Pressure Vessel Inspection Code: In-service Inspection, Rating, Repair, and Alteration

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Addendum 2

Page v (Table of Contents): Changed title in the entry for Section 6.7 to the following:

Page 6: Added "deferral" term and definition:

3.1.16
deferral
An approved and documented postponement of an inspection, test, or examination. See 6.7.

Page 6: Added "due date" term and definition:

3.1.19
due date
The date established by the owner-user and in accordance with this code, whereby an inspection, test, examination, or inspection recommendation falls due or is to be completed. The date may be established by rule-based inspection methodologies (e.g. fixed intervals, retirement half-life interval, retirement date), risk-based methodologies (e.g. RBI target date), fitness-for-service analysis results, owner-user inspection agency practices/procedures/guidelines, or any combination thereof.

Page 8: Deleted "inspection deferral" definition.

Page 16: Section 4.3 shall read:

All repairs and alterations shall be performed by a qualified repair organization. The repair organization is responsible to the owner/user and shall provide the materials, equipment, QC, and workmanship that is necessary to maintain and repair the vessel or pressure-relieving device in accordance with the requirements of this inspection code. See definition of a repair organization in 3.1.63.

Page 38: Section 6.6.1 shall read:

Pressure-relieving devices shall be tested and repaired by a repair organization qualified and experienced in relief valve maintenance per definitions in 3.1.63. Pressure-relieving devices should be inspected, tested, and maintained in accordance with API 576.

Page 39: Section 6.7 shall read:

6.7 Deferral of Inspections, Tests, and Examinations

Inspections, tests, or examinations for pressure vessels and associated pressure-relieving devices that cannot be completed by their due date may be deferred for a specified period, subject to the requirements in the following sub-sections.

Pressure vessels or pressure-relieving devices that are operated beyond the due date without a valid deferral in accordance with these requirements are not permitted by this code. Deferrals should be the occasional exception, not a frequent occurrence. All deferrals shall be documented. Pressure vessels or pressure-relieving devices that were granted a deferral can be operated to the new due date without being considered overdue for the deferred inspections, tests, or examinations.

6.7.1 Simplified Deferral

A simplified short-term deferral may be approved by the owner-user if all of the following conditions are met:

a) The current due date for the inspection, test, or examination has not been previously deferred.

b) The proposed new due date would not increase the current inspection/servicing interval or due date by more than 10 % or six months, whichever is less.

c) A review of the current operating conditions, as well as the pressure vessel or pressure-relieving device history, has been completed, with results that support a short-term/one-time deferral.

d) The deferral request has the consent of the inspector representing or employed by the owner-user and an appropriate operations management representative(s).

e) Updates to the pressure vessel or pressure-relieving device records with deferral documentation are complete before it is operated beyond the original due date.

6.7.2 Deferral

Deferral requests not meeting the conditions of a simplified deferral shall follow a documented deferral procedure/process that includes all of the following minimum requirements:

a) Perform a documented risk assessment or update an existing RBI assessment to determine if the proposed deferral date would increase risk above acceptable risk threshold levels as defined by the owner-user. The risk assessment may include any of the following elements as deemed necessary by the owner/user.

   — fitness-for-service analysis results;

   — consequence of failure;

   — applicable damage mechanism susceptibilities and rates of degradation;

   — calculated remaining life;

   — historical conditions/findings from inspections, tests, and examinations and their technical significance;

   — extent and/or probability of detection (i.e. effectiveness) of previous inspections, tests, or examinations, as well as the amount of time that has elapsed since they were last performed;

- considerations for any previous changes to inspection or test intervals (e.g. reductions in interval due to deteriorating conditions);
- disposition(s) of any previous requests for deferral on the same pressure vessel or pressure-relieving device;
- historical conditions/findings for pressure vessels or pressure-relieving devices in similar service if available

b) Determine if the deferral requires the implementation of, or modification to, existing integrity operating windows or operating process control limits.

c) Review the current inspection plan to determine if modifications are needed to support the deferral.

d) Obtain the consent and approval of appropriate pressure vessel personnel, including the inspector representing or employed by the owner-user and appropriate operations management representative(s).

e) Updates to the pressure vessel or pressure-relieving device records with deferral documentation are complete before it is operated beyond the original due date.

Page numbers in the Table of Contents have been updated to account for the above changes.

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Foreword

In December 1931, API and the American Society of Mechanical Engineers (ASME) created the Joint API/ASME Committee on Unfired Pressure Vessels. This committee was created to formulate and prepare for publication a code for safe practices in the design, construction, inspection, and repair of pressure vessels to be used in the petroleum industry. Entitled API/ASME *Code for Unfired Pressure Vessels for Petroleum Liquids and Gases* (commonly called the API/ASME *Code for Unfired Pressure Vessels* or API/ASME *Code*), the First Edition of the API/ASME *Code* was approved for publication in 1934. From its inception, the API/ASME *Code* contained Section I, which covered recommended practices for vessel inspection and repair and for establishing allowable working pressures for vessels in service. Section I recognized and afforded well-founded bases for handling various problems associated with the inspection and rating of vessels subject to corrosion. Although the provisions of Section I (like other parts of the API/ASME *Code*) were originally intended for pressure vessels installed in the plants of the petroleum industry, especially those vessels containing petroleum gases and liquids, these provisions were actually considered to be applicable to pressure vessels in most services. ASME's Boiler and Pressure Vessel Committee adopted substantially identical provisions and published them as a nonmandatory appendix in the 1950, 1952, 1956, and 1959 editions of Section VIII of the ASME *Boiler and Pressure Vessel Code*.

After the API/ASME *Code* was discontinued in 1956, a demand arose for the issuance of Section I as a separate publication, applicable not only to vessels built in accordance with any edition of the API/ASME *Code* but also to vessels built in accordance with any edition of Section VIII of the API/ASME *Code*. Such a publication appeared to be necessary to assure industry that the trend toward uniform maintenance and inspection practices afforded by Section I of the API/ASME *Code* would be preserved. API 510, first published in 1958, is intended to satisfy this need.

The procedures in Section I of the 1951 edition of the API/ASME *Code*, as amended by the March 16, 1954 addendum, have been updated and revised in API 510. Section I of the API/ASME *Code* contained references to certain design or construction provisions, so these references have been changed to refer to provisions in the API/ASME *Code*. Since the release of the 1960 edition of the National Board Inspection Code, elements of the API/ASME *Code* have also been carried by the National Board Inspection Code.

It is the intent of API to keep this publication up to date. All pressure vessel owners and operators are invited to report their experiences in the inspection and repair of pressure vessels whenever such experiences may suggest a need for revising or expanding the practices set forth in API 510.

This edition of API 510 supersedes all previous editions of API 510. Each edition, revision, or addendum to this API code may be used beginning with the date of issuance shown on the cover page for that edition, revision, or addendum. Each edition, revision, or addendum to this API code becomes effective six months after the date of issuance for equipment that is rerated, reconstructed, relocated, repaired, modified (altered), inspected, and tested per this code. During the six-month time between the date of issuance of the edition, revision, or addendum and the effective date, the user shall specify to which edition, revision, or addendum the equipment is to be rerated, reconstructed, relocated, repaired, modified (altered), inspected, and tested.

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Shall: As used in a standard, "shall" denotes a minimum requirement in order to conform to the specification.

Should: As used in a standard, "should" denotes a recommendation or that which is advised but not required in order to conform to the specification.

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Suggested revisions are invited and should be submitted to the Standards Department, API, 1220 L Street, NW, Washington, DC 20005, standards@api.org.

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1 Scope

1.1 General Application

1.1.1 Coverage

This inspection code covers the in-service inspection, repair, alteration, and rerating activities for pressure vessels and the pressure-relieving devices protecting these vessels. This inspection code applies to all hydrocarbon and chemical process vessels that have been placed in service unless specifically excluded per 1.2.2; but it could also be applied to process vessels in other industries at owner/user discretion. This includes:

a) vessels constructed in accordance with an applicable construction code [e.g. ASME *Boiler and Pressure Vessel Code* (ASME *Code*)];

b) vessels constructed without a construction code (noncode vessels)—a vessel not fabricated to a recognized construction code and meeting no known recognized standard;

c) vessels constructed and approved as jurisdictional special based upon jurisdiction acceptance of particular design, fabrication, inspection, testing, and installation;

d) nonstandard vessels—a vessel fabricated to a recognized construction code but has lost its nameplate or stamping.

However, vessels that have been officially retired from service and abandoned in place (i.e. no longer are an asset of record from a financial/accounting standpoint) are no longer covered by this “in-service inspection” code.

The ASME *Code* and other recognized construction codes are written for new construction; however, most of the technical requirements for design, welding, NDE, and materials can be applied to the inspection, rerating, repair, and alteration of in-service pressure vessels. If for some reason an item that has been placed in service cannot follow the construction code because of its new construction orientation, the requirements for design, material, fabrication, and inspection shall conform to API 510 rather than to the construction code. If in-service vessels are covered by requirements in the construction code and API 510 or if there is a conflict between the two codes, the requirements of API 510 shall take precedence. As an example of the intent of API 510, the phrase “applicable requirements of the construction code” has been used in API 510 instead of the phrase “in accordance with the construction code.”

1.1.2 Intent

The application of this inspection code is restricted to owner/users that employ or have access to the following technically qualified individuals and organizations:

a) an authorized inspection agency,

b) a repair organization,

c) an engineer,

d) an inspector, and,

e) examiners.