

# **Inspection Process: Repairs and Alterations**

**DIR/DOSH  
Pressure Vessel Unit  
Elihu Harris State Office Building  
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# Topics

- Circular Letters
- Repairs and Alterations
- Re-rating and De-rating
- Non-ASME Code Vessels
- Obtaining Jurisdictional Acceptance
- Inspection Process of a Repair

# Circular Letters

- PV-2006-2 Repairs & Alterations
- PV-2001-1 Re-Rate and De-Rate
- PV-2006-4 Non-ASME Code Construction
- PV-2006-3 Jurisdictional Acceptance

# Repairs/Alterations

## Circular Letter PV-2006-2

- This letter explains the Division's policy concerning **who may repair, alter, and inspect boilers and pressure vessels**. It is not intended **to provide details on how repairs** and alterations are to be completed.
- All repairs and alterations to boilers, boiler piping and pressure vessels **shall be done in accordance with the current issue** of the National Board Inspection Code (NBIC).

# Repairs/Alterations

## Circular Letter PV-2006-2 (continued)

- Employers subject to CCR Title 8 Subchapters 14 & 15 requirements shall repair boilers and pressure vessels **in accordance with either the 2004 Edition** of the NBIC or American Petroleum Industry (API) 510 Pressure Vessel Inspection Code, Eighth Edition, June 1997, August 2003 Addendum. The **API 510 Code shall not be used** to repair boilers and pressure vessels as follows:
  - Unfired Pressure vessels as defined in CCR Title 8, **Subchapter 1**.
  - Boilers and fired pressure vessels as defined in CCR Title 8, **Subchapter 2**.

# Repairs/Alterations

## Circular Letter PV-2006-2 (continued)

- The **Qualified Inspector** shall hold a valid Certificate of Competency issued by the Division and be employed by:
  - The Division
  - A city or county
  - The AIA of repair organization
  - The AIA that insures the boiler/pressure vessel
  - The Owner/User organization (shall not accept alterations performed by the inspector's employer)

# Repairs/Alterations

## Circular Letter PV-2006-2 (continued)

- Repair/Alteration Organizations
- Have a **valid ASME certificate**, providing the repair or alteration is within the scope of the certificate.
- Have a **valid National Board 'R' certificate**, providing the repair or alteration is within the scope of the certificate.

# Repairs/Alterations

## Circular Letter PV-2006-2 (continued)

- Qualified Repair/Alteration Organizations
- An **organization having welding procedures and operators** qualified in accordance with **Section IX** of the ASME Code may repair but not alter boilers and pressure vessels, providing the organizations repair program is accepted by the qualified inspector performing the repair. (**Not acceptable in refining or production**).
- **All organizations** shall have their Quality System Manual **reviewed and accepted by the Division** to ensure that all jurisdictional requirements are addressed.

# Routine Repairs

## Circular Letter PV-2006-2

- No routine repairs are acceptable.
  - All repairs must have authorization from the Inspector and a completed R-1 Form.
  - Can omit nameplate requirement if acceptable to the Inspector.

# Repairs or Alterations Performed Out-of-State

## Circular Letter PV-2006-2

- Performed by a valid National Board 'R' Certificate Holder.
- Inspected by a valid National Board commissioned Inspector.
- The repair or alteration shall conform to all the requirements of the NBIC and stamped as such.

# Documentation

## Circular Letter PV-2006-2

- Use a National Board 'R' Form.
- Use "equivalent" form **if not a 'R' Certificate holder**.
- R Certificate Holder shall register all repairs and alterations with the National Board.
- Permitted boilers, air, and LPG tanks also send copy to PV HQ.

# Re-Rating/De-Rating

## Circular Letter PV-2001-1

- Owner/User shall submit a request to the Pressure Vessel **Principal Engineer before re-rating or de-rating** any ASME pressure vessel.
  - Request shall include **reason for change**, list the original and **new MAWP and temperature**, and describe any **physical changes**.
- In addition, **technical information** shall comply with the requirements specified in PV-2001-1. **All requirements must be addressed even though they may not apply.**

# Re-Rating/De-Rating

## Circular Letter PV-2001-1 (continued)

- Examples of technical requirements include:
  - Fabrication drawings
  - Original Manufacturer's Data Report
  - Original nameplate stamping
  - Current UT readings
  - Inspection reports
  - Inspection intervals
  - Safety relief devices
  - Calculations using original material allowable stresses and joint efficiencies

# Re-Rating/De-Rating

## Circular Letter PV-2001-1 (continued)

- Following completion of the project, supply the **completed R-2 Form** with a copy of the **nameplate stamping** and the following information:
  - If vessel is a State permitted boiler, propane tank or air tank include the **Jurisdictional Number**.
  - **Hydrostatic test** pressure applied.
  - “**Design Certification**” and “Certificate of Design Change Review”.
  - If any physical changes were made, include the “**Construction Certification**” and “Certificate of Inspection”.
  - R-2 Form shall be registered with the National Board.

# Acceptance of Non-ASME Code Vessels

## Circular Letter PV-2006-4

- Boilers and pressure vessels to be installed in places of employment shall be either **constructed and stamped** in accordance with the rules of the **applicable ASME Code** or be **proven to the Division to provide equivalent safety**.
- **Requirements for design, construction,** inspection and installation of boilers and pressure vessels are **found in the CCR, Title 8**.
- Circular Letter PV–2006-4 provides **details for Non-Code vessels**.

# Acceptance of Non-ASME Code Vessels

## Circular Letter PV-2006-4 (continued)

- A **written permission is required** from the Pressure Vessel Unit to use such non-code vessels, if installed in a place of employment.
- All **18** requirements specified in **PV-2006-4** must be **addressed even though they may not apply**.
- A Certified Inspector employed by the Division **shall inspect the vessel at the place of installation to verify nameplate** identification and that all requirements are met.

# Repair Organizations obtaining Jurisdictional Acceptance

## Circular Letter PV-2006-3

- National Board Inspection Code (NBIC) has numerous references to the jurisdiction and are generally written similar to “**subject to the acceptance, concurrence or satisfaction** of the jurisdiction”.
- **Division requires that written acceptance, concurrence, or satisfaction be obtained in all cases.**
- **A request for a specific repair or alteration technique** may be made providing the repair organization **describes how the repair technique** is to be utilized and includes the written procedure in its Quality System Manual.

# Repair Organizations obtaining Jurisdictional Acceptance Circular Letter PV-2006-3 (continued)

- Acceptance shall take the form of a Division **signature in the Quality System Manual** or a separate letter from the Division.
- For example, a repair organization may request jurisdictional acceptance for the use of **NDE in lieu of hydrotesting** or **alternative welding methods in lieu of postweld heat treatment.**

# Inspection Process

## Scope

- **Scope of the R Certificate Holder** shall be current and be within the scope of the work to be performed.
- When the standard governing the original construction is the ASME Code, repairs and alterations to **pressure-retaining items shall conform to the section and edition of the ASME Code** most applicable to the work planned.

# Inspection Process

## Scope (continued)

- If the **original construction did not conform** with the ASME Code, it is permissible to use other codes and standards, including the ASME Code, provided the R Certificate Holder has the **concurrence of the Inspector and the Jurisdiction where the pressure-retaining item is installed.**

# Inspection Process

## Drawings and Specifications

- Drawings, design calculations and specifications for repairs or alterations shall be prepared, **reviewed and approved by the R Certificate Holder.**
- **Some repairs may not require drawings or design calculations** when the original Code of Construction is known and drawings and/or a Manufacturer's Data Report is available.

# Inspection Process

## Drawings and Specifications (continued)

- When a **Manufacturer's Data Report is required by the original Code of Construction** a copy of the original Manufacturer's Data Report shall be obtained for use in the design of the repair or alteration.
- When the original Manufacturer's Data Report **cannot be obtained**, agreements on the method of establishing design basis for the repair or alteration shall be obtained from the Inspector, and when required, the Jurisdiction.

# Inspection Process

## Drawings and Specifications (continued)

- Calculations for repairs or alterations shall be completed **prior to the start** of any physical work.
- All design calculations shall be completed by an **engineer experienced** in pressure vessel design.
- All calculations shall be **made available for review by the Inspector** accepting the work.

# Inspection Process

## Repair and Alteration Methods

- Authorization from the Inspector shall be obtained **prior to performing** any repair or alteration to a pressure-retaining item.
- Inspector shall have the opportunity to set **inspection points** for the pressure-retaining item to assure compliance to the NBIC and all applicable Jurisdictional rules.

# Inspection Process

## Repair and Alteration Methods (continued)

- R Certificate Holder shall **prepare a traveler/checklist** and present it to the Inspector to establish the necessary **inspection points**.
- R Certificate Holder shall keep the Inspector informed of the progress of work based on the Inspector **required inspection points**.

# Inspection Process

## Materials

- Materials used in making repairs or alterations shall **conform to the original Code of Construction or construction standard** or code selected, including the material specification requirements used for the work planned.
- Replacement material of different nominal composition, **which is equal to or greater in allowable stress from that used in the original design may be used**, provided the replacement material **satisfies the material and design requirements of the original Code of Construction**.

# Inspection Process

## Welding, NDE and Heat Treatment

- Post weld heat treatment shall be performed according to the original Code of Construction.
- NBIC permits **alternatives to post weld heat treatment** under certain conditions.
- In such cases, alternative methods of post weld heat treatment **acceptable to the Inspector and the Jurisdiction may be used.**
- Examples of **alternative post weld heat treatment or special welding methods** are described in the NBIC.

# Inspection Process

## Welding, NDE and Heat Treatment (continued)

- **NDE** requirements shall be in accordance with the **original Code of Construction** of the pressure-retaining item.
- In all cases, NDE methods or combination of methods used shall be **suitable for providing meaningful results to verify the integrity** of a repair or alteration.

# Inspection Process

## Pressure Tests

- Based on the nature and scope of the repair or alteration, one or a combination of the following examination and test methods shall be applied:
  - For **repairs, test pressure shall be the minimum required to verify leak tightness integrity**, but not more than 150% of the MAWP stamped on the item, as adjusted for temperature.
  - For **alterations, pressure test as required by the original Code of Construction shall be conducted**; however, test pressure shall not exceed 150% of the MAWP stamped on the item, as adjusted for temperature. Pressure tests shall be conducted using water or other liquid medium.

# Inspection Process

## Pressure Tests (continued)

- ASME U-2 or U-2A replacement parts are required to be tested by the ASME Certificate Holder, if not tested by the ASME Certificate Holder, then the part used in the repair or alteration shall be pressure tested by the R Certificate Holder.
- **Metal temperature** shall not be less than **60°F** unless owner provides information on the toughness characteristics of the material to indicate the acceptability of a lower test temperature.
- Hold-time shall be a **minimum of 10 minutes** prior to examination by the Inspector.

# Inspection Process

## Pressure Tests (continued)

- **NDE may be conducted when contamination** of the pressure-retaining item by liquids is possible or when pressure **testing is not practicable**.
- **Concurrence of the owner** shall be obtained in addition to the Inspector, and where required, the Jurisdiction.
- **Exclusive use** of Visual Examination (VT) shall not be permitted for alterations.
- In all cases NDE methods or combination of methods used shall be suitable for providing meaningful results to verify the **integrity of the alteration**.

# Inspection Process

## Pressure Tests (continued)

- Pneumatic test may be conducted when contamination of the pressure-retaining item by liquids is possible or when liquid pressure testing is not practicable.
- **Concurrence of the owner** shall be obtained in addition to the Inspector and Jurisdiction where required.

# Inspection Process

## Replacement Parts

- If **ASME is the original Code of Construction**, replacement parts shall be fabricated by an organization having an appropriate ASME Certificate of Authorization.
- Manufacturer shall supply a completed ASME Manufacturer's Partial Data Report.
- R parts as documented on **Form R-3** and defined in the NBIC, are not acceptable to this Jurisdiction.

# Inspection Process

## Calibration

- Calibration of pressure gauges, measuring and test equipment shall meet a National Standard and be documented.

# Inspection Process

## Stamping & Documentation

- R Certificate Holder shall stamp or attach a nameplate adjacent to the original manufacturer's stamping.
- For repairs only, a **single repair nameplate** or stamping may be used for more than one repair, provided each repair is carried out by the same certificate holder.
  - **Date of each repair**, corresponding with the date on associated Form R-1, shall be stamped on the nameplate.

# Inspection Process

## Stamping & Documentation (continued)

- If it is necessary to remove the original stamping, the Inspector shall, **subject to approval of the Jurisdiction**, witness the making of a facsimile of the stamping, the obliteration of the old stamping, and **transfer of the stamping to the new location**.
- Re-stamping or replacement of a Code stamp shall be performed only **as permitted by the governing Code of Construction**.

# Inspection Process

## Stamping & Documentation (continued)

- ASME permits the restamping or replacement of the Certification Mark under the Conformity Assessment Policy 21 (CAP-21) Criteria for Reapplication of an ASME Certification Mark.
- When all Code of Construction, Jurisdiction and NBIC requirements have been met, **final records and applicable NBIC Report Form** shall be presented to the Inspector for review and certification.

# Inspection Process

## Stamping & Documentation (continued)

- R Certificate Holder shall distribute legible copies of the NBIC Report Form with attachments to the following:
  - Owner or User
  - Authorized Inspection Agency
  - Inspector
  - Jurisdiction (if required)
  - An original to the National Board

# Inspection Process

## Stamping & Documentation (continued)

- R Certificate Holder shall maintain a sequential log for both repairs and alterations, registered with the National Board.
- Form R reports and supporting records and documentation shall be maintained for a **minimum of five (5) years.**