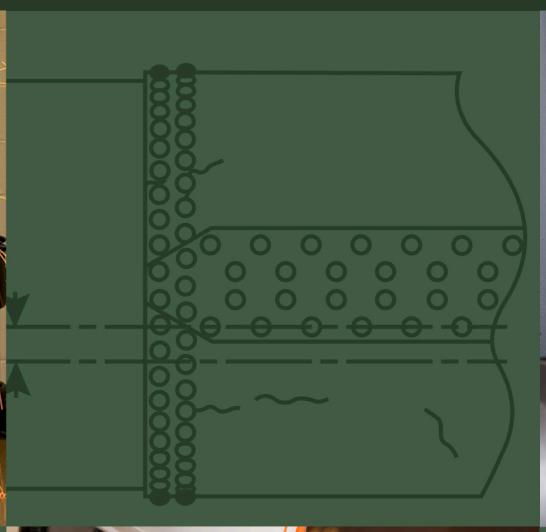
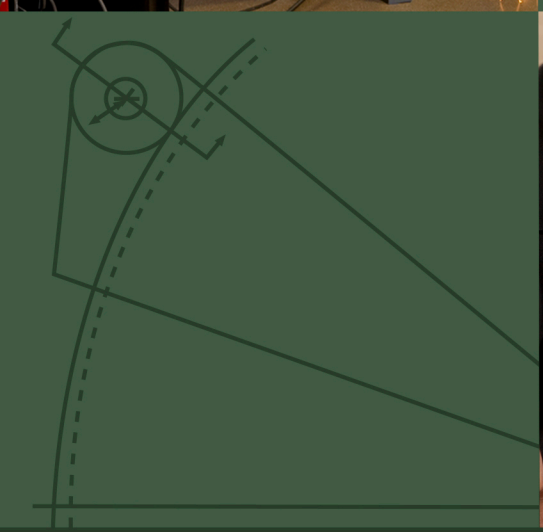
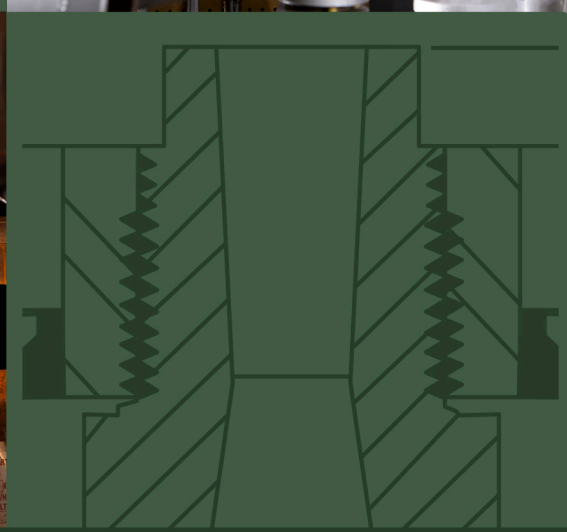
THE NATIONAL BOARD

2013 NBIC

NATIONAL BOARD INSPECTION CODE





AN AMERICAN NATIONAL STANDARD

PART 3 REPAIRS AND ALTERATIONS

THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS

2013 NBIC

PART 3, REPAIRS AND ALTERATIONS

NOTE: Pages ii through xvi are not part of this American National Standard.

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National Board Inspection Code
2013 Edition
Date of Issue — July 1, 2013

This code was developed under procedures accredited as meeting the criteria for American National Standards. The Consensus Committee that approved the code was balanced to ensure that individuals from competent and concerned interests had an opportunity to participate. The proposed code was made available for public review and comment, which provided an opportunity for additional public input from industry, academia, regulatory and jurisdictional agencies, and the public-at-large.

The National Board does not “approve,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

The National Board does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable Letters Patent, nor assume any such liability. Users of a code are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code.

The National Board accepts responsibility for only those interpretations issued in accordance with governing National Board procedures and policies that preclude the issuance of interpretations by individual committee members.

The footnotes in this document are part of this American National Standard.

The above National Board symbols are registered with the US Patent Office.

“National Board” is the abbreviation for The National Board of Boiler and Pressure Vessel Inspectors.

Foreword

The National Board of Boiler and Pressure Vessel Inspectors is an organization composed of Chief Inspectors for the states, cities, and territories of the United States and provinces and territories of Canada. It is organized for the purpose of promoting greater safety to life and property by securing concerted action and maintaining uniformity in post-construction activities of pressure-retaining items, thereby ensuring acceptance and interchangeability among Jurisdictional authorities responsible for the administration and enforcement of various codes and standards.

In keeping with the principles of promoting safety and maintaining uniformity, the National Board originally published the NBIC in 1946, establishing rules for inspection and repairs to boilers and pressure vessels. The National Board Inspection Code (NBIC) Committee is charged with the responsibility for maintaining and revising the NBIC. In the interest of public safety, the NBIC Committee decided, in 1995, to revise the scope of the NBIC to include rules for installation, inspection, and repair or alteration to boilers, pressure vessels, piping, and nonmetallic materials.

In 2007, the NBIC was restructured into three Parts specifically identifying important post-construction activities involving safety of pressure-retaining items. This restructuring provides for future expansion, transparency, and uniformity, ultimately improving public safety.

The NBIC Committee's function is to establish rules of safety governing post-construction activities for the installation, inspection, and repair and alteration of pressure-retaining items, and to interpret these rules when questions arise regarding their intent. In formulating the rules, the NBIC Committee considers the needs and concerns of individuals and organizations involved in the safety of pressure-retaining items. The objective of the rules is to afford reasonably certain protection of life and property, so as to give a reasonably long, safe period of usefulness. Advancements in design and material and the evidence of experience are recognized.

The rules established by the NBIC Committee are not to be interpreted as approving, recommending, or endorsing any proprietary or specific design, or as limiting in any way an organization's freedom to choose any method that conforms to the NBIC rules.

The NBIC Committee meets regularly to consider revisions of existing rules, formulation of new rules, and to respond to requests for interpretations. Requests for interpretation must be addressed to the NBIC Secretary in writing and must give full particulars in order to receive Committee consideration and a written reply. Proposed revisions to the Code resulting from inquiries will be presented to the NBIC Committee for appropriate action.

Proposed revisions to the Code approved by the NBIC Committee are submitted to the American National Standards Institute and published on the National Board Web site to invite comments from all interested persons. After the allotted time for public review and final approval, the new edition is published.

Organizations or users of pressure-retaining items are cautioned against making use of revisions that are less restrictive than earlier requirements without having assurance that they have been accepted by the Jurisdiction where the pressure-retaining item is installed.

The general philosophy underlying the NBIC is to parallel those provisions of the original code of construction, as they can be applied to post-construction activities.

The NBIC does not contain rules to cover all details of post-construction activities. Where complete details are not given, it is intended that individuals or organizations, subject to the acceptance of the Inspector and Jurisdiction when applicable, provide details for post-construction activities that will be as safe as otherwise provided by the rules in the original code of construction.

Activities not conforming to the rules of the original code of construction or the NBIC must receive specific approval of the Jurisdiction, who may establish requirements for design, construction, inspection, testing, and documentation.

There are instances where the NBIC serves to warn against pitfalls; but the Code is not a handbook, and cannot substitute for education, experience, and sound engineering judgment.

It is intended that this edition of the NBIC not be retroactive. Unless the Jurisdiction imposes the use of an earlier edition, the latest effective edition is the governing document.

Introduction

It is the purpose of the National Board Inspection Code (NBIC) to maintain the integrity of pressure-retaining items by providing rules for installation, and after the items have been placed into service, by providing rules for inspection and repair and alteration, thereby ensuring that these items may continue to be used safely.

The NBIC is intended to provide rules, information and guidance to manufacturers, Jurisdictions, inspectors, owner-users, installers, contractors, and other individuals and organizations performing or involved in post-construction activities, thereby encouraging the uniform administration of rules pertaining to pressure-retaining items.

Scope

The NBIC recognizes three important areas of post-construction activities where information, understanding, and following specific requirements will promote public and personal safety. These areas include:

- Installation
- Inspection
- Repairs and Alterations

The NBIC provides rules, information, and guidance for post-construction activities, but does not provide details for all conditions involving pressure-retaining items. Where complete details are not provided in this Code, the Code user is advised to seek guidance from the Jurisdiction and from other technical sources.

The words shall, should, and may are used throughout the NBIC and have the following intent:

- Shall – action that is mandatory and required.
- Should – indicates a preferred but not mandatory means to accomplish the requirement unless specified by others such as the Jurisdiction.
- May – permissive, not required or a means to accomplish the specified task.

Organization

The NBIC is organized into three Parts to coincide with specific post-construction activities involving pressure-retaining items. Each Part provides general and specific rules, information, and guidance within each applicable post-construction activity. Other NBIC Parts or other published standards may contain additional information or requirements needed to meet the rules of the NBIC. Specific references are provided in each Part to direct the user where to find this additional information. NBIC Parts are identified as:

- Part 1, Installation – This Part provides requirements and guidance to ensure all types of pressure-retaining items are installed and function properly. Installation includes meeting specific safety criteria for construction, materials, design, supports, safety devices, operation, testing, and maintenance.

- Part 2, Inspection – This Part provides information and guidance needed to perform and document inspections for all types of pressure-retaining items. This Part includes information on personnel safety, non-destructive examination, tests, failure mechanisms, types of pressure equipment, fitness for service, risk-based assessments, and performance-based standards.

- Part 3, Repairs and Alterations – This Part provides information and guidance to perform, verify, and document acceptable repairs or alterations to pressure-retaining items regardless of code of construction. Alternative methods for examination, testing, heat treatment, etc., are provided when the original code of construction requirements cannot be met. Specific acceptable and proven repair methods are also provided.

Each NBIC Part is divided into major Sections as outlined in the Table of Contents.

Tables, charts, and figures provide relevant illustrations or supporting information for text passages, and are designated with numbers corresponding to the paragraph they illustrate or support within each Section. Multiple tables, charts, or figures referenced by the same paragraph will have additional letters reflecting the order of reference. Tables, charts, and figures are located in or after each major Section within each NBIC Part.

Text Identification and Numbering

Each page in the text will be designated in the top header with the publication's name, part number, and part title. The numbering sequence for each section begins with the section number followed by a dot to further designate major Sections (e.g., 1.1, 1.2, 1.3). Major Sections are further subdivided using dots to designate Subsections within that major Section (e.g., 1.1.1, 1.2.1, 1.3.1). Subsections can further be divided as necessary.

Paragraphs under Sections or Subsections shall be designated with small letters in parenthesis [(e.g., a), b), c)] and further subdivided using numbers in parenthesis [e.g., 1), 2), 3)]. Subdivisions of paragraphs beyond this point will be designated using a hierarchical sequence of letters and numbers followed by a dot.

Example: 2.1 Major Section
- 2.1.1 Section
- 2.1.2 Section
  - 2.1.2.1 Subsection
    - a) paragraph
    - b) paragraph
      - 1) subparagraph
      - 2) subparagraph
        - a. subdivisions
          - 1. subdivisions
          - 2. subdivisions
        - b. subdivisions
          - 1. subdivisions
          - 2. subdivisions

Tables and figures will be designated with the referencing Section or Subsection identification. When more than one table or figure is referenced in the same Section or Subsection, letters or numbers in sequential order will be used following each Section or Subsection identification.

Supplements

Supplements are contained in each Part of the NBIC to designate information pertaining only to a specific type of pressure-retaining item (e.g., Locomotive Boilers, Historical Boilers, Graphite Pressure Vessels.) Supplements follow the same numbering system used for the main text, only preceded by the Letter "S." Each page of the Supplement will identify the Supplement number and name in the top heading.

Editions

Editions which include revisions and additions to this Code are published every two years. Editions are permissive on the date issued and become mandatory six months after the date of issue

Interpretations

On request, the NBIC Committee will render an interpretation of any requirement of this Code. Interpretations are provided for each Part and are specific to the Code edition and addenda referenced in the interpretation. Interpretations provide information only and are not part of this Code.

Jurisdictional Precedence

Reference is made throughout this Code to the requirements of the "Jurisdiction." Where any provision herein presents a direct or implied conflict with any jurisdictional regulation, the Jurisdictional regulation shall govern.

Units of Measurement

Both U.S. customary units and metric units are used in the NBIC. The value stated in U.S. customary units or metric units is to be regarded separately as the standard. Within the text, the metric units are shown in parentheses. In supplement 6, from Parts 2 and 3, Continued Service and Inspection of DOT Transport Tanks, however, the metric units are shown first with the U.S. customary units shown in parentheses.

U.S. customary units or metric units may be used with this edition of the NBIC, but one system of units shall be used consistently throughout a repair or alteration of pressure-retaining items. It is the responsibility of National Board accredited repair organizations to ensure the appropriate units are used consistently throughout all phases of work. This includes materials, design, procedures, testing, documentation, and stamping. The NBIC policy for metrication is outlined in each Part of the NBIC.

Accreditation Programs

The National Board administers and accredits three specific repair programs[1] as shown below:

"R"…….Repairs and Alterations to Pressure-Retaining Items
"VR"……..Repairs to Pressure Relief Valves
"NR"……..Repair and Replacement Activities for Nuclear Items

Part 3, Repairs and Alterations, of the NBIC describes the administrative requirements for the accreditation of these repair organizations.

The National Board also administers and accredits four specific inspection agency programs as shown below:

New Construction
Criteria for Acceptance of Authorized Inspection Agencies for New Construction (NB-360)

Inservice
Qualifications and Duties for Authorized Inspection Agencies (AIAs) Performing Inservice Inspection Activities and Qualifications for Inspectors of Boilers and Pressure Vessels (NB-369)

Owner-User
Accreditation of Owner-User Inspection Organizations (OUIO) Owners or users may be accredited for both a repair and inspection program provided the requirements for each accreditation program are met. (NB-371)

Federal Government
Qualifications and Duties for Federal Inspection Agencies (FIAs) Performing Inservice Inspection Activities (NB-390)

These programs can be viewed on the National Board Website. For questions or further information regarding these programs, contact:

The National Board of Boiler and Pressure Vessel Inspectors
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Phone — 614.888.8320
Fax — 614.847.1828
Website — www.nationalboard.org

Certificates of Authorization for Accreditation Programs

Any organization seeking an accredited program may apply to the National Board to obtain a Certificate of Authorization for the requested scope of activities. A confidential review shall be conducted to evaluate the organization's quality system. Upon completion of the evaluation, a recommendation will be made to the National Board regarding issuance of a Certificate of Authorization.

Certificate of Authorization scope, issuance, and revisions for National Board accreditation programs are specified in the applicable National Board procedures. When the quality system requirements of the appropriate accreditation program have been met, a Certificate of Authorization and appropriate National Board symbol stamp shall be issued.

1 Caution, some Jurisdictions may independently administer a program of authorization for organizations to perform repairs and alterations within that Jurisdiction.

2013 NBIC

PART 3, REPAIRS AND ALTERATIONS

PART 3 — REPAIRS AND ALTERATIONS
TABLE OF CONTENTS

2013 NBIC

PART 3, SECTION 1

REPAIRS AND ALTERATIONS – General and Administrative Requirements

PART 3, SECTION 1
REPAIRS AND ALTERATIONS — GENERAL AND ADMINISTRATIVE REQUIREMENTS

1.1 SCOPE

a) This part provides general requirements that apply when performing repairs and alterations to pressure-retaining items.

b) This part describes the administrative requirements for the accreditation of repair organizations.[1]

c) The National Board administers three specific accreditation programs:

"R" — Repairs and Alterations to Pressure-Retaining Items
"VR" — Repairs to Pressure Relief Valves
"NR" — Repair and Replacement Activities for Nuclear Items

1.2 CONSTRUCTION STANDARDS FOR PRESSURE-RETAINING ITEMS

a) When the standard governing the original construction is the ASME Code or ASME RTP-1, repairs and alterations to pressure-retaining items shall conform, insofar as possible, to the section and edition of the ASME Code most applicable to the work planned.

b) If the pressure-retaining item was not constructed to a construction code or standard, or when the standard governing the original construction is not the ASME Code or ASME RTP-1, repairs or alterations shall conform, insofar as possible, to the edition of the construction standard or specification most applicable to the work. Where this is not possible or practicable, it is permissible to use other codes, standards, or specifications, including the ASME Code or ASME RTP-1, provided the "R" Certificate Holder has the concurrence of the Inspector and the Jurisdiction where the pressure-retaining item is installed.

c) For historical boilers, the 1971 Edition of Section I of ASME Boiler Code, Part PR and PFT provides the many pressure-related components and features of construction encountered in firetube boilers.

d) For pressure relieving devices the applicable standard for new valves to be used for reference during repairs is the ASME Code. ASME Code Cases shall be used for repairs when they were used in the original construction of the valve. ASME Code Cases may be used when they have been accepted for use by the NBIC committee and the Jurisdiction where the pressure-retaining item is installed.

1) For pressure relieving devices the code case number shall be noted on the repair document and, when required by the code case, stamped on the repair nameplate.

2) The Jurisdiction where the pressure-retaining item is installed shall be consulted for any unique requirements it may have established.

1 Caution: Some jurisdictions may independently administer a program of authorization for organizations to perform repairs and alterations within that Jurisdiction.