Protection Agency, or the Ministry of Natural Resources, will also play greater roles in regulating different aspects of natural gas and oil activity in Guyana.

The primary legislation governing the natural gas and oil sector is the Petroleum (Exploration and Production) Act, passed in 1986. However, the government is still in the process of modernizing its natural gas and oil laws and regulations in partnership with external experts, including from the World Bank and the Inter-American Development Bank.

The Guyanese National Bureau of Standards (GNBS), a semi-autonomous agency within the Ministry of Business, is the national standards development organization. It is governed by the National Standards Council, made up of representatives from government and the private sector. According to its website, it has developed over 100 standards (abbreviated GYS), though development of standards for the natural gas and oil standards sector has only begun recently.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

API and the International Association of Oil and Gas Producers (IOGP) have collaborated closely with both the Department of Energy and GNBS on adoption of global standards and best practices, including API standards. As of June 2022, the GNBS has formally adopted 33 API standards, including:

1. API MPMS Chapter 2.2A Measurement and Calibration of Upright Cylindrical Tanks by the Manual Strapping Method
2. API MPMS Chapter 3.1A Standard Practice for the Manual Gauging of Petroleum and Petroleum Products
3. API MPMS 3.1B-Tank Gauging Section 1B- Level Measurement of Liquid Hydrocarbons In Stationary Tanks By Automatic Tank Gauging
4. API MPMS Chapter 4 Proving Systems – Section 2 Displacement Provers
5. API MPMS Chapter 4 Proving Systems - Section 4 Tank Provers
6. API MPMS Chapter 4 Proving Systems - Section 9 Methods of Calibration for Displacement and Volumetric Tank Provers - Part 2 Determination of the Volume of Displacement and Tank Provers by the Waterdraw Method of Calibration
7. API MPMS Chapter 5 Metering - Section 2 Measurement of Liquid Hydrocarbons by Displacement Meters
8. API MPMS Chapter 5 Metering - Measurement of Liquid Hydrocarbons by Turbine Meters
9. API MPMS Chapter 5 Metering – Section 6 Measurement of Liquid Hydrocarbons by Coriolis Meters
10. API MPMS Chapter 5.8 Measurement of Liquid Hydrocarbons by Ultrasonic Flow Meters
11. API MPMS Chapter 6.1 Lease Automatic Custody Transfer (LACT) Systems
12. API MPMS Chapter 7 Temperature Determination
13. API MPMS Chapter 8.1 Standard Practice for Manual Sampling of Petroleum and Petroleum Products
14. API MPMS Chapter 8.2 Standard Practice for Automatic Sampling of Petroleum and Petroleum Products
15. API MPMS Chapter 9.1 Standard Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
16. API MPMS Chapter 9.2 Standard Test Method for Density or Relative Density of Light Hydrocarbons by Pressure Hydrometer
17. API MPMS Chapter 9.3 Standard Test Method for Density, Relative Density, and API Gravity of Crude Petroleum and Liquid Petroleum Products by Thermohydrometer Method
18. API MPMS Chapter 10.3 Standard Test Method for Water and Sediment in Crude Oil by the Centrifuge Method (Laboratory Procedure)
19. API MPMS Chapter 10.4 Determination of Water and/or Sediment in Crude Oil by the Centrifuge Method (Field Procedure)
20. API MPMS Chapter 11—Physical Properties Data - Section 1—Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils Volume

21. API MPMS Chapter 11.5.1 —Physical Properties Data - Section 5 Density/Weight/Volume Intraconversion - Part 1—Conversions of API Gravity at 60 °F

22. API MPMS Chapter 12 Calculation of Petroleum Quantities - Section2 Using Dynamic Measurement Methods and Volumetric Correction Factors - Part 1—Introduction

23. API MPMS Chapter 12 Calculation of Petroleum Quantities – Section 2 Using Dynamic Measurement Methods and Volumetric Correction Factors - Part 2—Measurement Tickets

24. API MPMS Chapter 12—Calculation of Petroleum Quantities - Section 2 Calculation of Petroleum Quantities Using Dynamic Measurement Methods and Volumetric Correction Factors - Part 3 Proving Report

25. API MPMS Chapter 12 Calculation of Petroleum Quantities – Section 2 Using Dynamic Measurement Methods and Volumetric Correction Factors – Part 4 Calculation of Base Prover Volumes by the Waterdraw Method

26. API MPMS Chapter 12 Calculation of Petroleum Quantities – Section 2 Using Dynamic Measurement Methods and Volumetric Correction Factors - Part 5—Base Prover Volume Using Master Meter Method

27. API MPMS Chapter 13 Statistical Aspects of Measuring and Sampling – Section 2 Methods of Evaluating Meter Proving Data

28. API MPMS Chapter 13.3 Measurement Uncertainty

29. API MPMS Chapter 14—Natural Gas Fluids Measurement - Section 1—Collecting and Handling of Natural Gas Samples for Custody Transfer

30. API MPMS Chapter 14.3.1 Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids—Concentric Square-Edged Orifice Meters, Part 1: General Equations and Uncertainty Guidelines

31. API MPMS Chapter 21 Flow Measurement Using Electronic Metering Systems—Electronic Gas Measurement

32. API Q1 Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry

33. API Q2 Specification for Quality Management System Requirements for Service Supply Organizations for the Petroleum and Natural Gas Industries

MEXICO

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

Reforms to the Mexican Constitution in 2013 opened the natural gas and oil market up to private sector participants, in addition to Petrleós Mexicanos (PEMEX), the national state-owned oil company. Natural gas and oil resources are still owned by the government, and private companies may participate in bidding procedures for awarding exploration and extraction contracts. New government regulatory bodies are continuing to issue administrative regulations relating to natural gas and oil activities, with federal, local, and municipal permits required for the construction and operation of pipelines.

Regulatory bodies in Mexico include:

- The National Hydrocarbon Commission (CNH), which organizes tender procedures to award contracts for exploration and extraction, and manages and supervises contracts;
- The Energy Regulatory Commission (CRE), which regulates downstream natural gas activities
- The National Agency of Industrial Safety and Environmental Protection of the Hydrocarbons Sector (ASEA), which regulates health, safety, and environmental protection aspects of natural gas and oil activities
- PEMEX, which continues to be a major operator in the sector, also shapes the development of hydrocarbons in Mexico.

The major laws and regulations governing natural gas and oil are provided by Articles 25, 27 and 28 of Mexico's Federal Constitution, and the Hydrocarbons Law and its associated regulations. These laws lay out rules for private individuals and companies to participate in exploration and production activities, the type of contractual arrangements that the Mexican Government, through CNH, can use for exploration and extraction contracts; and establish rules regarding midstream and downstream activities.

The General Directorate of Standards (DGN) is Mexico's national standards body and is responsible for preparing various types of technical standards in coordination with relevant government agencies. Official Mexican Standards (abbreviated NOM) are mandatory technical regulations to be applied to products, processes, and services, including in the natural gas and oil sector. NOM are developed by CRE and ASEA for the sector.

In addition, there are voluntary Mexican Standards (NMX) developed by the Secretariat of Economy or industry bodies, and Reference Standards (RF) developed by certain publically administrated entities (such as PEMEX), to be applied to goods and services that they acquire, lease, or hire when national or international standards do not cover the relevant requirements, or their specifications are obsolete or inapplicable.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Several NOM standards reference API standards, as indicated below, along with other international standards including ISO. In addition, ASEA and the Comisión Regulatoria de Hidrocarburos have issued regulatory guidance that makes substantial reference to API standards. In total, 199 references to API standards were identified.

Mandatory NOM standards make 57 references to API standards:

NOMS ISSUED BY ASEA	
NOM	**References to API Standards**
Norma Oficial Mexicana NOM-005-ASEA-2016: Design, Construction, Operation and Maintenance of Service Stations for Storage and Sale of Diesel and Gasoline	API RP 1615: Installation of Underground Hazardous Substances or Petroleum Storage Systems API RP 1621: Bulk Liquid Stock Control at Retail Outlets
NORMA Oficial Mexicana NOM-007-ASEA-2016, Transportation of Natural Gas, Ethane and Gas Associated With Mineral Coal through Pipelines	API SPEC 5L: Line Pipe API SPEC 6D: Pipeline And Piping Valves API RP 5L1: Railroad Transportation of Line Pipe API RP 5LW: Transportation of Line Pipe on Barges and Marine Vessels API RP 2201 : Safe Hot Tapping Practices in the Petroleum and Petrochemical Industries API 521: Guide for Pressure-Relieving and Depressuring System API 526: Flanged Steel Pressure-relief Valves API 570: Piping Inspection Code API 1104: Welding of Pipelines and Related Facilities
NORMA Oficial Mexicana NOM-003-ASEA-2016, Distribution of Natural Gas and Liquefied Petroleum through Pipelines	API 1104: Welding of Pipelines and Related Facilities API RP 5L1: Railroad Transportation of Line Pipe API RP 5LW: Transportation of Line Pipe on Barges and Marine Vessels API SPEC 5L: Line Pipe API SPEC 6D: Line Pipe Valves
NORMA Oficial Mexicana de Emergencia NOM-EM-004-ASEA-2017, Specifications and Requirements Regarding Industrial Safety, Operational Safety and Environmental Protection for the Design, Construction, Pre-start, Operation, Maintenance, Closure and Dismantling of Service Stations With a Specific Purpose for the Sale to the Public of Liquefied Petroleum Gas, by Means of Partial or Total Filling of Portable Pressure Vessels	API 510: Pressure Vessel Inspection Code API 520: Sizing, Selection, and Installation of Pressure-relieving Devices API 526: Flanged Steel Pressure Relief Valves API 570: Piping Inspection Code API RP 572: Inspection of Pressure Vessels API RP 574: Inspection Practices for Piping System Components API-579-1: Fitness-For-Service API 580: Risk-Based Inspection API 608: Metal Ball Valves-Flanged, Threaded and Welding End API 2510: Design and Construction of LPG Installations

NOMS ISSUED BY ASEA	
NOM	**References to API Standards**
NORMA Oficial Mexicana NOM-006-ASEA-2017, Specifications and Technical Criteria for Industrial Safety, Operational Safety and Environmental Protection for the Design, Construction, Pre-start, Operation, Maintenance, Closure and Dismantling of Onshore Oil and Petroleum Storage Facilities, Except for Liquefied Petroleum Gas	API 650: Welded Steel Tanks for Oil Storage API 1632: Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems API 2015: Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks API 2610: Design, Construction, Operation, Maintenance, and Inspection of Terminal & Tank Facilities
NORMA Oficial Mexicana NOM-013-ASEA-2021, Liquefied Natural Gas Storage and Regasification Facilities	API 620: Design and Construction of Large, Welded, Low-Pressure Storage Tanks
NOM-014-ASEA-2022, Specifications for Environmental Protection for the Construction and Maintenance of Wells for the Exploration and Extraction of Hydrocarbons in Agricultural, Livestock and Uncultivated Areas, Outside of Protected Natural Areas or Forest Lands	API RP 13B, Field Testing Water-based Drilling Fluids API RP 13D, Rheology and Hydraulics of Oil-well Drilling Fluids API RP 13A, Drilling Fluid Materials API SPEC 5CT, Casing and Tubing API 65, Isolating Potential Flow Zones During Well Construction
NORMA Oficial Mexicana NOM-015-ASEA-2023, Decompression of Compressed Natural Gas	API 607, Fire Test for Quarter-turn Valves and Valves Equipped with Nonmetallic Seats API 570, Inspection, Repair, Alteration, and Rerating of In-service Piping Systems API SPEC 6D, Pipeline and Piping Valves API SPEC 5L, Line Pipe

NOMS ISSUED BY CRE	
NOM	**References to API Standards**
NORMA Oficial Mexicana NOM-002-SECRE-2010, Facilities for the Utilization of Natural Gas	API SPEC 5L: Line Pipe API SPEC 6D : Pipeline and Piping Valves API RP 5L1: Railroad Transportation of Line Pipe API RP 521: Pressure-relieving and Depressuring Systems API RP 526: Flanged Steel Pressure-relief Valves API RP 2201: Safe Hot Tapping Practices in the Petroleum and Petrochemical Industries API 1104 : Welding Pipelines and Related Facilities
NORMA Oficial Mexicana NOM-015-SECRE-2013, Design, Construction, Security, Operation and Maintenance of Liquefied Petroleum Gas Storage Systems Through a Deposit Plant or Supply Plant That Are Directly Linked to, or Are Part of, the Liquefied Petroleum Gas Pipeline Transportation or Distribution Systems	API 2510A: Fire Protection Considerations for the Design and Operation of Liquefied Petroleum Gas (LPG) Storage Facilities API SPEC 6D: Pipeline Valves API RP 14E: Design and Installation of Offshore Production Platform Piping Systems API RP 14F: Design and Installation of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities API RP 14G: Fire Prevention and Control on Open Type Offshore Production Platforms API RP 14J: Design and Hazards Analysis for Offshore Production Facilities API RP 500: Classification of Areas for Electrical Locations at Petroleum Facilities API 510: Pressure Vessel Inspection Code API 620: Design and Construction of Large, Welded, Low-Pressure Storage Tanks API RP 1111: Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines

CNH and ASEA have also issued regulatory guidance that make 142 references to API standards, including:

GUIDELINES ISSUED BY CNH	
Guidance	**References to API Standards**
Technical Guidelines on Hydrocarbon Measurement	API Manual of Petroleum Measurement Standards
Guidelines for Well Drilling	API RP 13C, Recommended Practice on Drilling Fluid Processing Systems Evaluation API 14B, Design, Installation, Operation, Test, and Redress of Subsurface Safety Valve Systems API RP 17L2, Recommended Practice for Ancillary Equipment for Flexible Pipes and Subsea Umbilicals API RP 2GEO, Geotechnical and Foundation Design Considerations API BULL 97, Well Construction Interface Document Guidelines API RP 13B-1, Field Testing Water-based Drilling Fluids API RP RP 13B-2, Field Testing Oil-based Drilling Fluids API RP 13D, Rheology and Hydraulics of Oil-well Drilling Fluids API RP 14J, Design and Hazards Analysis for Offshore Production Facilities API RP 7G, Drill Stem Design and Operating Limits API RP 92U, Underbalanced Drilling Operations API SPEC 13A, Drilling Fluids Materials API SPEC 14A, Subsurface Safety Valve Equipment API RP 64, Diverter Systems Equipment and Operations API SPEC 16A, Drill-through Equipment API SPEC 16C, Choke and Kill Equipment API SPEC 16D, Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment API SPEC 17L1, Ancillary Equipment for Flexible Pipes and Subsea Umbilicals API SPEC 2B, Fabrication of Structural Steel Pipe API SPEC 7K, Drilling and Well Servicing Equipment API SPEC 4F, Drilling and Well Servicing Structures API SPEC 5CRA, Corrosion Resistant Alloys API SPEC 11D1, Packers and Bridge Plugs API 16AR, Repair and Remanufacture of Drill-through Equipment API 53, Well Control Equipment Systems for Drilling Wells API 65-2, Isolating Potential Flow Zones During Well Construction API TR 6AF, Technical Report on Capabilities of API Flanges Under Combinations of Load API BULL E3, Wellbore Plugging and Abandonment Practices

GUIDELINES ISSUED BY ASEA	
Guidance	**References to API Standards**
Guide for the Development of a Risk-Based Inspection Program (IBR) in Hydrocarbon Sector Facilities	API 510: Pressure Vessel Inspection Code API 570: Piping Inspection Code API 571: Damage Mechanisms Affecting Fixed Equipment in the Refining Industry API 574: Inspection Practices for Piping System Components API 579-1: Fitness-For-Service API 653: Tank Inspection, Repair, Alteration, and Reconstruction API 750: Management of Process Hazards API RP 580: Risk-Based Inspection API RP 581: Risk-Based Inspection Methodology API RP 584: Integrity Operating Windows API RP 1160: Managing System Integrity for Hazardous Liquid Pipelines
Guidelines on Industrial Safety, Operational Safety and Protection of the Environment for Reconnaissance, Surface Exploration, Exploration, and Extraction of Hydrocarbons	API RP 53: Blowout Prevention Equipment Systems for Drilling Wells API 65-2: Isolating Potential Flow Zones During Well Construction API RP 7G: Drill Stem Design and Operating Limits API RP 10D-2: Centralizer Placement and Stop-collar Testing API RP 13B-1: Field Testing Water-based Drilling Fluids API RP 13B-2: Field Testing Oil-based Drilling Fluids API RP 13D: Rheology and Hydraulics of Oil-well Drilling Fluids API RP 14B: Design, Installation, Repair and Operation of Subsurface Safety Valve Systems API RP 14C: Analysis, Design, Installation, and Testing of Safety Systems for Offshore Production Facilities API RP 14G: Fire Prevention and Control on Fixed Open-type Offshore Production Platforms API RP 14H: Installation, Maintenance and Repair of Surface Safety Valves and Underwater Safety Valves Offshore API RP 14J: Design and Hazards Analysis for Offshore Production Facilities API RP 16Q: Design, Selection, Operation and Maintenance of Marine Drilling Riser System API RP 65-1: Cementing Shallow-water Flow Zones in Deepwater Wells API RP 96: Deepwater Well Design and Construction API RP 1111: Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines API RP 2A-WSD: Planning, Designing, and Constructing Fixed Offshore Platforms-Working Stress Design API RP 2SIM: Structural Integrity Management of Fixed Offshore Structures API RP 2MOP: Marine Operations, Petroleum and natural gas industries-Specific requirements for offshore structures-Part 6: Marine Operations API RP 90: Annular Casing Pressure Management for Offshore Wells API SPEC 5CT: Casing and Tubing API SPEC 5DP: Drill Pipe API SPEC 6A: Wellhead and Christmas Tree Equipment API SPEC 6AV1: Specification for Validation of Wellhead Surface Safety Valves and Underwater Safety Valves for Offshore Service API SPEC 13A: Drilling Fluids Materials API SPEC 14A: Subsurface Safety Valve Equipment API SPEC 17D: Design and Operation of Subsea Production Systems-Subsea Wellhead and Tree Equipment

GUIDELINES ISSUED BY ASEA	
Guidance	**References to API Standards**
Guidelines for Industrial Safety, Operational Safety and Environmental Protection for the Simultaneous Sale of Oil and/or Natural Gas	API SPEC 6D: Pipeline and Piping Valves API 510: Pressure Vessel Inspection Code API 520: Sizing, Selection, and Installation of Pressure-relieving Devices API 526: Flanged Steel Pressure Relief Valves API 570: Piping Inspection Code API 579-1: Fitness-For-Service API RP 545: Lightning Protection of Aboveground Storage Tanks for Flammable or Combustible Liquids. API RP 551: Process Measurement Instrumentation API RP 572: Inspection Practices for Pressure Vessels API RP 574: Inspection Practices for Piping System Components API RP 575: Inspection Practices for Atmospheric and Low-Pressure Storage Tanks API RP 580: Risk-Based Inspection API RP 581: Risk-based Inspection Methodology API RP 615: Valve Selection Guide API 594: Check Valves: Flanged, Lug, Wafer, and Butt-welding API 600: Steel Gate Valves-Flanged and Butt-Welding Ends, Bolted Bonnets API 602: Gate, Globe, and Check Valves for Sizes DN 100 (NPS 4) and Smaller for the Petroleum and Natural Gas Industries API 603: Corrosion-Resistant, Bolted Bonnet Gate Valves-Flanged and Butt-Welding Ends API 607: Fire test for quarter-turn Valves and Valves Equipped with non-metallic seats API 608: Metal Ball Valves-Flanged, Threaded, and Welding Ends API 609: Butterfly Valves: Double-Flanged, Lug- and Wafer-Type API 610: Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries API 622: Type Testing of Process Valve Packing for Fugitive Emissions API 624: Type Testing of Rising Stem Valves Equipped with Flexible Graphite Packing for Fugitive Emissions API 641: Type Testing of Quarter-Turn Valves for Fugitive Emissions API 682: Pumps – Shaft Sealing Systems for Centrifugal and Rotary Pumps API 1004: Bottom Loading and Vapor Recovery for MC -306 and DOT -406 Tank Motor Vehicles API RP 1615: Installation of Underground Petroleum Storage Systems API RP 1621: Bulk Liquid Stock Control at Retail Outlets API RP 1632: Cathodic Protection of Underground Petroleum Storage Tanks and Piping Systems API RP 2003: Protection against Ignitions Arising Out of Static, Lightning, and Stray Currents API 2510: Design and Construction of LPG Installations API Publication 2510A: Fire Protection Considerations for the Design and Operation of Liquefied Petroleum Gas Storage facilities API RP 3000: Classifying and Loading of Crude Oil into Rail Tank Cars
Guidelines to Be Fulfilled, in the Design, Construction, Pre-start, Operation, Maintenance, Closure, Dismantling and Abandonment, for the Transfer Facilities and Operations Associated With the Activities of Transport and/or Distribution of Hydrocarbons and/or Petroleum, by Means Other Than Pipelines	API 1004: Bottom Loading and Vapor Recovery for MC -306 and DOT -406 Tank Motor Vehicles API 2003: Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents API 2510: Design and Construction of LPG Installations API RP 3000: Classifying and Loading of Crude Oil into Rail Tank Cars

GUIDELINES ISSUED BY ASEA	
Guidance	**References to API Standards**
Guidelines on Industrial Safety, Operational Safety and Environmental Protection for the Design, Construction, Pre-start, Operation, Maintenance, Closure, Dismantling and Abandonment of Natural Gas Liquefaction Facilities	API SPEC 6D: Pipeline and Piping Valves API SPEC 12F: Shop Welded Tanks for Storage of Production Liquids API SPEC 12K: Indirect-Type Oil Field Heaters API RP 2A WSD: Planning, Designing, and Constructing Fixed Offshore. Platforms—Working Stress Design API RP 2GEO: Geotechnical and Foundation Design Considerations API RP 2MET: Derivation of Metocean Design and Operating Conditions API RP 551: Process Measurement API 520: Sizing, Selection, and Installation of Pressure-relieving Devices API 521: Pressure-relieving and Depressuring Systems API 610: Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries API 617: Axial and Centrifugal Compressors and Expander-compressors API 618: Reciprocating Compressors for Petroleum, Chemical, and Gas Industry Services API 619: Rotary-Type Positive-Displacement Compressors for Petroleum, Petrochemical and Natural Gas Industries API 650: Welded Steel Tanks for Oil Storage API 661: Petroleum, Petrochemical, and Natural Gas Industries - Air-cooled Heat Exchangers API 670: Machinery Protection Systems API 674: Positive Displacement Pumps-Reciprocating API 676: Positive Displacement Pumps-Rotary
Guidelines on Industrial Safety, Operational Safety and Environmental Protection, for Land Transportation through Pipelines of Petroleum, Petroleum Products and Petrochemicals	API SPEC 5L: Line Pipe
Guidelines on Industrial Safety, Operational Safety and Environmental Protection to Carry Out the Exploration and Extraction of Hydrocarbons Activities in Non-conventional Reservoirs on Land	API RP 13B-1: Field Testing Water-based Drilling Fluids API RP 13B-2: Field Testing Oil-Based Drilling Fluids API RP 13C: Drilling Fluid Processing Systems Evaluation API RP 13D: Rheology and Hydraulics of Oil-well Drilling Fluids API RP 13I: Laboratory Testing of Drilling Fluids API RP 14B: Design, Installation, Operation, Test, and Redress of Subsurface Safety Valve Systems API SPEC 12A: Oil Storage Tanks with Riveted Shells API SPEC 12B: Bolted Tanks for Storage of Production API SPEC 12D: Field-welded Tanks for Storage of Production Liquids API SPEC 12F: Specification for Shop Welded Tanks for Storage of Production Liquids API 620: Design and Construction of Large, Welded, Low-Pressure Storage Tanks API 650: Welded Steel Tanks for Oil Storage API 653: Tank Inspection, Repair, Alteration, and Reconstruction API SPEC 14A: Specification for Subsurface Safety Valve Equipment API SPEC 5CT: Casing and Tubing API 53: BOP Equipment Systems for Drilling API 2000: Venting Atmospheric and Low-Pressure Storage Tanks: Nonrefrigerated and Refrigerated

TRINIDAD AND TOBAGO

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The main regulatory body at the national level in Trinidad and Tobago is the Ministry of Energy and Energy Industries (MEEI), which implements comprehensive measures to manage the oil and gas industry. The state-owned national oil company of Trinidad and Tobago, Trinidad Petroleum Holdings also contributes to policy and regulatory development through its subsidiaries, Heritage Petroleum Company Ltd, Guaracara Refining Company Ltd, and Paria Fuel Trading Company.

The National Gas Company of Trinidad and Tobago Limited (NGC), the state-owned company responsible for natural gas, storage, transportation and distribution, also supports policy development for natural gas. Environmental compliance for oil and gas operations is overseen by the Environmental Management Authority (EMA) as well as the Water and Sewage Authority, which has issued assessments of the environmental impacts of upstream activities.

The Trinidad and Tobago Bureau of Standards (TTBS) serves as the standards development body, operating under the Ministry of Trade and Industry. TTBS is responsible developing standards for all sectors except for the food, drugs, and cosmetics sectors. National standards are delineated as TT.

The Petroleum Act (1969) serves as the primary legislative instrument for oil and gas activities in Trinidad and Tobago, along with the Petroleum Regulations (1970). These measures require conformance to standards established by TTBS and other internationally recognized standards.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

MEEI has issued technical guidance that reference 4 API standards:

Guidance	API Standard Referenced
Guidance Document for Completing the Application Form for Storage Approval of Refined Petroleum Products at 'End-User' Facilities	API 650, Welded Tanks for Oil Storage
Technical Guidance Document – GD 03: Verification Scheme For Offshore Structures	API RP2A, Planning, Designing and Constructing Fixed Offshore Platforms
Guidelines For the Transportation Of Petroleum By Road Tank Wagons	API RP 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents API RP 2003, Protection Against Lightning, and Stray Currents

In addition, three of the environmental assessments issued by the Water and Sewage Authority reference API 653, Aboveground Storage Tank Inspector. These are:

- Environmental & Social Assessment and Environmental & Social Management Plan for the Freeport Wells, WTP & Pipelines Projects (Freeport Projects Cluster)
- Environmental and Social Assessment for Rehabilitation of the Chatham Water Treatment Plant and Drilling of Chatham #15 Well
- Environmental and Social Assessment for the Refurbishment/Upgrade of the Guanapo, Navet and North Oropouche Water Treatment Plants across Trinidad

Finally, Heritage Petroleum Company's Energy Transition Framework relies on API's Petroleum Industry Guidelines for Reporting GHG Emissions.

CENTRAL ASIA AND THE MIDDLE EAST

AZERBAIJAN

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Energy is the chief regulator for all natural gas and oil activities in Azerbaijan. It frequently shapes through the national oil company, the State Oil Company of Azerbaijan (SOCAR), which is active in upstream, midstream and downstream segments.

Azerbaijan has three major laws governing the sector: the Law on Use of Energy Resources (1996), the Law on Energy (1998), and the Law on Subsoil (1998). The Law on Subsoil provides that all hydrocarbon resources are owned by the government, and the Law on Energy requires private sector participants to negotiate production sharing agreements (PSAs) with the government, typically with SOCAR.

The Ministry of Energy does not generally issue detailed regulations; instead, the PSAs set out the terms and requirements for natural gas and oil operations. In fact, it is not unusual for PSAs to be voted on and approved of by the Azerbaijani Parliament.

The Azerbaijan Standardization Institute (AZSTAND), the national standards development organization, publishes and disseminates national standards. The process for developing standards is coordinated by the State Committee for Standardization, Metrology and Patents, an agency within the cabinet. AZSTAND lists 946 standards in its catalogue, a significant portion of which pertain to the natural gas and oil sectors. National standards are abbreviated with AZS.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

At least two publicly available PSAs signed by SOCAR and its partners reference API standards:

PSA	API Standard Referenced
Agreement on Shah Deniz Prospective Area	API Manual of Petroleum Measurement Standards
Agreement on Azeri and Chirag Fields and the Deep Water Portion of the Gunashli Field in the Azerbaijani Sector of the Caspian Sea	API Manual of Petroleum Measurement Standards

SOCAR's subsidiary for drilling and well services, SOCAR-AQS, obtained an API SPEC Q2 certificate on quality management for service supply organizations in January 2017.

Furthermore, the catalogue of national standards issued by AZSTAND includes 15 standards based on API standards.

AZ5 Standard	API Standard Referenced
AZS 777-2014, Fire test for quarter-turn valves and valves equipped with nonmetallic seats	APİ 607-2010, Fire Test for Quarter-turn Valves and Valves Equipped with Nonmetallic Seats
AZS 778-2014, Metal Ball Valves—Flanged, Threaded, and Welding Ends	APİ 608-2012, Metal Ball Valves—Flanged, Threaded, and Welding Ends
AZS 784-2014, Inspection of pressure-relieving devices	API 576:2009, Inspection of Pressure-Relieving devices
AZS 785-2014, Valve Inspection and Testing	APİ 598:2009, Valve Inspection and Testing
AZS 786-2014, Steel Gate Valves - Flanged and Butt-welding Ends, Bolted Bonnets	APİ 600:2009, Steel Gate Valves - Flanged and Butt-welding Ends, Bolted Bonnets
AZS 787-2014, Corrosion-resistant, Bolted Bonnet Gate Valves - Flanged and Butt-welding Ends	APİ 603:2013, Corrosion-resistant, Bolted Bonnet Gate Valves - Flanged and Butt-welding Ends
AZS 788-2014, Machinery Protection Systems	API 670:2000, Machinery Protection Systems
AZS 789-2014, Manual of Petroleum Measurement Standards: Metering	API MPMS Chapter 5.2
AZS 790-2014, Specification for Fire Test for Valves	API 6FA: 2011, Specification for Fire Test for Valves
AZS 791-2014, Specification for Fire Test for Valve with Automatic Backseats	API 6FC:2009, Specification for Fire Test for Valve with Automatic Backseats
AZS 800-2014, Design and Construction of Large, Welded, Low Pressure Storage Tanks	API STD 620:2013, Design and Construction of Large, Welded, Low-Pressure Storage Tanks
AZS 803-2014, General Purpose Steam Turbines for Petroleum	API STD 611:1997, General-purpose Steam Turbines for Petroleum, Chemical, and Gas Industry Services
AZS 818-2015, Management of Hazards Associated with Location of Process Plant Permanent Buildings	API RP 752:2009, Management of Hazards Associated with Location of Process Plant Permanent Buildings
AZS 819-2015, Butterfly Valves: Double Flanged, Lug and Wafer Types	API STD 609:1997, Butterfly Valves: Double-flanged, Lug- and Wafer-type, and Butt-welding Ends
AZS 826-2015, Special Purposed Gear Units for Petroleum, Chemical and Gas Industry Services	API 613:2005, Special-purpose Gears for Petroleum, Chemical, and Gas Industry Services
AZS 827-2015, General Purpose Gear Units for Petroleum, Chemical and Gas Industry Services	API 677:2005, General-purpose, Extruder, and Epicyclic Gear Units for Petroleum, Chemical, and Gas Industry Services

SPECIAL NOTE: GULF COOPERATION COUNCIL

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Gulf Cooperation Council (GCC) is a regional intergovernmental organization consisting of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates. While the oil and gas industry is regulated at the national level within the GCC, the GCC Standardization Organization (GSO) develops and issues some region-wide technical standards, including some for the oil and gas sector.

Most GCC members are formally represented at the GSO by their national-level standards setting organizations, though other relevant stakeholders (such as national oil companies) contribute to the development of standards for the oil and gas sector. Kuwait, as a special case, is represented by both its national standards body and the Kuwait Oil Company at the GSO.

For the oil and gas sector, GSO has issued over 1,000 standards and 12 technical regulations. While standards are voluntary GSO technical regulations are mandatory unless the national laws and regulations of the GCC member specify otherwise. The 12 mandatory technical regulations include:

- GSO 1785:2013, Lubricating Oils for Internal Combustion Engines API Classifications
- GSO 558:2003, Transportable Gas Cylinders – Dissolved Acetylene Cylinders – Basic Requirements
- GSO 1182:2002 ,Determination of Acid Number of Petroleum Products by Potentiometric Titration
- GSO 1075:2002, Determination of Acid and Base Number n Petroleum Products by Colour — Indicator Titration
- GSO 882:1997, Petroleum Products and Hydrocarbon Solvents – Determination of Aniline Point and Mixed Aniline Point
- GSO ISO 5661:1994, Petroleum Products -- Hydrocarbon Liquids -- Determination of Refractive Index
- GSO 472:1994, Personnel Requirements for Professions of Liquefied Gas Distribution, Gas Appliances Installation and Maintenance
- GSO 129:1990, Methods of Testing for Crude Petroleum and Petroleum Products – Determination of Ash From Petroleum Products
- GSO 127:1990, Methods of Testing for Crude Petroleum and Petroleum Products – Determination of Density, Relative Density and API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
- GSO 74:1987, Industrial Safety and Health Regulations - Petroleum Industry

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

In March 2019, API signed an MOU with the GCC Standardization Organization to pursue adoption of API standards and build capacity and knowledge and collaborate on standards development.

The catalogue of GCC standards does not specify the normative references to other international standards. As evidenced by their title code, some standards are modeled on ISO standards or ASTM standards, including:

- GSO ISO 11960:2014, Steel Pipes for Use as Casing or Pipes for Wells
- GSO ASTM D1250:2015, Guidelines for the Use of Petroleum Measurement Tables
- GSO ISO 23251:2008, Pressure Relief and Venting Systems
- GSO ISO 15589-1, 2016, Cathodic Protection of Pipeline Systems, Part 1: Above Ground Pipelines

As of September 2024, the GCC Standardization Organization's standards database lists a single API-based standard, GSO API RP 615:2015, Valve Selection Guide.

BAHRAIN

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The oil and gas sector in Bahrain is regulated by the National Oil & Gas Authority (NOGA). In addition to its regulatory duties, NOGA signs development and sharing agreements with oil and gas companies through its investment arm, Nogaholding. NOGA has agreements with both the state-owned Bahrain Petroleum Company and a number of joint ventures with foreign companies for both upstream and downstream projects. The Supreme Council for the Environment is the highest environmental policymaking body in Bahrain and may also play a role in regulating oil and gas projects in some cases.

Bahrain does not have an overarching framework for oil and gas regulation. Instead, NOGA's regulations, its production and sharing agreements (which are negotiated on a case-by-case basis), and other agreements it reaches with private sector partners govern how companies can participate in Bahrain's oil and gas sector. The agreements generally require parties to comply with international standards for quality as well as health, safety and the environment.

Bahrain also has a national standards development organization (the Bahrain Standards & Metrology Directorate or BSMD within the Ministry of Industry, Commerce, and Tourism) but it does not have an active role in standards development the oil and gas sector.

Bahrain is also a member of the Gulf Cooperation Council (GCC), together with Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates. The GCC has a regional standards development organization, the GCC Standardization Organization, which develops region-wide standards (see special note on Gulf Cooperation Council). Bahrain is formally represented at the GCC standardization Organization by BSMD.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

NOGA does not make public a comprehensive list of the standards required for its suppliers and contractors. In many cases, it requires compliance with API or other international standards through its agreements with contractors and vendors. In general, Bahrain and NOGA have widely adopted API standards and broadly accept and/or require adherence with them from its contractors and suppliers.

EGYPT

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

Egypt's Ministry of Petroleum and Natural Resources sets overall policies for natural gas and oil sector; however, the Egyptian government also shapes policy in the sector through its participation via five national state-owned companies:

- the Egyptian General Petroleum Corporation (EGPC), (established by Laws No. 135/1956, No. 167/1958, and No. 20/1976), which conducts crude oil exploration, storage, transport, and refining
- the Egyptian Natural Gas Holding Company (EGAS) (established by Prime Ministerial Decree No. 1009/2001), which issues natural gas exploration licenses and manages government stakes in gas projects
- the Egyptian Petrochemicals Holding Company, which manages government ownership interests and investments in petrochemicals
- the Ganoub El-Wadi Petroleum Holding Company (GANOPE) (established by Prime Ministerial Decree No. 1580/2003), which manages oil exploration and production areas below 28° latitude
- the Egyptian Mineral Resources Authority (EMRA), which can grant concessions for certain blocks of subsoil oil reserves.

Along with Law No. 66/1953 which established the predecessor to EGPC, and the accompanying Ministerial Decree No. 758/1972, which sets out further implementing regulations, the above laws and the entities provide a legal framework for natural gas and oil policy. For downstream gas operations, the Gas Regulatory Authority (GRA) –established by Gas Market Activities Law No. 196/201 and the accompanying Prime Ministerial Decree No. 239/2018 – oversees the transmission, supply, and distribution of natural gas.

The national standards body is the Egyptian Organization for Standardization and Quality (EOS), which has issued over 10,000 national standards covering all industrial sectors, including natural gas and oil. Ministerial Decrees No. 180/1996 and No. 291/2003 require use of Egyptian national standards where available. Where such standards do not apply, the decrees permit the use of international standards, including API, ISO, IEC, EN, ANSI, JIS, and ASTM standards.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

The Egyptian natural gas and oil companies use a mix of international standards and national standards, including Egyptian standards modeled on European or British standards. EOS has partnered with the EU and the standards associations of its member states, including Association Française de Normalisation (AFNOR, the French standards body), the British Standards Institute (BSI, the UK standards body), and the Spanish Association for Standardization and Certification (AENOR, the Spanish standards body) on the development of standards.

On natural gas and oil, EOS has issued at least two national standards that refer to API standards:

- EOS 1735, Determination of Cold Filter Plugging Point for Distillate Fuel (Gas Oil and Diesel Oil)
- EOS 80, Test Method for Density, Relative Density or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method (refers to API MPMS).

IRAQ

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Oil in Iraq is the federal government agency responsible for managing Iraq's oil and gas resources, as well as exploration and production activities. The Ministry manages hydrocarbon resources through the Iraqi National Oil Company. These national oil and gas companies sign contracts with the private sector for participation in Iraq's oil and gas market.

Iraq's Ministry of the Environment also has a role in regulating oil and gas activities from a climate and environmental policy perspective.

Iraq's Constitution currently sets the legal framework for oil and gas law. Although the Constitution requires the legislature to pass a national oil and gas law, it has not yet done so. Oil and gas upstream operations are governed by the service contracts between private sector participants and the relevant national oil company. For downstream operations, the Law of Private Investment in Crude Oil Refining governs private sector investment and management of refining and marketing.

Separately from Iraq's federal regulation of oil and gas, the Kurdistan Regional Government (KRG), an autonomous state within Iraq, has typically administered its own oil and gas resources under the KRG Oil and Gas Law of 2007. However, its authority is a source of ongoing political and legal dispute with the federal Iraqi government. In February 2022, the Iraqi Federal Supreme Court declared the KRG Oil and Gas Law unconstitutional and ruled against KRG's legal authority to manage oil resources.

Within the federal Ministry of Planning, the Central Organization of Standardization and Quality Control (COSQC) is the national standards development and management body.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

While Iraq does not publish a list of applicable standards for the oil and gas sector, the Ministry of Oil has issued the National Code for Hydrocarbon Measurements (2007), which sets the measurement systems that are applicable to fiscal/ custody transfer measurements in contracts with the Ministry of Oil.

The National Code states that fiscal/custody transfer measurements "shall be in accordance with applicable published standards such as API and ISO." It makes specific reference to one API standard and five chapters of the Manual for the Measurement of Petroleum Standards:

- API 2540, Standard Petroleum Measurement Tables
- Chapter 1, Vocabulary
- Chapter 2, Tank Calibration
- Chapter 3, Tank Gauging
- Chapter 14, Natural Gas Fluids Measurement
- Chapter 21, Flow Measurement

ISRAEL

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Energy in Israel establishes the overarching policy framework for the oil and gas industry. The Natural Resources Administration, operating under the Ministry, manages the administration of oil and gas policies, including the issuance of exploration and production licenses.

Major pieces of legislation include:

•Petroleum Law (1952): Governs the exploration and production of oil and gas, setting out the licensing and permitting process.

• Natural Gas Sector Law (2002): Establishes the framework for the natural gas market, including the regulation of gas transportation and distribution.

• Energy Resources Law (1989): Governs the management and conservation of energy resources, emphasizing efficient use and environmental protection.

The regulation of downstream gas activities falls under the jurisdiction of the Natural Gas Authority, which supervises Israel's gas market operations. The Israel Natural Gas Lines Ltd. (INGL), a government-owned corporation, operates the national natural gas transmission system.

Standards in Israel are developed by the Standards Institution of Israel (SII), a state-owned corporation with statutory authority to prepare and publish specifications for all products and services in Israel, including for oil and gas.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Directive 083: Hydraulic Fracturing – Subsurface Integrity issued by the former Ministry of National Infrastructures, Energy and Water (now the Ministry of Energy) references API RP 505, Classification of Locations for Electrical Installations at Petroleum Facilities.

Israel Natural Gas Lines has issued a guidance document on "General Technical Information," ENG-CSE-SPC-0013, which references three API standards:

• API SPEC 5L, Line Pipe.

• API RP 5L1, Recommended Practice for Railroad Transportation of Line Pipe

• API SPEC 6D, Pipeline Valves

KUWAIT

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The oil and gas industry in Kuwait is regulated at the highest level by the Supreme Petroleum Council, as well as by the Ministry of Oil. The Ministry of Oil also governs the Kuwait Petroleum Corporation (KPC), the state-owned oil company. The Environment Public Authority is the environmental regulator and plays a role in assessing oil and gas projects.

Kuwait prohibits private sector investment in upstream oil and gas activities. Partnership with the state-owned KPC is required for both the upstream sector as well as major downstream activities as well. KPC's subsidiaries include the Kuwait Oil Company (KOC) for the upstream sector, the Kuwait National Petroleum Company (KNPC) for the downstream sector, and the Petrochemical Industries Company (PIC) for the petrochemical sector.

Requiring conformance with international standards or standards generally is required by laws and regulations. The chief regulatory measure governing oil and gas activities, the Regulations for the Conservation of Petroleum Resources, implementing Law No. 19 of the Year 1973 Concerning the Conservation of Petroleum Resources, require that:

- "Petroleum operations must be carried out in the best manner using efficient and reasonable methods and good techniques as would be expected from a person fully experienced in such operations under similar circumstances and conditions" (Article 3)
- "All machinery equipment, and materials used in petroleum operations must conform to recognized internationally acceptable specifications, meet safety requirements, and serve their purpose in accordance with the best techniques and practices." (Article 4)

In addition, KPC can also mandate the use of standards through their contracts and agreements with private sector participants.

Kuwait's national standards development organization, Standards and Industrial Services Affairs (KOWSMD) within the Public Authority for Industry (PAI) issues, develops, and approves standards in all industrial sectors, but is less relevant to standards for the oil and gas sector.

Kuwait is also a member of the Gulf Cooperation Council (GCC), which also includes Oman, Bahrain, Kuwait, United Arab Emirates, and Qatar. The GCC has a regional standards development organization, the GCC Standardization Organization, which develops region-wide standards. Kuwait is represented at the GCC Standardization Organization by KOWSMD and by KOC for the oil and gas sector.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Neither KPC nor the Ministry of Oil makes public a comprehensive list of standards for the oil and gas sector. KPC mandates use of certain standards for their suppliers and contractors. In general, KPC has widely adopted API standards and broadly accepts and/or requires adherence with them from its contractors and suppliers. KPC uses primarily API standards in their request for proposals.

Within KPC, the upstream subsidiary KOC has an internal Standards Team responsible for developing and issuing in-house standards related to the oil and gas sector. KOC has developed over 170 standards and continually reviews and updates them.

KOC-issued standards may be based on API standards or their equivalent ISO or other standards and will also reference specific international standards. While KOC does not publish its standards nor a list of international standards referenced by its standards, five KOC-issued standards were identified that reference 6 API standards. These include:

- KOC-MV-008, Air-Cooled Heat Exchangers is adopted from API 661, Air-Cooled Heat Exchangers for General Refinery Service
- KOC-MP-010, Ball Valves, references API 6D, Specification for Pipeline Valves
- KOC-MS-002, Material Specification for Induction Bends, references API Q1, Specification for Quality Programs for the Petroleum, Petrochemical and Natural Gas Industries, and API 5L, Specification for Line Pipe, Steel Pipe for Pipeline Transportation Systems.
- KOC-L-009, Fire Protection Systems and Safety Equipment, references API RP 581, Risk Based Inspection Technology
- KOC-C-007, Structural Steel Work – Materials, Fabrication, and Erection, references API 5L, Specification for Line Pipe

QATAR

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Energy Affairs is the primary regulator for oil and gas for production, operations and distribution. The state-owned Qatar Petroleum (QP) is the dominant company in both upstream and downstream operations, and the Chairman of QP concurrently serves as the Minister of Energy. By law, QP has exclusive concession rights for upstream activities. The Ministry of Environment is the environmental regulator for Qatar and plays a role in assessing oil and gas projects.

Conformance with international oil and gas standards is required by law in Qatar. Article 3 of the Decree Law No. 4 of 1977 on Preserving Petroleum Resources states:

Taking into consideration the measures required for safety precautions and production regulation, oil operations and related projects shall be conducted according to the prevailing technical traditions, rules and standards in the oil industry which guarantee the best practices for the optimal exploitation, investment, preservation, development and production of the State's oil resources, as well as the prevention of their loss, damage or waste.

In addition, QP mandates the use of standards through their contracts and agreements with private sector suppliers. QP also issues standards and technical requirements, some of which are based on or reference international standards. It has also mandated compliance with standards as part of the Health, Safety and Environment (HSE) Regulations for Contractors (QP-REG-S-001). Qatar's national standards development organization, the Qatar General Organization for Standardization (QS), plays less of a role in the oil and gas sector.

Qatar is also a member of the Gulf Cooperation Council (GCC), together with Bahrain, Kuwait, Oman, Saudi Arabia, and United Arab Emirates. The GCC has a regional standards development organization, the GCC Standardization Organization, which develops region-wide standards (see special note on Gulf Cooperation Council). Qatar is formally represented at the GCC standardization Organization by QS.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Neither QP nor the Ministry of Energy makes public a comprehensive list of standards for the oil and gas sector. In general, QP has widely adopted API standards and broadly accepts and/or requires adherence with them from its contractors and suppliers.

Qatar's HSE Regulations for Contractors directly refer to 8 API standards for drilling equipment by name:

- API Spec. 4A, Derricks and Masts
- API Spec. 5A, Casing, Tubing, and Drill Pipe
- API Spec. 5B, Threading, Gauging and Thread Inspection
- API Spec. 6A, Wellhead Equipment
- API Spec. 7, Rotary Drilling Equipment
- API Std. 8A, Drilling Hoisting Equipment
- API Spec. 9B, Wire Rope
- API RP 520, Pressure Relief Systems

In a few other areas, the HSE Regulations for Contractors prescribe meeting API standards without referring to specific standards by name. These include API standards and requirements for:

- Recommended soil parameters for use in reclamation and restoration
- Limits for land on onshore facilities to be considered as contaminated
- Metal guidance on maximum soil concentrations
- Classification of hazardous zones

OMAN

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Energy and Minerals (MEM) is the primary regulator for oil and gas activities in Oman for all upstream and downstream activities. As oil and gas reserves are owned by the state, MOG is the government counterparty to exploration and production sharing agreements with the private sector for upstream activities. It also grants licenses for downstream activities. As the chief environmental regulator, the Environmental Authority also plays a role in assessing the environmental impacts of oil and gas projects.

The main legislation governing oil and gas in Oman is Sultani Decree 8/2011, the Oil and Gas Law. Article 40 requires that parties to oil and gas agreements use "materials and equipment that are in conformity with international standards and specifications" and they should "meet the requirements of safety and environment according to the best methods in this regard."

Petroleum Development Oman (PDO), MEM's joint venture with Royal Dutch Shell, Total, and Partex, is the largest upstream participant in Oman and requires its suppliers and contractors to comply with technical standards. For downstream activities, the state-owned Oman Oil Refineries and Petroleum Industries Company (ORPIC) is the primary operator. As MOG has not issued regulations mandating or recommending use of specific technical standards for the oil and gas industry, PDO, ORPIC and other industry participants play a major role in determining which standards are used.

Oman's national standards development organization is the Directorate General for Specifications and Measurements (DGSM) within the Ministry of Commerce and Industry. DGSM is not active in issuing standards for the oil and gas sector.

Oman is also a member of the Gulf Cooperation Council (GCC), together with Bahrain, Kuwait, Qatar, Saudi Arabia, and UAE. The GCC has a regional standards development organization, the GCC Standardization Organization, which develops region-wide standards (see special note on Gulf Cooperation Council). Oman is formally represented at the GCC standardization Organization by DGSM.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Unlike the rest of the GCC, there is a general preference in Oman for use of British standards (EN), though API standards have increasingly gained widespread acceptance.

PDO has issued a Guide to Engineering Standards and Procedures which references 13 API standards for mechanical rotating equipment, materials selection and corrosion engineering, and pipeline and flowline engineering. These are:

Guide	API Standard Referenced
Mechanical rotating equipment	API 673, Centrifugal Fans for Petroleum, Chemical, and Gas Industry Services API 674, Positive Displacement Pumps – Reciprocating API 675, Positive Displacement Pumps – Controlled Volume API 676, Positive Displacement Pumps – Rotary API 616, Gas Turbines for Petroleum, Chemical, and Gas Industry Services API 617, Axial and Centrifugal Compressors and Expander-Compressors API 619, Rotary-Type Positive-Displacement Compressors
Materials Selection and Corrosion Engineering	API SPEC 6A, Nickel Base Alloy 718 API RP 5L7, Recommended Practice for Unprimed Internal Fusion Bonded Epoxy Coating of Line Pipe API SPEC 5LD, CRA Clad or Lined Steel Pipe API 1104, Welding Pipelines and Related Facilities API RP 582, Welding Guidelines for the Chemical, Oil, and Gas Industries
Pipeline and Flowline Engineering	API-5LC, CRA Line Pipe

SAUDI ARABIA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

Since foreign investment in upstream oil and gas activity is prohibited in Saudi Arabia, participation in Saudi Arabia's oil and gas sector generally occurs through the state-owned Saudi Arabian Oil Company (Saudi Aramco). In downstream sectors, foreign companies still frequently partner with Saudi Aramco through joint ventures or other arrangements. Because of this, the Supreme Council of Saudi Aramco, chaired by Crown Prince Mohammed bin Salman, is the highest-level decision making body for the oil and gas sector in Saudi Arabia. Saudi Aramco sets standards for the industry by requiring compliance from its suppliers and contractors.

In July 2018, Saudi Arabia formed the Higher Committee for Hydrocarbons, also led by bin Salman, which is nominally responsible for overseeing all oil and gas sector activities. The committee includes the ministers of energy, trade, finance, and economy. The General Authority for Meteorology and Environmental Protection oversees environmental regulation and plays a role in policymaking for the oil and gas sector.

Though it has been separated from governance of Saudi Aramco since 2015, Saudi Arabia's Ministry of Energy, Industry and Mineral Resources has some legal authority for policymaking in the oil and gas sector, particularly for downstream activities.

Saudi Aramco issues its own standards, which include Saudi Aramco Engineering Standards (SAES), Saudi Aramco Materials System Specifications (SAMSS), and Saudi Aramco Standard Drawings (SASDs). Saudi Aramco in many cases also mandates compliance with API and other international standards directly.

Saudi Arabia's national standards development organization, the Saudi Standards, Metrology, and Quality Organization (SASO), has not historically been involved in standards setting for the oil and gas sector. However, SASO signed a technical collaboration agreement with Saudi Aramco in January 2017 to share information and collaborate in developing and managing engineering standards.

Saudi Arabia is also a member of the Gulf Cooperation Council (GCC), together with Bahrain, Kuwait, Oman, Qatar, and United Arab Emirates. The GCC has a regional standards development organization, the GCC Standardization Organization, which develops region-wide standards (see special note on Gulf Cooperation Council). Saudi Arabia is represented at the GCC Standardization Organization by SASO.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Saudi Aramco does not make public a comprehensive list of the standards required for its suppliers and contractors. However, Saudi Aramco has widely adopted API standards and broadly accepts and/or requires adherence with them from its contractors and suppliers.

The safety manual intended for suppliers, entitled "Saudi Aramco Suppliers Safety Management System," requires compliance with "all applicable regulatory requirements and standards," but does not list any standards by name.

Saudi Aramco has also published a handbook entitled, Engineering Requirements for Technical and Quality Approval, to provide guidelines to manufacturers of engineering equipment used by Saudi Aramco. The handbook cites to 11 API standards directly:

- API Spec Q1, Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry
- API Spec 5LD, CRA Clad or Lined Steel Pipe
- API Recommended Practice 15S, Qualification of Spoolable Reinforced Plastic Line Pipe
- API Spec 17J, Unbonded Flexible Pipe
- API Recommended Practice 17B, Recommended Practice for Flexible Pipe
- API 660, Shell-and-Tube Heat Exchangers
- API 661, Petroleum, Petrochemical, and Natural Gas Industries Air-Cooled Heat Exchangers
- API 560, Fired Heaters for General Refinery Service
- API 530, Calculation of Heater-tube Thickness in Petroleum
- API SPEC 2C, Offshore Pedestal-mounted Cranes
- API SPEC 9A, Wire Rope

TURKEY

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Energy and Natural Resources (MENR) prepares energy policies and plans, under which the General Directorate of Petroleum Affairs (PIGM) is responsible for regulation of upstream oil and gas operations. For downstream oil and gas activities, the Energy Market Regulatory Authority (EMRA) oversees electricity, natural gas, and oil markets.

State-owned oil and gas companies also provide a key means of transmission for government policies in Turkey as well, including for technical standards. The Turkish Petroleum Corporation has businesses for hydrocarbon exploration, drilling, refining, marketing, and fuel production. The BOTAŞ Petroleum Pipeline Corporation owns and operates oil and gas pipelines.

Petroleum Law No. 6326 of 1954 (Petrol Kanunu) (the Law) and the Regulation on the Implementation of the Turkish Petroleum Law (Turk Petrol Kanunu Uygulama Yonetmeligi) provide the legal basis and general regulatory framework for the petroleum exploration and production. Other key pieces of legislation include:

- Natural Gas Market Law No. 4646 (NGML) covers trade, storage, and distribution of natural gas
- Liquefied Petroleum Gas (LPG) Market Law No 5307 covers trade, storage, and distribution of LPG
- The Law on Transit Passage of Petroleum through Pipelines No 4586 (Petrolün Boru Hatları ile Transit Geçisine Dair Kanun) governs pipeline transportation of oil and gas

Turkey's national standards body is the Turkish Standards Institution (TSE), a private, non-profit entity. In collaboration with the Turkish Petroleum Industry Association (PETFORM), TSE develops and issues standards for the oil and gas sector. These standards are generally voluntary unless explicitly mandated by Turkish regulations.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

The Technical Safety and Environmental Regulations on the Construction and Operation of Crude Oil and Natural Gas Pipeline Facilities issued by BOTAŞ references two API standards:

- API RP 1102, Steel Pipeline Crossing Railroads and Highways
- API 505, Classification of Locations for Electrical Installations at Petroleum Facilities

The 2022 Service Catalogue for the Turkish Petroleum Corporation's Research and Development Center, which describes the services it performs for the oil and gas sector, references API standards generally throughout and six API standards specifically:

- API SPEC 10A, Cements and Materials for Well Cementing
- API RP 10B, Recommended Practice for Testing Well Cements
- API 19C, Measurement of Proppants Used in Hydraulic Fracturing and Gravel-packing Operations
- API RP 38, Recommended Practice for Biological Analysis of Subsurface Injection Waters
- API RP45, Analysis of Oilfield Waters
- API RP42, Laboratory Evaluation of Surface Active Agents for Well Stimulation

Finally, Turkish Standard TS 10736, Recommended practice for railroad transportation of line pipe, references API 5L1, Recommended Practice for Railroad Transportation of Line Pipe.

UNITED ARAB EMIRATES (UAE)

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

Oil and gas regulation in the United Arab Emirates (UAE) is conducted primarily by each of the seven individual Emirates. The federal Ministry of Energy and Industry issues some regulations (particularly related to trade in oil and gas) but does not control exploration and production rights. Most regulatory activity for the sector takes place in the Emirate of Abu Dhabi, which controls over 94% of total UAE oil and gas reserves.

The federal Ministry of Climate Change and the Environment and the environmental regulators within each Emirate also play a role in environmental assessments of oil and gas projects.

In Abu Dhabi, the Abu Dhabi Supreme Petroleum Council (SPC) is the highest supervisory body for oil and gas companies operating. Its policies are generally carried out by the Abu Dhabi National Oil Company (ADNOC), whose board of directors is made up of SPC members. Because the private sector must generally partner with ADNOC in order to participate in Abu Dhabi's oil and gas sector, ADNOC serves as the de facto regulator, requiring conformance with technical standards for its suppliers and contractors.

Abu Dhabi's principal legislation governing oil and gas reserves, Law No. 8 of 1978 regarding the Conservation of Petroleum Resources, requires that industry use the "most efficient techniques" and the use of machinery and materials conforming to international standards on safety and efficiency.

The national standards development organization, the Emirates Authority for Standardization and Metrology (ESMA), does not play an active role in standards development for oil and gas.

UAE is also a member of the Gulf Cooperation Council (GCC), together with Bahrain, Kuwait, Oman, Qatar, and Saudi Arabia. The GCC has a regional standards development organization, the GCC Standardization Organization, which develops region-wide standards (see special note on Gulf Cooperation Council). UAE is formally represented at the GCC standardization Organization by ESMA.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

ADNOC has not made public a comprehensive list of standards for the oil and gas sector. It requires that its contractor and suppliers comply with mandatory "Codes of Practice" to manage health, safety and environment concerns, and publishes "Codes of Practice Guidelines," and "Codes of Practice Best Practice Notes," which are recommended but not mandatory.

In these Guidelines, ADNOC has widely adopted API standards and broadly accepts and/or requires adherence with them from its contractors and suppliers.

INDO-PACIFIC

AUSTRALIA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

Regulation of the natural gas and oil sector in Australia occurs at Federal, State/Territory and local council levels.

Federal laws affect petroleum activities in all States, including those relating environmental protection and offshore operations. The key federal legislation for upstream activities is the Offshore Petroleum and Greenhouse Gas Storage Act (2006), which provides a framework for all offshore petroleum exploration.

States and territories have jurisdiction to govern onshore exploration and production and do so through a variety of state legislative acts. Western Australia (WA), which makes the largest contribution to the country's hydrocarbon production, is regulated by the WA Department of Mines, Industry Regulation and Safety (DMIRS).

The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) is Australia's independent expert regulator for health and safety, structural well integrity and environmental management for all offshore operations and greenhouse gas storage activities. Exploration activities must be approved by a joint authority that includes the Federal Ministry for Resources along with relevant state/territory ministers, as well as NOPSEMA.

In addition to assessing and approving exploration activities, NOPSEMA provides continual oversight of environmental and safety impacts and issues performance data, policy and guidance material, and reports.

The Australian standards organization is Standards Australia (SAI), an independent, non-profit recognized through a memorandum of understanding with the Australian government as the country's national standards body. SAI has issued over 6,000 standards, including for the natural gas and oil sector. Through the Accreditation Board for Standards Development Organizations (ABSDO), other standards development organizations can be accredited to develop Australian standards.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Standards Australia has stated its support for the development and adoption of international standards, and the standards developed by the organizations are in some cases adoptions of international standards. However, the organization's Standards Catalogue does not publicly state whether individual standards reference API.

NOPSEMA, for its part, issues policy and guidance material for the hydrocarbon sector relating to safety, well integrity, and environment. Among this guidance are four references to API standards.

Guidance	API Standard Referenced
Guidance note: Control Measures and Performance Standards	API 520: Sizing, Selection, and Installation of Pressure relieving Devices API 607: Fire Test for Quarter-turn Valves and ValvesEquipped with Nonmetallic Seats
Guidance note: Well operations management plan	API Bulletin 97, Well Construction Interface Document Guidelines
Guidance note: Hazard identification and risk assessment	API Bulletin 97, Well Construction Interface Document Guidelines

CHINA

STANDARDS FRAMEWORK AND REGULATORY OVERVIEW

Three government agencies in China have principal oversight over the development of standards affecting the oil and gas sector:

- Standardization Administration of China (SAC) under the State Administration for Market Regulation (SAMR): SAC in China is the principal agency responsible for developing all technical standards for products and services. The China National Institute of Standardization (CNIS) acts as the research institute or "think tank" for SAC.
- National Energy Administration (NEA), National Development and Reform Commission (NDRC): NEA is responsible for developing certain standards specific to the oil and gas sector.
- Ministry of Industry and Information Technology (MIIT): MIIT is responsible for developing certain communications- and technology-related standards. The China Electronics Standardization Institute (CESI) under MIIT is a research institute that assists in developing standards.

All three agencies develop and/or issue standards with which oil and gas companies operating in China, both upstream and downstream, must comply. Additionally, several other Chinese agencies play a role in regulating the oil and gas sector and may rely on relevant standards issued by SAC, NEA, or MIIT:

- State Council: As the chief executive authority of the Chinese government, the State council plays a direct role in approving major oil and gas pipeline projects.
- Ministry of Natural Resources (MNR): MNR grants exploration and/ or exploitation licenses for oil and gas resources on behalf of the state.
- Ministry of Ecology and the Environment (MEE): MEE regulates environmental impacts of oil and gas exploration, production, refining, and processing.
- Ministry of Emergency Management (MEM): MEM regulates worker safety policies for the oil and gas sector, among others.

China recently began a process of streamlining its standards development to better incorporate global standards, reduce complexity, increase accountability, and enhance transparency. Its current standards framework is set by the Revised Chinese Standardization Law ("Revised Law"), which entered into force on January 1, 2018. Under the Revised Law, there are currently four notable categories of standards:

- Mandatory national standards, developed by national standards-setting agencies, with which all products and services must comply.
- Voluntary national standards, developed by national standards-setting agencies, which are recommended but not required.
- Voluntary association standards, which are developed by industry associations and other standards-setting social organizations (the China Association for Standardization (CAS) is one such public association affiliated with the State Administration of Market Regulation or SAMR); and
- Voluntary enterprise standards, which are developed by companies for their own use.

Foreign companies are required to partner with Chinese state-owned oil and gas companies to participate in relevant projects. State-owned companies include the China National Petroleum Corporation (CNPC), the China Petrochemical Corporation (SINOPEC), and the China National Offshore Oil Corporation (CNOOC).

Chinese oil and gas regulations typically do not refer to specific national Chinese standards or other international standards. Instead, environmental, worker safety, and energy laws and regulations require general compliance with all applicable standards. For example:

• Article 17, Detailed Rules for the Administration of Offshore Oil Safety (2015): During the operation of offshore oil production, operators and contractors shall ensure that the safety conditions of the offshore oil production and operating facilities (hereinafter referred to as "facilities") comply with the provisions of laws, administrative regulations, and rules and requirements of relevant national and industrial standards.

• Article 34, Revised Environmental Protection Law (2014): The discharge of pollutants and the dumping of wastes into the seas, and the construction of coastal projects and marine projects shall be conducted in compliance with provisions of laws and regulations and relevant standards to guard against and reduce the pollution and damage of the marine environment.

• Article 16, Revised Work Safety Law (2014): Production and business units shall have the conditions for work safety as specified by the provisions in this Law and relevant laws, administrative regulations and national standards or industrial specifications.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

All national Chinese standards (whether mandatory or voluntary) are issued and developed by SAC or the relevant Chinese agency. Many are coded as guobiao, or GB standards, with national recommended standards being coded as GB/T standards. Other relevant standards may be coded as SY (petroleum gas), SH (petrochemicals), HG (chemicals), and TSG (special equipment).

In the oil and gas sector many standards are voluntary, though Chinese state-owned oil companies may require suppliers and partners to comply with them. These standards are most adopted from or equivalent to ISO standards and are broadly used for both upstream and downstream activities, including drilling equipment, control systems, and pipelines, as well as for various measurements and methods. Examples include:

• GB/T 21412.6-2018, Design and Operation of Subsea Production Systems—Part 6: Subsea Production Control Systems (ISO 13628-6:2006)

• GB/T 16783.1-2014, Field Testing of Drilling Fluids—Part 1: Water-based Fluids (ISO 10414-1:2008)

• GB/T 498-2014, Classification Methods and Categories of Petroleum Products and Lubricants (ISO 8681:1986.)

• GB/T 30217.2-2016, Drilling and Production equipment—Part 2: Deepwater Drilling Riser Analysis Methodologies, Operations and Integrity (ISO/TR 13624-2:2009)

• GB/T 9711-2017, Steel Pipe for Oil and Gas Industry Pipeline Transportation System (ISO 3183:2012)

In other cases, national standards are adopted from or equivalent to ASTM, API, and GOST (Russia) standards. According to SAC's catalogue of national standards, 41 GB and GB/T standards model API standards, and are used particularly for submersible electrical pumps and related equipment, as well as for some drilling activities:

National Chinese Standard	API Standard Referenced
GB/T 17389-2013, Recommended Practice for the Application of Submersible Electric Pump Cable System	API RP 11S5, Recommended Practice for the Application of Electrical Submersible Cable Systems
GB/T 19190-2013, Petroleum and Natural Gas Industries—Drilling and Production Hoisting Equipment	API SPEC 8C, Drilling and Production Hoisting Equipment (PSL 1 and PSL 2)
GB/T 29172-2012, Practices for Core Analysis	API RP 40, Recommended Practices for Core Analysis
GB/T 17390-2010, Recommended Practice for Submersible Electrical Pump Teardown Report	API RP 11S1, Recommended Practice for Electrical Submersible Pump Teardown
GB/T 17388-2010, Installation of Submersible Electric Pumps	API RP 11S3, Recommended Practice for Electrical Submersible Pump Installations
GB/T 25430-2010, Specification for Drill Through Equipment - Rotating Control Devices	API SPEC 16RCD, Drill Through Equipment-Rotating Control Devices
GB/T 24956-2010, Recommended Practice for Petroleum and Natural Gas Industries — Drill Stem Design and Operating Limits	API RP 7G, Recommended Practice for Drill Stem Design and Operating Limits
GB/T 17386-2009, Sizing and Selection of Electric Submersible Pump Installations	API RP 11S4, Recommended Practice for Sizing and Selection of Electric Submersible Pump Installations
GB/T 19779-2005, Static Measurement of Oil Quantity of Petroleum and Liquid Petroleum Products	API Manual of Petroleum Measurement Standards Chapter 12—Calculation of Petroleum Quantities
GB/T 18050-2000, Test Method for Submersible Electric Pump Cables	API RP 11S6, Recommended Practice for Testing of Electric Submersible Pump Cable Systems
GB/T 18051-2000, Test Method for Vibration of Submersible Electric Pumps	API RP 11S8, Recommended Practice on Electric Submersible System Vibrations
GB 6950-2001, Safe Rest Conductivity of Light Fuel Oil	API RP 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents
GB/T 13894-1992, Petroleum and Liquid Petroleum Products—Measurement of Liquid Level in Tank—Manual Method	API STD 2545, Method of Gaging Petroleum and Petroleum Products
GB/T 17386-2009, Sizing and Selection of Electric Submersible Pump Installations	API RP 11S4, Recommended Practice for Sizing and Selection of Electric Submersible Pump Installations
GB/T 17387-1998, Recommended Practice for The Operation, Maintenance and Troubleshooting of Electric Submersible Pump Installations	API RP 11S, Recommended Practice for the Operation, Maintenance and Troubleshooting of Electric Submersible Pump Installations
GB/T 17388-2010, Electric Submersible Pump Installations	API RP 11S3, Recommended Practice for Electrical Submersible Pump Installations
GB/T 17389-2013, Recommended Practice for The Application of Electrical Submersible Cable System	API RP 11S5, Recommended Practice for the Application of Electrical Submersible Cable Systems
GB/T 17390-2010, Recommended Practice for Electrical Submersible Pump Teardown Report	API RP 11S1, Recommended Practice for Electrical Submersible Pump Teardown Report
GB/T 17605-1998, Petroleum and Liquid Petroleum Products—Volumetric Calibration of Horizontal Cylindrical Metal Tanks (Manual Methods)	API STD 2551, Measurement and Calibration of Horizontal Tanks
GB/T 18050-2000, Tests of Electric Submersible Pump Cable Systems	API RP 11S6, Recommended Practice for Testing of Electric Submersible Pump Cable Systems
GB/T 18051-2000, Tests of Electric Submersible Pump System Vibration	API RP 11S8, Recommended Practice on Electric Submersible System Vibrations
GB/T 18052-2000, Gauging and Inspection of Casing, Tubing and Line Pipe Threads	API RP 5B1, Gauging and Inspection of Casing, Tubing, and Line Pipe Threads
GB/T 19190-2013, Petroleum and Natural Gas Industries—Drilling and Production Hoisting Equipment	API Spec 8C, Drilling and Production Hoisting Equipment (PSL 1 and PSL 2)
GB/T 19779-2005, Petroleum and Liquid Petroleum Products—Calculation of Oil Quantities—Static Measurement	API Manual of Petroleum Measurement Standards Chapter 12—Calculation of Petroleum Quantities
GB/T 20488-2006, Test Method of Perforator Materials for Oil and Gas Well	API RP 19B, Recommended Practices for Evaluation of Well Perforators

National Chinese Standard	API Standard Referenced
GB/T 21357-2008, Specification for Similarity Jet Fuel Filter/ Separators	API/IP SPEC 1582, Specification for Similarity for API/IP 1581 Aviation Jet Fuel Filter/ Separators
GB/T 21358-2008, Specifications for Aviation Jet Fuel Filter/ Separators	API/IP SPEC 1581, Specifications and Qualification Procedures for Aviation Jet Fuel Filter/ Separators
GB/T 24920-2010, Steel Pressure Relief Valves for Petrochemical Industries	API STD 526, Flanged Steel Pressure Relief Valves
GB/T 24921.1-2010, Sizing, Selection and Installation of Pressure Relieving Valves for Petrochemical Industries—Part 1: Sizing and Selection	API RP 520 P1, Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries; Part I—Sizing and Selection
GB/T 24921.2-2010, Sizing, Selection and Installation of Pressure Relieving Valves for Petrochemical Industries—Part 2: Installation	API RP 520 P2, Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries; Part II—Installation
GB/T 24956-2010, Recommended Practice for Petroleum and Natural Gas Industries—Drill Stem Design and Operating Limits	API RP 7G, Recommended Practice for Drill Stem Design and Operating Limits
GB/T 25430-2010, Specification for Drill Through Equipment - Rotating Control Devices	API SPEC 16RCD, Drill Through Equipment-Rotating Control Devices
GB/T 26479-2011, Fire Test for Soft-Seated Quarter-Turn Valves	ANSI/API STD 607, Fire Test for Soft-Seated Quarter-Turn Valves
GB/T 26480-2011, Valve Inspection and Testing	API STD 598, Valve Inspection and Testing
GB/T 26482-2011, Fire Type-Testing Requirement for Check Valves	API SPEC 6FD, Specification for Fire Test for Check Valves
GB/T 26610.1-2011, Guideline for Implementation of Risk Based Inspection of Pressure Equipment System—Part 1: Basic Requirements and Implementation Procedure	API RP 580, Risk-Based Inspection
GB/T 28573-2012, Petroleum, Petrochemical and Natural Gas Industries Steam Turbines—General-Purpose Applications	API STD 611, General-Purpose Steam Turbines for Petroleum, Chemical, and Gas Industry Services
GB/T 28767-2012, Classification of Automotive Gear Lubricants	API PUBL 1560, Lubricant Service Designations for Automotive Manual Transmissions, Manual Transaxles, and Axles
GB/T 28772-2012, Classification of Internal Combustion Engine Oils	API 1509, Engine Oil Licensing and Certification System
GB/T 28777-2012, Process Valve Qualification Procedure for The Petrochemical Industry	API RP 591, Process Valve Qualification Procedure
GB/T 29172-2012, Practices for Core Analysis	API RP 40, Recommended Practices for Core Analysis

INDIA

STANDARDS FRAMEWORK AND REGULATORY OVERVIEW

The Ministry of Petroleum and Natural Gas is the primary regulator for the exploration and extraction of oil and gas, while the Petroleum and Natural Gas Regulatory Board regulates refining, processing, storage, transportation, distribution, marketing, and sale. Both agencies utilize and refer to complying with technical standards in their rules and regulations. The Ministry of Environment, Forest and Climate Change assesses environmental impacts of oil and gas projects and also plays a role in policymaking for the oil and gas sector.

Standards for India's oil and gas sector are issued by the Oil Industry Safety Directorate (OISD) within the Ministry of Petroleum and Natural Gas. India's national standards development organization, the Bureau of Indian Standards (BIS) within the Ministry of Consumer Affairs, has also developed standards for the oil and gas sector and represents India within the ISO and other international bodies.

OISD has issued over 120 standards (SDN), recommended practices (RP), and guidelines (GDN) related to oil and gas, while BIS has issued over 140 standards (IS) relevant to the sector. These standards pertain to all aspects of oil and gas activity, including design and layout of equipment and facilities, operating practices, environmental protection, and worker safety and fire protection. Most are voluntary and recommended. Standards are regularly reviewed and revised to maintain harmony with global standards.

21 standards issued by OISD are cited directly by Indian laws and regulations, namely the Petroleum Rules (2002), Gas Cylinder Rules (2016), Static and Mobile Pressure Vessels (Unfired) Rules (2016), and Oil Mines Regulation (2017). These include:

1. OISD-STD-105, Work Permit System

2. OISD-STD-114, Safe Handling of Hazardous Chemicals

3 OISD-STD-116, Fire Protection Facilities for Petroleum Refineries and Oil/Gas Processing Plants

4. OISD-STD-117, Fire Protection Facilities for Petroleum Depots, Terminals, Pipeline Installations & Lube Oil Installations

5. OISD-STD-118, Layouts for Oil & Gas Installations

6. OISD-STD-128, Inspection of Unfired Pressure Vessels

7. OISD-STD-129, Inspection of Storage Tanks

8. OISD-STD-141, Design & Construction Requirements for Cross Country Hydrocarbon Pipelines

9. OISD-STD-156, Fire Protection Facilities for Ports Handling Hydrocarbons

10. OISD-STD-144, Liquefied Petroleum Gas (LPG) Installations

11. OISD-STD-169, OISD Guidelines on Small LPG Bottling Plants (Design and Fire Protection Facilities)

12. OISD-STD-150, Design and Safety Requirements for Liquefied Petroleum Gas Mounded Storage Facility

13. OISD-STD-187, Care and Use of Wire Rope

14. OISD-STD-189, Standard On Fire Fighting Equipment For Drilling Rigs, Work over Rigs and Production Installations

15. OISD-STD-191, Oil Field Explosive Safety

16. OISD-STD-226, Natural Gas Transmission Pipelines and City Gas Distribution Networks

17. OISD-RP-108, Recommended Practices on Oil Storage and Handling

18. OISD-RP-149, Design Aspects for Safety in Electrical Systems

19. OISD-RP-174, Well Control

20. OISD-GDN-178, Guidelines on Management of Change

21. OISD-GDN-182, Safe Practices for Workover and Well Stimulation Operations

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

API signed an MOU with OISD in March 2014 to provide support in the development of standards. OISD, the Ministry of Petroleum and Natural Gas, and the Petroleum and Natural Gas Regulatory Board have widely adopted API standards and broadly accepts and/or requires adherence with them from oil and gas sector participants. In total, 106 API standards are referenced in the mandatory OISD standards, in guidance from the Ministry of Petroleum and Natural Gas, and in PNGRB regulations.

The below are the 40 API standards referenced in the mandatory OISD standards:

nvironment. Among this guidance are four references to API standards.

OISD Standard	API Standard Referenced
OISD-STD-105, Work Permit System	API 2016, Guidelines and Procedures for Entering and Cleaning Petroleum Storage Tanks API 2015, Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks API Publication 2009, Safe Welding, Cutting, and Other Hot Work Practices in Refineries, Gas Plants, and Petrochemical Plants
OISD-STD-116, Fire Protection Facilities for Petroleum Refineries and Oil/Gas Processing Plants	API RP 2001, Fire Protection in Refineries
OISD-STD-117, Fire Protection Facilities for Petroleum Depots, Terminals, Pipeline Installations & Lube Oil Installations	API SPEC 15LR, Low Pressure Fiberglass Line Pipe API SPEC 15HR, High-pressure Fiberglass Line Pipe
OISD-STD-118, Layouts for Oil & Gas Installations	API Standard 2610: Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities API Recommended Practices 2001, Fire Protection in Refineries

OISD Standard	API Standard Referenced
OISD-STD-141, Design & Construction Requirements for Cross Country Hydrocarbon Pipelines	API SPEC 5L, Line Pipe API RP 1102, Steel Pipelines Crossing Railroads and Highways
OISD-STD-156, Fire Protection Facilities for Ports Handling Hydrocarbons	API RP 2001, Fire Protection in Refineries
OISD-STD-119, Selection, Operation and Maintenance of Pumps	APIl 610, Centrifugal Pumps for General Refinery Services API 674, Positive Displacement Pump- Reciprocating
OISD-STD-144, Liquefied Petroleum Gas (LPG) Installations	API 2510, Design and Construction of LP Gas Installations
OISD-STD-214, Guidelines for Integrity Assessment of Cross Country Pipelines	API RP 1160, Managing System Integrity for Hazardous Liquid Pipelines
OISD-STD-226, Natural Gas Transmission Pipelines and City Gas Distribution Networks	API 15LR, Low Pressure Fiberglass Line Pipe and Fittings API 15HR, High-pressure Fiberglass Line Pipe API 617, Axial and Centrifugal Compressors and Expander-compressors API 618, Reciprocating Compressors for Petroleum, Chemical, and Gas Industry Services API 11P, Packaged Reciprocating Compressors for Oil and Gas Production Services API 1102, Steel Pipelines Crossing Railroads and Highways API 1104, Welding of Pipelines and Related Facilities API 1107, Pipeline Maintenance Welding Practices API 1109, Line Markers and Signage for Hazardous Liquid Pipelines and Facilities API 1110, Pressure Testing of Steel Pipelines for the Transportation of Gas, Petroleum Gas, Hazardous Liquids, Highly Volatile Liquids, or Carbon Dioxide API 500C, Classification of Locations for Electrical Installations at Pipeline Transportation Facilities API 5L, Line Pipe API 6D, Pipeline Valves
OISD-RP-108, Recommended Practices on Oil Storage and Handling	API 620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks API 650, Welded Tanks for Oil Storage
OISD-RP-174, Well Control	API RP 16E, Design of Control Systems for Drilling Well Control Equipment API RP 53, Blowout Prevention Equipment Systems for Drilling Wells API RP 59, Well Control Operations API RP 64, Diverter Systems Equipment and Operations API SPEC 16C, Choke and Kill Equipment API SPEC 16D, Control Systems for Drilling Well Control API SPEC 16R, Specification for Marine Drilling Riser Couplings
OISD-RP-GDN-182, Guidelines on Management Of Change	API 4G, Operation, Inspection, Maintenance, and Repair of Drilling and Well Servicing Structures API 5C1, Care and Use of Casing and Tubing

Apart from the specific OISD standards, the Ministry of Petroleum and Natural Gas has also issued "Good International Petroleum Industry Practices" (GIPIP) to provide guidelines for exploration and production of oil and gas. While the guidelines do not supersede applicable laws and regulations and are not legally binding, they are accepted as a reference guide for industry practices.

The GIPIP recommends meeting or exceeding 20 API standards and specifications for a broad swath of exploration and production activities. These include:

Relevant Field/Practice	API Standard Referenced
Well drilling practices and equipment	API RP 53, Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells API RP 90, Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells API RP 10B, Recommended Practice for Testing Well Cements API Bulletin D10, Procedure for Selecting Rotary Drilling Equipment API RP 04G, Drilling and Well Servicing Structures API RP 13B, Recommended Practice for Field Testing Water-based Drilling Fluids API RP 54, Occupational Safety and Health for Oil and Gas Well Drilling and Servicing Operations API SPEC 16D, Control Systems for Drilling Well API Bulletin D12A, API Well Number and Standard State and County Numeric Codes Including Offshore Waters

Relevant Field/Practice	API Standard Referenced
Pressure volume temperature (PVT) studies	API RP 44, Sampling Petroleum Reservoir Fluids API Manual of Petroleum Measurement Standards (MPMS)
Gas Flaring	API RP 55, Recommended Practice for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide
Core studies and analysis	PI RP 40, Recommended Practices for Core Analysis
Safety Management and Incident Response	API RP 14C, Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms API Technical Report 1145, Guidelines for Offshore Oil Spill Response Plans API RP 500, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2 API RP 505, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2 API RP 74, Recommended Practice for Occupational Safety for Onshore Oil and Gas Production Operation API RP 51R, Environmental Protection for Onshore Oil and Gas Production Operations and Leases API RP 67, Oilfield Explosives Safety

OISD has also issued a "Standard Operating Procedure for Integrity Assessment of Petroleum and Natural Gas Pipelines," which refers to API RP 1160, Managing System Integrity for Hazardous Liquid Pipelines.

Finally, regulations issued by the Petroleum and Natural Gas Regulatory Board (PNGRB) reference the below 45 API standards:

API Standard	Explanation/Description of standard
API Standard	Explanation/Description of standard
API 15S	Requirements for the manufacture and qualification of spoolable reinforced plastic line pipe in oilfield and energy applications
API 1104	Welding procedures and welders for welding of gas pipelines
API- RP-551, 552, 553, 554, 555 and 556	"Manual on Installation of Refinery Instruments and Control Systems
API 1102	Steel Pipelines Crossing Railroads and Highways.
API RP 2201	Recommended Practice for SafeHot Tapping Practices in the Petroleum and Petrochemicals Industry
API 6D	Specifications for Pipeline Valves
API 609	Double flanged, lug-type and wafer-type;
API 590	Steel Line Blanks
API 526	Flanged Steel Pressure Relief Valves
AGA Report No. 11 API MPMS Chapter 14.9	Measurement of Natural Gas by Coriolis Meter
API 5L	Specification for pipelines
API-617/618	Provides guidelines for the permissible pulsation amplitudes caused by a reciprocating compressor
API-11P	Specification for Packaged Reciprocating Compressors for Oil and Gas Production Services
API-1110	Recommended Practice for the Pressure Testing of Steel Pipelines for the Transportation of Gas, Petroleum Gas, Hazardous Liquids, Highly Volatile Liquids, or Carbon Dioxide
API 15 LR	Low Pressure Fiberglass Line Pipe.
API 15 HR	High-pressure Fiberglass Line Pipe.
API 607/6FA	Provides guidelines for quarter-turn valves, such as ball valves, and other valves that do not have metal seats when under pressure
API 550 or API-RP553	Manual on Installation of Refinery Instruments and Control Systems/ Refinery Valves and Accessories for Control and Safety Instrumented Systems
API-610	Specifies requirements for overhung, between-bearings and vertically-suspended centrifugal pumps used in petroleum, petrochemical and gas industry process service
API 674	Covers reciprocating positive displacement pumps for use in the petroleum, petrochemical, and gas industry services

API Standard	Explanation/Description of standard
API 675	Identifies requirements for reciprocating metering pumps used in the petroleum, petrochemical and gas industry services.
API 676	API standard for rotary, positive displacement pumps
API 540	"Electrical Installation of Petroleum Processing Units"
API standard 7C - 11F	"Recommended practice for Installation, Maintenance and Operation of Internal Combustion Engines"
API RP 1109	Marking Liquid Petroleum Pipeline Facilities
API RP 1107	Pipeline Maintenance Welding Practices
API RP 500 : 2012	Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division I and Division 2(viii) API- 5L 2012, Standard Specification for Line pipes
API 1160	Managing System Integrity for Hazardous Liquid Pipelines
API 620	Design and Construction of Large Welded Low Pressure Storage Tanks
API 625	Tank Systems for Refrigerated Liquefied Gas Storage
API 2218	Fireproofing Practices in Petroleum and Petrochemical Processing Plants
API Standard 25	Design and Construction of LP Gas Installations
API 11 P	Specification for Packaged Reciprocating Compressors for Oil and Gas Production Services
API 520	Applies to the sizing and selection of pressure relief devices for equipment with an MAWP of 15 psig or greater
API 619	Describes requirements for dry and oil-flooded, helical-lobe rotary compressors used for vacuum or pressure or both in petroleum, petrochemical, and gas industry services
API 105 Class 300 (forged)	Covers seamless forged carbon steel piping components for use in pressure systems at ambient and high-temperature service
API standard 2000	Venting Atmospheric and Low-pressure Storage Tanks.
API Std 620 R	Design and Construction of Large, Welded, Low-pressure Storage Tanks.
API RP 520	Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries
API 2510	Design and Construction of LPG Installations.
API 2350	Overfill Protection for Storage Tanks in Petroleum Facilities, Third Edition
API STD 650	Welded Tanks for Oil Storage
API 530	Calculation of Heater-tube Thickness in Petroleum Refineries
API-RP- 754	Process Safety Performance Indicators for the Refining and Petrochemical Industries
API Std. 650	Establishes minimum requirements for the design, fabrication, erection, and inspection of welded storage tanks

INDONESIA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

In Indonesia, the Ministry of Energy and Mineral Resources (ESDM) is the highest level regulator for the oil and gas industry. Within ESDM, SKK Migas (Special Task Force for Upstream Oil and Gas Business Activities) negotiates concession agreements and supervises the upstream sector, while BPH Migas (Downstream Oil and Gas Regulatory Agency) supervises the downstream sector.

The principal law governing oil and gas activity in Indonesia is the Oil and Gas Law No. 22/2001. Article 40 requires participating business entities to "guarantee the effective standard and quality in accordance with provisions of laws in force as well as apply good technical norms."

The national standards development organization is the Indonesian Standardization Body (BSN). BSN is active in developing national standards (referred to as SNI standards), with over 14,000 active across all sectors as of April 2022. The large majority of SNI standards are voluntary, but some (over 200 as of April 2022) are made mandatory by technical regulation.

Over 100 standards are currently active for the oil and gas sector, four of which have been made mandatory by ESDM:

- SNI 13-3473-1994, Fluid Transportation Systems for Hydrocarbons
- SNI 13-3474-1994, Gas Transmission and Distribution Piping System
- SNI IEC 60196:2015, General Electrical Installation Requirements 2000 (PUIL 2011)
- SNI 0255:2011+Amd 1, Standard Frequency

In 2018, ESDM issued Regulation 1846 K/18/MEM/2018, Use of Standards in Oil and Gas Business Activities ("The Regulation"), which requires oil and gas sector participants to comply with all mandatory SNI standards. Where no applicable mandatory SNI standards exist, the regulation permits oil and gas companies to adopt either voluntary SNI standards or other international standards (i.e., API or other standards) specifically listed by the regulation. The Directorate General for Oil and Gas within ESDM must approve of use of any standards outside of those specifically listed by the regulation.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

The Regulation specifically lists the international and foreign oil and gas standards permitted for use in Indonesia, which includes numerous API, ISO, ASTM, ASME and ANSI standards. 140 are API standards:

Guidance	API Standard Referenced
Exploration and Production	API RP 2A, Recommended Practice For Planning, Designing And Constructing Fixed Offshore Platforms API RP 2A-WSD, Planning, Designing, and Constructing Fixed Offshore. Platforms—Working Stress Design API RP 2SIM, Structural Integrity Management of Fixed Offshore Structures. API SPEC 2MT1, Specification for Carbon Manganese Steel Plate with Improved Toughness for Offshore Structures API SPEC 2MT2, Rolled Shapes with Improved Notch Toughness API SPEC 2H, Specification for Carbon Manganese Steel Plate for Offshore Structures API SPEC 2Y, Specification for Steel Plates, Quenched-and-Tempered, for Offshore Structures API SPEC 2W, Specification for Steel Plates for Offshore Structures, Produced by Thermo-Mechanical Control Processing (TMCP) API SPEC 2C, Offshore Pedestal-mounted Cranes API 2FB, Recommended Practice for the Design of Offshore Facilities against Fire and Blast Loading API RP 2D, Operation and Maintenance of Offshore Cranes API SPEC 5L, Line Pipe API RP 5L1, Recommended Practice for Railroad Transportation of Line Pipe API RP 5L2, Recommended Practice for Internal Coating of Line Pipe for Non-corrosive Gas Transmission Service API RP 5LW, Recommended Practice for Transportation of Line Pipe on Barges and Marine Vessels API RP 2T, Planning, Designing, and Constructing Tension Leg Platforms API 2RD, Design of Risers for Floating Production Systems (FPSs) and Tension-Leg Platforms (TLPs) API RP 2GEO, Geotechnical and Foundation Design Considerations API RP 2SK, Design and Analysis of Stationkeeping Systems for Floating Structures API RP 2FPS, Planning, Designing, and Constructing Floating Production Systems API 2MOP, Petroleum and natural gas industries - Specific requirements for offshore structures, Part 6-Marine operations API 570, Piping Inspection Code: In-service Inspection, Rating, Repair, and Alteration of Piping Systems API RP 572, Inspection of Pressure Vessels API RP 576, Inspection of Pressure-Relieving Devices API RP 2201, Safe Hot Tapping Practices in the Petroleum & Petrochemical Industries API SPEC 2F, Mooring Chain API BULL 75L, Guidance Document for the Development of a Safety and Environmental Management System for Onshore Oil and Natural Gas Production Operations and Associated Activities API 541, Form-wound Squirrel Cage Induction Motors—375 kW (500. Horsepower) and Larger API RP 686, Recommended Practice for Machinery Installation and Installation Design API SPEC 6FA, Specification for Fire Test for Valves API SPEC 6FB, Specification for Fire Test for End Connections API SPEC 5LC, CRA Line Pipe API SPEC 5LD, CRA Clad or Lined Steel Pipe API SPEC 6D, Pipeline Valves API SPEC 15LE, Polyethylene Line Pipe API SPEC 17J, Unbonded Flexible Pipe API SPEC 17L1, Flexible Pipe Ancillary Equipment API SPEC 17TR2, Ageing of PA-11 in Flexible Pipes API RP 17L2, Recommended Practice for Flexible Pipe Ancillary Equipment API 6DSS, Subsea Pipeline Valves API RP 14F, Recommended Practice for Design and Installation of Electrical Systems for Offshore Production API RP 14FZ, Recommended Practice for Design and Installation of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Zone 0, Zone 1 and Zone 2 Locations API RP 14C, Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms API RP 14J, Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities API RP 14G, Recommended Practice for Fire Prevention and Control on Open Type Offshore Production Platforms API RP 15S, Qualification of Spoolable Reinforced Plastic Line Pipe API RP 17B, Recommended Practice for Flexible Pipe API RP 17A, Design and Operation of Subsea Production Systems-General Requirements and Recommendations

Guidance	API Standard Referenced
Exploration and Production (cont)	API SPEC 17D, and Operation of Subsea Production Systems-Subsea Wellhead and Tree Equipment API 17F API RP 17H, Recommended Practice for Remotely Operated Tools and Inerfaces on Subsea Production Systems API RP 17N, Recommended Practice on Subsea Production System Reliability, Technical Risk, and Integrity Management API RP 17P, Recommended Practice for Subsea Structures and Manifolds API RP 17V, Recommended Practice for Analysis, Design, Installation, and Testing of Safety Systems for Subsea Applications API RP 17W, Recommended Practice for Subsea Capping Stacks API RP 17R, Recommended Practice for Flowline Connectors and Jumpers API RP 17U, Recommended Practice for Wet and Dry Thermal Insulation of Subsea Flowlines and Equipment API RP 17Q, Recommended Practice on Subsea Equipment Qualification API RP 17S, Recommended Practice for the Design, Testing, and Operation of Subsea Multiphase Flow Meters API STD 53, Well Control Equipment Systems for Drilling Wells API RP 55, Recommended Practice for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide API RP 85, Use of Subsea Wet-gas Flowmeters in Allocation Measurement Systems API RP 86, Recommended Practice for Measurement of Multiphase Flow API RP 170, Recommended Practice for Subsea High Integrity Pressure Protection System (HIPPS) API Spec 6A, Specification for Wellhead and Christmas Tree Equipment API SPEC 6AV1, Validation of Wellhead Surface Safety Valves and Underwater Safety Valves for Offshore Service API SPEC 16A, Drill-through Equipment API SPEC 16D, Control Systems for Drilling Well API RP 16Q, Design, Selection, Operation, and Maintenance of Marine Drilling Riser Systems API RP 17Q, Subsea Equipment Qualification-Standardized Process for Documentation API RP T3, Training And Qualification Of Personnel In Well Control Equipment And Techniques For Drilling On Offshore Locations API RP 65, Cementing Shallow Water Flow Zones in Deep Water Wells API SPEC 10A, Cements and Materials for Well Cementing API RP 10B, Recommended Practice for Testing Well Cements API SPEC 10D, Bow-string Casing Centralizers API 5A5, Field Inspection of New Casing, Tubing, and Plain-end Drill Pipe API SPEC 6A718, Nickel Base Alloy 718 API RP 13B-1, Recommended Practice for Field Testing Water-based Drilling Fluids API RP 13B-2, Recommended Practice for Field Testing Oil-based Drilling Fluids
Transportation	API 1104, Welding of Pipelines and Related Facilities API RP 1004, Bottom Loading and Vapor Recovery for MC-306 & DOT-406 Tank Motor Vehicles API RP 1130, Computational Pipeline Monitoring for Liquids API RP 1110, Recommended Practice for Pressure Testing of Liquid Petroleum Pipelines API RP 1111, Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines API RP 2200, Repairing Crude Oil, Liquefied Petroleum Gas, and Product Pipelines API RP 2201, Safe Hot Tapping Practices in the Petroleum & Petrochemical Industries
Refining and Marketing	API 685, Sealless Centrifugal Pumps API RP 752, Management of Hazards Associated with Location of Process Plant Building API RP 934-A, Materials and Fabrication Requirements for 2-1/4Cr-1Mo and 3Cr-1Mo Steel Heavy Wall Pressure Vessels for High Temperature, High Pressure Hydrogen Service API 2510, Design and Construction of Liquefied Petroleum Gas Installations (LPG) API 752, Management of Hazards Associated with Location of Process Plant Permanent Buildings API RP 571, Damage Mechanisms Affecting Fixed Equipment in the Refining Industry API RP 932B, Design, Materials, Fabrication, Operation, and Inspection Guidelines for Corrosion Control in Hydroprocessing Reactor Effluent Air Cooler (REAC) Systems API TR 938-B, Use of 9CR-1Mo-V (Grade 91) Steel in the Oil Refining Industry API TR 938-C, Use of Duplex Stainless Steels in the Oil Refining Industry API RP 1637, Using the API Color-Symbol System to Mark Equipment and Vehicles for Product Identification at Gasoline Dispensing Facilities and Distribution Terminals API 1542, Identification Markings for Dedicated Aviation Fuel Manufacturing and Distribution Facilities, Airport Storage and Mobile Fuelling Equipment

Guidance	API Standard Referenced
Fire Protection, Health and Environmental Issues	API RP 2218, Fireproofing Practices in Petroleum & Petrochemical Processing Plants API 2510A, Fire-Protection Considerations for the Design and Operation of Liquefied Petroleum Gas (LPG) Storage Facilities API 4602, Minimization, Handling, Treatment, and Disposal of Petroleum Products Terminal Wastewaters

In addition to the Regulation, the upstream regulator, SKK Migas, has issued Work Procedure Guidelines, three of which refer to nine API standards. These are:

• Guideline PTK-062-2021 (Revised), Management of Oil and Gas Operations, which refers extensively to different portions of the API Manual of Petroleum Measurement Standards (MPMS).

• Guideline PTK-013-2007, Operation and Maintenance of Petroleum Storage Tanks, which refers to:

  o API RP 12R1, Recommended Practice for Setting, Maintenance, Inspection, Operation, and Repair of Tanks in Production Service

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

  o API 650, Welded Steel Tanks for Oil Storage

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

  o API RP 575, Inspection Practices for Low Pressure Storage Tanks

• Guideline PTK-012-2007, Operation and Maintenance of Oil and Gas Distribution Pipes, which refers to:

  o API 1104, Welding of Pipelines and Related Facilities

  o API 1107, Pipeline Maintenance Welding Practices

JAPAN

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Economy, Trade and Industries Establishment Act provides that the Ministry of Economy, Trade and Industries (METI) jurisdiction over various matters relating to energy and mineral resources and the securing of the stable and efficient provision of gas, electric power and heating in Japan.

Within METI, regulatory bodies include:

• The Agency for Natural Resources and Energy, which oversees comprehensive policies related to energy and mineral resources and the securing of the stable supply of energy; and

• The Electricity and Gas Market Surveillance Commission, which monitors the electricity and gas trading markets through activities including compiling reports, conducting on-site inspections, providing recommendations to businesses.

Additionally, the Japan Oil, Gas and Metals Corporation (JOGMEC) is a government agency that provides technical and financial assistance to private oil and gas operators both in Japan and across the region to ensure the energy security of Japan.

Japan has few oilfields, all of which have limited production volume. Laws including the Oil Stockpiling Act and the Petroleum Supply and Demand Optimization Act aim to secure stable supplies of oil. The Oil Pipeline Business Act regulates the operation of oil pipeline projects.

The primary source of legislation regulating businesses involving liquid petroleum gas (LPG) is the Act Concerning the Securing of Safety and the Optimisation of Transaction of Liquefied Petroleum Gas (the LP Gas Act), along with its associated regulations. The LP Gas Act stipulates registration processes for the sale of LPG. The transportation and storage of LPG are regulated by the LP Gas Act as well as the High-Pressure Gas Safety Act.

The Japanese Industrial Standards Committee (JISC), within the Japanese Ministry of Economy, Trade, and Industry (METI), is Japan's national standardization body. JISC develops standards covering mineral or industrial products, data, and services, including quality, performance, and test methods. JISC is also responsible for Japan's growing contribution to setting international standards through its work with the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). Standards are then published through the Japanese Standards Association (JSA), an independent foundation.

Specifically for the hydrocarbon sector, the private sector-led Japan Petroleum Institute (JPI) is the association responsible for developing and issuing industry-led standards. It has issued over 82 standards with the abbreviation JPI.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

The Japanese Industrial Standards (JIS) issued by JISC frequently reference international ISO standards. Many JPI standards, on the other hand, are modeled on API standards for tubular goods (API Series 5 standards), though are not referenced by name.

JOGMEC has issued the "Recommended Guideline for Greenhouse Gas and Carbon Intensity Accounting Frameworks for LNG/Hydrogen/Ammonia Projects" (2023), which references the 2021 API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry.

MALAYSIA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

Malaysia's state-owned oil company, Petroliam Nasional Berhad (PETRONAS) owns all oil and gas resources in Malaysia and thus negotiates concession agreements with the private sector, serving as the chief regulator for the upstream sector. Within PETRONAS, Malaysia Petroleum Management (MPM) oversees all exploration and production activities, including promotion of exploration investments, optimization of exploration and production assets, and operations of upstream companies, in furtherance of the national interest.

The Ministry of International Trade and Industry (MITI) regulates and issues permits for refining and processing oil and gas, while the Ministry of Domestic Trade and Consumer Affairs (KPDNHEP) issues licenses for marketing and distribution of oil and gas. The Ministry of Natural Resources and the Environment (MNRE) also regulates environmental aspects of oil and gas activity.

The chief law and accompanying regulations governing oil and gas activity in Malaysia are the Petroleum Development Act of 1974 and the Petroleum Regulations 1974. These do not require compliance with any specific technical standards, but PETRNOAS, MITI, and MDTCC may require participants to comply with certain standards as part of their authority as regulators.

The Department of Standards Malaysia (DSM) under MITI is the national standards development organization. DSM is active in developing and issuing national Malaysian standards (MS), a number of which have been made mandatory by the appropriate regulators. For the oil and gas sector, DSM has issued over 531 active standards (as of June 2022), the vast majority of which are voluntary or recommended. 17 have been made mandatory by MITI, MDTC, or MNRE, including:

- MS ISO 3183, Petroleum and Natural Gas Industries – Steel Pipe for Pipeline Transportation Systems
- MS 830:2003, Code of Practice for the Storage, Handling, and Transportation of Liquefied Petroleum Gases
- MS 2381, Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless - Specification
- MS 761: 1982, Code of Practice for the Storage and Handling of Flammable and Combustible Liquids
- MS 563, Test Method for Distillation of Petroleum Products at Atmospheric Pressure
- MS 1891, Test method for Sulphur in petroleum products by wavelength dispersive x-ray fluorescence spectrometry
- MS 1893, Test method for density, relative density (specific gravity), or API gravity of crude petroleum and liquid petroleum products by hydrometer method
- MS 2012, Test method for vapor pressure of petroleum products (Reid method)

In addition to DSM's work on national standards, PETRONAS also issues its own technical standards (PTS), along with policy manuals for the upstream sector.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

A wide variety of MS standards are modeled on ISO standards as evidenced by their title. For example:

- MS ISO 3183, Petroleum and Natural Gas Industries – Steel Pipe for Pipeline Transportation Systems
- MS ISO 3448, Industrial Liquid Lubricants – ISO Viscosity Classification
- MS ISO 3171:2009, Petroleum Liquids – Automatic Pipeline Sampling

Many MS standards also make normative references to API standards (as well as other international standards). Two of Malaysia's mandatory MS standards refer to eight API standards:

MS Standard	API Standard Referenced
MS 761: 1982, Code of Practice for the Storage and Handling of Flammable and Combustible Liquids	API SPEC 12B, Bolted Production Tanks API SPEC 12D, Lar Welded Production Tanks API SPEC 12F, Shop Welded Tanks for Storage of Production Liquids API 620, Design and Construction of Large, Welded, Low-pressure Storage Tanks API 650, Welded Steel Tanks for Oil Storage API 2000, Venting Atmospheric and Low-Pressure Storage Tanks
MS 830:2003, Code of Practice for the Storage, Handling, and Transportation of Liquefied Petroleum Gases	API RP 520, Sizing, Selection, and Installation of Pressure-Relieving. Devices in Refineries API RP 521, Pressure-relieving and Depressuring Systems

PETRONAS's Procedures and Guidelines for Upstream Activities (PPGUA 4.1) refers throughout to international standards, including 13 API standards. These are:

Applicable PPGUA 4.1 Chapter	API Standard Referenced
Operations Management	API 17B, Recommended Practice for Flexible Pipe API Manual of Petroleum Measurement Standards
Well and Drilling Operations	API RP 500B, Recommended Practice for Classification of Locations for Electrical Installations at Drilling Rigs and Production Facilities on Land and on Marine Fixed and Mobile Platforms API RP 2SK, Recommended Practice for In-Service Inspection of Mooring Hardware for Floating Drilling Units API SPEC 10A, Cements and Materials for Well Cementing API RP 10B-2, Recommended Practice for Testing Well Cements API RP 10B-3, Testing of Well Cements Used in Deepwater Well Construction API RP 10F, Recommended Practice for Performance Testing of Cementing Float Equipment API 53, Well Control Equipment Systems for Drilling Wells API RP 64, Recommended Practice for Diverter Systems Equipment and Operations API RP 13B-1, Recommended Practice for Field Testing of Water-based Drilling Fluids API RP 14C, Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms API SPEC 4F, Specification for Drilling and Well Servicing Structures

In addition, 16 of Petronas's PTS standards reference a total of 18 API standards:

PTS Standard	API Standard Referenced
PTS 11.30.08, Dynamic Riser Design	API STD 2RD, Dynamic Risers for Floating Production Systems
PTS 11.30.10, Unbonded Flexible Pipe for Offshore Pipelines & Risers	API SPEC 17J, Unbonded Flexible Pipe API RP 17B, Flexible Pipe
PTS 11.31.01, Specification for Pipeline Valves	API 6D, Pipeline Valves API 6DSS, Subsea Pipeline Valves
PTS 12.22.02, Vertical Storage Tank	API 65, Wellbore Plugging and Abandonment

PTS Standard	API Standard Referenced
PTS 12.22.07, Fiberglass Reinforced Plastic Tanks	API SPEC 12P, Fiberglass Reinforced Plastic Tanks
PTS 12.51.01, Design And Operation Of Subsea Production Systems – Subsea Umbilicals	API 17E, Subsea Umbilicals
PTS 14.50.01, Subsea Production Control Systems – Subsea Equipment	API 17F, Subsea Production Control Systems
PTS 14.50.02, Subsea Production Control Systems – Topside Equipment	API 17F, Subsea Production Control Systems
PTS 15.10.02, Materials and Fabrication of Chromium – Molybdenum Steel Heavy Wall Pressure Vessels for High-Temperature, High-Pressure Hydrogen Service	API RP 934-A, Materials and Fabrication Requirements for 2-1/4Cr-1Mo and 3Cr-1Mo Steel Heavy Wall Pressure Vessels for High Temperature, High Pressure Hydrogen Service
PTS 15.10.04, CRA Clad or Lined Steel Pipe	API SPEC 5LD, CRA Clad or Lined Steel Pipe
PTS 15.10.05, Specification For CRA Line Pipe	API SPEC 5LC, CRA Lined Pipe
PTS 15.10.07, Line Pipe	API 5L, Line PIpe
PTS 15.10.16, Nickel Base Alloy 718 (UNS N07718) For Oil And Gas Drilling And Production Equipment	API SPEC 6A718, Nickel Base Alloy 718 (UNS N07718) for Oil and Gas Drilling and Production Equipment
PTS 15.12.01, Welding for Chemical, Oil, and Gas Industries	API RP 582, Welding Guidelines for the Chemical, Oil, and Gas Industries
PTS 15.12.04, Welding of Pipelines and Related Facilities	API 1104, Welding of Pipelines and Related Facilities
PTS 19.30.05, Marine Transportation for Structure and Linepipes	API RP 5LW, Transportation of Line Pipe on Barges and Marine Vessels

NEW ZEALAND

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

New Zealand Petroleum and Minerals (NZP&M) within the Ministry of Business, Innovation and Employment (MBIE) holds the primary responsibility for regulating the oil and gas industry at the national level. NZP&M regulates the right to prospect and mine oil and gas and manages the licensing system.

For downstream gas storage, transmission, and distribution, the Gas Industry Company (GIC) is the state-owned corporation that operates the infrastructure and helps promote health and safety regulations under the oversight of the MBIE.

For environmental aspects of oil and gas activities, the Environmental Protection Authority (EPA) has jurisdiction. WorkSafe New Zealand, the workplace health and safety regulator in New Zealand, has also issued regulations specific to the oil and gas sector.

The Crown Minerals Act 1991 governs New Zealand's legal framework for oil and gas exploration. This Act outlines the management of oil and gas resources, granting permits for exploration and production activities. Additionally, the Resource Management Act 1991 (RMA) governs the environmental management of oil and gas activities.

Additional technical regulations and standards include:

- Health and Safety at Work (Petroleum Exploration and Extraction) Regulations 2016: sets out the health and safety requirements for petroleum exploration and extraction activities.
- Health and Safety at Work (Hazardous Substances) Regulations 2017: sets out the health and safety requirements for working with hazardous substances including oil and gas
- Gas (Safety and Measurement) Regulations 2010: governs the safety aspects of gas supply systems
- Exclusive Economic Zone and Continental Shelf (Environmental Effects—Decommissioning Plans) Regulations 2021: strengthens the New Zealand's decommissioning framework for oil and gas installations

Standards New Zealand, a private, non-profit organization, plays a vital role in the development and issuance of technical standards for the oil and gas sector, working with industry experts and stakeholders. Its standards are delineated NZS.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

The Health and Safety at Work (Hazardous Substances) Regulations 2017 issued by WorkSafe New Zealand reference 8 API standards, including:

- API 6FA, Standard for Fire Test for Valves
- API 570, Piping Inspector
- API 607, Fire Safe Ball Valve
- API 620, Design and Construction of Large Welded Low Pressure Storage Tanks
- API 650, Welded Tanks for Oil Storage
- API 653, Aboveground Storage Tank Inspector
- API 2000, Venting Atmospheric and Low-pressure Storage Tanks
- API 2610, Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities

Additionally, a series of policy guidance module issued by the Ministry of the Environment, Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (1999 and amended 2011), references API Publication 1628, A Guide to the Assessment and Remediation of Underground Petroleum Releases.

SINGAPORE

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

Singapore does not have oil reserves and thus does not have upstream oil and gas activity. It is however, a major hub in Southeast Asia for refining, storage, and distribution of oil and gas.

Singapore does not have a regulator or regulatory framework specific to the oil sector, but downstream oil activities are subject to environmental regulation by the National Environment Agency and worker safety regulation by the Ministry of Manpower's Occupational Safety and Health Division. Oil sector activities are also subject to fire safety laws and regulations administered by the Singapore Civil Defence Force under the Ministry of Home Affairs.

The gas sector is subject to the above, as well as regulation by the Energy Market Authority, a statutory board under the Ministry of Trade and Industry. EMA licenses the transport, import, shipping, and retail of natural gas as well as LNG operators and onshore receiving facilities for piped natural gas.

Enterprise Singapore is the national standards development organization and administers the Singapore Standardization Program with the advice and assistance of the Singapore Standards Council, made up of public and private sector leaders appointed by Enterprise Singapore. Enterprise Singapore has issued over 800 voluntary standards, including a handful for the oil and gas sector.

The regulations governing oil and gas activities in Singapore do not specify the standards with which companies must comply, but instead permit the relevant authorities to refer to relevant national or international standards when determining compliance.

For example, the Fire Safety Act (Cap.109A), which requires licenses for operating pipelines that convey petroleum, permits the Commissioner of the Civil Defence Force to adopt standards issued by the Enterprise Singapore or by any other standards organization. Under the Environmental Protection and Management Act (Cap. 94A) (EPMA), the National Environment Agency must grant companies permission to occupy or use premises used for petroleum refining and may require the use of certain internationally-recognized technical standards.

Major oil and gas companies operating in Singapore may also use or require use of standards by their contractors and suppliers. The largest investors in Singapore's downstream energy activities are Singapore Petroleum Company (SPC), a subsidiary of the state-owned Chinese oil company PetroChina; Caltex, owned by Chevron; ExxonMobil, and Royal Dutch Shell.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Since no specific standards are made mandatory by Singaporean regulators, use of standards vary widely among participants in the sector. The decision to adopt certain standards are typically made for business reasons, not necessarily based on the strength of the standards, and may depend on geographical preference (i.e., API versus European or British standards).

Enterprise Singapore has issued several national voluntary standards that are relevant to the oil and gas sector.

- SS 634 (2018), Code of Practice for Fire Safety for Open Plant Processing Facilities in Oil, Chemical and Process Industries
- SS 281 (1984), Pressure Regulators for Liquefied Petroleum Gases
- SS 294 (1998), Valves for Use with Domestic and Industrial Liquefied Petroleum Gas (LPG) Cylinders
- SS ISO 19905 (2017), Site Specific Assessment of Mobile Offshore Units – Part 1: Jack-ups

Enterprise Singapore's catalogue of national standards does not indicate whether API or other international standards are referenced, though some are titled after ISO standards.

In examining SS634, Code of Practice for Fire Safety for Open Plant Processing Facilities in Oil, Chemical and Process Industries, references to 14 API standards were identified. These include:

- API 2G, Production Facilities on Offshore Structures
- API 2L Planning, Designing and Constructing Heliports for Fixed Offshore Platforms
- API 14C, Recommended Practice for Analysis, Design Installation and Testing of Basic Surface Safety Systems on Offshore Production Platforms
- API 14F, Design and Installation of Electrical Systems for Offshore Production Platforms (included in the Electrical Manual)
- API 14G, Fire Prevention and Control on Open Type Offshore Production Platforms
- API 4322, Fugitive Hydrocarbon Emissions from Petroleum Production Operations, Volumes I and II (1980)
- API 540, Electrical Installations in Petroleum Refineries
- API 500, Classification of Locations for Electrical Installation in Petroleum Facilities
- API 521, Guide for Pressure-Relieving and Depressuring Systems
- API 752, Management of Hazards Associated with Location of Process Plant Buildings
- API 2021, Guide for Fighting Fires In and Around Petroleum Storage Tanks
- API 2218, Guideline for Fireproofing Practices in Petroleum and Petrochemical Processing Plants
- API 2510A, Fire-Protection Considerations for the Design and Operation of Liquefied Petroleum Gas (LPG) Storage Facilities
- API Guide for the Inspection of Refinery Equipment, Chapter XVI, Pressure-Relieving Devices

SOUTH KOREA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Trade, Industry, and Energy (MOTIE) in South Korea establishes the overall strategy for the oil and gas industry and directs policies for upstream oil and gas operations. Under this Ministry, the Korea National Oil Corporation (KNOC) manages the supply of oil reserves while serving as a technical advisor.

Similarly, for downstream activities in the gas sector, the state-owned Korea Gas Corporation (KOGAS) manages the country's gas markets and infrastructure. The Korea Gas Safety Corporation (KGS), a government-owned corporation operating under MOTIE supervision, provides safety assessment and conformance for natural gas operations.

The Ministry of Employment and Labor (MOEL) governs health, safety, and emergency preparedness for all petroleum activities. Additionally, the Ministry of Environment and assess and regulate the environmental impacts of oil and gas operations, ensuring compliance with national and international environmental standards.

For upstream exploration and production, the Mining Industry Act governs onshore activities, while the Submarine Mineral Resources Development Act governs offshore activities (nearly all exploration and production is currently offshore in Korea). South Korea has a multitude of laws governing the midstream and downstream sectors that require compliance with technical standards, including:

- The KOGAS Act
- The Oil Pipeline Safety Control Act
- Petroleum and Alternative Fuel Business Act
- Urban Gas Business Act
- Safety Control and Business of Liquified Petroleum Gas Act
- The Economic Promotion and Safety Control of Hydrogen Economy Act

The primary standards body in South Korea is the Korean Agency for Technology and Standards (KATS), a governmental organization that develops and issues standards for all sectors. KOGAS also has its own standards applicable to the midstream and downstream gas sectors.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

The Korea Gas Safety Corporation (KGS) requires alignment with API standards for risk-based management, specifically:

- API 580, Risk Based Inspection
- API 581, Risk Based Inspection Technology

Additionally, 19 KOGAS standards refer to a total of 62 API standards:

KOGAS Standard	API Standard Referenced
KOGAS-GSM-0001, Specification for Ball Valves for Natural Gas	API SPEC 5L, Line Pipe API SPEC 6D, Pipeline Valves API 598, Testing Standards: Valve Leakage & Ratings API 607, Fire Safe Ball Valve API 6FA, Standard for Fire Test for Valves
KOGAS-GSM-0002, Specification of Buried Type Ball Valves for Natural Gas	API SPEC 5L, Line Pipe API SPEC 6D, Pipeline Valves API 598, Testing Standards: Valve Leakage & Ratings API 607, Fire Safe Ball Valve API 6FA, Standard for Fire Test for Valves
KOGAS-GSM-0003, Specification for Gas Leak Detectors	API RP 505, Classification of Locations for Electrical Installations at Petroleum Facilities
KOGAS-GSM-0004, Specification for Lighting Fixtures for Explosive Gas Atmospheres	API RP 505, Classification of Locations for Electrical Installations at Petroleum Facilities
KOGAS-GSM-0006, Specification for Ultrasonic Metering Equipment for Natural Gas	API SPEC 5L, Line Pipe

KOGAS Standard	API Standard Referenced
KOGAS-GSM-1002, Specification for 9% Ni Steel Plate of LNG Storage Tank	API 620, Design and Construction of Large Welded Low Pressure Storage Tanks
KOGAS-GSM-1003, Specification for 9% Ni Floor Insulation of LNG Storage Tank	API 620, Design and Construction of Large Welded Low Pressure Storage Tanks API 625, Tank Systems for Refrigerated Liquefied Gas Storage
KOGAS-GSM-1011, Specification for Cryogenic Ball Valve	API SPEC 6D, Pipeline Valves API 598, Testing Standards: Valve Leakage & Ratings API 607, Fire Safe Ball Valve API 6FA, Standard for Fire Test for Valves
KOGAS-GSM-1012, Specification for Cryogenic Gate Valve	API SPEC 6D, Pipeline Valves API 598, Testing Standards: Valve Leakage & Ratings API 607, Fire Safe Ball Valve API 6FA, Standard for Fire Test for Valves
KOGAS-GSM-1013, Specification for Cryogenic Globe Valve	API SPEC 6D, Pipeline Valves API 598, Testing Standards: Valve Leakage & Ratings API 607, Fire Safe Ball Valve API 6FA, Standard for Fire Test for Valves API 623, Global Valve
KOGAS-GSM-1014, Specification for Cryogenic Check Valve	API SPEC 6D, Pipeline Valves API 594, Check Valves: Flanged, Lug, Wafer, and Butt-welding API 598, Testing Standards: Valve Leakage & Ratings API 600, Gate Valves for Petroleum & Natural Gas API 602, Gate, Globe, and Check Valves for Sizes DN 100 (NPS 4) and Smaller for the Petroleum and Natural Gas Industries API 607, Fire Safe Ball Valve API 6FA, Standard for Fire Test for Valves
KOGAS-GSM-1015, Specification for Cryogenic Butterfly Valve	API SPEC 6D, Pipeline Valves API 6FA, Standard for Fire Test for Valves API 598, Testing Standards: Valve Leakage & Ratings API 600, Gate Valves for Petroleum & Natural Gas API 607, Fire Safe Ball Valve API 609, Butterfly Valve
KOGAS-GSM-1016, Specification for Cryogenic Safety Relief Valve	API RP 520, Sizing, Selection, and Installation of Pressure-Relieving. Devices in Refineries API 521, Pressure-Relieving and Depressurizing Systems API 526, Flanged Steel Pressure-relief Valves API 527, Seat Tightness of Pressure Relief Valves API 598, Testing Standards: Valve Leakage & Ratings API 600, Gate Valves for Petroleum & Natural Gas
KOGAS-GSM-2201, Specification for Natural Gas Pressure Regulation Unit	API SPEC 5L, Line Pipe API SPEC 6D, Pipeline Valves API 6FA, Standard for Fire Test for Valves API 598, Testing Standards: Valve Leakage & Ratings API 607, Fire Safe Ball Valve API 505, Classification of Locations for Electrical Installations at Petroleum Facilities
KOGAS-GSM-2202, Specification for Gas Filter for Natural Gas	API SPEC 5L, Line Pipe
KOGAS-GSM-2203, Specification for Natural Gas Gas Heater	API SPEC 5L, Line Pipe API RP 505, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities API RP 532, Measurement of the Thermal Efficiency of Fired Process Heaters
KOGAS-GSM-2205, Specification for Electric Motor Actuator Ball Valve for Natural Gas	API 505, Classification of Locations for Electrical Installations at Petroleum Facilities API SPEC 5L, Line Pipe
KOGAS-GSM-2208, Specification for City Turbine Metering Equipment	API RP 505, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities
KOGAS-GSM-2112, Specification for Pipe Fitting Covering	API SPEC 5L, Line Pipe

THAILAND

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry of Energy serves as the main agency overseeing oil and gas activities in Thailand. Key legislation and regulations for upstream activities include the Petroleum Act, B.E. 2514 (1971), which outlines the regulatory framework for exploration and production, including licensing procedures, fiscal regimes, and environmental obligations, and various ministerial regulations under the Petroleum Act, which provide guidelines on licensing, safety, and environmental management.

PTT Public Co. Ltd is the national state-owned oil company involved in all oil and gas sectors.

The Energy Regulatory Commission of Thailand is charged with regulating the transportation, storage, and distribution of petroleum products, as well as setting tariffs, ensuring quality standards, and enforcing safety protocols to maintain the reliability and security of the energy supply.

Environmental and climate regulations in the oil and gas sector are overseen by the Ministry of Natural Resources and Environment (MONRE).

Additionally, the Thai Industrial Standards Institute (TISI) plays a vital role in developing and enforcing standards for the oil and gas sector. TISI collaborates with various stakeholders to create comprehensive guidelines that ensure safety, quality, and efficiency in operations.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Thailand's Ministry of Energy has issued three regulations that reference API standards:

Regulation	API Standard Referenced
Regulations and Methods of Storage, Assignment of Responsible Special Personnel, and Exemption to Follow the Hazardous Substances Act 1992 for Areas of Liquefied Petroleum Gas Responsible by the Department of Energy Business B.E. 25635	API 620, Design and Construction of Large Welded Low Pressure Storage Tanks
Notification of the Department of Energy Business Re: Specification for Appearance and Quality of Engine Oils B.E. 2559	API Service Categories for ILSAC Engine Oil Standards
Ministerial Regulations: Fuel Oil Vapor Recovery B.E. 2550	API RP 1004, Bottom Loading and Vapour Recovery for MC-306 Tank Motor Vehicles

VIET NAM

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Viet Nam Oil and Gas Group (Petrovietnam or PVN), Viet Nam's state-owned oil and gas company, controls oil and gas resources in Viet Nam and frequently acts as de facto regulator for private sector participation. PVN's upstream subsidiary, Petrovietnam Exploration Production Corporation (PVEP) negotiates and signs concession agreements with private sector partners for exploration and production, while PVN's subsidiaries Petrovietnam Oil Company, the Petrovietnam Gas Company, and the Binh Son Refinery, among others, are involved in downstream activities.

The Department of Energy and Petroleum within the Ministry of Industry and Trade also coordinates closely with PVN and the Prime Minister of Viet Nam on the development of the oil and gas sector. Furthermore, the Ministry of Natural Resource and Environment also fulfills some duties related to environmental management of oil and gas.

Viet Nam's primary law for the oil and gas sector is the Petroleum Law ("the Law"). The Law does not specify use of any standards, but instead requires that petroleum operators "utilize advanced technology and comply with Vietnamese Laws regarding the protection of natural resources and the environment, and the safety of person and property." The Law also requires that petroleum operators develop a plan for environmental protection, take all measures to prevent pollution, and promptly eliminate sources of pollution," as well as establish a "safety zone around installations servicing Petroleum Operations in compliance with regulations of the Government of Vietnam."

Viet Nam's national standards development organization is the Directorate for Standards, Metrology, and Quality (STAMEQ) within the Ministry of Science and Technology. Within STAMEQ, the Vietnam Standards and Quality Institute (VSQI) assists the development, publishing, and issuing of national standards. STAMEQ is highly active in issuing national standards, which are divided into national standards (TCVN), organizational standards (TCCS), national technical regulations (QCVNs), and local technical regulations (QCDPs). Technical regulations are mandatory, while standards are generally voluntary.

Technical regulations that have been issued for the oil and gas sector include QCVN 8:2012/BKHCN, National Technical Regulation for Liquefied Petroleum Gas (LPG), and QCVN 35: 2010 / BTNMT, National Technical Regulations on Wastewater from Offshore Oil and Gas Works. STAMEQ has also issued over 300 active national standards (TCVNs) for the oil and gas sector, some of which are cited by the technical regulations.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

International standards are widely used in Viet Nam. Oil and gas operators in Vietnam frequently use GOST technical standards (Russia), though API, ISO, and ASTM standards are also commonly in use.

A large portion of national TCVN standards make normative references to international standards, including API, ISO, EN, and ASTM standards. In particular, many of the TCVN measurement standards refer to the API Manual of Petroleum Measurement Standards (MPMS). According to the most recently updated STAMEQ database, there were 42 references to API standards and the MPMS:

TVCN Standard	API Standard Referenced
TCVN 9734:2013, Reciprocating positive displacement pumps for Petroleum, petrochemical and natural gas industries	API 526, Flanged steel pressure relief valves API 541, Form-wound squirrel cage induction motors-250 horsepower and larger API 546, Brushless synchronous machines-500 kVA and larger API 611, General-purpose steam turbines for petroleum, chemical, and gas industry services API 677, General-purpose gear units for petroleum, chemical and gas industry services API RP 686, Machinery installation and installation design
TCVN 9733:2013, Centrifugal pumps for petroleum, petrochemical and natural gas industries	API 541, Form-Wound Squirrel-Cage Induction Motors-500 Horsepower and Larger API 611, General-Purpose Steam Turbines for Petroleum, Chemical, and Gas Industry Services API 670, Machinery Protection Systems API API 671, Special Purpose Couplings for Petroleum, Chemical and Gas Industry Services API 547, General-Purpose Form-Wound Squirrel Cage Induction Motors-250 Horsepower and Larger API 677, General-Purpose Gear Units for Petroleum, Chemical and Gas Industry Services
TCVN 9791:2013, Standard Test Method for Water in Crude Oil by Distillation	API MPMS, Chapters 8 and 10
TCVN 9451:2013, Packaged, integrally geared centrifugal air compressors	API Std 670, Vibration, axial position, and bearing temperature monitoring systems API RP 520 Sizing, selection, and installation of pressure-relieving devices in refineries,
TCVN 9450-2:2013 Rotary-type positive displacement compressors. Part 2: Packaged air compressors (oil-free)	API 614:1995, Lubrication, Shaft-Sealing, and Control-Oil Systems for Special-Purpose Application API 661:1992, Air-Cooled Heat Exchangers for General Refinery Service API 670:1993, Vibration, Axial-Position, and Bearing-Temperature Monitoring Systems API 671:1990, Special-Purpose Couplings for Petroleum, Chemical, and Gas Industry Services

TVCN Standard	API Standard Referenced
TCVN 9449:2013, Petroleum, chemical and gas service industries. Centrifugal compressors	API RP 550, Manual on installation of refinery instruments and control systems API 670, Machinery protection systems, fourth edition
TCVN 8617:2010, Liquefied natural gas (LNG). Vehicular fuel systems	API 620, Design and Construction of Large, Welded, Low Pressure Storage Tanks, 1996
TCVN 8404:2010, Rules for Classification and Technical Supervision of Flexible Pipe Systems.	API 6FB Fire test for end connections API RP 17B-2002:Recommend Practice for Flexible Pipe API 17J-2002 Specification for Unbonded Flexible Pipes API 17K-2002 Specification for Bonded Flexible Pipes
TCVN 8403:2010, Rules for Classification and Technical Supervision of Dynamic Riser Systems.	API 17J-2002 Specification for Unbonded Flexible Pipes
TCVN 12012:2017, Standard Guide for Use of the Petroleum Measurement Tables	API MPMS
TCVN 6594:2007, Crude petroleum and liquid petroleum products, Determination of density, relative density (specific gravity), or API gravity, Hydrometer Method	API MPMS Chapter 8
TCVN 2692:2007, Petroleum products and bituminous materials. Test method for determination of water by distillation	API MPMS, Chapters 8 and 10
TCVN 10953-1:2015, Guidelines for petroleum measurement. Proving systems. Part 1: General	API MPMS, Chapters 4, 11-13
TCVN 10953-2:2015, Guidelines for petroleum measurement. Proving systems. Part 2: Tank provers	API MPMS, Chapters 7, 12
TCVN 10953-3:2015, Guidelines for petroleum measurement. Proving systems. Part 3: Master meter provers	API MPMS, Chapters 4-5
TCVN 10954-1:2015, Guidelines for petroleum measurement. Level measurement of liquid hydrocarbons in stationary tanks by automatic tank gauges (ATG). Part 1: General requirements	API MPMS Chapters 1-3
TCVN 10954-2:2015, Guidelines for petroleum measurement. Level measurement of liquid hydrocarbons in stationary tanks by automatic tank gauges (ATG). Part 2: General requirements for the installation	API MPMS Chapters 1-3
TCVN 10955-1:2015, Guidelines for petroleum measurement. Measurement of liquid hydrocarbon. Part 1: Displacement meters	API MPMS Chapters 4, 12
TCVN 10956-1:2015, Guidelines for petroleum measurement. Flow measurement using electronic metering systems. Part 2: Turbine meters	API MPMS Chapters 4, 5, 12 API RP 500, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2
TCVN 10957-1:2015, Guidelines for petroleum measurement. Mass measurement of natural gas liquids	API MPMS Chapters 5, 11, 12, 14
TCVN 10960:2015, Guidelines for petroleum measurement. Proving systems. Manual gauging	API MPMS Chapters 2, 3, 17
TCVN 12823-1:2020: Mobile Offshore Units. Part 1: Classification	API RP 2I, Mooring Inspection API SPEC 9A, Wire Rope API RP 9B, Wire Breakage from Martensite in Drilling Lines

SUB-SAHARAN AFRICA

ANGOLA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The Ministry for Mineral Resources and Petroleum (MIREMPET) is the chief regulator for natural gas and oil activities in Angola. Within MIREMPET, the National Agency for Petroleum, Gas and Biofuels (ANPG) grants concession rights and licensing for exploration and production. Though the government began liberalizing the sector in 2018, the national state-owned oil company, Sonangol, still plays a role in shaping the market as a participant in upstream, midstream and downstream operations.

For the downstream segment, the Regulatory Institute for Petroleum Derivatives (IRDP) within MIREMPET oversees processing, storage, distribution, import, transport and sales of petroleum-derived products.

The Petroleum Activities Law (Law 10/04) provides the legal framework for exploration and production activities in Angola. According to the law, MIREMPET may authorize the use of technical standards by executive decree. MIREMPET has issued several technical regulations, including:

- Executive Decree 38/09, on health and safety requirements for natural gas and oil operations
- Executive Decree 39/00, on environmental protection requirements for natural gas and oil operations
- Executive Decrees 188/08, 189/08, 193/08, 200/08 and 203/08, on construction and operation of gas pipelines
- Executive Decree 187/08, on requirements for metrological control of gas meters

The Angolan Institute for Standardization and Quality (IANORQ) is the national standards development organization, which has published 342 voluntary standards in its 2019 catalogue. Most of these were developed and published as part of the country's National Normalization Plan 2016-2020. However, no national standards yet pertain to the natural gas and oil sector.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Executive Decree 38/09, which lays out the health and safety requirements for natural gas and oil operations, requires all operations, processes, and equipment to be compliant with national or international standards. The regulation defines "international standards" as guidelines and/or codes of conduct like those recognized in an attached annex, which references API, ISO, and IEC standards, among others.

The following eight API standards are referenced:

- API RP 14B, Design, Installation, Operation, Test, and Redress of. Subsurface Safety Valve Systems
- API RP 17B, Recommended Practice for Flexible Pipe
- API RP 13B2, Recommended Practice for Field Testing of Oil-based Drilling Fluids
- API SPEC 7J, Drill Pipe/Casing Protectors
- API RP 14C, Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms

Executive Decrees 200/08 and 203/08, regarding technical requirements for the construction and operation of pipelines, each require compliance with three API standards or their technical equivalents:

- API SPEC 5L, Line Pipe
- API SPEC 6D, Pipeline Valves
- API 1104, Standard for Welding Pipelines and Related Facilities

Additionally, in the downstream segment, IRDP has issued requirements for licensing of imported lubricating oils that require certification according to API's Engine Oil program.

EQUATORIAL GUINEA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

Equatorial Guinea is situated in the center of West Africa and is a major producer of oil. The Ministry of Mines, Industry and Energy (MMIE) supervises all oil and gas projects and is working on an integrated gas collection for projects throughout the region. The Ministry is headed by the Secretary General, who is considered the head of all personnel.

Unless the matter is reserved for a different Department Body, the Secretary General is head of personnel and has full control to resolve all matters referred to the Ministry, GE Petrol is Equatorial Guinea's national oil company, which reports directly to MMIE. GE Petrol acts as a state-agent and works together with the Ministry to coordinate all affairs related to the petroleum industry. Similarly, SONOGAS, which also reports to MMIE, is the state-owned natural gas company that operates the country's gas sector. SONOGAS owns a stake in EG LNG, which manages the country's LNG facilities.

Law No. 8/2006 of Hydrocarbons, and Regulation No. 04/2013, on Petroleum Operations Regulations establish the procedures and performance standards for exploration, evaluation, development, transportation, distribution, storage, refining, commercialism, and other related activities. Both set the international standards to which oil and gas operators must conform their services and equipment. A new regulation regarding operations in the oil gas sector, Regulation No. 2/2020 on Petroleum Operations, was issued in 2020. Equatorial Guinea does not have a national standardization organization nor are they members of the International Organization for Standardization (ISO).

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Law No. 8/2006 on Hydrocarbons and Regulations No. 04/2013 and No. 2/2020 on Petroleum Operations refer extensively to international standards, including API. A total of 84 standards are referenced by Equatorial Guinea's laws and regulations:

Law	API Standard Referenced
Law No. 8/2006 on Hydrocarbons	Manual of Petroleum Measurement Standards (MPMS) API 2550, Method for Measurement and Calibration of Upright Cylindrical Tanks API 2551, Method for Measurement and Calibration of Horizontal Tanks API 2552, Measurement and Calibration of Spheres and Spheroids API 2553, Measurement and Calibration of Barges API 2554, Measurement and Calibration of Tank Cars API 2555, Method for Liquid Calibration of Tanks

Law	API Standard Referenced
Regulation No. 04/2013 on Petroleum Operations	Manual of Petroleum Measurement Standards (MPMS) API 2550, Method for Measurement and Calibration of Upright Cylindrical Tanks API 2551, Method for Measurement and Calibration of Horizontal Tanks API 2552, Measurement and Calibration of Spheres and Spheroids API 2553, Measurement and Calibration of Barges API 2554, Measurement and Calibration of Tank Cars API 2555, Method for Liquid Calibration of Tanks
Regulation No. 2/2020 on Petroleum Operations	Manual of Petroleum Measurement Standards (MPMS) API RP 2A, Planning, Designing and Constructing Fixed Offshore Platforms API RP 2D, Recommended Practice for Operation and Maintenance of Offshore Cranes API RP 2I, Recommended Practice for In-service Inspection of Mooring Hardware for Floating Structures API RP 2L, Recommended Practice for Planning, Designing, and Constructing Heliports for Fixed Offshore Platforms API RP 2M, Recommended Practice for Qualification Testing of Steel Anchor Designs for Floating Structures API RP 2P, Recommended Practice for the Analysis of Spread Mooring Systems for Floating Drilling Units API RP 2R, Recommended Practice for Design, Rating, and Testing of Marine Drilling Riser Couplings API RP 2T, Planning, Designing, and Constructing Tension Leg Platforms API RP 2X, Recommended Practice for Ultrasonic and Magnetic Examination of Offshore Structural Fabrication and Guidelines for Qualification of Technicians API RP 3, Recommended Practice for Care and Use of Cable Drilling and Fishing Tools API RP 4G, Operation, Inspection, Maintenance, and Repair of Drilling and Well Servicing Structures API RP 5B1, Gauging and Inspection of Casing, Tubing, and Line Pipe Threads API RP 5C1, Recommended Practice for Care and Use of Casing and Tubing API RP 5A5, Field Inspection of New Casing, Tubing, and Plain-end Drill Pipe API RP 5C5, Procedures for Testing Casing and Tubing Connections API RP 6AR, Recommended Practice for Repair and Remanufacture of Wellhead and Christmas Tree Equipment API RP 7A1, Recommended Practice for Testing of Thread Compound for Rotary Shouldered Connections API RP 7G, Recommended Practice for Drill Stem Design and Operating Limits API RP 8B, Recommended Practice for Procedures for Inspections, Maintenance, Repair, and Remanufacture of Hoisting Equipment API RP 9B, Application, Care, and Use of Wire Rope for Oil Field Service API RP 10E, Application of Cement Lining to Steel Tubular Goods, Handling, Installation and Joining API RP 10F, Recommended Practice for Performance Testing of Cementing Float Equipment API RP 13B1, Recommended Practice for Field Testing Water-based Drilling Fluids API RP 13B2, Recommended Practice for Field Testing Oil-based Drilling Fluids API RP 13E, Recommended Practice for Shale Shaker Screen Cloth Designation API RP 13G, Recommended Practice Standard Procedure for Drilling Mud Report Form API SPEC 6FA, Fire Test for Valves API SPEC 6FB, Fire Test for End Connections API SPEC 6FC, Fire Test for Valves with Automatic Backseats API SPEC 7B11C, Internal- Combustion Reciprocating Engines for Oil-Field Service API SPEC 7F, Oil Field Chain and Sprockets API SPEC 7J, Rotary Drill Stem Elements API SPEC 8A and 8C, Drilling and Production Hoisting Equipment API SPEC 9A, Wire Rope API SPEC 10 and 10A, Cements and Materials for Well Cementing API SPEC 10D, Casing Bow-spring Centralizers

Law	API Standard Referenced
Regulation No. 2/2020 on Petroleum Operations (cont)	API SPEC 13A, Drilling Fluids Materials API SPEC 14A, Subsurface Safety Valve Equipment API SPEC 14D, Wellhead Surface Safety Valves and Underwater Safety Valves for Offshore Service API SPEC 15AR, Fiberglass Casing and Tubing API SPEC 16C, Choke and Kill Equipment API SPEC 16D, Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment API SPEC 17D, Subsea Wellhead and Tree Equipment API BULL 5C2, Bulletin on Performance Properties of Casing, Tubing, and Drill Pipe API BULL 5C3, Bulletin on Formulas and Calculations for Casing, Tubing, Drill Pipe, and Line Pipe Properties API BULL 5C4, Bulletin on Round Thread Casing Joint Strength with Combined Internal Pressure and Bending

GHANA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

Policies for the oil and gas sector in Ghana are set by the Ministry of Energy, while day-to-day upstream operations are regulated chiefly by the Petroleum Commission. The Commission administers rules and licenses for oil and gas development, as well as the local content requirements applicable to the sector.

Additionally, the Environmental Protection Agency (EPA) plays a role in managing the environmental impacts of upstream operations and sits on the governing board of the Petroleum Commission. For the downstream sector, the National Petroleum Authority (NPA) regulates refining, storage, and transport of oil and gas.

All upstream oil and gas operations are also required to include participation by the state-owned Ghana National Petroleum Corporation (GNPC), which works with private contractors through contractual agreements referred to as Petroleum Agreements. As in many countries, the GNPC plays a de facto regulatory role in shaping upstream oil and gas development through these agreements.

The national laws governing upstream and downstream oil and gas sectors, namely the Petroleum (Exploration and Production) Act (2016) and Ghana National Petroleum Corporation Law (1983) for the upstream sector, and the Petroleum Commission Act for the downstream sector, require compliance with oil and gas standards aligned with global best practices.

Under these laws, the Ghana Standards Authority (GSA), formerly the Ghana Standards Board, is the country's national standards body, is charged with working closely with the Petroleum Commission and the NPA to develop and issue standards and certifications for the oil and gas sector. The GSA has issued at least 18 national standards covering petroleum and petroleum products.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Many of the regulations governing oil and gas in Ghana do not reference specific international standards by name. However, the Guidelines to Petroleum (Exploration & Production) Measurement Regulation (L.I. 2246) references several chapters of the API Manual of Petroleum Measurement Standards, including:

- API MPMS Chapter 1
- API MPMS Chapter 4
- API MPMS Chapter 5
- API MPMS Chapter 7
- API MPMS Chapter 8
- API MPMS Chapter 11
- API MPMS Chapter 12
- API MPMS Chapter 13
- API MPMS Chapter 20

In addition, the Natural Gas Pipeline Safety (Construction, Operation And Maintenance) Regulations, 2012 (L.I. 2189) references API SPEC 5L, Line Pipe.

Finally, the West African Gas Pipeline Regulations, 2005 (L.I. 1814), which covers construction and operation of the West African Gas Pipeline, a key pipeline that brings gas from Nigeria to Ghana, refer to nine API standards, including:

- API 6D, Pipeline and Piping Valves
- API 5L, Line Pipe
- API 616, Gas Turbines for Petroleum, Chemical, and Gas Industry Services
- API 617, Axial and Centrifugal Compressors and Expander-compressors
- API RP 5L1, Railroad Transportation of Line Pipe
- API RP 5LW, Transportation of Line Pipe on Barges and Marine Vessels
- API 1104, Welding Pipelines and Related Facilities
- API RP 1102, Steel Pipelines Crossing Railroads and Highways
- API RP 1111, Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines

NIGERIA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

Nigeria's Federal Ministry of Petroleum Resources (FMPR) sets policies and regulates the entire natural gas and oil sector. The recently passed Petroleum Industry Act (PIA) 2021 sets the framework for oil and gas regulation and divides the responsibility for day-to-day supervision between the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) and the Nigerian Midstream and Downstream Petroleum Regulatory Authority, (NMDPRA), which regulate and set standards for their corresponding sectors. The PIA also replaces the former Nigerian National Petroleum Corporation with NNPC Limited, providing it with a greater degree of commercial independence, though it will remain owned by the government.

On environmental and public safety issues, the National Oil Spill Detection and Response Agency (NOSDRA) oversees and coordinates plans to prevent, detect, and address oil spillages according to existing environmental laws, supported by the Federal Ministry of the Environment (FME). Nigeria also has a government agency, the Nigerian Content Development and Monitoring Board (NCDMB), devoted to ensuring that domestic constituencies are given adequate priority in terms of contracts, employment, and goods and services used in the sector.

In 2017, the Federal Executive Council of Nigeria, consisting of the President and his ministers, adopted the National Petroleum Policy (NPP), a national policy plan for how hydrocarbons can be "used as a fuel for national economic growth." Section 5.2.11 of the NPP covering technical standards states that "Nigeria will adopt appropriate international standards selected, whichever is more stringent, from ISO, ASME, EI, API, ASTM, [and] ANSI, for example."

Standards development in Nigeria is coordinated by the Standards Organisation of Nigeria (SON), a governmental agency administrated by the Standards Council of Nigeria. SON conducts its standards development work through technical committees consisting of government officials, companies and industry groups, civil society, academics, and other experts. It has developed over 1,300 national standards, including some in the natural gas and oil sector.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

The Mineral Oils (Safety) Regulations of 1997 require that in the design and construction or modification of a major facility for natural gas and oil operations, a licensed operator should carry out comprehensive risk analysis in accordance with API recommended practices, which could include the following:

- API RP 75, Development Of A Safety And Environmental Management Program For Offshore Operations And Facilities
- API RP 76, Contractor Safety Management For Oil And Gas Drilling And Production Operations

The Mineral Oils (Safety) Regulations also require that installation of electrical equipment comply with API RP 500, Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division I and Division 2.

Additionally, SON has adopted at least 10 API Standards as national standards, including:

- API RP 50:2013, Natural Gas Processing Plant Practices For Protecting the Environment
- API RP 520:2014, Sizing, Selection, and Installation of Pressure-relieving Devices in Refineries
- API RP 520 P2:2015, Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries, Part II—Installation
- API 553:2012, Refinery Valves and Accessories for Control and Safety Instrumented Systems
- API 554-1:2007, Process Control Systems Part 1-Process Control Systems Functions and Functional Specification Development
- API 610:2011, Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries
- API 2000:2014, Venting Atmospheric and Low-Pressure Storage Tanks
- API SPEC 12D:2008, Field Welded Tanks for Storage of Production Liquids
- API SPEC 12F:2008, Shop Welded Tanks for Storage of Production Liquids
- API SPEC 12L:2008, Vertical and Horizontal Emulsion Treaters

Furthermore, NUPRC (and its former incarnation, the Department of Petroleum Resources) has issued guidelines governing aspects of natural gas and oil operations (many of which are mandatory) that include 58 references to API standards.

Guidelines	API Standard Referenced
Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (1991)	API RP 45, Recommended Practice for Analysis of Oilfield Waters API RP 10, Recommended Practice for Testing Well Cements API RP 57, Offshore Well Completion, Servicing, Workover, and Plug and Abandonment Operations
Procedure Guide for the Construction and Maintenance of Fixed Offshore Platforms (1992)	API RP 2A, Planning, Designing, and Constructing Fixed Offshore. Platforms—Working Stress Design API RP 14C, Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms API 1104, Standard for Welding Pipelines and Related Facilities
Procedure Guide for the Design and Construction of Oil and Gas Surface Production Facilities (2001)	API RP 2A, Planning, Designing, and Constructing Fixed Offshore. Platforms—Working Stress Design API RP 14C, Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms API RP 520, Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries API RP 1104, Welding of Pipelines and Related Facilities
Guidelines for the Establishment of Hydrocarbon Processing (Petroleum Refinery and Petrochemicals) Plants in Nigeria (2008)	API 2510, Design and Construction of LPG Installations API 520, Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries API 521, Pressure-relieving and Depressuring Systems API 550, Manual on Installation of Refinery Instruments and Control Systems API 1104, Standard for Welding Pipelines and Related Facilities
Guidelines for the Procedure for Lifting Equipment and Lifting Operations (2020)	API RP 2D, Operation and Maintenance of Offshore Cranes
Guidelines for Compliance with Technical Safety Control (TSC) Requirements for Facility Development Projects and Modifications (2020)	API RP 14C, Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms API RP 14J, Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities API RP 75, Recommended Practice for a Safety and Environmental Management System for Offshore Operations and Assets API RP 500, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2

Guidelines	API Standard Referenced
Guidelines for the Implementation of Risk-Based Inspections (2020)	API RP 510, Inspection, Rating, and Repair of Pressure Vessels in Petroleum Refinery Service API 570, Piping Inspection Code: In-service Inspection, Rating, Repair, and Alteration of Piping Systems API RP 571, Damage Mechanisms Affecting Fixed Equipment in the Refining Industry API RP 572, Inspection of Pressure Vessels API RP 576, Inspection of Pressure-Relieving Devices API RP 580, Risk-based Inspection API RP 581, Risk-Based Inspection Methodology API RP 653, Tank Inspection, Repair, Alteration, and Reconstruction
Procedure Guide for the Determination of the Quantity and Quality of Petroleum and Petroleum Products in Nigeria (2019)	API MPMS Chapter 3 – Tank Gauging API MPMS Chapter 7 – Temperature Determination API MPMS Chapter 8.1 Manual Sampling of Petroleum Products API MPMS Chapter 8.2 Automatic Sampling of Petroleum Products API MPMS Chapter 9 – Density Determination API MPMS Chapter 10 – Sediment and Water API MPMS Chapter 14.3 –Orifice metering of natural gas and other related hydrocarbon fluids
Procedures and Conditions for the Construction, Installation, Modification, Relocation and Operation of LPG Facilities (2019)	API 2510, Design and Construction of Liquefied Petroleum Gas Installations (LPG)
Guidelines for the Design, Construction, Operation, and Maintenance of Oil and Gas Pipeline Systems in Nigeria (2021)	API SPEC 5L, Line Pipe API SPEC 5B, Threading, Gauging, and Inspection of Casing, Tubing, and Line Pipe Threads API STD 1104, Welding Pipelines and Related Facilities API RP 1102, Steel Pipelines Crossing Railroads and Highways API RP 1111, Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines API RP 1160, Managing System Integrity for Hazardous Liquid Pipelines API STD 2RD, Design of Risers for Floating Production Systems (FPSs) and Tension-Leg Platforms (TLPs)
Guidelines for the Design, Construction, and Operation of Oil and Gas Production Facilities (2024)	API RP 2A, Planning, Designing and Constructing Fixed Offshore Platforms API BUL 2V, Design of Flat Plate Structures API BUL 2U, Stability Design of Cylindrical Shells API RP 2FPS, Planning, Designing, and Constructing Floating Production Systems API RP 2SK, Design and Analysis of Stationkeeping Systems for Floating Offshore Structures API SPEC 2F, Specification for Mooring Chain API RP 2SM, Design, Manufacture, Installation, and Maintenance of Synthetic Fiber Ropes for Offshore Mooring API RP 2T, Planning, Designing, and Constructing Tension Leg Platforms API RP 14C, Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms API 17H, Remotely Operated Tools and Interfaces on Subsea Production Systems API 521, Pressure-Relieving and Depressurizing Systems API 537, Flare Details for Petroleum, Petrochemical, and Natural Gas Industries API RP 520, Sizing, Selection, and Installation of Pressure-Relieving. Devices in Refineries API RP 521, Pressure-Relieving and Depressurizing Systems API RP 1109, Line Markers and Signage for Hazardous Liquid Pipelines and Facilities

SOUTH AFRICA

REGULATORY OVERVIEW AND STANDARDS FRAMEWORK

The National Department of Minerals and Energy and the Petroleum Agency of South Africa Limited are the principal bodies that oversee national oil and gas extraction. The Department of Environment, Forestry, and Fisheries (DEFF) regulates environmental concerns related to oil and gas extraction. The Petroleum Agency monitors compliance, provides an advisory and administrative role for administering petroleum rights and permits, and operates the national petroleum and exploration and production database.

The National Department of Minerals and Energy administers the Mineral and Petroleum Resources Development Act of 2002 (MPRDA), which must be read in conjunction with the Constitution of South Africa, the National Environmental Management Act of 1998 (NEMA), the Income Tax Act of 1962 (ITA), the Value Added Tax Act of 1991, the Mining Titles Registration Act of 1967, and the Mineral and Petroleum Resources Royalty Act of 2008. The MPRDA governs the exploration and production of petroleum resources and is the primary legislation for regulating petroleum. The Petroleum Production Act of 1977 lays out additional specifications and standards for petroleum products that may be sold for consumption in South Africa.

For downstream transport and storage of oil and gas, including for pipelines and storage facilities, the National Energy Regulator of South Africa grants permits and licenses.

The specifications and standards used in South Africa conform to the South African National Standards (SANS) laid out by the South Africa Bureau of Standards (SABS), which is a member of the International Organization for Standardization (ISO). SABS is a statutory body, which operates within the Standards Act of 2008 as well as the Standardization Institution of South Africa, and is mandated to develop, promote and maintain SANS. SABS promotes quality in connection with commodities, products and services, and renders conformity assessment services.

In 2021, the Upstream Petroleum Resources Development Bill (UPRD Bill) was introduced, signifying a possible transition in the South African oil and gas regulatory landscape, by aiming to separate the regulation of upstream petroleum production from the mining sector.

USES AND REFERENCES TO API AND OTHER INTERNATIONAL STANDARDS

Standards issued by SABS for the oil and gas sector are in line with the ISO, which develop voluntary, consensus-based, and market relevant international standards. Five standards reference a total of 8 API standards, listed below:

Standards	API Standard Referenced
SANS 1843:2019 High Performance Engine Lubricating Oil for Diesel Engines	API Service Category CJ-4
SANS 1842:2018 High Performance Engine Lubricating Oil for Petrol Engines	API Service Category SM
SANS 1517:2019 High Performance Engine Lubricating Oil for Diesel Engines	API Service Category CI-4
SANS 1516:2018 High Performance Engine Lubricating Oil for Petrol Engines	API Service Category SL
SANS 10141:2004 Above Ground Storage Tanks for Petroleum Products	API 5L, Recommended practice for railroad transportation of line pipe. API 650, Welded steel tanks for oil storage. API 653, Tank inspection, repair, alteration, and reconstruction. API 2000, Venting atmospheric and low-pressure storage tanks – Nonrefrigerated and refrigerated

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

The International Organization for Standardization (ISO), a global non-governmental organization based in Geneva, Switzerland is the foremost international body for the development of technical standards across all industry sectors, including oil and gas. ISO is made up of representatives from 167 standards bodies from around the world who contribute to the standards development process, and API participates in ISO through the U.S.-member body, the American National Standards Institute (ANSI).

Many ISO standards are modeled on or refer to API standards. A total of 75 ISO standards, primarily in the oil and gas sector, were identified that refer to or rely on 379 API standards below.

ISO Standard	API Standard Referenced
ISO 27914:2017(en) Carbon dioxide capture, transportation, and geological storage — Geological storage	API, RP 5B1 (R2010)-1999, Gauging and Inspection of Casing. Tubing and Pipe Line Threads, 1999 API, Bull 5C2-1999, Bulletin on Performance Properties of Casing, Tubing, and Drilling Pipe, 1999 API, RP 15TL4-1999, Care and Use of Fiberglass Tubulars, 1999 ANSI/API Spec 15HR-2001, Specification for High Pressure Fiberglass Line Pipe, 2001 API, Spec 15LR (R2008)-2001, Low Pressure Fiberglass Line Pipe and Fittings, 2001 ANSI/API Spec 6A-2010, Specification for Wellhead and Christmas Tree Equipment, 2010 API, Spec 6D-2008, Specification for Pipeline Valves, 2008 API, Bull 6J-1992, Testing of Oilfield Elastomers (A Tutorial), 1992 API, Spec 11D1 Ed2-2009, Packers and Bridge Plugs, 2009 API, SPEC 5CT-2011, Specification for Casing and Tubing, 2011 API, SPEC 5CRA-2010, Specification for Corrosion Resistant Alloy Seamless Tubes for Use as Casing. Tubing and Coupling Stock, 2010 API, RP 7G-1998, Recommended Practice for Drill Stem Design and Operation Limits, 1998 API, Bull 75L-2007, Guidance Document for the Development of a Safety and Environmental Management system for Onshore Oil and Natural Gas Production Operations and Associated Activities, 2007 API, RP 75-2004, Recommended Practice for Development of a Safety and Environmental Management Program (SEMP) for Offshore Operations and Facilities, 2004 API STD 65-2, Isolating potential flow zones during well construction

ISO Standard	API Standard Referenced
ISO 27914:2017(en) (cont) Carbon dioxide capture, transportation, and geological storage — Geological storage	API, RP 5A3-2009, Recommended Practice on Thread Compounds for Casing, Tubing, Line Pipe, and Drill Stem Elements, 2009 API, RP 10B-2 (R2010)-2005, Recommended Practice for Testing Well Cements, 2005 API, RP 10B-4 (R2010)-2004, Recommended Practice on Preparation and Testing of Foamed Cement Slurries at Atmospheric Pressure, 2004 ANSI/API RP 10B-5-2007, Recommended Practice on Determination of Shrinkage and Expansion of Well Cement Formulations at Atmospheric Pressure, 2007 API, RP 10D-2 (R2010)-2004, Recommended Practice for Centralizer Placement and Stop Collar Testing, 2004 API/API RP10F (R2010)-2002, Recommended Practice for Performance Testing of Cementing Float Equipment, 2002 API, Spec 10A-2010, Specification for Cements and Materials for Well Cementing, 2010 API, Spec 10D (R2010)-2002, Specification for Bow-Spring Casing Centralizers, 2002 API, RP 65-2002, Cementing Shallow Water Flow Zones in Deep Water Wells, 2002 API, 10TR1-2008, Cement Sheath Evaluation, 2008 API Technical Report, Summary of Carbon Dioxide Enhanced Oil Recovery (CO2 EOR) Injection Well Technology API, Bull E3 (R2000)-1993, Well Abandonment and Inactive Well Practices for U.S. Exploration and Production Operations, Environmental Guidance Document, 1993
ISO 19901-7:2013(en), Petroleum and natural gas industries — Specific requirements for offshore structures — Part 7: Station keeping systems for floating offshore structures and mobile offshore units	API RP 2I, Recommended Practice for In-Service Inspection of Mooring Hardware for Floating Structures, American Petroleum Institute API RP 2SK, Recommended Practice for Design and Analysis of Station keeping Systems for Floating Structures, American Petroleum Institute API RP 2SM, Recommended Practice for Design, Manufacture, Installation, and Maintenance of Synthetic Fiber Ropes for Offshore Mooring, American Petroleum Institute API RP 16Q, Recommended Practice for Design, Selection, Operation and Maintenance of Marine Drilling Riser Systems, American Petroleum Institute API Bulletin 2U, Stability Design of Cylindrical Shells, American Petroleum Institute API Bulletin 2V, Design of Flat Plate Structures, American Petroleum Institute [152] API Spec 2B, Specification for the Fabrication of Structural Steel Pipe, American Petroleum Institute API Spec 2SC, Manufacture of Structural Steel Castings for Primary Offshore Applications, American Petroleum Institute API Specification 2SF. Manufacture of Structural Steel Forgings for Primary Offshore Applications, American Petroleum Institute
ISO 7278-2:2022(en) Petroleum measurement systems — Part 2: Pipe prover design, calibration and operation	API Manual of Petroleum Measurement Standards, Chapter 4, Proving Systems, Section 9, methods of Calibration for Displacement and Volumetric Tank Provers: Part 3. Determination of the Volume of Displacement Provers by the Master Meter Method of Calibration, American Petroleum Institute 2010 API Manual of Petroleum Measurement Standards Chapter 11, Physical properties data, Section 1-Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils, 2004, reaffirmed 2012. American Petroleum Institute New York. API Manual of Petroleum Measurement Standards Chapter 11, Physical properties data section 2.1 and 2.1M Compressibility Factors for Hydrocarbons: 0-90 Degrees API Gravity and 638-1 074 Kilograms per Cubic Metre Ranges, 1986, American Petroleum Institute New York. API Manual of Petroleum Measurement Standards Chapter 4-Proving Systems Section 9-Methods of Calibration for Displacement and Volumetric Tank Provers Part 4-Determination of the Volume of Displacement and Tank Provers by the Gravimetric Method of Calibration 2010, American Petroleum Institute New York. API STD 2531, 1963, Mechanical Displacement Meter Provers, (withdrawn) American Standards Institute, (Withdrawn) American Petroleum Institute New York. Manual of Petroleum Measurement Standards Chapter 13—Statistical Aspects of Measuring and Sampling, Section 1—Statistical Concepts and Procedures in Measurements, 1st edition, June 1985, Reaffirmed, February 2011, American Petroleum Institute, New York Manual of Petroleum Measurement Standards Chapter 13—Statistical Aspects of Measuring and Sampling, Section 2, Methods of Evaluating Meter Proving Data, 2nd edition 2018, American Petroleum Institute, New York Manual of Petroleum Measurement Standards Chapter 4.8, Operation of Proving Systems, 2nd edition, September 2013, American Petroleum Institute, New York.

ISO Standard	API Standard Referenced
ISO 19902:2020(en), Petroleum and natural gas industries — Fixed steel offshore structures	Manual of Petroleum Measurement Standards Chapter 4.8, Operation of Proving Systems, 2nd edition, September 2013, American Petroleum Institute, New York. API RP 2A-LRFD, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms — Load and Resistance Factor Design, First Edition, 1993 API RP 2A-WSD, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms — Working Stress Design API RP 2A-WSD, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms — Working Stress Design, 21st Edition, 1993 ANSI/API RP 2MET, Derivation of Metocean Design and Operating Conditions, First Edition, November 2014 API RP 2FB, Recommended Practice for the Design of Offshore Facilities Against Fire and Blast Loading API Spec 2B, Specification for the Fabrication of Structural Steel Pipe API RP 2A-LRFD, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms — Load and Resistance Factor Design, First Edition, 1993 API RP 2Z, Preproduction Qualification for Steel Plates for Offshore Structures, Fourth Edition API Spec 2W, Steel Plates for Offshore Structures, Produced by Thermo-Mechanical Control Processing (TMCP) API Spec 2Y, Steel Plates, Quenched-and-tempered, for Offshore Structures, Fourth Edition API Spec 2H, Carbon Manganese Steel Plate for Offshore Platform Tubular Joints ANSI/API Spec Q1, Specification for Quality Programs for the Petroleum and Natural Gas Industry API RP2X, Recommended practice for ultrasonic and magnetic examination of offshore structural fabrication and guidelines for qualification of technicians API Spec 2MT1, Carbon Manganese Steel Plate with Improved Toughness for Offshore Structures API Spec 2MT2, Rolled Shapes with Improved Notch Toughness API Spec 5L, Line Pipe
ISO/TR 10400:2018(en), Petroleum and natural gas industries — Formulae and calculations for the properties of casing, tubing, drill pipe and line pipe used as casing or tubing	API 5B, Threading, Gauging and Thread Inspection of Casing, Tubing, and Line Pipe Threads (US Customary Units) API 579, Fitness-for-Service API RP 5C1, Recommended Practice for Care and Use of Casing and Tubing API RP 5C5, Recommended Practice on Procedures for Testing Casing and Tubing Connections API 5CT, Specification for Casing and Tubing API 5D, Specification for Drill Pipe API 5L, Specification for Line Pipe
ISO 19901-4:2016(en), Petroleum and natural gas industries — Specific requirements for offshore structures — Part 4: Geotechnical and foundation design considerations	API RP 2A, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms — Working Stress Design, American Petroleum Institute, Washington DC API RP 2GEO, Geotechnical and Foundation Design Considerations, ANSI/ API Recommended Practice 2GEO, American Petroleum Institute , Washington DC API RP 2SK, Recommended Practice for Design and Analysis of Stationkeeping Systems for Floating Structures, American Petroleum Institute , Washington DC API RP 2T, Recommended Practice for Planning, Designing and Constructing Tension Leg Platforms, American Petroleum Institute , Washington DC

ISO Standard	API Standard Referenced
ISO 2715:2017(en), Liquid hydrocarbons — Volumetric measurement by turbine flowmeter	API RP 2T, Recommended Practice for Planning, Designing and Constructing Tension Leg Platforms, American Petroleum Institute, Washington DC API MPMS 4.8, Manual of Petroleum Measurement Standards Chapter 4 — Proving Systems, Section 8 — Operation of Proving Systems. American Petroleum Institute, New York API MPMS 13.1, Manual of Petroleum Measurement Standards Chapter 13 — Statistical Aspects of Measuring and Sampling, Section 1 — Statistical Concepts and Procedures in Measurements. American Petroleum Institute, New York API MPMS 13.2, Manual of Petroleum Measurement Standards Chapter 13 — Statistical Aspects of Measuring and Sampling, Section 2 — Methods of Evaluating Meter Proving Data. American Petroleum Institute, New York API Manual of Petroleum Measurement Standards (MPMS) Chapter 12 Section 2, Calculation of Petroleum Quantities Using Dynamic Measurement Methods and Volumetric Corrections Factors. American Petroleum Institute, New York API MPMS 5.2, Manual of Petroleum Measurement Standards Chapter 5 — Metering Section 2 — Measurement of Liquid Hydrocarbons by Displacement Meters. American Petroleum Institute, New York API MPMS 5.3, Manual of Petroleum Measurement Standards Chapter 5 — Metering Section 3 — Measurement of Liquid Hydrocarbons by Turbine Meters. American Petroleum Institute, New York
ISO 2714:2017(en), Liquid hydrocarbons — Volumetric measurement by displacement meter	API MPMS 5.3, Manual of Petroleum Measurement Standards Chapter 5 — Metering Section 3 — Measurement of Liquid Hydrocarbons by Turbine Meters. American Petroleum Institute, New York API MPMS 4.8, Manual of Petroleum Measurement Standards Chapter 4 — Proving Systems, Section 8 — Operation of Proving Systems. American Petroleum Institute, New York API MPMS 13.1, Manual of Petroleum Measurement Standards Chapter 13 — Statistical Aspects of Measuring and Sampling, Section 1 — Statistical Concepts and Procedures in Measurements. American Petroleum Institute, New York API MPMS 13.2, Manual of Petroleum Measurement Standards Chapter 13 — Statistical Aspects of Measuring and Sampling, Section 2 — Methods of Evaluating Meter Proving Data. American Petroleum Institute, New York API Manual of Petroleum Measurement Standards (MPMS) Chapter 12 Section 2, Calculation of Petroleum Quantities Using Dynamic Measurement Methods and Volumetric Corrections Factors. American Petroleum Institute, New York API MPMS 5.2, Manual of Petroleum Measurement Standards Chapter 5 — Metering Section 2 — Measurement of Liquid Hydrocarbons by Displacement Meters. American Petroleum Institute, New York API MPMS 5.3, Manual of Petroleum Measurement Standards Chapter 5 — Metering Section 3 — Measurement of Liquid Hydrocarbons by Turbine Meters. American Petroleum Institute, New York
ISO 8222:2020(en), Petroleum measurement systems — Calibration — Volumetric measures, proving tanks and field measures (including formulae for properties of liquids and materials)	API MPMS 4.4, Manual of Petroleum Measurement Standards - Chapter 4 - Proving Systems - Section 4, Tank Provers, American Petroleum Institute, New York API MPMS 4.7, Manual of Petroleum Measurement Standards - Chapter 4 - Proving Systems - Section 7 - Field Standard Test Measures, American petroleum institute, New York

ISO Standard	API Standard Referenced
ISO 10439-1:2015(en), Petroleum, petrochemical and natural gas industries — Axial and centrifugal compressors and expander-compressors — Part 1: General requirements	API RP 520 PT I, Sizing, selection, and installation of pressure-relieving devices in refineries Part I — sizing and selection API 605, Large-diameter carbon steel flanges (nominal pipe sizes 26 through 60, classes 75, 150, 300, 400, 600, and 900) API 617, Axial and centrifugal compressors, and expander-compressors for special purpose applications handling gas or process air API 671, Petroleum, petrochemical and natural gas industries — Flexible couplings for mechanical power transmission — Special purpose applications API 672, Packaged, integrally geared centrifugal air compressors for petroleum, chemical, and gas industry services API 673, Centrifugal fans for petroleum, chemical and gas industry services API RP 684, API standard paragraphs rotordynamic Tutorial: Lateral critical speeds, unbalance response, stability, train torsionals, and rotor balancing API RP 686, Recommended practice for machinery installation and installation design API RP 687, API recommended practice 687, Rotor Repair
ISO 13628-4:2010(en), Petroleum and natural gas industries — Design and operation of subsea production systems — Part 4: Subsea wellhead and tree equipment	API Spec 17D, Specification for Subsea Wellhead and Christmas Tree Equipment API TR 17TR3, Evaluation of the Risks and Benefits of Penetrations in Subsea Wellheads Below the BOP Stack API RP 90, Recommended Practice for Annular Casing Pressure Management for Offshore Wells API RP 6HT, Heat Treatment and Testing of Large Cross Section and Critical Section Components
ISO 91:2017(en), Petroleum and related products — Temperature and pressure volume correction factors (petroleum measurement tables) and standard reference conditions	API/Standard 2540:1966, ASTM-IP Petroleum Measurement Tables API/Standard 1101-1960, Measurement of Petroleum Liquid Hydrocarbons by Positive Displacement Meter API MPMS Chapter 11.2.1-1984, Compressibility Factors for Hydrocarbons: 0–90° API Gravity Range API MPMS Chapter 11.2.1M-1984, Compressibility Factors for Hydrocarbons: 638–1074 Kilograms per Cubic Metre Range API MPMS Chapter 11.2.2-1984, Compressibility Factors for Hydrocarbons: 0.500–0.611 Relative Density Range and 20–128°F API-ASTM-GPA Technical Publication TP-25, Temperature Correction for the Volume of Light Hydrocarbons, Tables 24E and 23E, September 1988 API MPMS Chapter 11.2.5-2007/GPA Technical Publication TP-15, A Simplified Vapour Pressure Correlation for Commercial NGLs
ISO 13500:2008(en), Petroleum and natural gas industries — Drilling fluid materials — Specifications and tests	API RP 13K, Recommended Practice for Chemical Analysis of Barite ASTM E691, Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method API Spec 13A, Specification for Drilling-Fluid Materials, 16th Edition, February 1, 2004 API 88-30, 1989. Specification Parameters Determination Drilling Fluid Materials API 89-30, 1990. Specification Parameters Determination Drilling Fluid Materials API 90-30, 1992. Specification Parameters Determination Drilling Fluid Materials
ISO 11960:2020(en), Petroleum and natural gas industries — Steel pipes for use as casing or tubing for wells	Bull API, 5A2, Bulletin on Thread Compounds for Casing, Tubing, and Line Pipe, 6th edition, May 31, 1988 Spec API, 5CT, Specification for Casing and Tubing, 9th Edition National Bureau of Standards, Handbook 91, U.S. Department of Commerce, Experimental Statistics API RP 5C1, Recommended Practice for Care and Use of Casing and Tubing API RP 5B1, Recommended Practice for Gaging and Inspection of Casing, Tubing and Pipe Line API RP 5C6, Welding Connections to Pipe Threads Spec API, Q1, Specification for Quality Programs Std API, 5T1, Standard on Imperfection Terminology

ISO Standard	API Standard Referenced
ISO 15463:2003(en), Petroleum and natural gas industries — Field inspection of new casing, tubing and plain-end drill pipe	API Bull 5C2, Performance properties of casing, tubing, and drill pipe API Spec 5CT, Specification for casing and tubing API RP 5UE, Recommended practice for ultrasonic evaluation of pipe imperfections
ISO 13501:2011(en), Petroleum and natural gas industries — Drilling fluids — Processing equipment evaluation	API RP 13B-1, Recommended Practice for Field Testing Water-Based Drilling Fluids API RP 13B-2, Recommended Practice for Field Testing Oil-Based Drilling Fluids API RP 13C, Recommended Practice for Drilling Fluid Processing Systems Evaluation API RP 13E, Recommended Practice for Shale Shaker Screen Cloth Designation
ISO 10424-2:2007(en), Petroleum and natural gas industries — Rotary drilling equipment — Part 2: Threading and gauging of rotary shouldered thread connections	API Spec 7, Specification for rotary drill stem elements
ISO 19901-3:2014(en), Petroleum and natural gas industries — Specific requirements for offshore structures — Part 3: Topsides structure	API RP 2A-WSD:2000, Recommended practice for planning, designing and constructing fixed offshore platforms — Working stress design API RP 2A-LRFD:1993, Recommended practice for planning, designing and constructing fixed offshore platforms — Load and resistance factor design API RP 2FB:2006, Recommended practice for the design of offshore facilities against fire and blast loading
ISO 13678:2010(en), Petroleum and natural gas industries — Evaluation and testing of thread compounds for use with casing, tubing, line pipe and drill stem elements	ANSI/API TR 5C3, Bulletin on formulas and calculations for casing, tubing, drill pipe, and line pipe properties API BUL 5A2, Bulletin on thread compounds for casing, tubing, and line pipe API RP 5A3, Recommended practice on thread compounds for casing, tubing and line pipe API RP 5C1, Recommended practice for care and use of casing and tubing API RP 5C5, Recommended practice on procedures for testing casing and tubing connections API SPEC 5CT, Specification for casing and tubing API RP 7A11, Testing of thread compound for rotary shouldered connections API RP 7G, Recommended practice for drill stem design and operating limits
ISO 13628-15:2011(en), Petroleum and natural gas industries — Design and operation of subsea production systems — Part 15: Subsea structures and manifolds	API RP 2A, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms API Spec 2C, Specification for Offshore Pedestal Mounted Cranes ANSI/API Spec 5L, Specification for Line Pipe ANSI/API Spec 6A, Specification for Wellhead and Christmas Tree Equipment API Spec 6D, Specification for Pipeline Valves ANSI/API RP 14E, Recommended Practice for Design and Installation of Offshore Production Platform Piping Systems ANSI/API RP 17A, Design and Operation of Subsea Production Systems — General Requirements and Recommendations API Spec 17D, Specification for Subsea Wellhead and Christmas Tree Equipment ANSI/API RP 17F, Specification for Subsea Production Control Systems API 17H, Remotely operated tools and interfaces on Subsea Production Systems API Spec Q1, Specification for Quality Programs for the Petroleum, Petrochemical and Natural Gas Industry API Spec 1111, Design, Construction, Operation and Maintenance of Offshore Hydrocarbon Pipelines

ISO Standard	API Standard Referenced
ISO 13628-10:2005(en), Petroleum and natural gas industries — Design and operation of subsea production systems — Part 10: Specification for bonded flexible pipe	API RP 17B, Recommended Practice for Flexible Pipe API RP 17C, Recommended Practice on TFL (Through Flowline) API Spec 17K, Bonded flexible pipe API Spec 5L, Specification for Line Pipe API Spec 6A, Specification for Wellhead and Christmas Tree Equipment API Spec 16C, Specification for Choke and Kill Systems API Spec 17D, Specification for Subsea Wellhead and Christmas Tree Equipment API Spec 17J, Specification for Unbonded Flexible Pipe
ISO 16530-1:2017(en), Petroleum and natural gas industries — Well integrity — Part 1: Life cycle governance	Std API, 6AV2, Installation, Maintenance, and Repair of Surface Safety Valves and Underwater Safety Valves Offshore (replacing API RP 14H) API/TR 10TR1, Cement Sheath Evaluation API RP 14B, Design, Installation, Repair and Operation of Subsurface Safety Valve Systems API RP 14C, Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms API RP 14E, Recommended Practice for Design and Installation of Offshore Production Platform Piping Systems API RP 90, Annular Casing Pressure Management for Offshore Wells
ISO/TR 13624-2:2009(en), Petroleum and natural gas industries — Drilling and production equipment — Part 2: Deepwater drilling riser methodologies, operations, and integrity technical report	API RP 2A-WSD:2000, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms, 21st Edition API RP 2RD:1998, Design of Risers for Floating Production Systems and Tension-Leg Platforms API Spec 5L:2000, Specification for Line Pipe, 42nd Edition API RP 17B:2002, Recommended practice for flexible pipe
ISO/TR 22694:2008(en), Gas cylinders — Methods for establishing acceptance/rejection criteria for flaws in seamless steel and aluminium alloy cylinders at time of periodic inspection and testing	API RP 579, Recommended Practice for Fitness-for-Service, American Petroleum Institute , Washington DC, First Edition, 2000
ISO 19906:2019(en), Petroleum and natural gas industries — Arctic offshore structures	API Bulletin 2V-2004, Design of Flat Plate Structures, American Petroleum Institute API RP 2SK, Design and Analysis of Station Keeping Systems for Floating Structures, American Petroleum Institute , 2005 API RP 2T, Recommended practice for planning, design and constructing tension leg platforms, American Petroleum Institute, 1997
ISO/DIS 19901-3(en), Petroleum and natural gas industries — Specific requirements for offshore structures — Part 3: Topsides structure	API RP 2A-WSD, Recommended practice for planning, designing and constructing fixed offshore platforms — Working stress design API RP 2A-LRFD, Recommended practice for planning, designing and constructing fixed offshore platforms — Load and resistance factor design API Spec 4F:2020, Specification for drilling and well servicing structures, fifth edition, December 2020 API Bulletin 2V, 3rd Edition, 2004 ANSI/API RP 2TOP – Topsides structure – ISO 19901-3 (modified), Petroleum and natural gas industries – Specific requirements for offshore structures – Part 3: Topsides structure, first edition, 2019

ISO Standard	API Standard Referenced
ISO 27916:2019(en), Carbon dioxide capture, transportation and geological storage — Carbon dioxide storage using enhanced oil recovery (CO2-EOR)	Spec 5/CT ISO 11960, Specifications for Casing and Tubing API 10D/Spec 1 — TR4 Centralizers API Std 53, Blowout Prevention Equipment Systems for Drilling Wells, Fourth Edition, (Includes Addendum Bull 5C2: Performance Properties of Casing Tubing and Drill Pipe Spec 5L: Specification for Line Pipe Spec 5LD: CRA or Lined Steel Pipe Spec 6A: Specifications for Wellhead and Christmas Tree Equipment Spec 6D/ISO 14313: Specifications for Pipeline Vales Bull 6J: Testing of Oilfield Elastomers RP 10B-2 through 5: Testing Well Cements Spec 10A/ISO 10426-1: Specifications for Cements and Materials for Well Cementing TR 10TR1: Cement Sheath Evaluation API STANDARD 65—PART 2 Isolating Potential Flow Zones During Well Construction (2d ed. Dec) 2010) Spec 11D/ISO 14310: Petroleum and Natural Gas Industries — Downhole Equipment — Packers and Bridge Plugs Spec 15HR: High Pressure Fiberglass Line Pipe Spec 15LR: Low Pressure Fiberglass Line Pipe API , RP51R (R2013), Environmental sound practices to promote protection of the environment in domestic onshore oil and gas production API , API Environmental Guidance Document: Onshore Solid Waste Management in Exploration and Production Operations API , Guidelines for Commercial Exploration and Production Waste Management Facilities Bulletin A.P.I., E2, Bulletin on Management of Naturally Occurring Radioactive Materials (NORM) in Oil and Gas Production Bulletin A.P.I., E3, Environmental Guidance Document: Well Abandonment and Inactive Well Practices for U.S. Exploration and Production Operations API Specification 7B-11C, Specification for Internal-Combustion Reciprocating Engines for Oil-Field Service API Recommended Practice 7C-11F, Recommended Practice for Installation, Maintenance, and Operation of Internal-Combustion Engines API Recommended Practice 11ER, Recommended Practice for Guarding of Pumping Units Bulletin API , 11K, Data Sheet for the Design of Air Exchange Coolers API Specification 11N, Specification for Lease Automatic Custody Transfer (LACT) Equipment API Specification 12B, Specification for Bolted Tanks for Storage of Production Liquids API Specification 12D, Specification for Field Welded Tanks for Storage of Production Liquids API Specification 12F, Specification for Shop Welded Tanks for Storage of Production Liquids API Specification 12J, Specification for Oil and Gas Separators API Specification 12K, Specification for Indirect Type Oilfield Heaters API Specification 12L, Specification for Vertical and Horizontal Emulsion Treaters API Recommended Practice 12N, Recommended Practice for the Operation, Maintenance and Testing of Firebox Flame Arresters API Specification 12P, Specification for Fiberglass Reinforced Plastic Tanks API Recommended Practice 12R1, Recommended Practice for Setting, Maintenance, Inspection, Operation, and Repair of Tanks in Production Service

ISO Standard	API Standard Referenced
ISO 27916:2019(en), Carbon dioxide capture, transportation and geological storage — Carbon dioxide storage using enhanced oil recovery (CO2-EOR) (CONT)	API Recommended Practice 53, Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells API Recommended Practice 55, Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide API Bulletin 75L, Guidance Document for the Development of a Safety and Environmental Management System for Onshore Oil and Natural Gas Production Operations and Associated Activities API Recommended Practice 580, Risk-Based Inspection, Third Edition API Recommended Practice 581, Risk-Based Inspection Technology, Third Edition API Recommended Practice 2350, Overfill Protection for Storage Tanks in Petroleum Facilities API Publication 4663, Remediation of Salt-Affected Soils at Oil and Gas Production Facilities
ISO 13680:2020(en), Petroleum and natural gas industries — Corrosion-resistant alloy seamless tubular products for use as casing, tubing, coupling stock and accessory material — Technical delivery conditions	API Standard 20H, Heat Treatment Services-Batch Type for Equipment Used in the Petroleum and Natural Gas Industry
ISO 13624-1:2009(en), Petroleum and natural gas industries — Drilling and production equipment — Part 1: Design and operation of marine drilling riser equipment	API RP 9B, Recommended Practice on Application Care, and Use of Wire Rope for Oil Field Service API RP 16Q, Design, Selection, Operation and Maintenance of Marine Drilling Riser Systems API RP 53, Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells API Spec 16F, Specification for Marine Drilling Riser Equipment APl RP 64, Recommended Practices for Diverter Systems Equipment and Operations ANSI/ API Spec 16C, Choke and Kill System ANSI/ API RP 14E, Recommended Practice for Design and Installation of Offshore Products Platform Piping Systems ANSI/ API Bull 5C3, Bulletin on Formulas and Calculations for Casing, Tubing, Drill Pipe, and Line Pipe Properties APl RP 2SK, Design and Analysis of Stationkeeping Systems for Floating Structures ANSI/ API Spec 5L/ISO 3183, Specification for Line Pipe API RP 2A (all parts), Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms API Technical Report 16TR1, Deepstar Committee, Document number 4-1-4-041/TN01 Rev. Ic, April 2002 API RP 2R, Recommended Practice for Marine Drilling Riser Couplings

ISO Standard	API Standard Referenced
ISO 27916:2019(en), Carbon dioxide capture, transportation and geological storage — Carbon dioxide storage using enhanced oil recovery (CO2-EOR)	Spec 5/CT ISO 11960, Specifications for Casing and Tubing API 10D/Spec 1 — TR4 Centralizers API Std 53, Blowout Prevention Equipment Systems for Drilling Wells, Fourth Edition, (Includes Addendum 1) Bull 5C2: Performance Properties of Casing Tubing and Drill Pipe Spec 5L: Specification for Line Pipe Spec 5LD: CRA or Lined Steel Pipe Spec 6A: Specifications for Wellhead and Christmas Tree Equipment Spec 6D/ISO 14313: Specifications for Pipeline Vales Bull 6J: Testing of Oilfield Elastomers RP 10B-2 through 5: Testing Well Cements Spec 10A/ISO 10426-1: Specifications for Cements and Materials for Well Cementing TR 10TR1: Cement Sheath Evaluation API STANDARD 65—PART 2 Isolating Potential Flow Zones During Well Construction (2d ed. Dec) 2010) Spec 11D/ISO 14310: Petroleum and Natural Gas Industries — Downhole Equipment — Packers and Bridge Plugs Spec 15HR: High Pressure Fiberglass Line Pipe Spec 15LR: Low Pressure Fiberglass Line Pipe API , RP51R (R2013), Environmental sound practices to promote protection of the environment in domestic onshore oil and gas production API , API Environmental Guidance Document: Onshore Solid Waste Management in Exploration and Production Operations API , Guidelines for Commercial Exploration and Production Waste Management Facilities Bulletin A.P.I., E2, Bulletin on Management of Naturally Occurring Radioactive Materials (NORM) in Oil and Gas Production Bulletin A.P.I., E3, Environmental Guidance Document: Well Abandonment and Inactive Well Practices for U.S. Exploration and Production Operations API Specification 7B-11C, Specification for Internal-Combustion Reciprocating Engines for Oil-Field Service API Recommended Practice 7C-11F, Recommended Practice for Installation, Maintenance, and Operation of Internal-Combustion Engines API Recommended Practice 11ER, Recommended Practice for Guarding of Pumping Units Bulletin API , 11K, Data Sheet for the Design of Air Exchange Coolers API Specification 11N, Specification for Lease Automatic Custody Transfer (LACT) Equipment API Specification 12B, Specification for Bolted Tanks for Storage of Production Liquids API Specification 12D, Specification for Field Welded Tanks for Storage of Production Liquids API Specification 12F, Specification for Shop Welded Tanks for Storage of Production Liquids API Specification 12J, Specification for Oil and Gas Separators API Specification 12K, Specification for Indirect Type Oilfield Heaters API Specification 12L, Specification for Vertical and Horizontal Emulsion Treaters API Recommended Practice 12N, Recommended Practice for the Operation, Maintenance and Testing of Firebox Flame Arresters API Specification 12P, Specification for Fiberglass Reinforced Plastic Tanks API Recommended Practice 12R1, Recommended Practice for Setting, Maintenance, Inspection, Operation, and Repair of Tanks in Production Service API Recommended Practice 49, Recommended Practice for Drilling and Well Servicing Operations Involving Hydrogen Sulfide

ISO Standard	API Standard Referenced
ISO 27916:2019(en), Carbon dioxide capture, transportation and geological storage — Carbon dioxide storage using enhanced oil recovery (CO2-EOR) (COMT)	API Recommended Practice 53, Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells API Recommended Practice 55, Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide API Bulletin 75L, Guidance Document for the Development of a Safety and Environmental Management System for Onshore Oil and Natural Gas Production Operations and Associated Activities API Recommended Practice 580, Risk-Based Inspection, Third Edition API Recommended Practice 581, Risk-Based Inspection Technology, Third Edition API Recommended Practice 2350, Overfill Protection for Storage Tanks in Petroleum Facilities API Publication 4663, Remediation of Salt-Affected Soils at Oil and Gas Production Facilities API Bulletin 75L, Guidance Document for the Development of a Safety and Environmental Management System for Onshore Oil and Natural Gas Production Operations and Associated Activities API Recommended Practice 580, Risk-Based Inspection, Third Edition API Recommended Practice 581, Risk-Based Inspection Technology, Third Edition API Recommended Practice 2350, Overfill Protection for Storage Tanks in Petroleum Facilities API Publication 4663, Remediation of Salt-Affected Soils at Oil and Gas Production Facilities
ISO 13533:2001(en), Petroleum and natural gas industries — Drilling and production equipment — Drill-through equipment	API Specification 7 - 39th edition, Specification for rotary drill stem elements
ISO 13628-1:2005(en), Petroleum and natural gas industries — Design and operation of subsea production systems — Part 1: General requirements and recommendations	API TR 6AF, Technical Report on Capabilities of API Flanges under Combinations of Load API RP 2RD, Design of Risers for Floating Production Systems (FPSs) and Tension–Leg Platforms (TLPs) API RP 16Q, Recommended Practice for Design, Selection, Operation and Maintenance of Marine Drilling Riser Systems API TR 6AF1, Technical Report on Temperature Derating on API Flanges under Combination of Loading API TR 6AF2, Bulletin on Capabilities of API Integral Flanges under Combination of Loading — Phase II API RP 1111, Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines (Limit State Design)
ISO 10416:2008(en), Petroleum and natural gas industries — Drilling fluids — Laboratory testing	API RP 13B-1:2003, Recommended Practice for Field Testing Water-Based Drilling Fluids API RP 13I, Recommended Practice for Laboratory Testing of Drilling Fluids API RP 13K, Recommended Practice for Chemical Analysis of Barite
ISO 19903:2019(en), Petroleum and natural gas industries — Concrete offshore structures	API Std 2000, Venting Atmospheric and Low-Pressure Storage Tanks: Nonrefrigerated and Refrigerated, American Petroleum Institute
ISO 11961:2018(en), Petroleum and natural gas industries — Steel drill pipe	API Std, 5T1, Standard on Imperfection Terminology Spec API, Q1/ISO/TS 29001, Specification for Quality Programs for the Petroleum, Petrochemical and Natural Gas Industry, Eighth Edition Spec API, 7, Specification for Rotary Drill Stem Elements API RP 7G, Recommended Practice for Drill Stem Design and Operating Limits API RP13B-1/ISO 10414-1, Field Testing for Water-Based Drilling Fluids ANSI/API 5C3, Bulletin on Formulas and Calculations for Casing, Tubing, Drill-pipe, and Line Pipe Properties
ISO 10439-3:2015(en), Petroleum, petrochemical and natural gas industries — Axial and centrifugal compressors and expander-compressors — Part 3: Integrally geared centrifugal compressors	API 672, Packaged, integrally geared centrifugal air compressors for petroleum, chemical, and gas industry services API RP 686, Machinery installation and installation design
ISO 10439-2:2015(en), Petroleum, petrochemical and natural gas industries — Axial and centrifugal compressors and expander-compressors — Part 2: Non-integrally geared centrifugal and axial compressors	API 613, Special purpose gear units for petroleum, chemical, and gas industry services API 672, Packaged, integrally geared centrifugal air compressors for petroleum, chemical, and gas industry services API 614 5th edition1, Lubrication, shaft-sealing, and oil-control systems and auxiliaries

ISO Standard	API Standard Referenced
ISO 16488:2015(en), Marine finfish farms — Open net cage — Design and operation	API RP 2SK Design and Analysis of Stationkeeping Systems for Floating Structures (Includes 2008 Addendum), American Petroleum Institute
ISO/DIS 13702(en), Petroleum and natural gas industries — Control and mitigation of fires and explosions on offshore production installations — Requirements and guidelines	API STD 521, Pressure relieving and depressuring systems API RP 2FB, Recommended Practice for the Design of Offshore Facilities Against Fire and Black Loading API RP 14G, Recommended Practice for Fire Prevention and Control on Open Type Offshore Production Platforms API RP 500, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2 API RP 505, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2 API RP 2003, Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents API 2030, Application of Fixed Water Spray Systems for Fire Protection in the Petroleum and Petrochemical Industries
ISO 10439-4:2015(en), Petroleum, petrochemical and natural gas industries — Axial and centrifugal compressors and expander-compressors — Part 4: Expander-compressors	API RP 684, API standard paragraphs rotordynamic tutorial: Lateral critical speeds, unbalance response, stability, train torsionals, and rotor balancing ANSI/AWS—C6.1, Recommended practices for friction welding API 6141, Lubrication, Shaft-sealing and Oil-control Systems and Auxiliaries, Fifth Edition
ISO 20257-1:2020(en), Installation and equipment for liquefied natural gas — Design of floating LNG installations — Part 1: General requirements	API RP 2SK, Design and Analysis of Stationkeeping Systems for Floating Structures API RP 505, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1 and Zone 2 API Std 520, Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries API Std 521, Guide for Pressure-Relieving and Depressuring Systems
ISO 13702:2015(en), Petroleum and natural gas industries — Control and mitigation of fires and explosions on offshore production installations — Requirements and guidelines	API RP 2FB, Recommended Practice for the Design of Offshore Facilities Against Fire and Black Loading API RP 14J, Recommended Practice for Design and Hazard Analysis for Offshore Production Facilities API RP 14G, Recommended Practice for Fire Prevention and Control on Open Type Offshore Production Platforms API RP 75, Recommended Practice for Development of a Safety and Environmental Management Program for Offshore Operation and Facilities API RP 500, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2 API RP 505, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2 API RP 2003, Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents API 2030, Application of Fixed Water Spray Systems for Fire Protection in the Petroleum and Petrochemical Industries
ISO 17782:2018(en), Petroleum, petrochemical and natural gas industries — Scheme for conformity assessment of manufacturers of special materials	API RP 6HT:2013, Heat Treatment and Testing of Carbon and Low Alloy Steel Large Cross Section and Critical Section Components API 6A:2010, Specification for Wellhead and Christmas Tree Equipment — Qualification of heat treatment equipment
ISO 17945:2015(en), Petroleum, petrochemical and natural gas industries — Metallic materials resistant to sulfide stress cracking in corrosive petroleum refining environments	API Spec 5L, Specification for Line Pipe
ISO 13628-6:2006(en), Petroleum and natural gas industries — Design and operation of subsea production systems — Part 6: Subsea production control systems	API Spec 6A, Specification for Wellhead and Christmas Tree Equipment API Spec 17D, Specification for Subsea Wellhead and Christmas Tree Equipment API Spec 17E, Specification for Subsea Umbilicals
ISO 16961:2015(en), Petroleum, petrochemical and natural gas industries — Internal coating and lining of steel storage tanks	API STD 650, Welded Tanks for Oil Storage API STD 2217A, Guidelines for Safe Work in Inert Confined Spaces in the Petroleum and Petrochemical Industries

ISO Standard	API Standard Referenced
ISO 10976:2015(en), Refrigerated light hydrocarbon fluids — Measurement of cargoes on board LNG carriers	API MPMS Chapter 14.5, Calculation of Gross Heating Value, Relative Density, Compressibility and Theoretical Hydrocarbon Liquid Content for Natural Gas Mixtures for Custody Transfer API MPMS Chapter 17.1, Guidelines for Marine Cargo Inspection
ISO 15138:2018(en), Petroleum and natural gas industries — Offshore production installations — Heating, ventilation, and air-conditioning	API 4589, Fugitive Hydrocarbon Emissions from Oil and Gas Production Operations
ISO/DIS 16961(en), Petroleum, petrochemical and natural gas industries — Internal coating and lining of steel storage tanks	API Std 650, Welded Tanks for Oil Storage API Std 2217A, Guidelines for Safe Work in Inert Confined Spaces in the Petroleum and Petrochemical Industries
ISO/IWA 28:2018(en), Faecal sludge treatment units — Energy independent, prefabricated, community-scale resource-recovery units — Safety and performance	API 520, Sizing, selection, and installation of pressure-relieving devices API 521, Pressure-relieving and depressuring systems
ISO 10414-1:2008(en), Petroleum and natural gas industries — Field testing of drilling fluids — Part 1: Water-based fluids	API RP 13B-1, Recommended Practice Standard Procedure for Field Testing Water-Based Drilling Fluids API RP 13D, Recommended Practice on the Rheology and Hydraulics of Oil-Well Drilling Fluids ISO 10416, Petroleum and natural gas industries — Drilling fluids — Laboratory testing API RP 13I, Laboratory Testing of Drilling Fluids
ISO 14692-1:2017(en), Petroleum and natural gas industries — Glass-reinforced plastics (GRP) piping — Part 1: Vocabulary, symbols, applications and materials	API 15 HR, Specification for high pressure fibreglass line pipe
ISO 4126-10:2010(en), Safety devices for protection against excessive pressure — Part 10: Sizing of safety valves for gas/liquid two-phase flow	API Std 520, Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries. Part 1 — Sizing and Selection API RP 521, Guide for Pressure-Relieving and Depressuring Systems
ISO 10442:2002(en), Petroleum, chemical and gas service industries — Packaged, integrally geared centrifugal air compressors	API Std 672, Packaged, integrally geared centrifugal air compressors for petroleum, chemical, and gas industry services, second edition, April 1988
ISO 13503-2:2006(en), Petroleum and natural gas industries — Completion fluids and materials — Part 2: Measurement of properties of proppants used in hydraulic fracturing and gravel-packing operations	API RP 56:1995, Recommended Practices for Testing Sand Used in Hydraulic Fracturing Operations 8) API RP 58:1995, Recommended Practices for Testing Sand Used in Gravel-packing Operations API RP 60:1995, Recommended Practices for Testing High Strength Proppants Used in Hydraulic Fracturing Operations
ISO 19880-1:2020(en) Gaseous hydrogen — Fueling stations — Part 1: General requirements	API RP 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents
ISO 31800:2020(en), Faecal sludge treatment units — Energy independent, prefabricated, community-scale, resource recovery units — Safety and performance requirements	API 520, Sizing, selection, and installation of pressure-relieving devices API 521, Pressure-relieving and depressuring systems API 650, Welded steel tanks for oil
ISO 21650:2007(en), Actions from waves and currents on coastal structures	API RP 2A WSD, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms — Load and Resistance Factor Design, First edition, API, USA, 1993
ISO/TS 18226:2006(en), Plastics pipes and fittings — Reinforced thermoplastics pipe systems for the supply of gaseous fuels for pressures up to 4 MPa (40 bar)	API Spec 15LE, Polyethylene (PE) Line Pipe, April 1995 API Spec 15HR, High Pressure Fibreglass Line Pipe, August 2001 API Spec 17J, Unbonded Flexible Pipe, November 1999
ISO 13503-5:2006(en), Petroleum and natural gas industries — Completion fluids and materials — Part 5: Procedures for measuring the long-term conductivity of proppants	API RP 61, Recommended Practices for Evaluating Short Term Proppant Pack Conductivity, First Edition, October 1, 1989
ISO 16110-1:2007(en), Hydrogen generators using fuel processing technologies — Part 1: Safety	API 934, Materials and Fabrication Requirements for 2-1/4Cr-1Mo and 3Cr-1Mo Steel Heavy Wall Pressure Vessels for High Temperature, High Pressure Hydrogen Service API 941, Steels for Hydrogen Service at Elevated Temperatures and Pressures in Petroleum Refineries and Petrochemical Plants

ISO Standard	API Standard Referenced
ISO 16111:2018(en), Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride	API RP 934, Materials and Fabrication Requirements for 2 1/4 Cr-1Mo and 3Cr-1Mo Steel Heavy Wall Pressure Vessels for High Temperature, High Pressure Hydrogen Service API RP 941, Steels for Hydrogen Service at Elevated Temperatures and Pressures in Petroleum Refineries and Petrochemical Plants
ISO 24817:2017(en), Petroleum, petrochemical and natural gas industries — Composite repairs for pipework — Qualification and design, installation, testing and inspection	ASME FFS-1/API RP 579, Fitness-For-Service (Recommended Practice)
ISO 13706:2011(en), Petroleum, petrochemical and natural gas industries — Air-cooled heat exchangers	API RP 571-11, Damage mechanisms affecting fixed equipment in the refining industry
ISO 21457:2010(en), Petroleum, petrochemical and natural gas industries — Materials selection and corrosion control for oil and gas production systems	API RP 945, Avoiding Environmental Cracking in Amine Units
ISO 10434:2020(en), Bolted bonnet steel gate valves for the petroleum, petrochemical and allied industries	API/ANSI 600 eleventh edition, Bolted Bonnet Steel Gate Valves for Petroleum and Natural Gas Industries — Modified National Adoption of ISO 10434:1998 API 602, Steel Gate, Globe and Check Valves for Sizes DN 100 and Smaller for the Petroleum and Natural Gas Industries
ISO 21789:2022(en), Gas turbine applications — Safety	API 613:2003,3 Special Purpose Gear Units for Petrochemical, Chemical and Gas Industry Services – 5TH Edition
ISO 12242:2012(en), Measurement of fluid flow in closed conduits — Ultrasonic transit-time meters for liquid	API MPMS 5.8, Measurement of liquid hydrocarbons by ultrasonic flow meters using transit time technology. In: API manual of petroleum measurement standards
ISO 15664:2001(en), Acoustics — Noise control design procedures for open plant	API RP 521, Guide for Pressure Relief and Depressuring Systems
ISO 15112:2018(en), Natural gas — Energy determination	API MPMS Chapter 14.5: Calculation of Gross Heating Value, Relative Density, Compressibility and Theoretical Hydrocarbon Liquid Content for Natural Gas Mixtures for Custody Transfer
ISO 12213-3:2006(en), Natural gas — Calculation of compression factor — Part 3: Calculation using physical properties	API MPMS, Chapter 14.2, Second edition, November 1992
ISO 7507-1:2003(en), Petroleum and liquid petroleum products — Calibration of vertical cylindrical tanks — Part 1: Strapping method	API MPMS, Chapter 2.2A, Measurement and calibration of upright cylindrical tanks by the strapping method, 1st ed., February 1995
ISO 19901-2:2022(en), Petroleum and natural gas industries — Specific requirements for offshore structures — Part 2: Seismic design procedures and criteria	API RP2A-LRFD Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms, American Petroleum Institute, July 1993, 1st ed.
ISO 12213-1:2006(en), Natural gas — Calculation of compression factor — Part 1: Introduction and guidelines	API MPMS, chapter 14.2, second edition, November 1992

Learn more at *API.org*

ACKNOWLEDGEMENT

This information was prepared by API Global Standards Strategy in conjunction with API staff. API greatly appreciates the significant amount of work that went into this report, especially by C&M International and API's global offices. For information, contact the API Standards Department at GSS@API.org.