

# **Piping Inspection Code: In-service Inspection, Rating, Repair, and Alteration of Piping Systems**

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# Piping Inspection Code: In-service Inspection, Rating, Repair, and Alteration of Piping Systems

## 1 Scope

### 1.1 General Application

#### 1.1.1 Coverage

API 570 covers inspection, rating, repair, and alteration procedures for metallic and fiberglass-reinforced plastic (FRP) piping systems and their associated pressure relieving devices that have been placed in service. This inspection Code applies to all hydrocarbon and chemical process piping covered in 1.2.1 that have been placed in service unless specifically designated as optional per 1.2.2. This publication does not cover inspection of specialty equipment including instrumentation, exchanger tubes and control valves. However, this piping Code could be used by owner/users in other industries and other services at their discretion.

Process piping systems that have been retired from service and abandoned in place are no longer covered by this “in service inspection” Code. However abandoned in place piping may still need some amount of inspection and/or risk mitigation to assure that it does not become a process safety hazard because of continuing deterioration. Process piping systems that are temporarily out of service but have been mothballed (preserved for potential future use) are still covered by this Code.

#### 1.1.2 Intent

The intent of this Code is to specify the in-service inspection and condition-monitoring program as well as repair guidance that is needed to determine and maintain the on-going integrity of piping systems. That program should provide reasonably accurate and timely assessments to determine if any changes in the condition of piping could possibly compromise continued safe operation. It is also the intent of this Code that owner/users shall respond to any inspection results that require corrective actions to assure the continued integrity of piping consistent with appropriate risk analysis. API 570 is intended for use by organizations that maintain or have access to an authorized inspection agency, a repair organization, and technically qualified piping engineers, inspectors, and examiners, all as defined in Section 3.

#### 1.1.3 Limitations

API 570 shall not be used as a substitute for the original construction requirements governing a piping system before it is placed in-service; nor shall it be used in conflict with any prevailing regulatory requirements. If the requirements of this Code are more stringent than the regulatory requirements, then the requirements of this Code shall govern.

### 1.2 Specific Applications

The term non-metallics has a broad definition but in this Code refers to the fiber reinforced plastic groups encompassed by the generic acronyms FRP (fiberglass-reinforced plastic) and GRP (glass-reinforced plastic). The extruded, generally homogenous non-metallics, such as high and low-density polyethylene are not specifically covered by this Code. Refer to API 574 and MTI 129 for guidance on degradation and inspection issues associated with FRP piping.

### 1.2.1 Included Fluid Services

Except as provided in 1.2.2, API 570 applies to piping systems for process fluids, hydrocarbons, and similar flammable or toxic fluid services, such as the following:

- a) raw, intermediate, and finished petroleum and chemical products;
- b) catalyst lines;
- c) hydrogen, natural gas, fuel gas, and flare systems;
- d) sour water and hazardous waste streams;
- e) hazardous fluid services;
- f) cryogenic fluids such as: liquid N<sub>2</sub>, H<sub>2</sub>, O<sub>2</sub>, and air;
- g) high-pressure gases greater than 150 psig such as: gaseous He, H<sub>2</sub>, O<sub>2</sub>, and N<sub>2</sub>.

### 1.2.2 Optional Piping Systems and Fluid Services

The fluid services and classes of piping systems listed below are optional with regard to the requirements of API 570:

- a) hazardous fluid services below designated threshold limits, as defined by jurisdictional regulations;
- b) water (including fire protection systems), steam, steam-condensate, boiler feed water, and Category D fluid services as defined in ASME B31.3;
- c) other classes of piping that are exempted from the applicable process piping code.

### 1.3 Fitness-For-Service (FFS) and Risk-Based Inspection (RBI)

This inspection Code recognizes Fitness-For-Service concepts for evaluating in-service damage of pressure containing piping components. API 579-1/ASME FFS-1, *Fitness-For-Service* provides detailed FFS assessment procedures for specific types of damage that are referenced in this Code. This inspection Code also recognizes RBI concepts for determining inspection intervals or due dates and strategies. API 580 provides the basic minimum and recommended elements for developing, implementing, and maintaining a risk-based inspection (RBI) program for fixed equipment, including piping. API 581 provides a set of methodologies for assessing risk (both POF and COF) and for developing inspection plans.

## 2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API Standard 510, *Pressure Vessel Inspection Code: Maintenance Inspection, Rating, Repair, and Alteration*

API Standard 530, *Calculation of Heater Tube Thicknesses in Petroleum Refineries*

API Recommended Practice 571, *Damage Mechanisms Affecting Fixed Equipment in the Refining Industry*

API Recommended Practice 572, *Inspection Practices for Pressure Vessels*