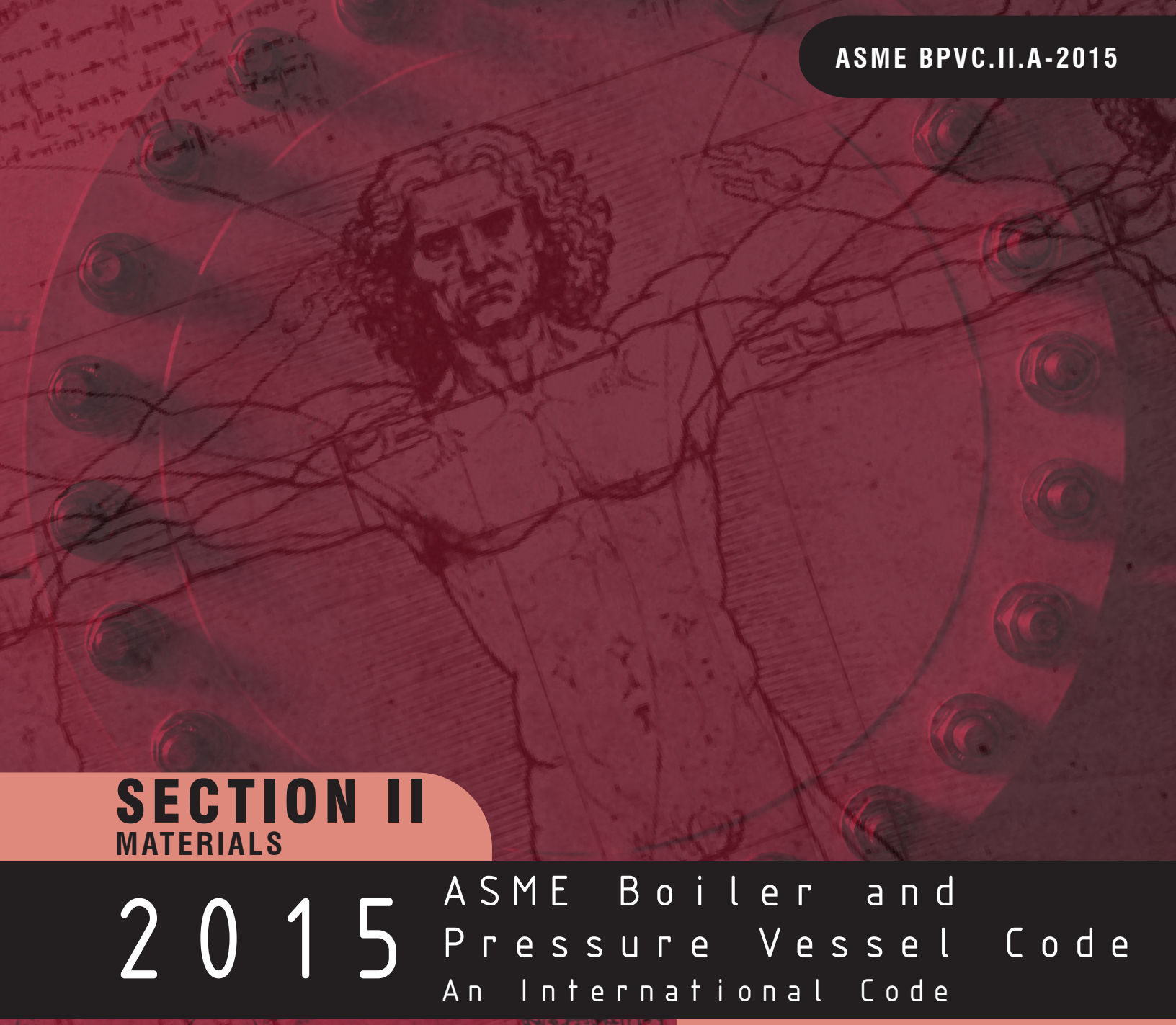
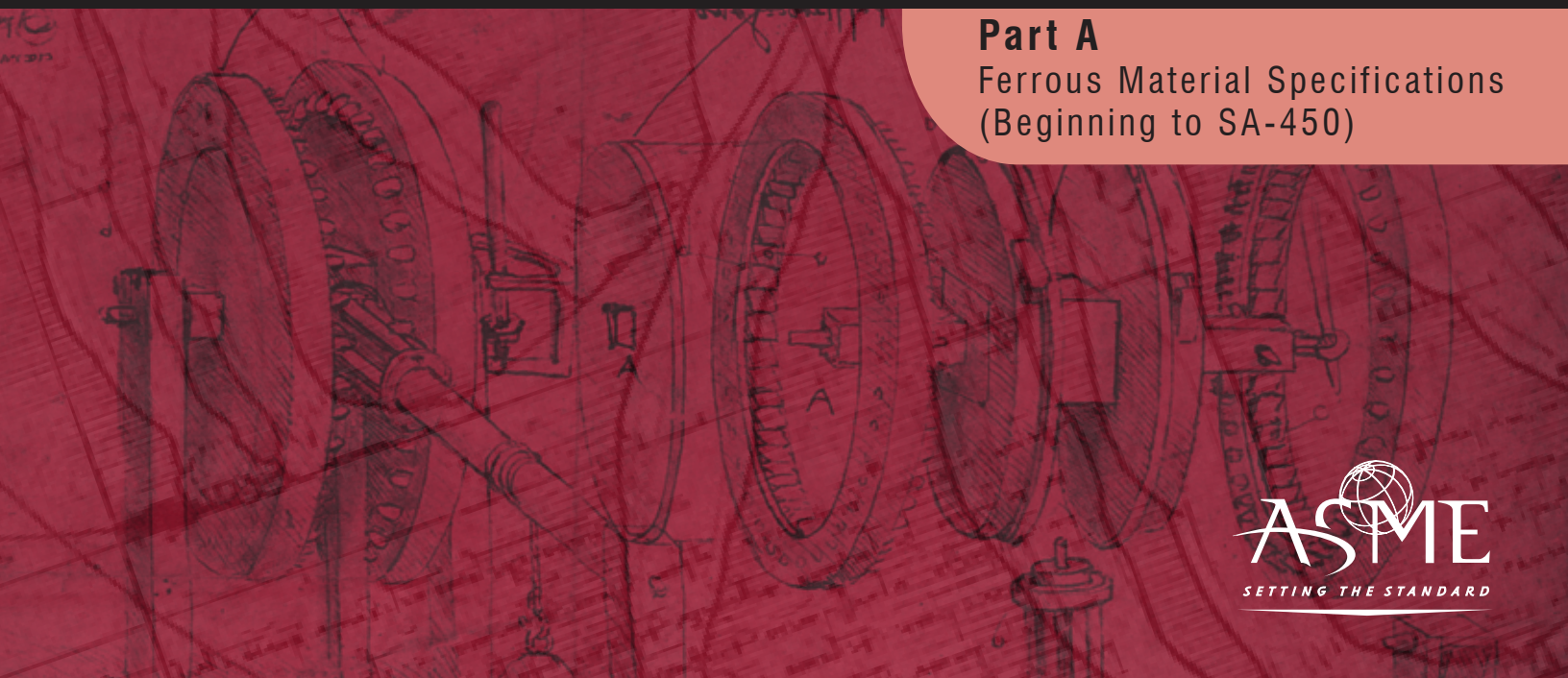
ASME BPVC.II.A-2015



SECTION II
MATERIALS

2015 ASME Boiler and Pressure Vessel Code
An International Code

Part A
Ferrous Material Specifications
(Beginning to SA-450)



ASME
SETTING THE STANDARD

AN INTERNATIONAL CODE

2015 ASME Boiler & Pressure Vessel Code

2015 Edition July 1, 2015

II

MATERIALS

Part A

Ferrous Material Specifications (Beginning to SA-450)

ASME Boiler and Pressure Vessel Committee
on Materials

The American Society of Mechanical Engineers

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: July 1, 2015

This international code or standard was developed under procedures accredited as meeting the criteria for American National Standards and it is an American National Standard. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME 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 or standard 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 or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

The endnotes and preamble in this document (if any) are part of this American National Standard.

ASME collective membership mark

Certification Mark

Library of Congress Catalog Card Number: 56-3934
Printed in the United States of America

Adopted by the Council of The American Society of Mechanical Engineers, 1914; latest edition 2015.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

TABLE OF CONTENTS

(15)

LIST OF SECTIONS

SECTIONS

I Rules for Construction of Power Boilers

II Materials
- Part A — Ferrous Material Specifications
- Part B — Nonferrous Material Specifications
- Part C — Specifications for Welding Rods, Electrodes, and Filler Metals
- Part D — Properties (Customary)
- Part D — Properties (Metric)

III Rules for Construction of Nuclear Facility Components
- Subsection NCA — General Requirements for Division 1 and Division 2
- Appendices
- Division 1
  - Subsection NB — Class 1 Components
  - Subsection NC — Class 2 Components
  - Subsection ND — Class 3 Components
  - Subsection NE — Class MC Components
  - Subsection NF — Supports
  - Subsection NG — Core Support Structures
  - Subsection NH — Class 1 Components in Elevated Temperature Service[*]
- Division 2 — Code for Concrete Containments
- Division 3 — Containments for Transportation and Storage of Spent Nuclear Fuel and High Level Radioactive Material and Waste
- Division 5 — High Temperature Reactors

IV Rules for Construction of Heating Boilers

V Nondestructive Examination

VI Recommended Rules for the Care and Operation of Heating Boilers

VII Recommended Guidelines for the Care of Power Boilers

VIII Rules for Construction of Pressure Vessels
- Division 1
- Division 2 — Alternative Rules
- Division 3 — Alternative Rules for Construction of High Pressure Vessels

IX Welding, Brazing, and Fusing Qualifications

X Fiber-Reinforced Plastic Pressure Vessels

XI Rules for Inservice Inspection of Nuclear Power Plant Components

XII Rules for Construction and Continued Service of Transport Tanks

[*] The 2015 Edition of Section III is the last edition in which Section III, Division 1, Subsection NH, *Class 1 Components in Elevated Temperature Service*, will be published. The requirements located within Subsection NH have been moved to Section III, Division 5, Subsection HB, Subpart B for the elevated temperature construction of Class A components.

INTERPRETATIONS

Interpretations of the Code have historically been posted in January and July at http://cstools.asme.org/interpretations.cfm. Interpretations issued during the previous two calendar years are included with the publication of the applicable Section of the Code in the 2015 Edition. Interpretations of Section III, Divisions 1 and 2 and Section III Appendices are included with Subsection NCA.

Following the 2015 Edition, interpretations will not be included in editions; they will be issued in real time in ASME's Interpretations Database at http://go.asme.org/Interpretations. Historical BPVC interpretations may also be found in the Database.

CODE CASES

The Boiler and Pressure Vessel Code committees meet regularly to consider proposed additions and revisions to the Code and to formulate Cases to clarify the intent of existing requirements or provide, when the need is urgent, rules for materials or constructions not covered by existing Code rules. Those Cases that have been adopted will appear in the appropriate 2015 Code Cases book: “Boilers and Pressure Vessels” or “Nuclear Components.” Supplements will be sent or made available automatically to the purchasers of the Code Cases books up to the publication of the 2017 Code.

(15)

FOREWORD*

In 1911, The American Society of Mechanical Engineers established the Boiler and Pressure Vessel Committee to formulate standard rules for the construction of steam boilers and other pressure vessels. In 2009, the Boiler and Pressure Vessel Committee was superseded by the following committees:

(a) Committee on Power Boilers (I)

(b) Committee on Materials (II)

(c) Committee on Construction of Nuclear Facility Components (III)

(d) Committee on Heating Boilers (IV)

(e) Committee on Nondestructive Examination (V)

(f) Committee on Pressure Vessels (VIII)

(g) Committee on Welding, Brazing, and Fusing (IX)

(h) Committee on Fiber-Reinforced Plastic Pressure Vessels (X)

(i) Committee on Nuclear Inservice Inspection (XI)

(j) Committee on Transport Tanks (XII)

(k) Technical Oversight Management Committee (TOMC)

Where reference is made to "the Committee" in this Foreword, each of these committees is included individually and collectively.

The Committee's function is to establish rules of safety relating only to pressure integrity, which govern the construction** of boilers, pressure vessels, transport tanks, and nuclear components, and the inservice inspection of nuclear components and transport tanks. The Committee also interprets these rules when questions arise regarding their intent. The technical consistency of the Sections of the Code and coordination of standards development activities of the Committees is supported and guided by the Technical Oversight Management Committee. This Code does not address other safety issues relating to the construction of boilers, pressure vessels, transport tanks, or nuclear components, or the inservice inspection of nuclear components or transport tanks. Users of the Code should refer to the pertinent codes, standards, laws, regulations, or other relevant documents for safety issues other than those relating to pressure integrity. Except for Sections XI and XII, and with a few other exceptions, the rules do not, of practical necessity, reflect the likelihood and consequences of deterioration in service related to specific service fluids or external operating environments. In formulating the rules, the Committee considers the needs of users, manufacturers, and inspectors of pressure vessels. The objective of the rules is to afford reasonably certain protection of life and property, and to provide a margin for deterioration in service to give a reasonably long, safe period of usefulness. Advancements in design and materials and evidence of experience have been recognized.

This Code contains mandatory requirements, specific prohibitions, and nonmandatory guidance for construction activities and inservice inspection and testing activities. The Code does not address all aspects of these activities and those aspects that are not specifically addressed should not be considered prohibited. The Code is not a handbook and cannot replace education, experience, and the use of engineering judgment. The phrase *engineering judgement* refers to technical judgments made by knowledgeable engineers experienced in the application of the Code. Engineering judgments must be consistent with Code philosophy, and such judgments must never be used to overrule mandatory requirements or specific prohibitions of the Code.

The Committee recognizes that tools and techniques used for design and analysis change as technology progresses and expects engineers to use good judgment in the application of these tools. The designer is responsible for complying with Code rules and demonstrating compliance with Code equations when such equations are mandatory. The Code neither requires nor prohibits the use of computers for the design or analysis of components constructed to the

* The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. Therefore, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Code.

** *Construction*, as used in this Foreword, is an all-inclusive term comprising materials, design, fabrication, examination, inspection, testing, certification, and pressure relief.

requirements of the Code. However, designers and engineers using computer programs for design or analysis are cautioned that they are responsible for all technical assumptions inherent in the programs they use and the application of these programs to their design.

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

The Committee meets regularly to consider revisions of the rules, new rules as dictated by technological development, Code Cases, and requests for interpretations. Only the Committee has the authority to provide official interpretations of this Code. Requests for revisions, new rules, Code Cases, or interpretations shall be addressed to the Secretary in writing and shall give full particulars in order to receive consideration and action (see Submittal of Technical Inquiries to the Boiler and Pressure Vessel Standards Committees). Proposed revisions to the Code resulting from inquiries will be presented to the Committee for appropriate action. The action of the Committee becomes effective only after confirmation by ballot of the Committee and approval by ASME. Proposed revisions to the Code approved by the Committee are submitted to the American National Standards Institute (ANSI) and published at http://go.asme.org/BPVCPublicReview to invite comments from all interested persons. After public review and final approval by ASME, revisions are published at regular intervals in Editions of the Code.

The Committee does not rule on whether a component shall or shall not be constructed to the provisions of the Code. The scope of each Section has been established to identify the components and parameters considered by the Committee in formulating the Code rules.

Questions or issues regarding compliance of a specific component with the Code rules are to be directed to the ASME Certificate Holder (Manufacturer). Inquiries concerning the interpretation of the Code are to be directed to the Committee. ASME is to be notified should questions arise concerning improper use of an ASME Certification Mark.

When required by context in this Section, the singular shall be interpreted as the plural, and vice versa, and the feminine, masculine, or neuter gender shall be treated as such other gender as appropriate.

STATEMENT OF POLICY ON THE USE OF THE CERTIFICATION MARK AND CODE AUTHORIZATION IN ADVERTISING

ASME has established procedures to authorize qualified organizations to perform various activities in accordance with the requirements of the ASME Boiler and Pressure Vessel Code. It is the aim of the Society to provide recognition of organizations so authorized. An organization holding authorization to perform various activities in accordance with the requirements of the Code may state this capability in its advertising literature.

Organizations that are authorized to use the Certification Mark for marking items or constructions that have been constructed and inspected in compliance with the ASME Boiler and Pressure Vessel Code are issued Certificates of Authorization. It is the aim of the Society to maintain the standing of the Certification Mark for the benefit of the users, the enforcement jurisdictions, and the holders of the Certification Mark who comply with all requirements.

Based on these objectives, the following policy has been established on the usage in advertising of facsimiles of the Certification Mark, Certificates of Authorization, and reference to Code construction. The American Society of Mechanical Engineers does not "approve," "certify," "rate," or "endorse" any item, construction, or activity and there shall be no statements or implications that might so indicate. An organization holding the Certification Mark and/or a Certificate of Authorization may state in advertising literature that items, constructions, or activities "are built (produced or performed) or activities conducted in accordance with the requirements of the ASME Boiler and Pressure Vessel Code," or "meet the requirements of the ASME Boiler and Pressure Vessel Code." An ASME corporate logo shall not be used by any organization other than ASME.

The Certification Mark shall be used only for stamping and nameplates as specifically provided in the Code. However, facsimiles may be used for the purpose of fostering the use of such construction. Such usage may be by an association or a society, or by a holder of the Certification Mark who may also use the facsimile in advertising to show that clearly specified items will carry the Certification Mark. General usage is permitted only when all of a manufacturer's items are constructed under the rules.

STATEMENT OF POLICY ON THE USE OF ASME MARKING TO IDENTIFY MANUFACTURED ITEMS

The ASME Boiler and Pressure Vessel Code provides rules for the construction of boilers, pressure vessels, and nuclear components. This includes requirements for materials, design, fabrication, examination, inspection, and stamping. Items constructed in accordance with all of the applicable rules of the Code are identified with the official Certification Mark described in the governing Section of the Code.

Markings such as "ASME," "ASME Standard," or any other marking including "ASME" or the Certification Mark shall not be used on any item that is not constructed in accordance with all of the applicable requirements of the Code.

Items shall not be described on ASME Data Report Forms nor on similar forms referring to ASME that tend to imply that all Code requirements have been met when, in fact, they have not been. Data Report Forms covering items not fully complying with ASME requirements should not refer to ASME or they should clearly identify all exceptions to the ASME requirements.

SUBMITTAL OF TECHNICAL INQUIRIES TO THE BOILER AND PRESSURE VESSEL STANDARDS COMMITTEES (15)

1 INTRODUCTION

(a) The following information provides guidance to Code users for submitting technical inquiries to the committees. See Guideline on the Approval of New Materials Under the ASME Boiler and Pressure Vessel Code in Section II, Parts C and D for additional requirements for requests involving adding new materials to the Code. Technical inquiries include requests for revisions or additions to the Code rules, requests for Code Cases, and requests for Code Interpretations, as described below.

(1) Code Revisions. Code revisions are considered to accommodate technological developments, address administrative requirements, incorporate Code Cases, or to clarify Code intent.

(2) Code Cases. Code Cases represent alternatives or additions to existing Code rules. Code Cases are written as a question and reply, and are usually intended to be incorporated into the Code at a later date. When used, Code Cases prescribe mandatory requirements in the same sense as the text of the Code. However, users are cautioned that not all jurisdictions or owners automatically accept Code Cases. The most common applications for Code Cases are:

(-a) to permit early implementation of an approved Code revision based on an urgent need

(-b) to permit the use of a new material for Code construction

(-c) to gain experience with new materials or alternative rules prior to incorporation directly into the Code

(3) Code Interpretations. Code Interpretations provide clarification of the meaning of existing rules in the Code, and are also presented in question and reply format. Interpretations do not introduce new requirements. In cases where existing Code text does not fully convey the meaning that was intended, and revision of the rules is required to support an interpretation, an Intent Interpretation will be issued and the Code will be revised.

(b) The Code rules, Code Cases, and Code Interpretations established by the committees are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Code rules.

(c) Inquiries that do not comply with these provisions or that do not provide sufficient information for a committee's full understanding may result in the request being returned to the inquirer with no action.

2 INQUIRY FORMAT

Submittals to a committee shall include:

(a) Purpose. Specify one of the following:

(1) revision of present Code rules

(2) new or additional Code rules

(3) Code Case

(4) Code Interpretation

(b) Background. Provide the information needed for the committee's understanding of the inquiry, being sure to include reference to the applicable Code Section, Division, edition, addenda (if applicable), paragraphs, figures, and tables. Preferably, provide a copy of the specific referenced portions of the Code.

(c) Presentations. The inquirer may desire or be asked to attend a meeting of the committee to make a formal presentation or to answer questions from the committee members with regard to the inquiry. Attendance at a committee meeting shall be at the expense of the inquirer. The inquirer's attendance or lack of attendance at a meeting shall not be a basis for acceptance or rejection of the inquiry by the committee.

3 CODE REVISIONS OR ADDITIONS

Requests for Code revisions or additions shall provide the following:

(a) Proposed Revisions or Additions. For revisions, identify the rules of the Code that require revision and submit a copy of the appropriate rules as they appear in the Code, marked up with the proposed revision. For additions, provide the recommended wording referenced to the existing Code rules.

(b) Statement of Need. Provide a brief explanation of the need for the revision or addition.

(c) Background Information. Provide background information to support the revision or addition, including any data or changes in technology that form the basis for the request that will allow the committee to adequately evaluate the proposed revision or addition. Sketches, tables, figures, and graphs should be submitted as appropriate. When applicable, identify any pertinent paragraph in the Code that would be affected by the revision or addition and identify paragraphs in the Code that reference the paragraphs that are to be revised or added.

4 CODE CASES

Requests for Code Cases shall provide a Statement of Need and Background Information similar to that defined in 3(b) and 3(c), respectively, for Code revisions or additions. The urgency of the Code Case (e.g., project underway or imminent, new procedure, etc.) must be defined and it must be confirmed that the request is in connection with equipment that will bear the Certification Mark, with the exception of Section XI applications. The proposed Code Case should identify the Code Section and Division, and be written as a *Question* and a *Reply* in the same format as existing Code Cases. Requests for Code Cases should also indicate the applicable Code editions and addenda (if applicable) to which the proposed Code Case applies.

5 CODE INTERPRETATIONS

(a) Requests for Code Interpretations shall provide the following:

(1) Inquiry. Provide a condensed and precise question, omitting superfluous background information and, when possible, composed in such a way that a "yes" or a "no" *Reply,* with brief provisos if needed, is acceptable. The question should be technically and editorially correct.

(2) Reply. Provide a proposed *Reply* that will clearly and concisely answer the *Inquiry* question. Preferably, the *Reply* should be "yes" or "no," with brief provisos if needed.

(3) Background Information. Provide any background information that will assist the committee in understanding the proposed *Inquiry* and *Reply.*

(b) Requests for Code Interpretations must be limited to an interpretation of a particular requirement in the Code or a Code Case. The committee cannot consider consulting type requests such as the following:

(1) a review of calculations, design drawings, welding qualifications, or descriptions of equipment or parts to determine compliance with Code requirements;

(2) a request for assistance in performing any Code-prescribed functions relating to, but not limited to, material selection, designs, calculations, fabrication, inspection, pressure testing, or installation;

(3) a request seeking the rationale for Code requirements.

6 SUBMITTALS

Submittals to and responses from the committees shall meet the following:

(a) Submittal. Inquiries from Code users shall be in English and preferably be submitted in typewritten form; however, legible handwritten inquiries will also be considered. They shall include the name, address, telephone number, fax number, and e-mail address, if available, of the inquirer and be mailed to the following address:

Secretary
ASME Boiler and Pressure Vessel Committee
Two Park Avenue
New York, NY 10016-5990

As an alternative, inquiries may be submitted via e-mail to: SecretaryBPV@asme.org or via our online tool at http://go.asme.org/InterpretationRequest.

(b) Response. The Secretary of the appropriate committee shall acknowledge receipt of each properly prepared inquiry and shall provide a written response to the inquirer upon completion of the requested action by the committee.

(15)

PERSONNEL
ASME Boiler and Pressure Vessel Standards Committees, Subgroups, and Working Groups

January 1, 2015

TECHNICAL OVERSIGHT MANAGEMENT COMMITTEE (TOMC)

T. P. Pastor, *Chair*
R. W. Barnes, *Vice Chair*
J. S. Brzuszkiewicz, *Staff Secretary*
R. J. Basile
J. E. Batey
T. L. Bedeaux
D. L. Berger
D. A. Canonico
A. Chaudouet
D. B. DeMichael
R. P. Deubler
P. D. Edwards
J. G. Feldstein
R. E. Gimple
M. Gold
T. E. Hansen
G. W. Hembree
J. F. Henry
R. S. Hill III
G. G. Karcher
W. M. Lundy
J. R. MacKay
W. E. Norris
G. C. Park
M. D. Rana
R. F. Reedy, Sr.
B. W. Roberts
S. C. Roberts
F. J. Schaaf, Jr.
A. Selz
B. F. Shelley
W. J. Sperko
R. W. Swayne
C. Withers

HONORARY MEMBERS (MAIN COMMITTEE)

F. P. Barton
R. J. Cepluch
T. M. Cullen
W. D. Doty
G. E. Feigel
O. F. Hedden
M. H. Jawad
A. J. Justin
W. G. Knecht
J. LeCoff
T. G. McCarty
G. C. Millman
R. A. Moen
R. F. Reedy, Sr.

ADMINISTRATIVE COMMITTEE

T. P. Pastor, *Chair*
R. W. Barnes, *Vice Chair*
J. S. Brzuszkiewicz, *Staff Secretary*
R. J. Basile
J. E. Batey
T. L. Bedeaux
D. L. Berger
J. F. Henry
R. S. Hill III
G. C. Park
M. D. Rana
B. F. Shelley
W. J. Sperko

MARINE CONFERENCE GROUP

J. G. Hungerbuhler, Jr.
G. Nair
N. Prokopuk
J. D. Reynolds

CONFERENCE COMMITTEE

D. A. Douin — Ohio, *Secretary*
M. J. Adams — Ontario, Canada
J. T. Amato — Minnesota
B. P. Anthony — Rhode Island
R. D. Austin — Arizona
R. J. Brockman — Missouri
M. A. Burns — Florida
J. H. Burpee — Maine
C. B. Cantrell — Nebraska
D. C. Cook — California
B. J. Crawford — Georgia
E. L. Creaser — New Brunswick, Canada
J. J. Dacanay — Hawaii
C. Dautrich — North Dakota
P. L. Dodge — Nova Scotia, Canada
D. Eastman — Newfoundland and Labrador, Canada
J. J. Esch — Delaware
C. Fulton — Alaska
R. J. Handy — Kentucky
D. R. Hannon — Arkansas
E. S. Kawa — Massachusetts
J. C. Klug — Wisconsin
M. Kotb — Quebec, Canada
T. C. Hellman — Oklahoma
E. G. Hilton — Virginia
D. T. Jagger — Ohio
K. J. Kraft — Maryland
L. C. Leet — Washington
A. M. Lorimor — South Dakota
M. Mailman — Northwest Territories, Canada
D. E. Mallory — New Hampshire
W. McGivney — New York
U. Merkle — Iowa
M. S. Moore — Michigan
S. V. Nelson — Colorado
C. C. Novak — Illinois
T. Oda — Washington
R. P. Pate — Alabama
M. K. Perdue — Oregon
M. Poehlmann — Alberta, Canada
J. F. Porcella — West Virginia
A. Pratt — Connecticut
C. F. Reyes — California
M. J. Ryan — Illinois
M. H. Sansone — New York
T. S. Scholl — British Columbia, Canada
G. L. Schultz — Nevada
T. S. Seine — North Dakota
C. S. Selinger — Saskatchewan, Canada
D. Slater — Manitoba, Canada
N. Smith — Pennsylvania
R. Spiker — North Carolina
R. K. Sturm — Utah
S. R. Townsend — Prince Edward Island, Canada
R. D. Troutt — Texas
M. J. Verhagen — Wisconsin
M. Washington — New Jersey
K. L. Watson — Mississippi
C. J. Wilson III — Kansas

INTERNATIONAL INTEREST REVIEW GROUP

V. Felix
Y.-G. Kim
S. H. Leong
W. Lin
O. F. Manafa
C. Minu
T. S. G. Narayannen
Y.-W. Park
R. Reynaga
P. Williamson

COMMITTEE ON POWER BOILERS (BPV I)

D. L. Berger, *Chair*
R. E. McLaughlin, *Vice Chair*
U. D'Urso, *Staff Secretary*
J. L. Arnold
S. W. Cameron
D. A. Canonico
K. K. Coleman
P. D. Edwards
P. Fallouey
J. G. Feldstein
G. W. Galanes
T. E. Hansen
J. F. Henry
J. S. Hunter
W. L. Lowry
F. Massi
L. Moedinger
P. A. Molvie
Y. Oishi
E. M. Ortman
J. T. Pillow
B. W. Roberts
J. M. Tanzosh
D. Tompkins
D. E. Tuttle
J. Vattappilly
R. V. Wielgoszinski
Y. Li, *Delegate*
H. Michael, *Delegate*
D. N. French, *Honorary Member*
T. C. McGough, *Honorary Member*
R. L. Williams, *Honorary Member*

Subgroup on Design (BPV I)

J. Vattappilly, *Chair*
D. I. Anderson, *Secretary*
D. Dewees
P. Dhorajia
H. A. Fonzi, Jr.
J. P. Glaspie
G. B. Komora
P. A. Molvie
D. A. Olson
S. V. Torkildson
M. Wadkinson
C. F. Jeerings, *Contributing Member*
J. C. Light, *Contributing Member*

Subgroup on Fabrication and Examination (BPV I)

J. T. Pillow, *Chair*
J. L. Arnold, *Secretary*
P. Becker
D. L. Berger
S. W. Cameron
S. Fincher
G. W. Galanes
P. F. Gilston
J. Hainsworth
T. E. Hansen
C. T. McDaris
R. E. McLaughlin
R. J. Newell
Y. Oishi
R. V. Wielgoszinski

Subgroup on General Requirements and Piping (BPV I)

T. E. Hansen, *Chair*
E. M. Ortman, *Vice Chair*
F. Massi, *Secretary*
P. Becker
D. L. Berger
P. D. Edwards
G. W. Galanes
W. L. Lowry
R. E. McLaughlin
B. Mollitor
J. T. Pillow
D. Tompkins
S. V. Torkildson
D. E. Tuttle
M. Wadkinson
R. V. Wielgoszinski
C. F. Jeerings, *Contributing Member*
R. Uebel, *Contributing Member*

Subgroup on Heat Recovery Steam Generators (BPV I)

S. V. Torkildson, *Chair*
J. L. Arnold
J. P. Bell
B. G. Carson
J. Gertz
T. E. Hansen
G. B. Komora
C. T. McDaris
Y. Oishi
E. M. Ortman
D. Tompkins
B. C. Turczynski

Subgroup on Locomotive Boilers (BPV I)

L. Moedinger, *Chair*
S. M. Butler, *Secretary*
P. Boschan
J. Braun
R. C. Franzen, Jr.
D. W. Griner
S. D. Jackson
M. A. Janssen
S. A. Lee
G. M. Ray
J. E. Rimmasch
R. B. Stone
M. W. Westland
R. Yuill
R. D. Reetz, *Contributing Member*

Subgroup on Materials (BPV I)

G. W. Galanes, *Chair*
K. K. Coleman, *Vice Chair*
J. S. Hunter, *Secretary*
S. H. Bowes
D. A. Canonico
P. Fallouey
K. L. Hayes
J. F. Henry
M. Lewis
O. X. Li
F. Masuyama
D. W. Rahoi
B. W. Roberts
J. M. Tanzosh
J. Vattappilly

Subgroup on Solar Boilers (BPV I)

J. S. Hunter, *Chair*
S. V. Torkildson, *Secretary*
G. W. Galanes
R. E. Hearne
P. Jennings
D. J. Koza
F. Massi
E. M. Ortman
M. J. Slater
J. C. Light, *Contributing Member*

India International Working Group (BPV I)

H. Dalal
I. Kalyanasundaram
S. Mathur
A. J. Patil
A. R. Patil
G. V. S. Rao
U. Revisanakaran
N. Satheesan
G. U. Shanker
D. Shrivastava
S. Venkataramana

Task Group on Modernization of BPVC Section I

D. I. Anderson, *Chair*
U. D'Urso, *Staff Secretary*
J. L. Arnold
S. W. Cameron
D. Dewees
G. W. Galanes
J. P. Glaspie
T. E. Hansen
J. F. Henry
R. E. McLaughlin
P. A. Molvie
E. M. Ortman
J. T. Pillow
B. W. Roberts
D. E. Tuttle
J. Vattappilly

COMMITTEE ON MATERIALS (BPV II)

J. F. Henry, *Chair*
D. W. Rahoi, *Vice Chair*
N. Lobo, *Staff Secretary*
F. Abe
A. Appleton
J. Cameron
D. A. Canonico
A. Chaudouet
P. Fallouey
J. R. Foulds
D. W. Gandy
M. H. Gilkey
M. Gold
J. F. Grubb
J. A. Hall
K. M. Hottle
M. Katcher
O. X. Li
F. Masuyama
R. K. Nanstad
B. W. Roberts
E. Shapiro
M. J. Slater
R. C. Sutherlin
R. W. Swindeman
J. M. Tanzosh
D. Tyler
O. Oldani, *Delegate*
H. D. Bushfield, *Contributing Member*
M. L. Nayyar, *Contributing Member*
E. G. Nisbett, *Contributing Member*
E. Upitis, *Contributing Member*
T. M. Cullen, *Honorary Member*
W. D. Doty, *Honorary Member*
W. D. Edsall, *Honorary Member*
G. C. Hsu, *Honorary Member*
R. A. Moen, *Honorary Member*
C. E. Spaeder, Jr., *Honorary Member*
A. W. Zeuthen, *Honorary Member*

Executive Committee (BPV II)

J. F. Henry, *Chair*
D. W. Rahoi, *Vice Chair*
N. Lobo, *Staff Secretary*
A. Appleton
A. Chaudouet
J. R. Foulds
M. Gold
J. F. Grubb
R. W. Mikitka
B. W. Roberts
R. C. Sutherlin
R. W. Swindeman
J. M. Tanosh

Subgroup on External Pressure (BPV II)

R. W. Mikitka, *Chair*
D. L. Kurle, *Vice Chair*
J. A. A. Morrow, *Secretary*
L. F. Campbell
H. Chen
D. S. Griffin
J. F. Grubb
J. R. Harris III
M. H. Jawad
C. R. Thomas
M. Wadkinson
M. Katcher, *Contributing Member*
C. H. Sturgeon, *Contributing Member*

Subgroup on Ferrous Specifications (BPV II)

A. Appleton, *Chair*
K. M. Hottle, *Vice Chair*
P. Wittenbach, *Secretary*
H. Chen
B. M. Dingman
M. J. Dosdourian
P. Fallouey
J. D. Fritz
T. Graham
J. M. Grocki
J. F. Grubb
C. Hyde
D. S. Janikowski
L. J. Lavezzi
S. G. Lee
W. C. Mack
A. S. Melilli
K. E. Orie
J. Shick
E. Upitis
J. D. Wilson
R. Zawierucha
E. G. Nisbett, *Contributing Member*

Subgroup on International Material Specifications (BPV II)

A. Chaudouet, *Chair*
O. X. Li, *Vice Chair*
T. F. Miskell, *Secretary*
S. W. Cameron
D. A. Canonico
H. Chen
P. Fallouey
A. F. Garbolevsky
D. O. Henry
M. Ishikawa
W. M. Lundy
A. R. Nywening
E. Upitis
F. Zeller
D. Kwon, *Delegate*
O. Oldani, *Delegate*
H. Lorenz, *Contributing Member*

Subgroup on Nonferrous Alloys (BPV II)

R. C. Sutherlin, *Chair*
M. H. Gilkey, *Vice Chair*
H. Anada
J. Calland
D. B. Denis
J. F. Grubb
A. Heino
M. Katcher
J. A. McMaster
L. Paul
D. W. Rahoi
W. Ren
E. Shapiro
M. H. Skillingberg
D. Tyler
J. Weritz
R. Wright
R. Zawierucha
W. R. Apblett, Jr., *Contributing Member*

Subgroup on Physical Properties (BPV II)

J. F. Grubb, *Chair*
H. D. Bushfield
D. B. Denis
P. Fallouey
E. Shapiro

Subgroup on Strength, Ferrous Alloys (BPV II)

J. M. Tanzosh, *Chair*
M. J. Slater, *Secretary*
F. Abe
H. Anada
D. A. Canonico
A. Di Rienzo
P. Fallouey
J. R. Foulds
M. Gold
J. A. Hall
J. F. Henry
K. Kimura
S. W. Knowles
F. Masuyama
C. Pearce
D. W. Rahoi
B. W. Roberts
M. S. Shelton
J. P. Shingledecker
R. W. Swindeman
W. R. Apblett, Jr., *Contributing Member*
H. Murakami, *Contributing Member*

Subgroup on Strength of Weldments (BPV II & BPV IX)

W. F. Newell, Jr., *Chair*
S. H. Bowes
K. K. Coleman
P. D. Flenner
J. R. Foulds
D. W. Gandy
M. Gold
K. L. Hayes
J. F. Henry
J. Penso
D. W. Rahoi
B. W. Roberts
J. P. Shingledecker
W. J. Sperko
J. P. Swezy, Jr.
J. M. Tanzosh

Working Group on Materials Database (BPV II)

R. W. Swindeman, *Chair*
N. Lobo, *Staff Secretary*
F. Abe
J. R. Foulds
J. F. Henry
M. Katcher
B. W. Roberts
R. C. Sutherlin
D. Andrei, *Contributing Member*
J. L. Arnold, *Contributing Member*
W. Hoffelner, *Contributing Member*
T. Lazar, *Contributing Member*
D. T. Peters, *Contributing Member*
W. Ren, *Contributing Member*

Working Group on Creep Strength Enhanced Ferritic Steels (BPV II)

J. F. Henry, *Chair*
F. Abe
S. H. Bowes
D. A. Canonico
K. K. Coleman
G. Cumino
P. D. Flenner
J. R. Foulds
D. W. Gandy
M. Gold
F. Masuyama
W. F. Newell, Jr.
B. W. Roberts
W. J. Sperko
R. W. Swindeman
J. M. Tanzosh
R. G. Young

Working Group on Data Analysis (BPV II)

J. R. Foulds, *Chair*
F. Abe
M. Gold
J. F. Grubb
J. F. Henry
M. Katcher
F. Masuyama
W. Ren
B. W. Roberts
M. Subanovic
M. J. Swindeman
R. W. Swindeman

China International Working Group (BPV II)

B. Shou, *Chair*
Yong Zhang, *Vice Chair*
X. Tong, *Secretary*
W. Fang
Q. C. Feng
S. Huo
H. Li
J. Li
S. Li
Z. Rongcan
S. Tan
C. Wang
X. Wang
F. Yang
G. Yang
R. Ye
L. Yin
H. Zhang
X.-H. Zhang
Yingkai Zhang
Q. Zhao
S. Zhao
J. Zou

COMMITTEE ON CONSTRUCTION OF NUCLEAR FACILITY COMPONENTS (BPV III)

R. S. Hill III, *Chair*
R. B. Keating, *Vice Chair*
J. C. Minichiello, *Vice Chair*
A. Byk, *Staff Secretary*
T. M. Adams
A. Appleton
R. W. Barnes
W. H. Borter
C. W. Bruny
T. D. Burchell
J. R. Cole
R. P. Deubler
A. C. Eberhardt
B. A. Erler
G. M. Foster
W. Hoffelner
R. M. Jessee
R. I. Jetter
C. C. Kim
G. H. Koo
V. Kostarev
K. A. Manoly
D. E. Matthews
R. P. McIntyre
M. N. Mitchell
M. Morishita
D. K. Morton
T. Nagata
R. F. Reedy, Sr.
I. Saito
C. T. Smith
W. K. Sowder, Jr.
W. J. Sperko
K. R. Wichman
C. S. Withers
Y. H. Choi, *Delegate*
T. Ius, *Delegate*
H.-T. Wang, *Delegate*
M. Zhou, *Contributing Member*
E. B. Branch, *Honorary Member*
G. D. Cooper, *Honorary Member*
W. D. Doty, *Honorary Member*
D. F. Landers, *Honorary Member*
R. A. Moen, *Honorary Member*
C. J. Pieper, *Honorary Member*

Subcommittee on Design (BPV III)

R. P. Deubler, *Chair*
D. E. Matthews, *Vice Chair*
G. L. Hollinger, *Secretary*
T. M. Adams
G. A. Antaki
R. L. Bratton
C. W. Bruny
P. R. Donavin
R. S. Hill III
P. Hirschberg
M. H. Jawad
R. I. Jetter
R. B. Keating
R. A. Ladefian
K. A. Manoly
R. J. Masterson
M. N. Mitchell
W. J. O'Donnell, Sr.
E. L. Pleins
T.-L. Sham
J. P. Tucker
K. Wright
J. Yang

Subgroup on Component Design (SC-D) (BPV III)

T. M. Adams, *Chair*
R. B. Keating, *Vice Chair*
S. Pellet, *Secretary*
G. A. Antaki
S. Asada
J. F. Ball
J. R. Cole
R. P. Deubler
P. Hirschberg
H. Kobayashi
R. A. Ladefian
K. A. Manoly
R. J. Masterson
D. E. Matthews
J. C. Minichiello
D. K. Morton
T. M. Musto
T. Nagata
A. N. Nguyen
E. L. Pleins
I. Saito
G. C. Slagis
J. R. Stinson
G. Z. Tokarski
J. P. Tucker
P. Vock
K. R. Wichman
C. Wilson
J. Yang
C. W. Bruny, *Contributing Member*
A. A. Dermenjian, *Contributing Member*

Working Group on Core Support Structures (SG-CD) (BPV III)

J. Yang, *Chair*
J. F. Kielb, *Secretary*
L. C. Hartless
D. Keck
T. Liszkai
H. S. Mehta
M. Nakajima
M. D. Snyder
A. Tsirigotis
R. Vollmer
J. T. Land, *Contributing Member*

Working Group on Design of Division 3 Containments (SG-CD) (BPV III)

D. K. Morton, *Chair*
D. J. Ammerman
G. Bjorkman
G. Broz
S. Horowitz
D. W. Lewis
J. C. Minichiello
E. L. Pleins
C. J. Temus
I. D. McInnes, *Contributing Member*
R. E. Nickell, *Contributing Member*
H. P. Shrivastava, *Contributing Member*

Working Group on HDPE Design of Components (SG-CD) (BPV III)

T. M. Musto, *Chair*
J. Ossmann, *Secretary*
T. M. Adams
T. A. Bacon
C. Basavaraju
D. Burwell
S. Choi
P. Krishnaswamy
M. Martin
J. C. Minichiello
D. P. Munson
F. J. Schaaf, Jr.
R. Stakenborghs
H. E. Svetlik

Working Group on Piping (SG-CD) (BPV III)

G. A. Antaki, *Chair*
G. Z. Tokarski, *Secretary*
T. M. Adams
T. A. Bacon
C. Basavaraju
J. Catalano
F. Claeys
J. R. Cole
C. M. Faidy
R. G. Gilada
N. M. Graham
M. A. Gray
R. W. Haupt
A. Hirano
P. Hirschberg
M. Kassar
J. Kawahata
R. B. Keating
V. Kostarev
Y. Liu
J. F. McCabe
J. C. Minichiello
I.-K. Nam
A. N. Nguyen
M. S. Sills
G. C. Slagis
N. C. Sutherland
E. A. Wais
C.-I. Wu
J. J. Martinez, *Contributing Member*
N. J. Shah, *Contributing Member*
E. C. Rodabaugh, *Honorary Member*

Working Group on Pressure Relief (SG-CD) (BPV III)

J. F. Ball, *Chair*
A. L. Szeglin
D. G. Thibault

Working Group on Pumps (SG-CD) (BPV III)

R. A. Ladefian, *Chair*
P. W. Behnke
R. E. Cornman, Jr.
M. D. Eftychiou
A. Fraser
M. A. Gaydon
R. Ghanbari
M. Higuchi
S. Mauvais
R. A. Patrick
J. Sulley
R. Udo
A. G. Washburn

Working Group on Supports (SG-CD) (BPV III)

J. R. Stinson, *Chair*
U. S. Bandyopadhyay, *Secretary*
K. Avrithi
T. H. Baker
F. J. Birch
R. P. Deubler
N. M. Graham
R. J. Masterson
S. Pellet
I. Saito
H. P. Shrivastava
C. Stirzel
T. G. Terryah
G. Z. Tokarski
P. Wiseman
C.-I. Wu

Working Group on Valves (SG-CD) (BPV III)

P. Vock, *Chair*
J. O'Callaghan, *Secretary*
M. C. Buckley
G. A. Jolly
J. Klein
T. A. McMahon
C. A. Mizer
K. E. Reid II
H. R. Sonderegger
J. Sully
I. Tseng
J. P. Tucker

Working Group on Vessels (SG-CD) (BPV III)

D. E. Matthews, *Chair*
R. M. Wilson, *Secretary*
C. Basavaraju
J. V. Gregg, Jr.
W. J. Heilker
A. Kalnins
R. B. Keating
D. Keck
J. Kim
O.-S. Kim
K. Matsunaga
M. C. Scott
P. K. Shah
J. Shupert
C. Turylo
D. Vlaicu
W. F. Weitze
T. Yamazaki
R. Z. Ziegler

Subgroup on Design Methods (SC-D) (BPV III)

C. W. Bruny, *Chair*
S. McKillop, *Secretary*
K. Avrithi
W. Culp
P. R. Donavin, Jr.
J. V. Gregg, Jr.
H. T. Harrison III
K. Hsu
M. Kassar
D. Keck
M. N. Mitchell
W. J. O'Donnell, Sr.
P. J. O'Regan
W. D. Reinhardt
P. Smith
S. D. Snow
W. F. Weitze
K. Wright

Working Group on Design Methodology (SG-DM) (BPV III)

S. D. Snow, *Chair*
M. R. Breach, *Secretary*
K. Avrithi
C. Basavaraju
R. D. Blevins
D. L. Caldwell
D. Dewees
C. M. Faidy
H. T. Harrison III
P. Hirschberg
M. Kassar
R. B. Keating
J. Kim
H. Kobayashi
T. Liszkai
J. F. McCabe
A. N. Nguyen
W. D. Reinhardt
D. H. Roarty
P. K. Shah
R. Vollmer
S. Wang
T. M. Wiger
K. Wright
J. Yang
M. K. Au-Yang, *Contributing Member*

Working Group on Environmental Effects (SG-DM) (BPV III)

W. Culp, *Chair*
B. D. Frew, *Secretary*
K. Avrithi
P. J. Dobson
W. J. Heilker
C. Jonker
J. E. Nestell
T. Schriefer
M. S. Shelton
Y. H. Choi, *Delegate*

Working Group on Environmental Fatigue Evaluation Methods (SG-DM) (BPV III)

K. Wright, *Chair*
M. A. Gray, *Vice Chair*
W. F. Weitze, *Secretary*
T. M. Adams
S. Asada
K. Avrithi
R. C. Cipolla
J. R. Cole
T. M. Damiani
C. M. Faidy
T. D. Gilman
S. R. Gosselin
Y. He
P. Hirschberg
H. S. Mehta
J.-S. Park
D. H. Roarty
I. Saito
D. Vlaicu
R. Z. Ziegler

Working Group on Fatigue Strength (SG-DM) (BPV III)

P. R. Donavin, *Chair*
T. M. Damiani
D. Dewees
C. M. Faidy
S. R. Gosselin
R. J. Gurdal
C. F. Heberling II
C. E. Hinnant
P. Hirschberg
K. Hsu
S. H. Kleinsmith
S. Majumdar
S. N. Malik
D. H. Roarty
M. S. Shelton
G. Taxacher
A. Tsirigotis
K. Wright
H. H. Ziada
G. S. Chakrabarti, *Contributing Member*
W. J. O'Donnell, Sr., *Contributing Member*

Working Group on Graphite and Composites Design (SG-DM) (BPV III)

M. N. Mitchell, *Chair*
M. W. Davies, *Vice Chair*
C. A. Sanna, *Staff Secretary*
T. D. Burchell, *Secretary*
A. Appleton
R. L. Bratton
S. Cadell
S.-H. Chi
A. Covac
S. W. Doms
S. F. Duffy
S. T. Gonczy
Y. Katoh
J. Ossmann
M. Roemmler
N. Salstrom
T. Shibata
S. Yu
G. L. Zeng

Working Group on Probabilistic Methods in Design (SG-DM) (BPV III)

P. J. O'Regan, *Chair*
M. Golliet, *Secretary*
T. Asayama
K. Avrithi
M. R. Graybeal
D. O. Henry
R. S. Hill III
M. Morishita
N. A. Palm
I. Saito

Special Working Group on Computational Modeling for Explicit Dynamics (SG-DM) (BPV III)

G. Bjorkman, *Chair*
D. J. Ammerman, *Secretary*
M. R. Breach
G. Broz
J. Jordan
D. Molitoris
J. Piotter
W. D. Reinhardt
P. Y.-K. Shih
S. D. Snow
C.-F. Tso
M. C. Yaksh
U. Zencker

Subgroup on Elevated Temperature Design (SC-D) (BPV III)

T.-L. Sham, *Chair*
T. Asayama
C. Becht IV
F. W. Brust
P. Carter
J. F. Cervenka
B. F. Hantz
W. Hoffelner
A. B. Hull
M. H. Jawad
R. I. Jetter
G. H. Koo
M. Li
S. Majumdar
J. E. Nestell
W. J. O'Donnell, Sr.
R. W. Swindeman
D. S. Griffin, *Contributing Member*
W. J. Koves, *Contributing Member*
D. L. Marriott, *Contributing Member*

Working Group on Allowable Stress Criteria (SG-ETD) (BPV III)

R. W. Swindeman, *Chair*
R. Wright, *Secretary*
J. R. Foulds
K. Kimura
M. Li
S. N. Malik
J. E. Nestell
W. Ren
B. W. Roberts
M. Sengupta
T.-I. Sham

Working Group on Analysis Methods (SG-ETD) (BPV III)

P. Carter, *Chair*
M. J. Swindeman, *Secretary*
M. Ando
M. R. Breach
R. I. Jetter
S. Krishnamurthy
T.-I. Sham
D. K. Williams

Working Group on Creep-Fatigue and Negligible Creep (SG-ETD) (BPV III)

T. Asayama, *Chair*
M. Li, *Secretary*
F. W. Brust
P. Carter
R. I. Jetter
G. H. Koo
B.-L. Lyow
S. N. Malik
H. Qian
T.-I. Sham

Working Group on Elevated Temperature Construction (SG-ETD) (BPV III)

M. H. Jawad, *Chair*
B. Mollitor, *Secretary*
D. I. Anderson
R. G. Brown
D. Dewees
J. P. Glaspie
B. F. Hantz
G. L. Hollinger
R. I. Jetter
S. Krishnamurthy
A. Mann
D. L. Marriott
M. N. Mitchell
C. Nadarajah

Working Group on High Temperature Flaw Evaluation (SG-ETD) (BPV III)

F. W. Brust, *Chair*
N. Broom
P. Carter
W. Hoffelner
S. N. Malik
D. L. Rudland
P. J. Rush
D.-J. Shim
S. X. Xu

Subgroup on General Requirements (BPV III)

R. P. McIntyre, *Chair*
L. M. Plante, *Secretary*
V. Apostolescu
A. Appleton
S. Bell
J. R. Berry
B. K. Bobo
J. DeKleine
J. V. Gardiner
G. Gratti
J. W. Highlands
G. V. Imbro
K. A. Kavanagh
Y.-S. Kim
M. R. Minick
E. C. Renaud
D. J. Roszman
C. T. Smith
W. K. Sowder, Jr.
G. E. Szabatura
T. G. Terryah
D. M. Vickery
C. S. Withers
H. Michael, *Delegate*
G. L. Hollinger, *Contributing Member*

Working Group on Duties and Responsibilities (SG-GR) (BPV III)

J. V. Gardiner, *Chair*
G. L. Hollinger, *Secretary*
S. Bell
J. R. Berry
J. DeKleine
N. DeSantis
Y. Diaz-Castillo
E. L. Farrow
G. Gratti
B. N. Juarez
K. A. Kavanagh
J. M. Lyons
L. M. Plante
D. J. Roszman
T. G. Terryah

Working Group on Quality Assurance, Certification, and Stamping (SG-GR) (BPV III)

C. T. Smith, *Chair*
C. S. Withers, *Secretary*
V. Apostolescu
A. Appleton
B. K. Bobo
S. M. Goodwin
J. Grimm
J. W. Highlands
Y.-S. Kim
B. McGlone
R. P. McIntyre
M. R. Minick
R. B. Patel
E. C. Renaud
T. Rezk
J. Rogers
W. K. Sowder, Jr.
J. F. Strunk
G. E. Szabatura
D. M. Vickery
C. A. Spletter, *Contributing Member*

Special Working Group on General Requirements Consolidation (SG-GR) (BPV III)

J. V. Gardiner, *Chair*
C. T. Smith, *Vice Chair*
S. Bell
M. Cusick
Y. Diaz-Castillo
J. Grimm
J. M. Lyons
M. McGlone
R. Patel
E. C. Renaud
T. Rezk
J. Rogers
D. J. Roszman
B. S. Sandhu
G. J. Solovey
R. Spuhl
G. E. Szabatura
C. S. Withers
S. F. Harrison, *Contributing Member*

Subgroup on Materials, Fabrication, and Examination (BPV III)

R. M. Jessee, *Chair*
B. D. Frew, *Vice Chair*
S. Hunter, *Secretary*
W. H. Borter
T. D. Burchell
G. R. Cannell
R. H. Davis
G. M. Foster
G. B. Georgiev
S. E. Gingrich
M. Golliet
J. Grimm
J. Johnston, Jr.
C. C. Kim
M. Lashley
T. Melfi
H. Murakami
J. Ossmann
J. E. O'Sullivan
C. Pearce
N. M. Simpson
W. J. Sperko
J. R. Stinson
J. F. Strunk
K. B. Stuckey
R. Wright
S. Yee
H. Michael, *Delegate*
R. W. Barnes, *Contributing Member*

Working Group on Graphite and Composite Materials (SG-MFE) (BPV III)

T. D. Burchell, *Chair*
A. Appleton
R. L. Bratton
S. Cadell
S.-H. Chi
A. Covac
M. W. Davies
S. W. Doms
S. F. Duffy
S. T. Gonzcy
M. G. Jenkins
Y. Katoh
M. N. Mitchell
J. Ossmann
M. Roemmler
N. Salstrom
T. Shibata
S. Yu
G. L. Zeng

Working Group on HDPE Materials (SG-MFE) (BPV III)

M. Golliet, *Chair*
M. A. Martin, *Secretary*
W. H. Borter
M. C. Buckley
E. M. Focht
B. Hauger
J. Johnston, Jr.
P. Krishnaswamy
E. W. McElroy
T. M. Musto
S. Patterson
S. Schuessler
R. Stakenborghs
T. Tipton
M. Troughton
Z. J. Zhou

Joint ACI-ASME Committee on Concrete Components for Nuclear Service (BPV III)

A. C. Eberhardt, *Chair*
C. T. Smith, *Vice Chair*
A. Byk, *Staff Secretary*
J. F. Artuso
C. J. Bang
F. Farzam
P. S. Ghosal
B. D. Hovis
T. C. Inman
O. Jovall
N.-H. Lee
J. McLean
J. Munshi
N. Orbovic
J. F. Strunk
T. Tonyan
T. J. Ahl, *Contributing Member*
N. Alchaar, *Contributing Member*
B. A. Erler, *Contributing Member*
J. Gutierrez, *Contributing Member*
M. F. Hessheimer, *Contributing Member*
T. E. Johnson, *Contributing Member*
T. Muraki, *Contributing Member*
B. B. Scott, *Contributing Member*
M. R. Senecal, *Contributing Member*
M. K. Thumm, *Contributing Member*

Working Group on Design (BPV III-2)

J. Munshi, *Chair*
N. Alchaar
M. Allam
S. Bae
L. J. Colarusso
A. C. Eberhardt
F. Farzam
P. S. Ghosal
B. D. Hovis
T. C. Inman
O. Jovall
N.-H. Lee
M. Diaz, *Contributing Member*
S. Diaz, *Contributing Member*
M. F. Hessheimer, *Contributing Member*
A. Istar, *Contributing Member*
T. E. Johnson, *Contributing Member*
B. R. Laskewitz, *Contributing Member*
Z. Shang, *Contributing Member*
M. Sircar, *Contributing Member*

Working Group on Materials, Fabrication, and Examination (BPV III-2)

P. S. Ghosal, *Chair*
T. Tonyan, *Vice Chair*
M. Allam
J. F. Artuso
J.-B. Domage
A. C. Eberhardt
C. Jones
C. T. Smith
J. F. Strunk
D. Ufuk
J. Gutierrez, *Contributing Member*
B. B. Scott, *Contributing Member*
Z. Shang, *Contributing Member*

Special Working Group on Modernization (BPV III-2)

J. McLean, *Chair*
N. Orbovic, *Vice Chair*
A. Adediran
N. Alchaar
O. Jovall
C. T. Smith
M. A. Ugalde
S. Wang
S. Diaz, *Contributing Member*
J.-B. Domage, *Contributing Member*
U. Ricklefs, *Contributing Member*

Subgroup on Containment Systems for Spent Fuel and High-Level Waste Transport Packagings (BPV III)

D. K. Morton, *Chair*
G. M. Foster, *Vice Chair*
G. R. Cannell, *Secretary*
G. Abramczyk
D. J. Ammerman
G. Bjorkman
S. Horowitz
D. W. Lewis
P. E. McConnell
R. E. Nickell
E. L. Pleins
R. H. Smith
G. J. Solovey
C. J. Temus
W. H. Borter, *Contributing Member*
R. S. Hill III, *Contributing Member*
A. B. Meichler, *Contributing Member*
T. Saegusa, *Contributing Member*
N. M. Simpson, *Contributing Member*

Subgroup on Fusion Energy Devices (BPV III)

W. K. Sowder, Jr., *Chair*
D. Andrei, *Staff Secretary*
D. J. Roszman, *Secretary*
R. W. Barnes
B. R. Doshi
M. Higuchi
G. Holtmeier
M. Kalsey
K. A. Kavanagh
H. J. Kim
K. Kim
I. Kimihiro
S. Lee
G. Li
X. Li
P. Mokaria
T. R. Muldoon
M. Porton
Y. Song
M. Trosen
C. Waldon
I. J. Zatz

Working Group on General Requirements (BPV III-4)

W. K. Sowder, Jr., *Chair*

Working Group on In-Vessel Components (BPV III-4)

M. Kalsey, *Chair*

Working Group on Magnets (BPV III-4)

K. Kim, *Chair*

Working Group on Materials (BPV III-4)

M. Porton, *Chair*

Working Group on Vacuum Vessels (BPV III-4)

I. Kimihiro, *Chair*
B. R. Doshi

Subgroup on High Temperature Reactors (BPV III)

M. Morishita, *Chair*
R. I. Jetter, *Vice Chair*
T.-L. Sham, *Secretary*
N. Broom
T. D. Burchell
W. Hoffelner
G.-H. Koo
D. K. Morton
J. E. Nestell
N. N. Ray
X. Li, *Contributing Member*
L. Shi, *Contributing Member*

Working Group on High Temperature Gas-Cooled Reactors (BPV III-5)

J. E. Nestell, *Chair*
M. Sengupta, *Secretary*
N. Broom
T. D. Burchell
R. S. Hill III
E. V. Imbro
R. I. Jetter
Y. W. Kim
T. R. Lupold
S. N. Malik
D. L. Marriott
D. K. Morton
T.-L. Sham
X. Li, *Contributing Member*
L. Shi, *Contributing Member*

Working Group on High Temperature Liquid-Cooled Reactors (BPV III-5)

T.-L. Sham, *Chair*
T. Asayama, *Secretary*
M. Arcaro
R. W. Barnes
P. Carter
M. E. Cohen
A. B. Hull
R. I. Jetter
G. H. Koo
M. Li
S. Majumdar
M. Morishita
J. E. Nestell
X. Li, *Contributing Member*
G. Wu, *Contributing Member*

Executive Committee (BPV III)

R. S. Hill III, *Chair*
A. Byk, *Staff Secretary*
T. M. Adams
C. W. Bruny
R. P. Deubler
A. C. Eberhardt
R. M. Jessee
R. B. Keating
R. P. McIntyre
J. C. Minichiello
M. Morishita
D. K. Morton
C. A. Sanna
T.-L. Sham
W. K. Sowder, Jr.

China International Working Group (BPV III)

J. Yan, *Chair*
W. Tang, *Vice Chair*
C. A. Sanna, *Staff Secretary*
Y. He, *Secretary*
H. Ge
Z. Han
J. Jian
Y. Jing
F. Kai
D. Kang
X. Li
Y. Li
B. Liang
H. Lin
S. Lin
J. Liu
S. Liu
W. Liu
K. Mao
W. Pei
G. Sun
G. Tang
Y. Tu
Y. Wang
H. Wu
X. Wu
Z. Wu
S. Xue
Z. Yan
C. Ye
Z. Yin
S. Zaozhan
G. Zhang
K. Zhang
W. Zhang
G. Zhao
W. Zhao
Y. Zhong
Z. Zhong
G. Zhu

Germany International Working Group (BPV III)

C. Huttner, *Chair*
H.-R. Bath, *Secretary*
B. Arndt
M. Bauer
G. Daum
L. Gerstner
G. Haenle
K.-H. Herter
U. Jendrich
G. Kramarz
C. Krumb
W. Mayinger
D. Moehring
D. Ostermann
G. Roos
J. Rudolph
C. A. Sanna
H. Schau
C. A. Spletter
R. Trieglaff
P. Völlmecke
J. Wendt
F. Wille
M. Winter
N. Wirtz

India International Working Group (BPV III)

B. Basu, *Chair*
G. Mathivanan, *Vice Chair*
C. A. Sanna, *Staff Secretary*
S. B. Parkash, *Secretary*
V. Bhasin
P. Chellapandi
S. Jalaldeen
D. Kulkarni
S. A. Kumar De
N. M. Nadaph
M. Ponnusamy
R. N. Sen
A. Sundararajan

Korea International Working Group (BPV III)

G. H. Koo, *Chair*
S. S. Hwang, *Vice Chair*
O.-S. Kim, *Secretary*
H. S. Byun
S. Choi
J.-Y. Hong
N.-S. Huh
J.-K. Hwang
C. Jang
I. I. Jeong
H. J. Kim
J. Kim
J.-S. Kim
K. Kim
Y.-B. Kim
Y.-S. Kim
D. Kwon
B. Lee
D. Lee
Sanghoon Lee
Sangil Lee
D. J. Lim
H. Lim
I.-K. Nam
B. Noh
C.-K. Oh
C. Park
J.-S. Park
T. Shin
S. Song
O. Yoo

Special Working Group on Editing and Review (BPV III)

D. K. Morton, *Chair*
R. L. Bratton
R. P. Deubler
A. C. Eberhardt
R. I. Jetter
J. C. Minichiello
L. M. Plante
R. F. Reedy, Sr.
W. K. Sowder, Jr.
C. Wilson

Special Working Group on HDPE Stakeholders (BPV III)

D. Burwell, *Chair*
S. Patterson, *Secretary*
T. M. Adams
S. Bruce
S. Choi
C. M. Faidy
E. M. Focht
M. Golliet
J. Grimes
R. M. Jessee
J. Johnston, Jr.
D. Keller
M. Lashley
T. R. Lupold
K. A. Manoly
D. P. Munson
T. M. Musto
J. E. O'Sullivan
M. A. Richter
V. Rohatgi
F. J. Schaaf, Jr.
R. Stakenborghs
M. Troughton
Z. J. Zhou

Special Working Group on Honors and Awards (BPV III)

R. M. Jessee, *Chair*
A. Appleton
R. W. Barnes
J. R. Cole
D. E. Matthews
J. C. Minichiello

Special Working Group on Industry Experience for New Plants (BPV III & BPV XI)

G. M. Foster, *Chair*
J. T. Lindberg, *Chair*
H. L. Gustin, *Secretary*
J. Ossmann, *Secretary*
T. L. Chan
D. R. Graham
P. J. Hennessey
D. O. Henry
J. Honcharik
E. V. Imbro
C. G. Kim
O.-S. Kim
Y.-S. Kim
K. Matsunaga
D. E. Matthews
R. E. McLaughlin
E. L. Pleins
D. W. Sandusky
D. M. Swann
T. Tsuruta
E. R. Willis
R. M. Wilson
S. M. Yee

Special Working Group on International Meetings (BPV III)

C. T. Smith, *Chair*
A. Byk, *Staff Secretary*
T. D. Burchell
S. W. Cameron
J. R. Cole
R. L. Crane
G. M. Foster
R. S. Hill III
M. N. Mitchell
R. F. Reedy, Sr.
C. A. Sanna

Special Working Group on New Advanced Light Water Reactor Plant Construction Issues (BPV III)

E. L. Pleins, *Chair*
M. C. Scott, *Secretary*
A. Cardillo
P. J. Coco
B. Gilligan
J. Honcharik
G. V. Imbro
O.-S Kim
M. Kris
J. C. Minichiello
D. W. Sandusky
C. A. Sanna
R. R. Stevenson
R. Troficanto
M. L. Wilson
J. Yan

Special Working Group on Regulatory Interface (BPV III)

G. V. Imbro, *Chair*
S. Bell, *Secretary*
A. Cardillo
A. A. Dermenjian
B. N. Juarez
K. Matsunaga
D. E. Matthews
A. T. Roberts III
R. R. Stevenson
D. Terao
M. L. Wilson
R. A. Yonekawa

COMMITTEE ON HEATING BOILERS (BPV IV)

T. L. Bedeaux, *Chair*
J. A. Hall, *Vice Chair*
G. Moino, *Staff Secretary*
B. Calderon
J. Calland
J. P. Chicoine
C. M. Dove
A. Heino
B. J. Iske
P. A. Molvie
R. E. Olson
M. Wadkinson
R. V. Wielgoszinski
H. Michael, *Delegate*
D. Picart, *Delegate*
S. V. Voorhees, *Contributing Member*
J. L. Kleiss, *Alternate*
W. L. Haag, Jr., *Honorary Member*

Subgroup on Care and Operation of Heating Boilers (BPV IV)

M. Wadkinson, *Chair*
T. L. Bedeaux
J. Calland
J. A. Hall
P. A. Molvie

Subgroup on Cast Iron Boilers (BPV IV)

J. P. Chicoine, *Chair*
T. L. Bedeaux, *Vice Chair*
C. M. Dove
J. M. Downs
J. A. Hall
J. L. Kleiss

Subgroup on Materials (BPV IV)

J. A. Hall, *Chair*
M. Wadkinson, *Vice Chair*
J. Calland
J. M. Downs
A. Heino
B. J. Iske
J. L. Kleiss
E. Rightmier

Subgroup on Water Heaters (BPV IV)

J. Calland, *Chair*
J. P. Chicoine
B. J. Iske
R. E. Olson
T. E. Trant

Subgroup on Welded Boilers (BPV IV)

J. Calland, *Chair*
T. L. Bedeaux
B. Calderon
J. L. Kleiss
P. A. Molvie
R. E. Olson
M. Wadkinson
R. V. Wielgoszinski

COMMITTEE ON NONDESTRUCTIVE EXAMINATION (BPV V)

G. W. Hembree, *Chair*
F. B. Kovacs, *Vice Chair*
J. S. Brzuszkiewicz, *Staff Secretary*
S. J. Akrin
C. A. Anderson
J. E. Batey
A. S. Birks
P. L. Brown
M. A. Burns
B. Caccamise
N. Y. Faransso
N. A. Finney
A. F. Garbolevsky
J. F. Halley
J. W. Houf
S. A. Johnson
R. W. Kruzic
C. May
A. B. Nagel
T. L. Plasek
F. J. Sattler
G. M. Gatti, *Delegate*
X. Guiping, *Delegate*
B. D. Laite, *Alternate*
H. C. Graber, *Honorary Member*
O. F. Hedden, *Honorary Member*
J. R. MacKay, *Honorary Member*
T. G. McCarty, *Honorary Member*

Subgroup on General Requirements/Personnel Qualifications and Inquiries (BPV V)

F. B. Kovacs, *Chair*
J. W. Houf, *Vice Chair*
S. J. Akrin
C. A. Anderson
J. E. Batey
A. S. Birks
C. Emslander
N. Y. Faransso
N. A. Finney
G. W. Hembree
S. A. Johnson
D. I. Morris
A. B. Nagel
J. P. Swezy, Jr., *Contributing Member*

Special Working Group on NDE Resource Support (SG-GR/PQ & I) (BPV V)

N. A. Finney, *Chair*
D. Adkins
J. Anderson
T. G. Bollhalter
C. T. Brown
N. Carter
J. L. Garner
M. Ghahremani
J. W. Mefford, Jr.
M. Sens
D. Van Allen

Subgroup on Surface Examination Methods (BPV V)

S. A. Johnson, *Chair*
J. Halley, *Vice Chair*
S. J. Akrin
J. E. Batey
A. S. Birks
P. L. Brown
B. Caccamise
N. Y. Faransso
N. Farenbaugh
N. A. Finney
G. W. Hembree
R. W. Kruzic
B. D. Laite
C. May
L. E. Mullins
A. B. Nagel
F. J. Sattler
P. Shaw
G. M. Gatti, *Delegate*

Subgroup on Volumetric Methods (BPV V)

A. B. Nagel, *Chair*
N. A. Finney, *Vice Chair*
S. J. Akrin
J. E. Batey
P. L. Brown
B. Caccamise
N. Y. Faransso
A. F. Garbolevsky
J. F. Halley
R. W. Hardy
G. W. Hembree
S. A. Johnson
F. B. Kovacs
R. W. Kruzic
C. May
L. E. Mullins
T. L. Plasek
F. J. Sattler
M. Torok
G. M. Gatti, *Delegate*

Working Group on Acoustic Emissions (SG-VM) (BPV V)

N. Y. Faransso, *Chair*
J. E. Batey, *Vice Chair*
S. R. Doctor
R. K. Miller

Working Group on Radiography (SG-VM) (BPV V)

B. Caccamise, *Chair*
F. B. Kovacs, *Vice Chair*
S. J. Akrin
J. E. Batey
P. L. Brown
C. Emslander
N. Y. Faransso
A. F. Garbolevsky
R. W. Hardy
G. W. Hembree
S. A. Johnson
R. W. Kruzic
B. D. Laite
S. Mango
C. May
R. J. Mills
A. B. Nagel
T. L. Plasek
M. Torok

Working Group on Ultrasonics (SG-VM) (BPV V)

N. A. Finney, *Chair*
J. F. Halley, *Vice Chair*
B. Caccamise
K. J. Chizen
J. M. Davis
N. Y. Faransso
P. T. Hayes
S. A. Johnson
R. W. Kruzic
B. D. Laite
C. May
L. E. Mullins
A. B. Nagel
F. J. Sattler
M. Torok

Working Group on Guided Wave Ultrasonic Testing (SG-VM) (BPV V)

N. Y. Faransso, *Chair*
J. E. Batey, *Vice Chair*
D. Alleyne
N. Amir
J. F. Halley
S. A. Johnson
G. M. Light
P. Mudge
M. J. Quarry
J. Vanvelsor

COMMITTEE ON PRESSURE VESSELS (VIII)

R. J. Basile, *Chair*
S. C. Roberts, *Vice Chair*
S. J. Rossi, *Staff Secretary*
T. Schellens, *Staff Secretary*
G. Aurioles, Sr.
V. Bogosian
J. Cameron
A. Chaudouet
D. B. DeMichael
J. P. Glaspie
J. F. Grubb
L. E. Hayden, Jr.
G. G. Karcher
D. L. Kurle
K. T. Lau
M. D. Lower
R. Mahadeen
R. W. Mikitka
U. R. Miller
T. W. Norton
T. P. Pastor
D. T. Peters
M. J. Pischke
M. D. Rana
G. B. Rawls, Jr.
F. L. Richter
C. D. Rodery
E. Soltow
D. A. Swanson
J. P. Swezy, Jr.
S. Terada
E. Upitis
P. A. McGowan, *Delegate*
H. Michael, *Delegate*
K. Oyamada, *Delegate*
M. E. Papponetti, *Delegate*
D. Rui, *Delegate*
T. Tahara, *Delegate*
M. Gold, *Contributing Member*
W. S. Jacobs, *Contributing Member*
K. Mokhtarian, *Contributing Member*
C. C. Neely, *Contributing Member*
A. Selz, *Contributing Member*
K. K. Tam, *Contributing Member*

Subgroup on Design (BPV VIII)

D. A. Swanson, *Chair*
J. C. Sowinski, *Vice Chair*
M. Faulkner, *Secretary*
G. Aurioles, Sr.
S. R. Babka
O. A. Barsky
R. J. Basile
M. R. Breach
F. L. Brown
D. Chandiramani
B. F. Hantz
C. E. Hinnant
C. S. Hinson
M. H. Jawad
D. L. Kurle
M. D. Lower
R. W. Mikitka
U. R. Miller
T. P. Pastor
M. D. Rana
G. B. Rawls, Jr.
S. C. Roberts
C. D. Rodery
D. Srnic
J. Vattappilly
R. A. Whipple
K. Xu
K. Oyamada, *Delegate*
M. E. Papponetti, *Delegate*
W. S. Jacobs, *Contributing Member*
P. K. Lam, *Contributing Member*
K. Mokhtarian, *Contributing Member*
A. Selz, *Contributing Member*
S. C. Shah, *Contributing Member*
K. K. Tam, *Contributing Member*

Working Group on Design-By-Analysis (BPV III)

B. F. Hantz, *Chair*
T. W. Norton, *Secretary*
R. G. Brown
D. Dewees
R. D. Dixon
Z. Gu
C. E. Hinnant
R. Jain
M. H. Jawad
S. Krishnamurthy
A. Mann
G. A. Miller
C. Nadarajah
M. D. Rana
T. G. Seipp
M. A. Shah
S. Terada
D. Arnett, *Contributing Member*

Subgroup on Fabrication and Inspection (BPV VIII)

C. D. Rodery, *Chair*
J. P. Swezy, Jr., *Vice Chair*
B. R. Morelock, *Secretary*
L. F. Campbell
D. I. Morris
O. Mulet
M. J. Pischke
M. J. Rice
B. F. Shelley
P. L. Sturgill
E. A. Whittle
K. Oyamada, *Delegate*
W. J. Bees, *Contributing Member*
W. S. Jacobs, *Contributing Member*
J. Lee, *Contributing Member*
R. Uebel, *Contributing Member*
E. Upitis, *Contributing Member*

Subgroup on General Requirements (BPV VIII)

M. D. Lower, *Chair*
J. P. Glaspie, *Vice Chair*
F. L. Richter, *Secretary*
R. J. Basile
V. Bogosian
D. T. Davis
D. B. DeMichael
M. Faulkener
L. E. Hayden, Jr.
K. T. Lau
A. S. Olivares
T. P. Pastor
S. C. Roberts
J. C. Sowinski
P. Speranza
D. B. Stewart
D. A. Swanson
R. Uebel
K. Oyamada, *Delegate*
C. C. Neely, *Contributing Member*

Task Group on U-2(g) (BPV VIII)

S. R. Babka
R. J. Basile
D. K. Chandiramani
R. Mahadeen
U. R. Miller
T. W. Norton
T. P. Pastor
R. F. Reedy, Sr.
S. C. Roberts
M. A. Shah, Jr.
D. Srnic
D. A. Swanson
R. Uebel
K. K. Tam, *Contributing Member*

Subgroup on Heat Transfer Equipment (BPV VIII)

G. Aurioles, Sr., *Chair*
P. Matkovics, *Secretary*
D. Angstadt
S. R. Babka
M. Bahadori
J. H. Barbee
O. A. Barsky
I. G. Campbell
A. Chaudouet
M. D. Clark
S. Jeyakumar
G. G. Karcher
D. L. Kurle
B. J. Lerch
R. Mahadeen
S. Mayeux
U. R. Miller
T. W. Norton
K. Oyamada
D. Srnic
A. M. Voytko
R. P. Wiberg
F. E. Jehrio, *Contributing Member*
J. Mauritz, *Contributing Member*
F. Osweiller, *Contributing Member*
R. Tiwari, *Contributing Member*
S. Yokell, *Contributing Member*
S. M. Caldwell, *Honorary Member*

Task Group on Plate Heat Exchangers (BPV VIII)

M. J. Pischke, *Chair*
S. R. Babka
S. Flynn
J. F. Grubb
F. Hamtak
J. E. Lane
R. Mahadeen
P. Metkovics
D. I. Morris
C. M. Romero
E. Soltow
D. Srnic

Subgroup on High Pressure Vessels (BPV VIII)

D. T. Peters, *Chair*
R. D. Dixon, *Vice Chair*
R. T. Hallman, *Vice Chair*
A. P. Maslowski, *Staff Secretary*
L. P. Antalffy
R. C. Biel
P. N. Chaku
R. Cordes
L. Fridlund
D. M. Fryer
A. H. Honza
J. A. Kapp
J. Keltjens
A. K. Khare
N. McKie
S. C. Mordre
G. T. Nelson
E. A. Rodriguez
E. D. Roll
K. C. Simpson, Jr.
D. L. Stang
F. W. Tatar
S. Terada
J. L. Traud
R. Wink
K.-J. Young
K. Oyamada, *Delegate*
R. M. Hoshman, *Contributing Member*
G. J. Mraz, *Contributing Member*
D. J. Burns, *Honorary Member*
E. H. Perez, *Honorary Member*

Subgroup on Materials (BPV VIII)

J. F. Grubb, *Chair*
J. Cameron, *Vice Chair*
P. G. Wittenbach, *Secretary*
A. Di Rienzo
J. D. Fritz
M. Katcher
M. Kowalczyk
W. M. Lundy
J. Penso
D. W. Rahoi
R. C. Sutherlin
E. Upitis
K. Xu
K. Oyamada, *Delegate*
G. S. Dixit, *Contributing Member*
M. Gold, *Contributing Member*
J. A. McMaster, *Contributing Member*
E. G. Nisbett, *Contributing Member*

Subgroup on Toughness (BPV II & BPV VIII)

D. L. Kurle, *Chair*
K. Xu, *Vice Chair*
R. J. Basile
W. S. Jacobs
M. D. Rana
F. L. Richter
K. Subramanian
D. A. Swanson
J. P. Swezy, Jr.
E. Upitis
J. Vattappilly
K. Oyamada, *Delegate*
K. Mokhtarian, *Contributing Member*
C. C. Neely, *Contributing Member*

Subgroup on Graphite Pressure Equipment (BPV VIII)

E. Soltow, *Chair*
G. C. Becherer
T. F. Bonn
F. L. Brown
M. R. Minick
A. A. Stupica
A. Viet

Italy International Working Group (BPV VIII)

G. Pontiggia, *Chair*
A. Veroni, *Secretary*
B. G. Alborali
P. Angelini
R. Boatti
A. Camanni
P. Conti
P. L. Dinelli
F. Finco
L. Gaetani
A. Ghidini
M. Guglielmetti
P. Mantovani
M. Maroni
M. Massobrio
L. Moracchioli
L. Possenti
C. Sangaletti
A. Teli
I. Venier
G. Gobbi, *Contributing Member*

Special Working Group on Bolted Flanged Joints (BPV VIII)

R. W. Mikitka, *Chair*
G. D. Bibel
W. Brown
H. Chen
W. J. Koves
M. Morishita
J. R. Payne
G. B. Rawls, Jr.
M. S. Shelton

Working Group on Design (BPV VIII Div. 3)

J. Keltjens, *Chair*
C. Becht V
R. C. Biel
R. Cordes
R. D. Dixon
L. Fridlund
R. T. Hallman
G. M. Mital
S. C. Mordre
G. T. Nelson
D. T. Peters
E. D. Roll
K. C. Simpson
D. L. Stang
K. Subramanian
S. Terada
J. L. Traud
R. Wink
Y. Xu
F. Kirkemo, *Contributing Member*
D. J. Burns, *Honorary Member*
D. M. Fryer, *Honorary Member*
G. J. Mraz, *Honorary Member*
E. H. Perez, *Honorary Member*

Working Group on Materials (BPV VIII Div. 3)

F. W. Tatar, *Chair*
L. P. Antalffy
P. N. Chaku
J. A. Kapp
A. K. Khare

Task Group on Impulsively Loaded Vessels (BPV VIII)

E. A. Rodriguez, *Chair*
P. O. Leslie, *Secretary*
G. A. Antaki
J. K. Asahina
D. D. Barker
A. M. Clayton
J. E. Didlake, Jr.
T. A. Duffey
B. L. Haroldsen
K. Hayashi
D. Hilding
K. W. King
R. Kitamura
R. A. Leishear
R. E. Nickell
F. Ohlson
C. Romero
N. Rushton
J. H. Stofleth
Q. Dong, *Contributing Member*
H.-P. Schildberg, *Contributing Member*
J. E. Shepherd, *Contributing Member*
M. Yip, *Contributing Member*

Subgroup on Interpretations (BPV VIII)

U. R. Miller, *Chair*
T. Schellens, *Staff Secretary*
G. Aurioles, Sr.
R. J. Basile
J. Cameron
R. D. Dixon
J. F. Grubb
D. L. Kurle
M. D. Lower
R. Mahadeen
D. T. Peters
S. C. Roberts
C. D. Rodery
D. B. Stewart
P. L. Sturgill
D. A. Swanson
J. P. Swezy, Jr.
J. Vattappilly
T. P. Pastor, *Contributing Member*

COMMITTEE ON WELDING, BRAZING, AND FUSING (BPV IX)

W. J. Sperko, *Chair*
D. A. Bowers, *Vice Chair*
S. J. Rossi, *Staff Secretary*
M. Bernasek
M. L. Carpenter
J. G. Feldstein
P. D. Flenner
S. E. Gingrich
R. M. Jessee
J. S. Lee
W. M. Lundy
T. Melfi
W. F. Newell, Jr.
A. S. Olivares
D. K. Peetz
M. J. Pischke
M. J. Rice
M. B. Sims
M. J. Stanko
P. L. Sturgill
J. P. Swezy, Jr.
P. L. Van Fosson
R. R. Young
A. Roza, *Delegate*
R. K. Brown, Jr., *Contributing Member*
M. Consonni, *Contributing Member*
S. A. Jones, *Contributing Member*
S. Raghunathan, *Contributing Member*
W. D. Doty, *Honorary Member*
B. R. Newmark, *Honorary Member*
S. D. Reynolds, Jr., *Honorary Member*

Subgroup on Brazing (BPV IX)

M. J. Pischke, *Chair*
E. W. Beckman
L. F. Campbell
M. L. Carpenter
A. F. Garbolevsky
A. R. Nywening
J. P. Swezy, Jr.

Subgroup on General Requirements (BPV IX)

P. L. Sturgill, *Chair*
E. W. Beckman
J. P. Bell
G. Chandler
P. R. Evans
A. Howard
R. M. Jessee
A. S. Olivares
D. K. Peetz
H. B. Porter
K. R. Willens
E. W. Woelfel
E. Molina, *Delegate*
B. R. Newmark, *Honorary Member*

Subgroup on Materials (BPV IX)

M. Bernasek, *Chair*
T. Anderson
J. L. Arnold
M. L. Carpenter
E. Cutlip
S. S. Fiore
S. E. Gingrich
L. Harbison
R. M. Jessee
C. C. Kim
T. Melfi
M. J. Pischke
C. E. Sainz
W. J. Sperko
M. J. Stanko
P. L. Sturgill
R. R. Young
V. G. V. Giunto, *Delegate*

Subgroup on Performance Qualification (BPV IX)

D. A. Bowers, *Chair*
M. J. Rice, *Secretary*
M. A. Boring
R. B. Corbit
P. D. Flenner
K. L. Hayes
J. S. Lee
W. M. Lundy
T. Melfi
E. G. Reichelt
M. B. Sims
S. Schuessler
P. L. Sturgill
J. P. Swezy, Jr.
M. Troughton
E. W. Woelfel
J. Wright
J. C. Minichiello, *Contributing Member*
C. W. Rowley, *Contributing Member*

Subgroup on Plastic Fusing (BPV IX)

M. L. Carpenter, *Chair*
D. Burwell
J. M. Craig
M. Ghahremani
K. L. Hayes
R. M. Jessee
J. Johnston, Jr.
E. W. McElroy
J. E. O'Sullivan
E. G. Reichelt
M. J. Rice

Subgroup on Procedure Qualification (BPV IX)

D. A. Bowers, *Chair*
M. J. Rice, *Secretary*
M. Bernasek
M. A. Boring
L. Harbison
W. M. Lundy
W. F. Newell, Jr.
S. Raghunathan
M. B. Sims
W. J. Sperko
S. A. Sprague
J. P. Swezy, Jr.
P. L. Van Fosson
T. C. Wiesner
D. Chandiramani, *Contributing Member*

COMMITTEE ON FIBER-REINFORCED PLASTIC PRESSURE VESSELS (BPV X)

D. Eisberg, *Chair*
B. F. Shelley, *Vice Chair*
P. D. Stumpf, *Staff Secretary*
F. L. Brown
J. L. Bustillos
T. W. Cowley
I. L. Dinovo
T. J. Fowler
M. R. Gorman
B. Hebb
D. H. Hodgkinson
L. E. Hunt
D. L. Keeler
B. M. Linnemann
N. L. Newhouse
D. J. Painter
G. Ramirez
J. R. Richter
F. W. Van Name
D. O. Yancey, Jr.
P. H. Ziehl

COMMITTEE ON NUCLEAR INSERVICE INSPECTION (BPV XI)

G. C. Park, *Chair*
R. W. Swayne, *Vice Chair*
R. A. Yonekawa, *Vice Chair*
R. L. Crane, *Staff Secretary*
J. M. Agold
V. L. Armentrout
J. F. Ball
W. H. Bamford
T. L. Chan
R. C. Cipolla
D. D. Davis
G. H. DeBoo
R. L. Dyle
E. V. Farrell, Jr.
E. L. Farrow
E. B. Gerlach
R. E. Gimple
T. J. Griesbach
D. O. Henry
R. D. Kerr
S. D. Kulat
D. W. Lamond
D. R. Lee
G. A. Lofthus
E. J. Maloney
J. E. O'Sullivan
R. K. Rhyne
D. A. Scarth
F. J. Schaaf, Jr.
J. C. Spanner, Jr.
G. L. Stevens
D. E. Waskey
J. G. Weicks
T. Yuhara
H. D. Chung, *Delegate*
C. Ye, *Delegate*
B. R. Newton, *Contributing Member*
R. A. West, *Contributing Member*
J. Hakii, *Alternate*
J. T. Lindberg, *Alternate*
C. J. Wirtz, *Alternate*
C. D. Cowfer, *Honorary Member*
F. E. Gregor, *Honorary Member*
O. F. Hedden, *Honorary Member*
P. C. Riccardella, *Honorary Member*

Executive Committee (BPV XI)

R. A. Yonekawa, *Chair*
G. C. Park, *Vice Chair*
R. L. Crane, *Staff Secretary*
W. H. Bamford
R. L. Dyle
M. J. Ferlisi
E. B. Gerlach
R. E. Gimple
S. D. Kulat
J. T. Lindberg
W. E. Norris
R. K. Rhyne
J. C. Spanner, Jr.
G. L. Stevens
R. W. Swayne

China International Working Group (BPV XI)

J. H. Liu, *Chair*
Y. Nie, *Vice Chair*
C. Ye, *Vice Chair*
M. W. Zhou, *Secretary*
J. Cai
D. X. Chen
H. Chen
H. D. Chen
Y. B. Guo
Y. Hou
P. F. Hu
D. M. Kang
X. Y. Liang
Z. X. Liang
S. X. Lin
L. Q. Liu
Y. Liu
W. N. Pei
C. L. Peng
G. X. Tang
Q. Wang
Q. W. Wang
Z. S. Wang
F. Xu
Z. Y. Xu
Q. Yin
K. Zhang
Y. Zhang
Z. M. Zhong
L. L. Zou

Germany International Working Group (BPV XI)

C. A. Spletter, *Secretary*
H.-R. Bath
B. Hoffmann
U. Jendrich
H. Schau
X. Schuler
J. Wendt

Subgroup on Evaluation Standards (SG-ES) (BPV XI)

W. H. Bamford, *Chair*
G. L. Stevens, *Secretary*
H. D. Chung
R. C. Cipolla
G. H. DeBoo
R. L. Dyle
B. R. Ganta
T. J. Griesbach
K. Hasegawa
K. Hojo
D. N. Hopkins
K. Koyama
D. R. Lee
Y. Li
R. O. McGill
H. S. Mehta
K. Miyazaki
R. Pace
J. C. Poehler
S. Ranganath
D. A. Scarth
T. V. Vo
K. R. Wichman
S. X. Xu

Task Group on Evaluation of Beyond Design Basis Events (SG-ES) (BPV XI)

R. Pace, *Chair*
K. E. Woods, *Secretary*
G. Antaki
P. R. Donavin
R. G. Gilada
T. J. Griesbach
H. L. Gustin
M. Hayashi
K. Hojo
S. A. Kleinsmith
H. S. Mehta
D. V. Sommerville
T. V. Vo
K. R. Wichman
G. M. Wilkowski
T. Weaver, *Contributing Member*

Working Group on Flaw Evaluation (SG-ES) (BPV XI)

R. C. Cipolla, *Chair*
W. H. Bamford
M. L. Benson
B. Bezensek
H. D. Chung
G. H. DeBoo
C. M. Faidy
B. R. Ganta
R. G. Gilada
H. L. Gustin
F. D. Hayes
P. H. Hoang
K. Hojo
D. N. Hopkins
Y. Kim
K. Koyama
V. Lacroix
D. R. Lee
Y. Li
H. S. Mehta
G. A. A. Miessi
K. Miyazaki
R. K. Qashu
S. Ranganath
H. Rathbun
P. J. Rush
D. A. Scarth
W. L. Server
D.-J. Shim
A. Udyawar
T. V. Vo
B. Wasiluk
K. R. Wichman
G. M. Wilkowski
D. L. Rudland, *Alternate*

Task Group on Evaluation Procedures for Degraded Buried Pipe (WG-PFE) (BPV XI)

R. O. McGill, *Chair*
S. X. Xu, *Secretary*
G. Antaki
R. C. Cipolla
G. H. DeBoo
K. Hasegawa
K. M. Hoffman
G. A. A. Miessi
M. Moenssens
D. P. Munson
R. Pace
P. J. Rush
D. A. Scarth

Working Group on Operating Plant Criteria (SG-ES) (BPV XI)

T. J. Griesbach, *Chair*
V. Marthandam, *Secretary*
K. R. Baker
W. H. Bamford
H. Behnke
T. L. Dickson
R. L. Dyle
A. E. Freed
S. R. Gosselin
M. Hayashi
S. A. Kleinsmith
H. S. Mehta
A. D. Odell
R. Pace
N. A. Palm
J. C. Poehler
S. Ranganath
W. L. Server
D. V. Sommerville
C. A. Tomes
A. Udyawar
T. V. Vo
D. P. Weakland
K. E. Woods
T. Hardin, *Alternate*

Working Group on Pipe Flaw Evaluation (SG-ES) (BPV XI)

D. A. Scarth, *Chair*
G. M. Wilkowski, *Secretary*
W. H. Bamford
H. D. Chung
R. C. Cipolla
N. G. Cofie
J. M. Davis
G. H. DeBoo
C. M. Faidy
B. R. Ganta
S. R. Gosselin
L. F. Goyette
C. E. Guzman-Leong
K. Hasegawa
P. H. Hoang
K. Hojo
D. N. Hopkins
E. J. Houston
K. Kashima
Y. Li
R. O. McGill
H. S. Mehta
G. A. A. Miessi
K. Miyazaki
S. H. Pellet
H. Rathbun
D. L. Rudland
P. J. Rush
D.-J. Shim
A. Udyawar
T. V. Vo
B. Wasiluk
S. X. Xu
A. Alleshwaram, *Alternate*
M. L. Benson, *Alternate*

Subgroup on Nondestructive Examination (SG-NDE) (BPV XI)

J. C. Spanner, Jr., *Chair*
D. R. Cordes, *Secretary*
D. Alley
T. L. Chan
C. B. Cheezem
F. E. Dohmen
D. O. Henry
J. T. Lindberg
G. A. Lofthus
G. R. Perkins
S. A. Sabo
F. J. Schaaf, Jr.
R. V. Swain
C. J. Wirtz

Working Group on Personnel Qualification and Surface Visual and Eddy Current Examination (SG-NDE) (BPV XI)

J. T. Lindberg, *Chair*
J. E. Aycock, *Secretary*
S. E. Cumblidge
A. Diaz
N. Farenbaugh
D. O. Henry
J. W. Houf
J. C. Spanner, Jr.
J. T. Timm
M. C. Weatherly
M. L. Whytsell
C. J. Wirtz

Working Group on Procedure Qualification and Volumetric Examination (SG-NDE) (BPV XI)

G. A. Lofthus, *Chair*
G. R. Perkins, *Secretary*
M. T. Anderson
M. Briley
C. B. Cheezem
A. D. Chockie
D. R. Cordes
M. Dennis
S. R. Doctor
F. E. Dohmen
K. J. Hacker
D. B. King
D. A. Kull
C. A. Nove
S. A. Sabo
R. V. Swain
S. J. Todd
D. K. Zimmerman

Subgroup on Repair/Replacement Activities (SG-RRA) (BPV XI)

E. B. Gerlach, *Chair*
E. V. Farrell, Jr., *Secretary*
J. F. Ball
S. B. Brown
R. E. Cantrell
R. Clow
P. D. Fisher
R. E. Gimple
D. R. Graham
R. A. Hermann
K. J. Karwoski
R. D. Kerr
S. L. McCracken
B. R. Newton
J. E. O'Sullivan
S. Schuessler
R. R. Stevenson
R. W. Swayne
D. L. Tilly
D. E. Waskey
J. G. Weicks
R. A. Yonekawa
E. G. Reichelt, *Alternate*

Working Group on Welding and Special Repair Processes (SG-RRA) (BPV XI)

D. E. Waskey, *Chair*
D. J. Tilly, *Secretary*
R. E. Cantrell
S. J. Findlan
P. D. Fisher
M. L. Hall
R. A. Hermann
K. J. Karwoski
C. C. Kim
S. L. McCracken
D. B. Meredith
B. R. Newton
J. E. O'Sullivan
R. E. Smith
J. G. Weicks

Working Group on Nonmetals Repair/Replacement Activities (SG-RRA) (BPV XI)

J. E. O'Sullivan, *Chair*
S. Schuessler, *Secretary*
M. T. Audrain
J. Johnston, Jr.
T. M. Musto
S. Patterson
B. B. Raji
F. J. Schaaf, Jr.
Z. J. Zhou

Task Group on Repair by Carbon Fiber Composites (WGN-MRR) (BPV XI)

J. E. O'Sullivan, *Chair*
J. W. Collins
M. Golliet
L. S. Gordon
T. Jimenez
G. M. Lupia
M. P. Marohl
R. P. Ojdrovic
D. Peguero
A. Pridmore
B. B. Raji
C. W. Rowley
V. Roy
J. Wen

Working Group on Design and Programs (SG-RRA) (BPV XI)

R. Clow, *Chair*
A. B. Meichler, *Secretary*
O. Bhatty
S. B. Brown
J. W. Collins
L. R. Corr
R. R. Croft
E. V. Farrell, Jr.
E. B. Gerlach
D. R. Graham
G. F. Harttraft
T. E. Hiss
H. Malikowski
M. A. Pyne
R. R. Stevenson
R. W. Swayne
R. A. Yonekawa

Subgroup on Water-Cooled Systems (SG-WCS) (BPV XI)

S. D. Kulat, *Chair*
N. A. Palm, *Secretary*
J. M. Agold
V. L. Armentrout
J. M. Boughman
S. T. Chesworth
A. D. Cinson
D. D. Davis
H. Q. Do
E. L. Farrow
M. J. Ferlisi
P. J. Hennessey
D. W. Lamond
A. McNeill III
T. Nomura
G. C. Park
J. E. Staffiera
H. M. Stephens, Jr.
R. Turner

Task Group on High Strength Nickel Alloys Issues (SG-WCS) (BPV XI)

R. L. Dyle, *Chair*
B. L. Montgomery, *Secretary*
W. H. Bamford
P. R. Donavin
R. E. Gimple
R. Hardies
K. Koyama
M. Lashley
H. Malikowski
S. E. Marlette
G. C. Park
J. M. Shuping
J. C. Spanner, Jr.
K. B. Stuckey
E. J. Sullivan, Jr.
B. C. Thomas
D. P. Weakland

Working Group on Containment (SG-WCS) (BPV XI)

J. E. Staffiera, *Chair*
H. M. Stephens, Jr., *Secretary*
P. S. Ghosal
H. T. Hill
R. D. Hough
B. Lehman
J. A. Munshi
D. J. Naus
A. A. Reyes-Cruz
E. A. Rodriguez
M. Sircar
S. G. Brown, *Alternate*
T. J. Herrity, *Alternate*

Working Group on Inspection of Systems and Components (SG-WCS) (BPV XI)

J. M. Agold, *Chair*
N. Granback, *Secretary*
R. W. Blyde
C. Cueto-Felgueroso
R. E. Day
H. Q. Do
M. J. Ferlisi
K. W. Hall
K. M. Hoffman
S. D. Kulat
A. Lee
T. Nomura
J. C. Nygaard
R. Rishel
G. J. Navratil, *Alternate*

Task Group on Optimization of Ultrasonic Evaluation Requirements (WG-ISC) (BPV XI)

M. J. Ferlisi, *Chair*
K. W. Hall
D. O. Henry
K. M. Hoffman
B. L. Montgomery
G. J. Navratil
M. Orihuela
J. C. Poehler

Working Group on Pressure Testing (SG-WCS) (BPV XI)

D. W. Lamond, *Chair*
J. M. Boughman, *Secretary*
D. Alley
Y.-K. Chung
J. A. Doughty
R. E. Hall
A. E. Keyser
J. K. McClanahan
B. L. Montgomery
S. A. Norman

Task Group on Buried Components Inspection and Testing (WG-PT) (BPV XI)

D. W. Lamond, *Chair*
J. M. Boughman, *Secretary*
M. Moenssens, *Secretary*
C. Blackwelder
G. C. Coker
R. E. Day
R. Hardies
T. Ivy
A. Lee
G. M. Lupia
J. Ossmann
M. A. Richter
D. Smith

Working Group on Risk-Informed Activities (SG-WCS) (BPV XI)

M. A. Pyne, *Chair*
S. T. Chesworth, *Secretary*
J. M. Agold
C. Cueto-Felgueroso
H. Q. Do
R. Fougerousse
M. R. Graybeal
R. Haessler
J. Hakii
K. W. Hall
K. M. Hoffman
S. D. Kulat
D. W. Lamond
R. K. Mattu
A. McNeill III
P. J. O'Regan
N. A. Palm
D. Vetter
J. C. Younger

Special Working Group on Editing and Review (BPV XI)

R. W. Swayne, *Chair*
C. E. Moyer
K. R. Rao
J. E. Staffiera
D. J. Tilly
C. J. Wirtz

Special Working Group on Nuclear Plant Aging Management (BPV XI)

B. R. Snyder, *Chair*
A. B. Meichler, *Secretary*
T. M. Anselmi
S. Asada
D. V. Burgess
Y.-K. Chung
D. D. Davis
R. L. Dyle
A. L. Hiser, Jr.
R. E. Nickell
K. Sakamoto
W. L. Server
R. L. Turner
G. G. Young
Z. Zhong
M. Srinivasan, *Alternate*

Working Group on General Requirements (BPV XI)

R. K. Rhyne, *Chair*
E. J. Maloney, *Secretary*
J. F. Ball
T. L. Chan
E. L. Farrow
P. J. Hennessey
K. M. Herman
R. K. Mattu
C. E. Moyer
R. L. Williams

Special Working Group on Reliability and Integrity Management Program (BPV XI)

F. J. Schaaf, Jr., *Chair*
A. T. Roberts III, *Secretary*
N. Broom
S. R. Doctor
J. Fletcher
S. R. Gosselin
N. Granback
J. Grimm
A. B. Hull
D. M. Jones
A. L. Krinzman
D. R. Lee
R. K. Miller
M. N. Mitchell
R. Morrill
T. Roney
R. W. Swayne
S. Takaya

JSME/ASME Joint Task Group for System-Based Code (SWG-RIM) (BPV XI)

T. Asayama, *Chair*
K. Dozaki
M. R. Graybeal
M. Hayashi
Y. Kamishima
H. Machida
M. Morishita
F. J. Schaaf, Jr.
S. Takaya
D. Watanabe

COMMITTEE ON TRANSPORT TANKS (BPV XII)

M. D. Rana, *Chair*
N. J. Paulick, *Vice Chair*
T. Schellens, *Staff Secretary*
A. N. Antoniou
P. Chilukuri
W. L. Garfield
G. G. Karcher
M. Pitts
T. A. Rogers
S. Staniszewski
A. P. Varghese
M. R. Ward
J. A. Byers, *Contributing Member*
R. Meyers, *Contributing Member*
M. D. Pham, *Contributing Member*
A. Selz, *Contributing Member*

Subgroup on Design and Materials (BPV XII)

A. P. Varghese, *Chair*
R. C. Sallash, *Secretary*
D. K. Chandiramani
P. Chilukuri
G. G. Karcher
S. L. McWilliams
N. J. Paulick
M. D. Rana
T. A. Rogers
A. Selz
M. R. Ward
K. Xu
J. Zheng, *Corresponding Member*
T. Hitchcock, *Contributing Member*
M. D. Pham, *Contributing Member*

Subgroup on Fabrication, Inspection, and Continued Service (BPV XII)

M. Pitts, *Chair*
P. Chilukuri, *Secretary*
W. L. Garfield
D. Hayworth
K. Mansker
G. McRae
O. Mulet
T. A. Rogers
M. Rudek
R. C. Sallash
S. Staniszewski
S. E. Benet, *Contributing Member*
J. A. Byers, *Contributing Member*
A. S. Olivares, *Contributing Member*
L. H. Strouse, *Contributing Member*
S. V. Voorhees, *Contributing Member*

Subgroup on General Requirements (BPV XII)

S. Staniszewski, *Chair*
A. N. Antoniou
J. L. Freiler
W. L. Garfield
O. Mulet
B. Pittel
M. Pitts
T. Rummel
R. C. Sallash
K. L. Gilmore, *Contributing Member*
L. H. Strouse, *Contributing Member*

Subgroup on Nonmandatory Appendices (BPV XII)

N. J. Paulick, *Chair*
S. Staniszewski, *Secretary*
P. Chilukuri
D. Hayworth
K. Mansker
S. L. McWilliams
M. Pitts
T. A. Rogers
R. C. Sallash
D. G. Shelton
M. R. Ward
S. E. Benet, *Contributing Member*
D. D. Brusewitz, *Contributing Member*
J. L. Conley, *Contributing Member*
T. Eubanks, *Contributing Member*
T. Hitchcock, *Contributing Member*
A. Selz, *Contributing Member*
A. P. Varghese, *Contributing Member*

COMMITTEE ON BOILER AND PRESSURE VESSEL CONFORMITY ASSESSMENT (CBPVCA)

P. D. Edwards, *Chair*
L. E. McDonald, *Vice Chair*
K. I. Baron, *Staff Secretary*
M. Vazquez, *Staff Secretary*
S. W. Cameron
J. P. Chicoine
D. C. Cook
M. A. DeVries
T. E. Hansen
K. T. Lau
D. Miller
B. R. Morelock
J. D. O'Leary
G. Scribner
B. C. Turczynski
D. E. Tuttle
E. A. Whittle
R. V. Wielgoszinski
P. Williams
D. Cheetham, *Contributing Member*
V. Bogosian, *Alternate*
J. B. Carr, *Alternate*
J. W. Dickson, *Alternate*
M. B. Doherty, *Alternate*
J. M. Downs, *Alternate*
B. J. Hackett, *Alternate*
B. L. Krasiun, *Alternate*
P. F. Martin, *Alternate*
K. McPhie, *Alternate*
M. R. Minick, *Alternate*
I. Powell, *Alternate*
R. Pulliam, *Alternate*
R. Rockwood, *Alternate*
R. D. Troutt, *Alternate*
R. Uebel, *Alternate*
J. A. West, *Alternate*
D. A. Wright, *Alternate*
A. J. Spencer, *Honorary Member*

COMMITTEE ON NUCLEAR CERTIFICATION (CNC)

R. R. Stevenson, *Chair*
J. DeKleine, *Vice Chair*
E. Suarez, *Staff Secretary*
G. Gobbi
S. M. Goodwin
J. W. Highlands
K. A. Huber
J. C. Krane
M. A. Lockwood
R. P. McIntyre
M. R. Minick
L. M. Plante
H. B. Prasse
T. E. Quaka
C. T. Smith
D. M. Vickery
C. S. Withers
S. Yang
S. F. Harrison, *Contributing Member*
S. Andrews, *Alternate*
V. Bogosian, *Alternate*
P. J. Coco, *Alternate*
P. D. Edwards, *Alternate*
D. P. Gobbi, *Alternate*
K. M. Hottle, *Alternate*
K. A. Kavanagh, *Alternate*
B. G. Kovarik, *Alternate*
M. A. Martin, *Alternate*
M. Paris, *Alternate*
A. Torosyan, *Alternate*
E. A. Whittle, *Alternate*
H. L. Wiger, *Alternate*

Subcommittee on Safety Valve Requirements (SC-SVR)

D. B. DeMichael, *Chair*
J. F. Ball, *Vice Chair*
C. E. O'Brien, *Staff Secretary*
J. Burgess
S. Cammeresi
J. A. Cox
R. J. Doelling
J. P. Glaspie
S. F. Harrison, Jr.
W. F. Hart
D. Miller
B. K. Nutter
T. Patel
Z. Wang
J. A. West
R. D. Danzy, *Contributing Member*

Subgroup on Design (SC-SVR)

D. Miller, *Chair*
C. E. Beair
J. A. Conley
R. J. Doelling
T. Patel
J. A. West
R. D. Danzy, *Contributing Member*

Subgroup on General Requirements (SC-SVR)

J. F. Ball, *Chair*
G. Brazier
J. Burgess
D. B. DeMichael
S. T. French
J. P. Glaspie
B. Pittel
D. E. Tuttle

Subgroup on Testing (SC-SVR)

J. A. Cox, *Chair*
T. Beirne
J. E. Britt
S. Cammeresi
J. W. Dickson
G. D. Goodson
W. F. Hart
B. K. Nutter
C. Sharpe
Z. Wang
A. Wilson

U.S. Technical Advisory Group ISO/TC 185 Safety Relief Valves

T. J. Bevilacqua, *Chair*
C. E. O'Brien, *Staff Secretary*
J. F. Ball
G. Brazier
D. B. DeMichael
D. Miller
B. K. Nutter
J. A. West

(**15**)

ASTM PERSONNEL

(Cooperating in the Development of the Specifications Herein)
As of January 1, 2015

A1 COMMITTEE ON STEEL, STAINLESS STEEL, AND RELATED ALLOYS

G. M. Cobb, *Chair*
T. E. Murphy, *Producer Vice Chair*
W. J. Peppler, *Producer Vice Chair*
J. Sasaki, *Producer Vice Chair*
E. R. Boes, *User Vice Chair*
G. R. Folsom, *User Vice Chair*
J. Gossett, *User Vice Chair*
M. P. Morrison, *Secretary*
L. Conner, *Membership Secretary*
K. Shanahan, *Staff Manager*

A4 COMMITTEE ON IRON CASTINGS

W. C. Bliss, *Chair*
G. L. Simmons, *Vice Chair*
M. Campos, *Secretary*
W. H. LeVan, *Membership Secretary*
K. McClung, *Staff Manager*

PREFACE

The American Society of Mechanical Engineers (ASME) and the American Society for Testing and Materials (ASTM) have cooperated for more than fifty years in the preparation of material specifications adequate for safety in the field of pressure equipment for ferrous and nonferrous materials, contained in Section II (Part A — Ferrous and Part B — Nonferrous) of the ASME Boiler and Pressure Vessel Code.

The evolution of this cooperative effort is contained in Professor A. M. Greene's "History of the ASME Boiler Code," which was published as a series of articles in *Mechanical Engineering* from July 1952 through August 1953 and is now available from ASME in a special bound edition. The following quotations from this history, which was based upon the minutes of the ASME Boiler and Pressure Vessel Committee, will help focus on the cooperative nature of the specifications found in Section II, Material Specifications.

"General discussion of material specifications comprising Paragraphs 1 to 112 of Part 2 and the advisability of having them agree with ASTM specifications," (1914).

"ASME Subcommittee appointed to confer with ASTM," (1916).

"Because of this cooperation the specifications of the 1918 Edition of the ASME Boiler Code were more nearly in agreement with ASTM specifications. In the 1924 Edition of the Code, 10 specifications were in complete agreement with ASTM specifications, 4 in substantial agreement and 2 covered materials for which ASTM had no corresponding specifications."

"In Section II, Material Specifications, the paragraphs were given new numbers beginning with S-1 and extending to S-213," (1925).

"Section II was brought into agreement with changes made in the latest ASTM specifications since 1921," (1932).

"The Subcommittee on Material Specifications arranged for the introduction of the revisions of many of the specifications so that they would agree with the latest form of the earlier ASTM specifications...," (1935).

From the preceding, it is evident that many of the material specifications were prepared by the Boiler and Pressure Vessel Code Committees, then subsequently, by cooperative action, modified and identified as ASTM specifications. Section II, Parts A and B, currently contain many material specifications which are identical with the corresponding ASTM specifications and some which have been modified for Code usage. Many of these specifications are published in dual format. That is, they contain both U.S. Customary units and SI units. The metrication protocols followed in the specifications are those adopted by ASTM, and are usually to the rules of IEEE/ASTM 10-1997 Standard for the Use of the International System of Units (SI): The Modern Metric System.

In 1969, the American Welding Society began publication of specifications for welding rods, electrodes, and filler metals, hitherto issued by ASTM. The Boiler and Pressure Vessel Committee has recognized this new arrangement, and is now working with AWS on these specifications. Section II, Part C, contains the welding material specifications approved for Code use.

In 1992, the ASME Board of Pressure Technology Codes and Standards endorsed the use of non-ASTM material for Boiler and Pressure Vessel Code applications. It is the intent to follow the procedures and practices currently in use to implement the adoption of non-ASTM materials.

All identical specifications are indicated by the ASME/originating organization symbols. The specifications prepared and copyrighted by ASTM, AWS, and other originating organizations are reproduced in the Code with the permission of the respective Society. The ASME Boiler and Pressure Vessel Committee has given careful consideration to each new and revised specification, and has made such changes as they deemed necessary to make the specification adaptable for Code usage. In addition, ASME has furnished ASTM with the basic requirements that should govern many proposed new specifications. Joint action will continue an effort to make the ASTM, AWS, and ASME specifications identical.

To assure that there will be a clear understanding on the part of the users of Section II, ASME publishes both the identical specifications and those amended for Code usage in three parts every 2 years.

The ASME Boiler and Pressure Vessel Code has been adopted into law by 50 states and many municipalities in the United States and by all of the Canadian provinces.

SPECIFICATIONS LISTED BY MATERIALS

Corrosion-Resisting and Heat-Resisting Steels

Methods

Steel Bars

Steel Billets and Forgings

Steel Bolting Materials

Steel Castings

Steel Flanges, Fittings, Valves, and Parts

Steel Pipe

Steel Plate, Sheet, and Strip

Steel Plates, Sheets, and Strip for Pressure Vessels

Steel Tubes

Structural Steel

Wrought Iron, Cast Iron, and Malleable Iron

(**15**)

SPECIFICATION REMOVAL

From time to time, it becomes necessary to remove specifications from this Part of Section II. This occurs because the sponsoring society (e.g., ASTM, AWS, CEN) has notified ASME that the specification has either been replaced with another specification, or that there is no known use and production of a material. Removal of a specification from this Section also results in concurrent removal of the same specification from Section IX and from all of the ASME Boiler and Pressure Vessel Construction Codes that reference the material. This action effectively prohibits further use of the material in ASME Boiler and Pressure Vessel construction.

The following specifications will be dropped from this Section in the next Edition, unless information concerning current production and use of the material is received before December 1 of this year:

None in this Edition.

If you are currently using and purchasing new material to this specification for ASME Boiler and Pressure Vessel Code construction, and if discontinuance of this specification would present a hardship, please notify the Secretary of the ASME Boiler and Pressure Vessel Committee, at the address shown below:

Secretary
ASME Boiler and Pressure Vessel Committee
Two Park Avenue
New York, NY 10016-5990

SUMMARY OF CHANGES

After publication of the 2015 Edition, Errata to the BPV Code may be posted on the ASME Web site to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in the BPV Code. Such Errata shall be used on the date posted.

Information regarding Special Notices and Errata is published by ASME at http://go.asme.org/BPVCerrata.

Changes given below are identified on the pages by a margin note, **(15)**, placed next to the affected area.

The Record Numbers listed below are explained in more detail in "List of Changes in Record Number Order" following this Summary of Changes.

Page	*Location*	*Change (Record Number)*
x	List of Sections	Revised
xii	Foreword	*(1)* Revised *(2)* New footnote added by errata *(13-860)*
xv	Submittal of Technical Inquiries to the Boiler and Pressure Vessel Standards Committees	In last line of 6(a), URL revised
xvii	Personnel	Updated
xxxiv	ASTM Personnel	Updated
xxxv	Preface	Penultimate paragraph editorially revised
xliv	Specification Removal	Updated
85	SA-20/SA-20M	Revised *(13-1727)*
141	SA-31	Revised *(14-691)*
147	SA-36/SA-36M	Paragraph 7.2 revised *(14-682)*
243	SA-182/SA-182M	Revised *(08-1150)*
265	SA-193/SA-193M	Revised *(12-2250)*
279	SA-194/SA-194M	Revised *(12-2251)*
313	SA-213/SA-213M	*(1)* Paragraph 6.2.2 revised *(14-254)* *(2)* In Table 5 "T22" corrected by errata to "T36" *(14-2064)*
371	SA-240/SA-240M	Revised *(13-1400)*
385	SA-249/SA-249M	Revised *(08-1152)*
427	SA-268/SA-268M	Revised *(14-1246)*
465	SA-302/SA-302M	In the subtitle "a Note" added and reference to Table 1 corrected by errata to Table 2 *(13-1806)*
469	SA-307	Revised *(12-2252)*
481	SA-312/SA-312M	Revised *(04-978)*
493	SA-320/SA-320M	Revised *(12-2253)*
501	SA-325	Revised *(12-2254)*

Page	*Location*	*Change (Record Number)*
593	SA-354	Revised *(12-2255)*
601	SA-358/SA-358M	Revised *(13-2183)*
775	SA-437/SA-437M	Revised *(12-2256)*
779	SA-449	Revised *(12-2257)*
787	SA-450/SA-450M	Revised *(14-1761)*
805	SA-453/SA-453M	Revised *(12-2258)*
825	SA-479/SA-479M	Revised *(04-219)*
835	SA-480/SA-480M	Revised *(02-3132, 13-2211)*
863	SA-484/SA-484M	Revised *(02-3181)*
971	SA-537/SA-537M	Revised *(13-1728)*
975	SA-540/SA-540M	Revised *(12-2259)*
1193	SA-671/SA-671M	Revised *(02-3142)*
1201	SA-672/SA-672M	Revised *(13-2194)*
1215	SA-688/SA-688M	Revised *(12-2115)*
1307	SA-736/SA-736M	Revised *(13-1147)*
1315	SA-738/SA-738M	Revised *(13-236)*
1431	SA-803/SA-803M	Revised *(12-2116)*
1469	SA-832/SA-832M	Revised *(13-1148)*
1485	SA-841/SA-841M	Revised *(13-1729)*
1627	SA-1016/SA-1016M	Revised *(13-2185)*
1659	SA/EN 10025-2	In the title page and coversheet subtitle, “04” corrected by errata to “2004” *(14-2451)*
1661	SA/EN 10028-2	Paragraph 3.1 specification reference corrected by errata *(13-1741, 14-2451)*
1677	SA/GB 713	Revised *(14-1592)*
1687	SA/NF A 36-215	Last line of para. 1.1 and second line of para.1.2 corrected by errata *(14-1759)*
1690	Mandatory Appendix II	*(1)* Table II-200-1 revised *(14-453)* *(2)* Table II-200-2 for SA/CSA-G40.21 last column corrected by errata *(13-1741)* *(3)* Table II-200-2 revised *(14-351)*
1705	Mandatory Appendix IV	*(1)* IV-800 revised *(13-430, 14-145)* *(2)* Table IV-800-1 added *(13-430)* *(3)* IV-900 revised *(13-430)* *(4)* IV-1400 revised *(13-430)* *(5)* IV-1500 revised *(12-2363)* *(6)* Table IV-1500 added *(12-2363)*
1713	Nonmandatory Appendix A	Revised *(13-890)*

NOTE: Volume 63 of the Interpretations to Section II, Part A of the ASME Boiler and Pressure Vessel Code follows the last page of Section II, Part A.

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
02-3132	Updated SA-480/SA-480M to 2013b version of ASTM A480/A480M.
02-3142	Updated SA-671/SA-671M to 2014 version of ASTM A671/A671M.
02-3181	Updated SA-484/SA-484M to later 2013a version of ASTM A484/A484M.
04-219	Updated SA-479/SA-479M to later 2013b version of ASTM A479/A479M.
04-978	Updated SA-312/SA-312M to 2013b version of ASTM A312/A312M.
06-1155	Updated SA-450/SA-450M to 2004a version of ASTM A450/A450M.
08-1152	Updated SA-249/SA-249M to later 2014 version of ASTM A249/A249M.
12-1363	Replaced the weldability paragraph IV-1500 of Appendix IV, with new requirements.
12-2115	Updated SA-688/SA-688M to later 2012 version of ASTM A688/A688M.
12-2116	Updated SA-803/SA-803M to later 2012 version of ASTM A803/A803M.
12-2250	Updated SA-193/SA-193M to 2012b version of ASTM A193/A193M.
12-2251	Updated SA-194/SA-194M to 2012 version of ASTM A194/A194M.
12-2252	Updated SA-307 to 2010 version of ASTM A307 except for the deletion of the term "private label distributor" and "as applicable" in para. 13.1.1.
12-2253	Updated SA-320/SA-320M to 2011a version of ASTM A320/A320M.
12-2254	Updated SA-325 to 2010 version of ASTM A325 except for the deletion of the term "private label distributor" in paras. 15.1 and 15.5.
12-2255	Updated SA-354 to 2011 version of ASTM A354 except for the deletion of the term "private label distributor" in paras. 15.1 and 15.3.5.
12-2256	Updated SA-437/SA-437M to 2012 version of ASTM A437/A437M.
12-2257	Updated SA-449 to 2010 version of ASTM A449, except for requiring that all mating fastener components be coated by the same zinc coating process in para. 5.1.4, the removal of reference to bolts in para. 6.4 and the deletion of the term "private label distributor" in paras. 16.1 and 16.3.2.
12-2258	Updated SA-453/SA-453M to 2012 version of ASTM A453/A453M.
12-2259	Updated SA-540/SA-540M to 2011 version of ASTM A540/A540M.
13-236	Updated SA-738/SA-738M to 2012a version of ASTM A738/A738M.
13-430	Revised Appendix IV to specify test methods and precision requirements for data required by Appendix IV.
13-860	In the Foreword, the subtitle has been deleted and replaced with an ANSI disclaimer as a footnote.
13-890	Updated Appendix A list of standards organizations' contact information.
13-1147	Updated SA-736/SA-736M to 2012 version of ASTM A736/A736M.
13-1148	Updated SA-832/SA-832M to 2010 version of ASTM A832/A832M.
13-1727	Updated SA-20/SA-20M to 2013 version of ASTM A20/A20M.
13-1728	Updated SA-537/SA-537M to 2013 version of ASTM A537/A537M.
13-1729	Updated SA-841/SA-841M to 2013 version of ASTM A841/A841M.
13-1741	Updated SA/EN 10028-2 and Table II-200-2 for SA/CSA-G40.21 corrected by errata.
13-1806	Updated SA-302/SA-302M coversheet and Table II-200-1 "a Note" and reference to "Table 1" corrected by errata to "Table 2."
13-2183	Updated SA-358/SA-358M to 2014 version of ASTM A358/A358M.
13-2185	Updated SA-1016/SA-1016M to 2014 version of ASTM A1016/A1016M.
13-2194	Updated SA-672/SA-672M to 2014 version of ASTM A672/A672M.
13-2211	Revised Table A1.1 of SA-480/SA-480M.
14-145	Revised Appendix IV, para. IV-800.
14-254	Revised SA-213/SA-213M, para. 6.2.2 to include UNS S30432.
14-682	Updated SA-36/SA-36M, para. 7.2 revised.
14-691	Updated SA-31 to 2014 version of ASTM A31.
14-1246	Updated SA-268/SA-268M to 2010 version of ASTM A268/A268M.
14-1592	Updated SA/GB 713 para.1.4, comma added.
14-1759	Updated SA/NF A 36-215 coversheet corrected by errata.

Record Number	Change
14-1761	Updated SA-450/SA-450M to 2010 version of ASTM A450/A450M.
14-2064	Updated SA-213/SA-213M by errata to correct Table 5 grade designation T22" to "T36.
14-2451	Corrected by errata the year-date in the subtitle of SA/EN 10025-2 specification and the specification reference in the SA/EN 10028-2 specification.

CROSS-REFERENCING AND STYLISTIC CHANGES IN THE BOILER AND PRESSURE VESSEL CODE

There have been structural and stylistic changes to BPVC, starting with the 2011 Addenda, that should be noted to aid navigating the contents. The following is an overview of the changes:

Subparagraph Breakdowns/Nested Lists Hierarchy

- First-level breakdowns are designated as (a), (b), (c), etc., as in the past.
- Second-level breakdowns are designated as (1), (2), (3), etc., as in the past.
- Third-level breakdowns are now designated as (-a), (-b), (-c), etc.
- Fourth-level breakdowns are now designated as (-1), (-2), (-3), etc.
- Fifth-level breakdowns are now designated as (+a), (+b), (+c), etc.
- Sixth-level breakdowns are now designated as (+1), (+2), etc.

Footnotes

With the exception of those included in the front matter (roman-numbered pages), all footnotes are treated as endnotes. The endnotes are referenced in numeric order and appear at the end of each BPVC section/subsection.

Submittal of Technical Inquiries to the Boiler and Pressure Vessel Standards Committees

Submittal of Technical Inquiries to the Boiler and Pressure Vessel Standards Committees has been moved to the front matter. This information now appears in all Boiler Code Sections (except for Code Case books).

Cross-References

It is our intention to establish cross-reference link functionality in the current edition and moving forward. To facilitate this, cross-reference style has changed. Cross-references within a subsection or subarticle will not include the designator/identifier of that subsection/subarticle. Examples follow:

- *(Sub-)Paragraph Cross-References.* The cross-references to subparagraph breakdowns will follow the hierarchy of the designators under which the breakdown appears.
  - If subparagraph (-a) appears in X.1(c)(1) and is referenced in X.1(c)(1), it will be referenced as (-a).
  - If subparagraph (-a) appears in X.1(c)(1) but is referenced in X.1(c)(2), it will be referenced as (1)(-a).
  - If subparagraph (-a) appears in X.1(c)(1) but is referenced in X.1(e)(1), it will be referenced as (c)(1)(-a).
  - If subparagraph (-a) appears in X.1(c)(1) but is referenced in X.2(c)(2), it will be referenced as X.1(c)(1)(-a).
- *Equation Cross-References.* The cross-references to equations will follow the same logic. For example, if eq. (1) appears in X.1(a)(1) but is referenced in X.1(b), it will be referenced as eq. (a)(1)(1). If eq. (1) appears in X.1(a)(1) but is referenced in a different subsection/subarticle/paragraph, it will be referenced as eq. X.1(a)(1)(1).

INTENTIONALLY LEFT BLANK

SPECIFICATION FOR GENERAL REQUIREMENTS FOR ROLLED STRUCTURAL STEEL BARS, PLATES, SHAPES, AND SHEET PILING

SA-6/SA-6M

(Identical with ASTM Specification A6/A6M-07.)

SPECIFICATION FOR GENERAL REQUIREMENTS FOR ROLLED STRUCTURAL STEEL BARS, PLATES, SHAPES, AND SHEET PILING

SA-6/SA-6M

(Identical with ASTM Specification A 6/A 6M-07.)

1. Scope

1.1 This general requirements specification covers a group of common requirements that, unless otherwise specified in the applicable product specification, apply to rolled structural steel bars, plates, shapes, and sheet piling covered by each of the following product specifications issued by ASTM:

ASTM Designation	Title of Specification
A 36/A 36M	Carbon Structural Steel
A 131/A 131M	Structural Steel for Ships
A 242/A 242M	High-Strength Low-Alloy Structural Steel
A 283/A 283M	Low and Intermediate Tensile Strength Carbon Steel Plates
A 328/A 328M	Steel Sheet Piling
A 514/A 514M	High-Yield Strength, Quenched and Tempered Alloy Steel Plate Suitable for Welding
A 529/A 529M	High-Strength Carbon-Manganese Steel of Structural Quality
A 572/A 572M	High-Strength Low-Alloy Columbium-Vanadium Steel
A 573/A 573M	Structural Carbon Steel Plates of Improved Toughness
A 588/A 588M	High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 in. [100 mm] Thick
A 633/A 633M	Normalized High-Strength Low-Alloy Structural Steel Plates
A 656/A 656M	Hot-Rolled Structural Steel, High-Strength Low-Alloy Plate with Improved Formability
A 678/A 678M	Quenched-and-Tempered Carbon and High-Strength Low-Alloy Structural Steel Plates
A 690/A 690M	High-Strength Low-Alloy Steel H-Piles and Sheet Piling for Use in Marine Environments
A 709/A 709M	Carbon and High-Strength Low-Alloy Structural Steel Shapes, Plates, and Bars and Quenched-and-Tempered Alloy Structural Steel Plates for Bridges
A 710/A 710M	Age-Hardening Low-Carbon Nickel-Copper-Chromium-Molybdenum-Columbium Alloy Structural Steel Plates
A 769/A 769M	Carbon and High-Strength Electric Resistance Welded Steel Structural Shapes
A 786/A 786M	Rolled Steel Floor Plates
A 808/A 808M	High-Strength Low-Alloy Carbon, Manganese, Columbium, Vanadium Steel of Structural Quality with Improved Notch Toughness
A 827/A 827M	Plates, Carbon Steel, for Forging and Similar Applications
A 829/A 829M	Plates, Alloy Steel, Structural Quality
A 830/A 830M	Plates, Carbon Steel, Structural Quality, Furnished to Chemical Composition Requirements
A 852/A 852M	Quenched and Tempered Low-Alloy Structural Steel Plate with 70 ksi [485 MPa] Minimum Yield Strength to 4 in. [100 mm] Thick
A 857/A 857M	Steel Sheet Piling, Cold Formed, Light Gage
A 871/A 871M	High-Strength Low Alloy Structural Steel Plate with Atmospheric Corrosion Resistance
A 913/A 913M	Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process (QST)
A 945/A 945M	Specification for High-Strength Low-Alloy Structural Steel Plate with Low Carbon and Restricted Sulfur

ASTM Designation	Title of Specification
	for Improved Weldability, Formability, and Toughness
A 950/A 950M	Specification for Fusion Bonded Epoxy-Coated Structural Steel H-Piles and Sheet Piling
A 992/A 992M	Specification for Steel for Structural Shapes for Use in Building Framing
A 1026	Specification for Alloy Steel Structural Shapes for Use in Building Framing
A 1043/A 1043M	Specification for Structural Steel with Low Yield to Tensile Ratio for Use in Buildings

1.2 Annex A1 lists permitted variations in dimensions and mass (Note 1) in SI units. The values listed are not exact conversions of the values in Tables 1 to 31 inclusive but are, instead, rounded or rationalized values. Conformance to Annex A1 is mandatory when the "M" specification designation is used.

NOTE 1 — The term "weight" is used when inch-pound units are the standard; however, under SI, the preferred term is "mass."

1.3 Annex A2 lists the dimensions of some shape profiles.

1.4 Appendix X1 provides information on coil as a source of structural products.

1.5 Appendix X2 provides information on the variability of tensile properties in plates and structural shapes.

1.6 Appendix X3 provides information on weldability.

1.7 Appendix X4 provides information on cold bending of plates, including suggested minimum inside radii for cold bending.

1.8 This general requirements specification also covers a group of supplementary requirements that are applicable to several of the above product specifications as indicated therein. Such requirements are provided for use where additional testing or additional restrictions are required by the purchaser, and apply only where specified individually in the purchase order.

1.9 In case of any conflict in requirements, the requirements of the applicable product specification prevail over those of this general requirements specification.

1.10 Additional requirements that are specified in the purchase order and accepted by the supplier are permitted, provided that such requirements do not negate any of the requirements of this general requirements specification or the applicable product specification.

1.11 For purposes of determining conformance with this general requirements specification and the applicable product specification, values are to be rounded to the nearest unit in the right-hand place of figures used in expressing the limiting values in accordance with the rounding method of Practice E 29.

1.12 The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system is to be used independently of the other, without combining values in any way.

1.13 This general requirements specification and the applicable product specification are expressed in both inch-pound units and SI units; however, unless the order specifies the applicable "M" specification designation (SI units), the structural product is furnished to inch-pound units.

1.14 The text of this general requirements specification contains notes and/or footnotes that provide explanatory material. Such notes and footnotes, excluding those in tables and figures, do not contain any mandatory requirements.

2. Referenced Documents

2.1 *ASTM Standards:*

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products

A 673/A 673M Specification for Sampling Procedure for Impact Testing of Structural Steel

A 700 Practices for Packaging, Marking, and Loading Methods for Steel Products for Shipment

A 751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

A 829/A 829M Specification for Alloy Structural Steel Plates

A 941 Terminology Relating to Steel, Stainless Steel, Related Alloys, and Ferroalloys

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E 112 Test Methods for Determining Average Grain Size

E 208 Test Method for Conducting Drop-Weight Test to Determine Nil-Ductility Transition Temperature of Ferritic Steels

2.2 *American Welding Society Standards:*

A5.1 Mild Steel Covered Arc-Welding Electrodes

A5.5 Low-Alloy Steel Covered Arc-Welding Electrodes

2.3 *U.S. Military Standards:*

MIL-STD-129 Marking for Shipment and Storage

MIL-STD-163 Steel Mill Products Preparation for Shipment and Storage

2.4 *U.S. Federal Standard:*

Fed. Std. No. 123 Marking for Shipments (Civil Agencies)

2.5 *AIAG Standard:*

AIAG B-1 Bar Code Symbology Standard