



API Spec 6D 24th Edition & API 20 series Supply chain management standards

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Agenda

- History of API Standards
- Overview of API 6D 24th edition
- Overview of API 20 Series – Supply Chain Management



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History of Standards Development

API

1st Edition of API 6D was (API 5G1) was published in September 1936 and went through 5 revisions and officially published in June 1947 as API 6D -5th edition. We are moving to the 24th Edition in 2014.

ISO

For 22 + years ISO developed jointly with API many product standards for both upstream and downstream product standards. Due to ISO allowing full voting membership to ISO TC67 in early 2012, API is no longer allowing its intellectual property be provide to ISO. Approximately 800 technical expert from the US are no longer work on ISO standards. The 22 plus early is getting our industry to a single global standard has quickly fell apart is just 2 years. All future API standards shall be developed solely with in API frame work.



- History of API Standards
- Overview of API 6D 24th edition
- Overview of API 20 Series – Supply Chain Management

Highlights of API Spec. 6D –24th edition changes

- Title of specification has changed to: “Pipeline and Piping valves”
- Units of Measurement in this standard, data shall be stated as USC - United States Customor first and SI units in brackets.
- Processes Requiring Validation : The following operations performed during manufacturing shall be validated as the resulting output cannot be verified by subsequent monitoring or measurement. The following processes shall be validated, by the manufacturer, in accordance with their quality system as applicable:
 - Nondestructive Examination (NDE)
 - Welding
 - Heat Treating
 - External coating/ component plating that may impact product performance, by agreement

Highlights of API Spec. 6D 24th edition changes

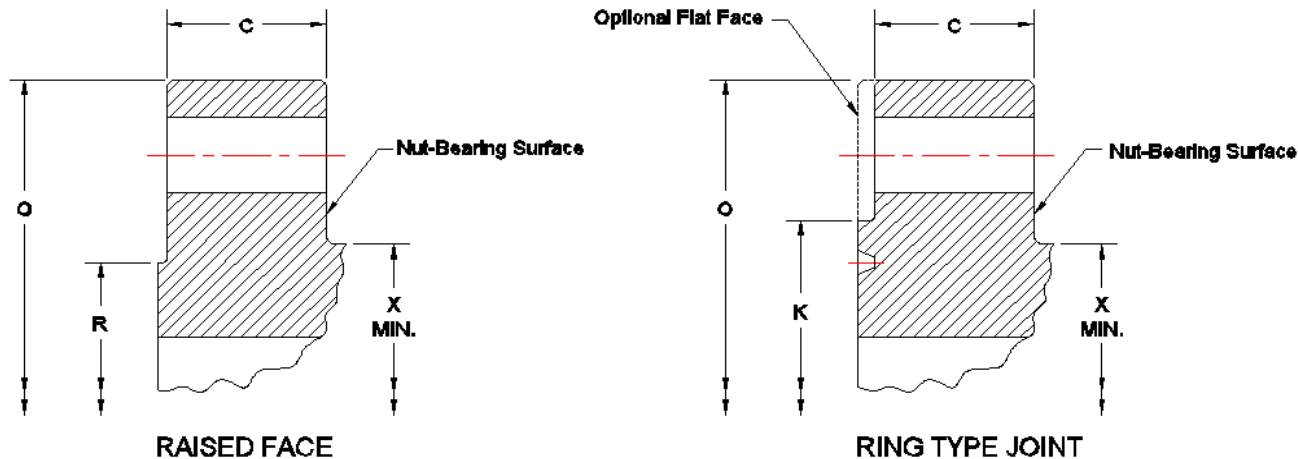
- New /revised definitions added to text
- Block and bleed valve -Single valve with at least one seating surface that, in the closed position, provides a seal against pressure from one end of the valve with the body vented.
- Delete nominal pressure class (PN)
- Pressure-containing parts- A part, whose failure to function as intended results in a release of contained fluid into the environment and as a minimum includes bodies, end-connections, bonnets/covers and stems.

Highlights of API Spec. 6D 24th edition changes

- Shaft -Part that supports the obturator on a check valve and does not pass through the pressure boundary.
- Stem -Part that drives the obturator and passes through the pressure boundary.
- Valve Types and Configurations which included all the figures and end – to-end dimension tables have been moved to a new Annex B and Annex C
- When there is no minimum bore dimensions listed for a valve pressure class and size stated in Table 1, the size and bore shall be by agreement and the manufacture shall stamp the size and bore on the nameplate.

Highlights of API Spec. 6D 24th edition changes

- Flanges shall be furnished with a raised face or ring joint face (raised face or full face). Specified dimensions, tolerances and finishes, including drilling templates, flange facing, nut-bearing surfaces (i.e. spot facing and back facing), outside diameters and thickness



Highlights of API Spec. 6D 24th edition changes

Design

- Injection Points - Sealant fittings shall have a design pressure not less than the greater of the pipeline or piping valve rated pressure and the injection pressure. Note an example is a button head fitting with integral check valve and sealing cap.
- Hand-wheel diameter(s) shall not exceed the face-to-face or end-to-end length of the valve or 40(1065 mm)
- Travel Stops -Valves that do not require mechanical force to effect a seal shall be provided with travel stops. shall be provided on the valve and/or operator and they shall locate the position of the obturator in the open and closed position. The travel stops shall not affect the sealing capability of the valve. New Annex D for guidance for travel stops by valve type.
- Actuator sizing and mounting kits shall be in accordance with API 6DX or ISO 12490

Highlights of API Spec. 6D 24th edition changes

Allowable Stresses

- The 23rd edition of API 6D addresses the tensile stresses in drive train components, including stem extensions as well as shear stress (including torsional shear stress) and bearing stress shall comply with ASME BPVC Section VIII Div.2 AD-132:2004.
- In the 2007 ,2010 and 2013 revisions of ASME BPVC Section VIII Div.2 this clause was deleted and no text was included to address these issues.
- For the 24th edition of API 6D new text has been added to address the tensile stresses in drive train components, including stem extensions as well as shear stress (including torsional shear stress) and bearing stress with general notes section of ASME BPVC Section II, Part D which are more in line with industry standards.

Highlights of API Spec. 6D 24th edition changes

Material Specification

Specifications for metallic pressure-containing and pressure-controlling parts shall be issued by the manufacturer and shall address the following.

- Material grade
- Melting practice
- Chemical analysis;
- Heat treatment;
- Mechanical properties (tensile)
- Certification to report all items listed in 8.1.

Other requirements of the material specifications shall be as follows, if applicable

- Carbon equivalent ;
- Charpy impacts
- Hardness;
- Testing;

Highlights of API Spec. 6D 24th edition changes

Service Compatibility - Selection of elastomeric materials for valves intended for rapid gas decompression service at pressures of class 600 and above shall address the effect of explosive decompression.

Forged Parts - All forge material(s) shall be formed using a hot-working practice and heat treatment throughout that produces a forged structure.

Composition Limits - The chemical composition of carbon steel welding ends shall meet the following requirements.

- The sulfur content shall not exceed 0.020% by mass.
- The phosphorus content shall not exceed 0.025 % by mass.

Highlights of API Spec. 6D 24th edition changes

Materials

- Charpy impact values for full-size specimens of duplex or super duplex stainless steels shall be as follows:
 - a) average of three specimens: 33ft.lbs (45 J) minimum;
 - b) no single specimen less than 26 ft. lbs. (35 J).
 - c) Charpy impact test temperature shall be -50F (-46C)
- If the first set of the Charpy impact test(s) do not satisfy the applicable requirements, one additional set of 3 impact tests on two additional test specimens (removed from the same test coupon with no additional heat treatment) may be performed in an effort to qualify the material. The results of each of these tests shall satisfy the applicable requirements.

Highlights of API Spec. 6D 24th edition changes

Material – *continued...*

Sour Service

Materials for pressure-containing and pressure-controlling parts and bolting for sour service shall meet the requirements of NACE MR0175 or ISO 15156 (all parts) or MR0103 . Purchaser shall specify which standard is to be used.

Welding Welding consumables shall conform to the American Welding Society's or manufacturer's specifications. The manufacturer shall have a written procedure for storage and control of welding consumables. Materials of low-hydrogen type (including electrodes, wires, and fluxes) shall be stored and used as recommended by the manufacturer of the welding consumable to retain their original low-hydrogen properties.

Highlights of API Spec. 6D 24th edition changes

Welding - – *continued...*

- For weld overlay or clad welding with nickel-based alloy UNS N06625, the weld overlay or clad thickness chemical composition shall meet one of the class listed below.
- Class Fe 10: Iron mass fraction 10.0% maximum or,
- Class Fe 5: Iron mass fraction 5.0% maximum, when specified by the purchaser.

Highlights of API Spec. 6D 24th edition changes

Welding-continue

- Weld repair of forgings and plates shall not be performed to correct material defects, unless otherwise agreed. However, weld repair can be used to correct machining errors. The weld repair shall be in accordance with the applicable material standard, including any PWHT, if applicable.

Highlights of API Spec. 6D 24th edition changes

Quality control

Calibration Intervals

- Calibration intervals shall be established for calibrations based on repeatability and degree of usage.
- Calibration intervals shall be a maximum of three (3) months until recorded calibration history can be established by the manufacturer.
- Intervals shall be shortened and may be lengthened based on review of the calibration history and determination of interval adjustments as defined in the manufacturer's written procedure. Increments to establish longer intervals shall be limited to three (3) months maximum.
- The maximum calibration period shall not exceed one (1) calendar year.

Highlights of API Spec. 6D 24th edition changes

Quality control – *continued...*

- Personnel performing visual inspections of welding operations and completed welds shall be qualified and certified as either:
 - AWS QC1 or equivalent certified welding inspector or;
 - AWS QC1 or equivalent senior certified welding inspector or;
 - AWS QC1 or equivalent certified associated welding inspector, or;
 - welding inspector certified by the manufacturer's documented training program

Highlights of API Spec. 6D 24th edition changes

Testing

- Test fluid shall be fresh water, shall contain a corrosion inhibitor. Based on the end location of the valve the test fluid shall have, antifreeze (glycol) unless otherwise agreed. The water temperature shall not be no greater than 100 F (38 C) during the testing period.
- All hydrostatic and pneumatic shell tests specified shall be performed with the valve unseated and partially open and may also be performed with the valve fully open, provided the body cavity is simultaneously filled and pressurized through a cavity connection.
- Supply pressure shall be isolated from the valve being tested and shall be stabilized prior to the start of pressure testing duration. The pressure measuring device shall be installed in the test apparatus in such a manner that the device continuously monitors/records the test pressure of the valve assembly. The pressure test shall be held for the minimum test durations listed in Tables 4, 5, and 6 after stabilization as determined by the manufacturer.

Highlights of API Spec. 6D 24th edition changes

Testing-continue

- Table 6—Minimum Duration of Seat Tests

Valve size		Test duration min
DN	NPS	
≤ 100	≤ 4	2
150-450	6-18	5
500 and larger	20 & Larger	10

Highlights of API Spec. 6D 24th edition changes

Coating

- All non-corrosion-resistant valves shall be coated externally in accordance with the manufacturer's standards, unless otherwise agreed. If external coating operations are performed by the manufacturer or their coating contractor, preventative measures shall be taken to assure that no foreign material enters the internal cavity of the valve that may impact the valve function.
- Flange faces sealing surfaces, weld bevel ends and exposed stems shall not be external coated. See Annex M to provided details on where coat is not allowed.
- Corrosion protection shall be provided using the manufacturer's documented requirements for flange faces, weld bevel ends, exposed stems and internal surfaces of the valve.

Highlights of API Spec. 6D 24th edition changes

Marking

- If a product or component is marked in accordance with the product specification and the API monogram is applied (i.e., monogrammed equipment), and it is subsequently determined that the product fails to satisfy any applicable requirements of this specification, the nonconformance(s) should be reported to the API Monogram Program per the Monogram Program Annex (see Annex A.6).
- Each valve shall be provided with an austenitic stainless steel nameplate securely affixed and so located that it is easily accessible. The nameplate shall be attached to the valve body, however based on valve design the nameplate maybe attached the bonnet/cover or closure /end-connector at the option of the manufacture.

Highlights of API Spec. 6D 24th edition changes

Marking-continue

- The marking on the body, end connector and bonnet/cover and nameplate shall be visually legible.
- The body marking shall be minimum letter size shall be 0.25 in.
- The nameplate minimum letter size shall be .125 in (3 mm) on valves sizes NPS 2 (DN 50) and larger. All valves NPS 1.5in (DN 38) and smaller, the nameplate letter size shall be per the manufactures standard.
- On valves whose size or shape limits the body markings, they may be omitted in the following order:
 - a) manufacturer's name or trademark;
 - b) material;
 - c) rating;
 - d) size

Highlights of API Spec. 6D 24th edition changes

Preparation for Shipment

- Protective covers shall be made of wood, wood fiber, plastic or metal and shall be securely attached to the valve ends by using bolting/nuts or plastic straps or steel clips or friction-locking devices.
- Protective covers made of wood or wood fiber shall be fitted with a non-porous moisture barrier between the cover and the metal flange or welding end. All flanged end and weld end protective covers installed on the valves shall be sealed using a rubberized water proof tape.
- Check valves NPS 4 (DN 100) and larger shall be shipped with the disc secured or supported during transport. A warning label shall be attached to the protective cover with instructions to remove, prior to installation, material from inside the valve that secures or supports the disc.

Highlights of API Spec. 6D 24th edition changes

Documentation

- Documentation provided with the valve(s). As a minimum, a certificate of compliance to this standard shall be supplied by the manufacturer.
- The Certificate(s) shall identify the valves type, size, class, end connection; serial number(s) and a statement that valve (s) are in full compliance with this product specification and revision date.

Highlights of API Spec. 6D 24th edition changes

Minimum facility requirements for the following category of manufacturer.

1	Product Design	Performed on-site, off-site and/or outsourced
1B	Product design validation	Performed on-site, off-site
2	Material Procurement	Performed on-site, off-site or outsourced
3	Receiving Verification	Performed on-site
4	Machining	Performed on-site, off-site or outsourced
5	In-process Inspection	Performed on-site, off-site or outsourced
6	Welding	Performed on-site, off-site or outsourced
7	Assembly	Performed on-site
8	Verification Testing-FAT	Performed on-site
9	Supplementary NDE & Testing (Annex G,H, I, O	Performed on-site, off-site or outsourced
10	Marking/ Tagging/nameplate	Performed on-site
11	Painting/Coating	Performed on-site, off-site or outsourced
12	Preparation for shipment	Performed on-site
13	Final Inspection	Performed on-site

Highlights of API Spec. 6D 24th edition changes

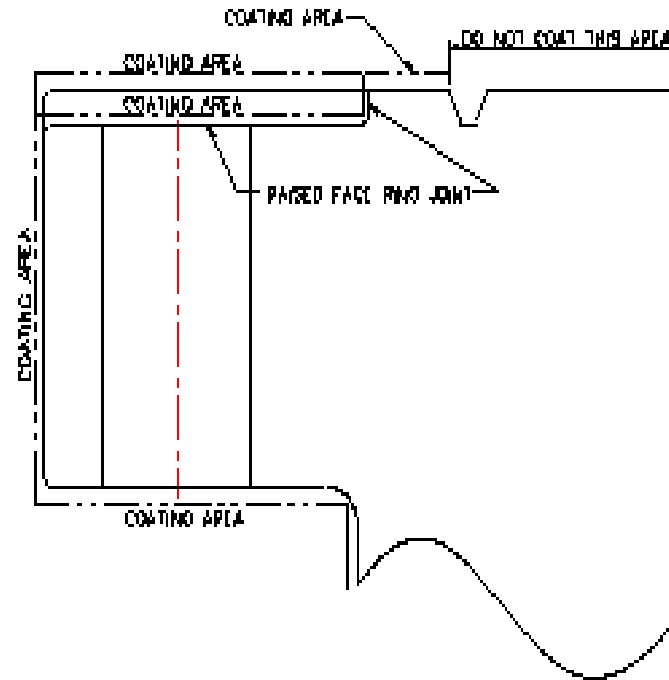
- Annex A - API monogram requirements
- Annex B – Valve configurations sketches
- Annex C – Valve end-to-end dimensions
- Annex D (Informative) Guidance for travel stops by valve type
- Annex E – (Informative) supply chain management
- Annex F (Normative) Recommended Practice for Qualification of Heat-treating Equipment
- Annex G (Normative) Requirements for non-destructive examination

Highlights of API Spec. 6D 24th edition changes

- Annex I (Normative) Supplementary Test Requirements
- Annex J (informative) Requirements for Extended Hydrostatic Shell Test Duration and Records Retention for Valves in Jurisdictional Pipeline Systems
- Annex K (normative) Quality Specification Level (QSL) for Pipeline Valves
- Annex L (Informative) Isolation valve features
- Annex M (Informative) External Coating for End Connections
- Annex N (informative) Supplementary Documentation Requirements
- Annex O (informative) Purchasing Guidelines

Highlights of API Spec. 6D 24th edition changes

M.3 Ring type joint or raised face ring type joint: Valves with ring type joint or raised face ring type joint end connections shall have the entire flange coated except for the portion from the ring joint O.D. to valve bore see, Figure M-2.





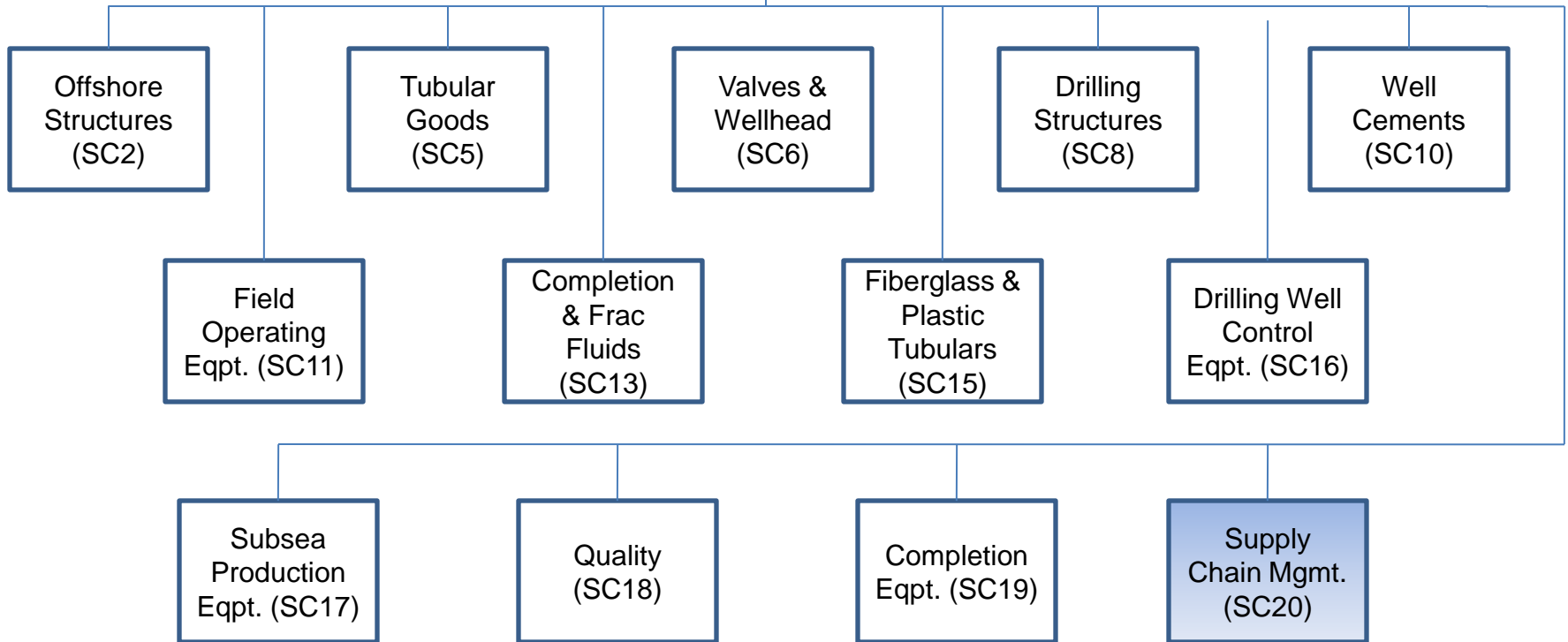
- History of API Standards
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Overview of API 20 Series – Supply Chain

- API formed in 1919 as a national trade association
- New organization focuses on three priority issues – industry taxation, statistics, and standards
- Standards Program organized in 1923, first standard published in 1924 on drilling threads
- API now publishes 500 standards covering all industry segments
- API Standards are:
 - Core of Institute’s technical authority
 - Represent industry’s best practices and are used in worldwide operations
 - Facilitate reasonable regulations
- API is accredited by the American National Standards Institute

API Standards Organization

CSOEM Committee on Standardization Of Oilfield Equipment and Materials



Drivers for Oil & Gas Industry Supply Chain Standards

- Ongoing industry issues with materials and processes deemed critical to the safety and reliability of products used in the Oil and Gas industry.
- Increasingly global supply chain with limited history with oil and gas standards and best practices.
- Increasing requirements for local content and sustainable development initiatives including regulatory compliance.

“Finally become looking like forging”



Goals of Supply Chain Standards

- Institutionalize best practices for supplier review and qualification.
- Harmonize component and process qualification requirements.
- Establish scalable requirements to address various levels of criticality and risk.
- Allow suppliers, product manufacturers and end users access to the industry's licensing and accreditation program – the API Monogram Program.



The API Monogram Program

- The API Monogram Program allows an API Licensee to apply the API Monogram to products.
- The API Monogram Program delivers significant value to the international oil and gas industry by linking the verification of an organization's quality management system with the demonstrated ability to meet specific product specification requirements.
- The use of the Monogram on products constitutes a representation and warranty by the Licensee to purchasers of the products that, on the date indicated, the products were produced in accordance with a verified quality management system and in accordance with the appropriate API product specification.
- API Monogram Program licenses are issued only after an on-site audit has verified that the Licensee conforms to the requirements described in API Q1 (ISO 9001) in total, and the requirements of the specific API product specification. Audits are routinely performed.



Using API Supply Chain Standards

- Voluntary licensing and use by the supplier. Example: Forging supplier applies to API for a license for Specification 20C: Closed Die Forgings and is approved following audits of their quality management system and of their facility's compliance with the 20C requirements.
- Use by the purchaser: Cameron requires licensing and/or compliance with API Specification 20C as a contractual requirement.
- Use by the end-user: ExxonMobil requires that Cameron's products be produced from API Specification 20C compliant components.
- Use in Other Standards or Regulation: API Specification 6A (Valves & Wellheads) requires that products be produced from Spec 20C forgings.

API Specification 20C

Annex A (informative)

Use of the API Monogram by Licensees

A.1 Scope

The API Monogram Program allows an API Licensee to apply the API Monogram to products. The API Monogram Program delivers significant value to the international oil and gas industry by linking the verification of an organization's quality management system with the demonstrated ability to meet specific product specification requirements. The use of the Monogram on products constitutes a representation and warranty by the Licensee to purchasers of the products that, on the date indicated, the products were produced in accordance with a verified quality management system and in accordance with an API product specification.

When used in conjunction with the requirements of the API License Agreement, API Q1, in its entirety, defines the requirements for those organizations who wish to voluntarily obtain an API license to provide API monogrammed products in accordance with an API product specification.

API Monogram Program licenses are issued only after an on-site audit has verified that the Licensee conforms to the requirements described in API Q1 in total, and the requirements of an API product specification. Customers/users are requested to report to API all problems with API monogrammed products. The effectiveness of the API Monogram Program can be strengthened by customers/users reporting problems encountered with API monogrammed products. A nonconformance may be reported using the API Nonconformance Reporting System available at <https://ncr.api.org>. API solicits information on new product that is found to be nonconforming with API-specified requirements, as well as field failures (or malfunctions), which are judged to be caused by either specification deficiencies or nonconformities with API-specified requirements.

Work Plan for API Subcommittee 20: Supply Chain Standards

- Specification 20A: Castings for use in the Petroleum and Natural Gas Industry. First Edition Published March 2012. Rick Faircloth - Chairman
- Specification 20B: Open Die Forgings for use in the Petroleum and Natural Gas Industry. First Edition Published April 2013 Joel Russo - Chairman
- Specification 20C: Closed Die Forgings for use in the Petroleum and Natural Gas Industry. First Edition Published October 2009
- Specification 20D: Qualification of Nondestructive Testing Operations for use in the Petroleum and Natural Gas Industry. 1st-Ballot to start Mid September 2011. Jerry Longmire - Chairman
- Specification 20E: Specification for Low Alloy Steel Bolting for Pressure Containing Gas Equipment. First Edition Published August 2012
Tom Goin- Chairman

Work Plan for API Subcommittee 20: Supply Chain Standards

- Specification 20F: Specification for CRA Steel Bolting for Pressure Containing Gas Equipment. Under development- estimated Publication 2014 Tom Goin- Chairman
- Specification 20G: Welding services use in the Petroleum and Natural Gas Industry. Under development- Bud Weightman - Chairman
- Specification 20H: Heat treat services use in the Petroleum and Natural Gas Industry. Under development- –Estimated publication 2015 Joel Russo - Chairman
- Specification 20I: Quality requirements fro Distributors of Raw materials for use in the Petroleum and Natural Gas Industry. Under development- Estimated publication 2015 Des Burnley- Chairman

Any questions -

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