



Overview of Industry Guidance/Best Practices on Hydraulic Fracturing (HF)

Industry, working through organizations like the American Petroleum Institute (API), has a long history of developing consensus based “best practices.” These best practices are developed by industry experts in a variety of areas of technology and operations and go through a rigorous review process before being adopted. They are then evaluated regularly to incorporate evolving technology and operational practices.

Building on existing API standards and practices pertaining to oil and gas extraction, we have developed a set of 5 documents which specifically address the risk management issues accompanying unconventional well construction and management.

These robust practices help to protect the public by providing a blueprint for strong, carefully tended wells. They were created to meet or exceed federal requirements while remaining flexible enough to accommodate the variations in state regulatory frameworks that often occur due to fundamental differences in regional geology and other factors.

Copies of the documents are available at www.api.org.

HF1 – Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines, 1st Edition, October 2009, (API)

- Highlights industry practices for well construction and integrity for wells that will be hydraulically fractured.
- The guidance identifies actions to protect shallow groundwater aquifers, while also enabling economically viable development of oil and natural gas resources.

HF2 – Water Management Associated with Hydraulic Fracturing, 1st Edition, June 2010, (API)

- Identifies best practices used to minimize environmental and societal impacts associated with the acquisition, use, management, treatment, and disposal of water and other fluids associated with the process of hydraulic fracturing.
- Focuses primarily on issues associated with hydraulic fracturing pursued in deep shale gas development, but also describes the important distinctions related to hydraulic fracturing in other applications.

HF3 – Practices for Mitigating Surface Impacts Associated with Hydraulic Fracturing, 1st Edition, February 2011, (API)

- Identifies the best practices for minimizing surface environmental impacts associated with hydraulic fracturing operations.
- Focused on protecting surface water, soils, wildlife, other surface ecosystems, and nearby communities.
- Includes API’s policy on chemical disclosure:
 - API supports transparency regarding the disclosure of the chemical ingredients;
 - States are the proper authority to determine reporting requirements and formatting of reporting and public disclosure;
 - Proprietary information should be protected; and
 - Hydraulic fracturing is effectively regulated by numerous federal, state and local requirements. Hydraulic fracturing should not be placed exclusively under the purview of the Safe Drinking Water Act (SDWA) or any other federal statute.

Std 65 Part 2 – Isolating Potential Flow Zones During Well Construction, 2nd Edition, December 2010, (API)

- Helps ensure the well is properly designed and constructed to contain the hydrocarbons through the well bore and isolate them from ground water aquifers. This is accomplished through the use of casing, cement, and mechanical barriers.
- Included is information on industry cementing practices. A well-designed cement job optimizes cement placement through considerations such as laboratory-tested slurry design, honoring pore pressure/fracture gradient window, use of spacers/pre-flushes, proper density and rheological hierarchy, fluid compatibility and adequate centralization.

RP 51R – Environmental Protection for Onshore Oil and Gas Production Operations and Leases, 1st Edition, July 2009, (API)

- Provides environmentally sound practices for domestic onshore oil and gas production operations, including fracturing. Applies to all production facilities, including produced water handling facilities. Operational coverage begins with the design and construction of access roads and well locations, and includes reclamation, abandonment, and restoration operations.
- **Annex A provides guidance for a company to consider as a “Good Neighbor.”**



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Selected Industry Guidance/Best Practices on Hydraulic Fracturing (HF)

Copies of the documents are
available at www.api.org.

API's documents specific to hydraulic fracturing build on years of industry's best practice work by incorporating and citing the following additional standards, recommended practices and technical reports:

- API Spec 4F, *Drilling and Well Servicing Structures*
- API RP 4G, *Recommended Practice for Use and Procedures for Inspection, Maintenance, and Repair of Drilling Well Service Structures*
- API RP 5A3, *Recommended Practice on Thread Compounds for Casing, Tubing, and Line Pipe*
- API RP 5A5, *Field Inspection of New Casing, Tubing, and Plain-end Drill Pipe*
- API Spec 5B, *Specification for Threading, Gauging, and Thread Inspection of Casing, Tubing, and Line Pipe Threads*
- API RP 5B1, *Gauging and Inspection of Casing, Tubing, and Line Pipe Threads*
- API RP 5C1, *Recommended Practice for Case and Use of Casing and Tubing*
- 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 RP 5C5, *Recommended Practice on Procedures for Testing Casing and Tubing Connections*
- API RP 5C6, *Welding Connections to Pipe*
- API Spec 5CT, *Specification for Casing and Tubing*
- API Spec 6A, *Specification for Wellhead and Christmas Tree Equipment*
- API Spec 7B-11C, *Specification for Internal Combustion Reciprocating Engines for Oil-Field Service*
- API RP 7C-11F, *Recommended Practice for Installation, Maintenance, and Operation of Internal-Combustion Engines*
- API Spec 10A, *Specification for Cements and Materials for Well Cementing*
- API RP 10B-2, *Recommended Practice for Testing Well Cements*
- API RP 10B-3, *Recommended Practice on Testing of Deepwater Well Cement Formulations*
- API RP 10B-4, *Recommended Practice on Preparation and Testing of Foams and Cement Slurries at Atmospheric Pressure*
- API RP 10B-5, *Recommended Practice on Determination of Shrinkage and Expansion of Well Cement Formulations at Atmospheric Pressure*
- API RP 10B-6, *Recommended Practice on Determining the Static Gel Strength of Cement Formulations*
- API Spec 10D, *Specification for Bow Spring Casing Centralizers*
- API RP 10D-2, *Recommended Practice for Centralizer Placement and Stop Collar Testing*
- API RP 10F, *Recommended Practice for Performance Testing of Cementing Float Equipment*
- API TR 10TR1, *Cement Sheath Evaluation*
- API TR 10TR2, *Shrinkage and Expansion in Oilwell Cements*
- API TR 10TR3, *Temperatures for API Cement Operating Thickening Time Tests*
- API TR 10TR4, *Technical Report on Considerations Regarding Selection of Centralizers for Primary Cementing Operations*
- API TR 10TR5, *Technical Report on Methods for Testing of Solid and Rigid Centralizers*
- API RP 11ER, *Recommended Practice for Guarding of Pumping Units*
- API Bulletin 11K, *Data Sheet for Design of Air Exchange Coolers*
- API Spec 11N, *Specification for Lease Automatic Custody Transfer (LACT) Equipment*
- API Spec 12B, *Specification for Bolted Tanks for Storage of Production Liquids*
- API Spec 12D, *Specification for Field Welded Tanks for Storage of Production Liquids*
- API Spec 12F, *Specification for Shop Welded Tanks for Storage of Production Liquids*



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- API Spec 12J, *Specification for Oil and Gas Separators*
- API Spec 12K, *Specification for Indirect Type Oilfield Heaters*
- API Spec 12L, *Specification for Vertical and Horizontal Emulsion Treaters*
- API RP 12N, *Recommended Practice for the Operation, Maintenance, and Testing of Flame Arresters*
- API Spec 12P, *Specification for Fiberglass Reinforced Plastic Tanks*
- API RP 12R1, *Recommended Practice for Setting, Maintenance, Inspection, Operation, and Repair of Tanks in Production Service*
- API Spec 13A, *Specification for Drilling Fluid Materials*
- 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 on Drilling Fluid Processing Systems Evaluation*
- API RP-13D, *Recommended Practice on the Rheology and Hydraulics of Oil-well Drilling Fluids*
- API RP 13I, *Recommended Practice for Laboratory Testing Drilling Fluids*
- API RP 13J, *Testing of Heavy Brines*
- API RP 13M, *Recommended Practice for the Measurement of Viscous Properties of Completion Fluids*
- API RP 13M-4, *Recommended Practice for Measuring Simulation and Gravel-pack Fluid Leakoff Under Static*
- API RP 19B, *Evaluation of Well Perforators*
- API RP 19C, *Recommended Practice for Measurement of Properties of Proppants Used in Hydraulic Fracturing and Gravel-packing Operations*
- API RP 19D, *Recommended Practice for Measuring the Long-term Conductivity of Proppants*
- API RP 49, *Recommended Practice for Drilling and Well Servicing Operations Involving Hydrogen Sulfide*
- API RP 53, *Recommended Practices for Blowout Prevention Equipment Systems for Drilling Operations*
- API RP 54, *Occupational Safety for Oil and Gas Well Drilling and Servicing Operations*
- API RP 55, *Recommended Practices for Oil and Gas Producing and Gas Processing Operations Involving Hydrogen Sulfide*
- API RP 65, *Cementing Shallow Water Flow Zones in Deep Water Wells*
- API RP 67, *Recommended Practice for Oilfield Explosives Study*
- API RP 74, *Occupational Safety for Oil and Gas Well Drilling and Servicing Operations*
- API RP 75L, *Guidance Document for the Development of a Safety and Environmental Management System for Onshore Oil and Natural Gas Production Operation and Associated Activities*
- API RP 76, *Contractor Safety Management for Oil and Gas Drilling and Production Operations*
- API RP 90, *Annular Casing Pressure Management for Offshore Wells*
- API RP 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 E2, *Bulletin on Management of Naturally Occurring Radioactive Waste Materials (NORM) in Oil and Gas Production*
- API Bulletin E3, *Environmental Guidance Document: Well Abandonment and Inactive Well Practices for U.S. Exploration and Production Operations*
- API Environmental Guidance Document E5, *Waste Management in Exploration and Production Operations*
- *API Guidelines for Commercial Exploration and Production Waste Management Facilities*



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