

2013

ASME Boiler and Pressure Vessel Code

AN INTERNATIONAL CODE

XI

Rules for Inservice Inspection of Nuclear Power Plant Components



INTENTIONALLY LEFT BLANK

AN INTERNATIONAL CODE

2013 ASME Boiler & Pressure Vessel Code

2013 Edition

July 1, 2013

XI

RULES FOR INSERVICE INSPECTION OF NUCLEAR POWER PLANT COMPONENTS

ASME Boiler and Pressure Vessel Committee
on Nuclear Inservice Inspection



The American Society of
Mechanical Engineers

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: July 1, 2013

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 in this document (if any) are part of this American National Standard.



ASME collective membership mark



Certification Mark

The above ASME symbol is registered in the U.S. Patent Office.

“ASME” is the trademark of The American Society of Mechanical Engineers.

No part of this document may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

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 2013.

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

Copyright © 2013 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved

TABLE OF CONTENTS

List of Sections	xi
Foreword	xiii
Statement of Policy on the Use of the Certification Mark and Code Authorization in Advertising	xv
Statement of Policy on the Use of ASME Marking to Identify Manufactured Items	xv
Submittal of Technical Inquiries to the Boiler and Pressure Vessel Standards Committees	xvi
Personnel	xviii
Preface to Section XI	xxxiii
Organization of Section XI	xxxiv
Summary of Changes	xxxvii
List of Changes in Record Number Order	xliv
Cross-Referencing and Stylistic Changes in the Boiler and Pressure Vessel Code	xlvii
 Division 1	
Rules for Inspection and Testing of Components of Light-Water-Cooled Plants	1
Subsection IWA	
General Requirements	1
Article IWA-1000	
IWA-1100	1
IWA-1200	1
IWA-1300	1
IWA-1400	2
IWA-1500	2
IWA-1600	3
IWA-1700	3
IWA-1800	4
Article IWA-2000	
IWA-2100	5
IWA-2200	5
IWA-2300	8
IWA-2400	11
IWA-2500	12
IWA-2600	12
Article IWA-3000	
IWA-3100	14
IWA-3200	14
IWA-3300	14
IWA-3400	18
Article IWA-4000	
IWA-4100	26
IWA-4200	30
IWA-4300	32
IWA-4400	33
IWA-4500	36
IWA-4600	38
IWA-4700	57
Article IWA-5000	
IWA-5100	66

IWA-5200	System Test Requirement	66
IWA-5300	Test Records	69
Article IWA-6000	Records and Reports	70
IWA-6100	Scope	70
IWA-6200	Requirements	70
IWA-6300	Retention	71
Article IWA-9000	Glossary	72
Subsection IWB	Requirements for Class 1 Components of Light-Water Cooled Plants	77
Article IWB-1000	Scope and Responsibility	77
IWB-1100	Scope	77
IWB-1200	Components Subject to Examination	77
Article IWB-2000	Examination and Inspection	78
IWB-2200	Preservice Examination	78
IWB-2400	Inspection Schedule	78
IWB-2500	Examination and Pressure Test Requirements	80
Article IWB-3000	Acceptance Standards	122
IWB-3100	Evaluation of Examination Results	122
IWB-3200	Supplemental Examinations	124
IWB-3400	Standards	124
IWB-3500	Acceptance Standards	125
IWB-3600	Analytical Evaluation of Planar Flaws	136
IWB-3700	Analytical Evaluation of Plant Operating Events	139
Article IWB-5000	System Pressure Tests	141
IWB-5200	System Test Requirements	141
Subsection IWC	Requirements for Class 2 Components of Light-Water Cooled Plants	142
Article IWC-1000	Scope and Responsibility	142
IWC-1100	Scope	142
IWC-1200	Components Subject to Examination	142
Article IWC-2000	Examination and Inspection	144
IWC-2200	Preservice Examination	144
IWC-2400	Inspection Schedule	144
IWC-2500	Examination and Pressure Test Requirements	146
Article IWC-3000	Acceptance Standards	170
IWC-3100	Evaluation of Examination Results	170
IWC-3200	Supplemental Examinations	172
IWC-3400	Standards	172
IWC-3500	Acceptance Standards	172
IWC-3600	Analytical Evaluation of Planar Flaws	178
Article IWC-5000	System Pressure Tests	180
IWC-5200	System Test Requirements	180
Subsection IWD	Requirements for Class 3 Components of Light-Water Cooled Plants	182
Article IWD-1000	Scope and Responsibility	182
IWD-1100	Scope	182
IWD-1200	Components Subject to Examination	182
Article IWD-2000	Examination and Inspection	183
IWD-2200	Preservice Examination	183
IWD-2400	Inspection Schedule	183
IWD-2500	Examination and Pressure Test Requirements	184

Article IWD-3000	Acceptance Standards	189
IWD-3100	Evaluation of Examination Results	189
IWD-3200	Supplemental Examinations	189
IWD-3400	Standards	190
IWD-3500	Acceptance Standards	190
IWD-3600	Analytical Evaluation of Planar Flaws	190
Article IWD-5000	System Pressure Tests	192
IWD-5200	System Test Requirements	192
Subsection IWE	Requirements for Class MC and Metallic Liners of Class CC Components of Light-Water Cooled Plants	194
Article IWE-1000	Scope and Responsibility	194
IWE-1100	Scope	194
IWE-1200	Components Subject to Examination	194
Article IWE-2000	Examination and Inspection	196
IWE-2100	General	196
IWE-2200	Preservice Examination	196
IWE-2300	Visual Examination, Personnel Qualification, and Responsible Individual ..	196
IWE-2400	Inspection Schedule	197
IWE-2500	Examination and Pressure Test Requirements	198
IWE-2600	Condition of Surface to be Examined	198
Article IWE-3000	Acceptance Standards	203
IWE-3100	Evaluation of Examination Results	203
IWE-3200	Supplemental Examinations	204
IWE-3400	Standards	204
IWE-3500	Acceptance Standards	204
Article IWE-5000	System Pressure Tests	206
IWE-5200	System Test Requirements	206
Subsection IWF	Requirements for Class 1, 2, 3, and MC Components Supports of Light-Water Cooled Plants	207
Article IWF-1000	Scope and Responsibility	207
IWF-1100	Scope	207
IWF-1200	Component Supports Subject to Examination and Test	207
IWF-1300	Support Examination Boundaries	207
Article IWF-2000	Examination and Inspection	210
IWF-2100	Scope	210
IWF-2200	Preservice Examination	210
IWF-2400	Inspection Schedule	210
IWF-2500	Examination Requirements	211
Article IWF-3000	Standards for Examination Evaluations	214
IWF-3100	Evaluation of Examination Results	214
IWF-3200	Supplemental Examinations	215
IWF-3400	Acceptance Standards	215
Subsection IWL	Requirements for Class CC Concrete Components of Light-Water- Cooled Plants	216
Article IWL-1000	Scope and Responsibility	216
IWL-1100	Scope	216
IWL-1200	Items Subject to Examination	216
Article IWL-2000	Examination and Inspection	217
IWL-2100	General	217
IWL-2200	Preservice Examination	217

IWL-2300	Visual Examination, Personnel Qualification, and Responsible Engineer ..	217
IWL-2400	Inservice Inspection Schedule	218
IWL-2500	Examination Requirements	219
Article IWL-3000	Acceptance Standards	227
IWL-3100	Preservice Examination	227
IWL-3200	Inservice Examination	227
IWL-3300	Evaluation	228
Article IWL-4000	Repair/Replacement Activities	229
IWL-4100	General	229
IWL-4200	Repair/Replacement Plan	229
IWL-4300	Examination	230
Article IWL-5000	System Pressure Tests	231
IWL-5100	Scope	231
IWL-5200	System Test Requirements	231
IWL-5300	Report	231
Mandatory Appendix I	Ultrasonic Examinations	232
Mandatory Appendix II	Owner's Report for Inservice Inspections	242
Mandatory Appendix III	Ultrasonic Examination of Vessel and Piping Welds	249
Mandatory Appendix IV	Eddy Current Examination	260
Mandatory Appendix VI	Qualification of Personnel for Visual Examination	272
Mandatory Appendix VII	Qualification of Nondestructive Examination Personnel for Ultrasonic Examination	278
Mandatory Appendix VIII	Performance Demonstration for Ultrasonic Examination Systems ..	288
Mandatory Appendix IX	315
Mandatory Appendix X	Standard Units for Use in Equations	316
Nonmandatory Appendix A	Analysis of Flaws	317
Nonmandatory Appendix C	Evaluation of Flaws in Piping	342
Nonmandatory Appendix D	Conditioning of Classes 1 and 2 Piping Welds Which Require Examination	401
Nonmandatory Appendix E	Evaluation of Unanticipated Operating Events	404
Nonmandatory Appendix G	Fracture Toughness Criteria for Protection Against Failure	406
Nonmandatory Appendix H	Evaluation Procedures for Flaws in Piping Based on Use of a Failure Assessment Diagram	424
Nonmandatory Appendix J	Guide to Plant Maintenance Activities and Section XI Repair/Replacement Activities	436
Nonmandatory Appendix K	Assessment of Reactor Vessels with Low Upper Shelf Charpy Impact Energy Levels	441
Nonmandatory Appendix L	Operating Plant Fatigue Assessment	458
Nonmandatory Appendix M	Applying Mathematical Modeling to Ultrasonic Examination of Pressure Retaining Components	466
Nonmandatory Appendix N	Written Practice Development for Qualification and Certification of NDE Personnel	468
Nonmandatory Appendix O	Evaluation of Flaws in PWR Reactor Vessel Head Penetration Nozzles	473

Nonmandatory Appendix P	Guidance for the Use of U.S. Customary and SI Units in the ASME Boiler and Pressure Vessel Code	478
Nonmandatory Appendix Q	Weld Overlay Repair of Classes 1, 2, and 3 Austenitic Stainless Steel Piping Weldments	481
Nonmandatory Appendix R	Risk-Informed Inspection Requirements for Piping	486
Nonmandatory Appendix S	Evaluating Coverage for Section XI Nondestructive Examination	516
Nonmandatory Appendix T	Reporting of Contracted Repair/Replacement Activities	520
Nonmandatory Appendix U	Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Piping and Class 2 or 3 Vessels and Tanks	524
Nonmandatory Appendix W	Mechanical Clamping Devices for Class 2 and 3 Piping Pressure Boundary	544
Division 2	Rules for Inspection and Testing of Components of Gas-Cooled Plants	550
Division 3	Rules for Inspection and Testing of Components of Liquid-Metal-Cooled Plants	552
FIGURES		
IWA-3310-1	Surface Planar Flaws Oriented in Plane Normal to Pressure Retaining Surface	15
IWA-3320-1	Subsurface Planar Flaws Oriented in Plane Normal to Pressure Retaining Surface	17
IWA-3320-2	Successive Examination Surface Proximity Rule for Class 1 and Class 2 Vessels	18
IWA-3330-1	Multiple Planar Flaws Oriented in Plane Normal to Pressure Retaining Surface	19
IWA-3340-1	Nonplanar Elliptical Subsurface Flaws	20
IWA-3350-1	Parallel Planar Flaws	21
IWA-3360-1	Laminar Flaws	22
IWA-3380-1	Nonaligned Coplanar Flaws in Plane Normal to Pressure Retaining Surface	23
IWA-3390-1	Multiple Aligned Planar Flaws ($\frac{1}{2}$ in. = 13 mm)	24
IWA-3400-1	Linear Surface Flaws	25
IWA-4623.1-1	Temper Bead Welding and Weld Temper Bead Reinforcement	41
IWA-4623.2-1	Automatic or Machine (GTAW) Temper Bead Welding	42
IWA-4633.1-1	Temper Bead Welding and Weld Temper Bead Reinforcement of Dissimilar Metal Welds or Buttering	44
IWA-4633.2-1	Automatic or Machine (GTAW) Temper Bead Welding of Dissimilar Metal Welds or Buttering	45
IWA-4643.2-1	Automatic or Machine (GTAW) Temper Bead Welding of Cladding	47
IWA-4652.4-1	Temper Bead Technique	50
IWA-4652.4-2	Illustration of the Temper Bead Technique for Reinforcement of Existing Fillet Welds ...	51
IWA-4655-1	Welding Techniques for Improper Temper Bead Spacing	52
IWA-4655-2	Example of Weld Undercut Welding Technique	53
IWA-4663.1-1	Carbon Equivalency Calculation	55
IWA-4712.2-1	Examples of Extension and Recess of Tube and Plug	60
IWB-2500-1	Vessel Shell Circumferential Weld Joints	100
IWB-2500-2	Vessel Shell Longitudinal Weld Joints	101
IWB-2500-3	Spherical Vessel Head Circumferential and Meridional Weld Joints	102
IWB-2500-4	Shell-to-Flange Weld Joint	103
IWB-2500-5	Head-to-Flange Weld Joint	104
IWB-2500-6	Typical Tubesheet-to-Head Weld Joints	105
IWB-2500-7(a)	Nozzle in Shell or Head	106
IWB-2500-7(b)	Nozzle in Shell or Head	107
IWB-2500-7(c)	Nozzle in Shell or Head	108
IWB-2500-7(d)	Nozzle in Shell or Head	109
IWB-2500-8	Similar and Dissimilar Metal Welds in Components, Nozzles, and Piping	110
IWB-2500-9	Pipe Branch Connection	113
IWB-2500-10	Pipe Branch Connection	114

IWB-2500-11	Pipe Branch Connection	115
IWB-2500-12	Closure Stud and Threads in Flange Stud Hole	116
IWB-2500-13	Welded Attachment	117
IWB-2500-14	Welded Attachment	118
IWB-2500-15	Welded Attachment	119
IWB-2500-18	Control Rod Drive and Instrument Nozzle Housing Welds	120
IWB-2500-20	Extent of Weld Examination	121
IWB-3610-1	Characterization and Proximity Rules for Analytical Evaluation of Clad Components	137
IWB-3662-1	Definition of Circumferential Orientation for Flaw Characterization	139
IWC-2500-1	Vessel Circumferential Welds	155
IWC-2500-2	Typical Tubesheet-to-Shell Circumferential Welds	156
IWC-2500-3	Nozzle-to-Vessel Welds	157
IWC-2500-4	Nozzle-to-Vessel Welds	158
IWC-2500-5	Welded Attachments	161
IWC-2500-6	Pressure Retaining Bolting	162
IWC-2500-7	Welds in Piping	163
IWC-2500-9	Branch Connection Welds	165
IWC-2500-10	Pipe Branch Connection	166
IWC-2500-11	Pipe Branch Connection	167
IWC-2500-12	Pipe Branch Connection	168
IWC-2500-13	Pipe Branch Connection	169
IWD-2500-1	Welded Attachments	188
IWE-2500-1	Examination Areas for Moisture Barriers	202
IWF-1300-1	Illustrations of Typical Support Examination Boundaries	208

TABLES

IWA-1600-1	Referenced Standards and Specifications	3
IWA-2211-1	Visual Examinations	7
IWA-2322-1	Near-Distance Acuity Test Distances and Character Heights	10
IWA-4461.1-1	Minimum Preheat Temperature, °F (°C)	36
IWA-4662.1-1	Depth Limitations for Underwater Welding Qualification	54
IWA-4662.1-2	Procedure and Performance Qualification – Position Limitations	55
IWA-5210-1	66
IWB-2411-1	Inspection Program	78
IWB-2500-1 (B-A)	Examination Category B-A, Pressure Retaining Welds in Reactor Vessel	82
IWB-2500-1 (B-B)	Examination Category B-B, Pressure Retaining Welds in Vessels Other Than Reactor Vessels	83
IWB-2500-1 (B-D)	Examination Category B-D, Full Penetration Welded Nozzles in Vessels	85
IWB-2500-1 (B-F)	Examination Category B-F, Pressure Retaining Dissimilar Metal Welds in Vessel Nozzles	86
IWB-2500-1 (B-G-1)	Examination Category B-G-1, Pressure Retaining Bolting, Greater Than 2 in. (50 mm) in Diameter	87
IWB-2500-1 (B-G-2)	Examination Category B-G-2, Pressure Retaining Bolting, 2 in. (50 mm) and Less in Diameter	90
IWB-2500-1 (B-J)	Examination Category B-J, Pressure Retaining Welds in Piping	91
IWB-2500-1 (B-K)	Examination Category B-K, Welded Attachments for Vessels, Piping, Pumps, and Valves	93
IWB-2500-1 (B-L-2, B-M-2)	Examination Categories B-L-2, Pump Casings; B-M-2, Valve Bodies ...	95
IWB-2500-1 (B-N-1, B-N-2, B-N-3)	Examination Categories B-N-1, Interior of Reactor Vessel; B-N-2, Welded Core Support Structures and Interior Attachments to Reactor Vessels; B-N-3, Removable Core Support Structures	96
IWB-2500-1 (B-O)	Examination Category B-O, Pressure Retaining Welds in Control Rod Drive and Instrument Nozzle Housings	97
IWB-2500-1 (B-P)	Examination Category B-P, All Pressure Retaining Components	98
IWB-2500-1 (B-Q)	Examination Category B-Q, Steam Generator Tubing	99
IWB-3410-1	Acceptance Standards	125

IWB-3510-1	Allowable Planar Flaws	126
IWB-3510-2	Allowable Laminar Flaws	126
IWB-3510-3	Allowable Linear Flaws	127
IWB-3512-1	Allowable Planar Flaws	127
IWB-3512-2	Component Thickness Vs Flaw Location	128
IWB-3514-1	Allowable Planar Flaws	129
IWB-3514-2	Allowable Linear Flaws	130
IWB-3514-3	Allowable Laminar Flaws	130
IWB-3514-4	Allowable Linear Flaws	131
IWB-3515-1	Allowable Planar Flaws	132
IWB-3519.2-1	Allowable Planar Flaws	134
IWB-3519.2-2	Allowable Planar Flaws	135
IWB-3663-1	Reactor Vessel Head Penetration Nozzle Acceptance Criteria	140
IWB-5230-1	Test Pressure	141
IWC-2411-1	Inspection Program	144
IWC-2500-1 (C-A)	Examination Category C-A, Pressure Retaining Welds in Pressure Vessels	147
IWC-2500-1 (C-B)	Examination Category C-B, Pressure Retaining Nozzle Welds in Pressure Vessels	148
IWC-2500-1 (C-C)	Examination Category C-C, Welded Attachments for Pressure Vessels , Piping, Pumps, and Valves	149
IWC-2500-1 (C-D)	Examination Category C-D, Pressure Retaining Bolting Greater Than 2 in. (50 mm) in Diameter	150
IWC-2500-1 (C-F-1)	Examination Category C-F-1, Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping	151
IWC-2500-1 (C-F-2)	Examination Category C-F-2, Pressure Retaining Welds in Carbon or Low Alloy Steel Piping	152
IWC-2500-1 (C-H)	Examination Category C-H, All Pressure Retaining Components	154
IWC-3410-1	Acceptance Standards	172
IWC-3510-1	Allowable Planar Flaws	173
IWC-3510-2	Allowable Laminar Flaws	173
IWC-3510-3	Allowable Linear Flaws	174
IWC-3511-1	Allowable Planar Flaws	174
IWC-3511-2	Allowable Linear Flaws	175
IWC-3513-1	Allowable Planar Flaws	175
IWC-3514-1	Allowable Planar Flaws	177
IWD-2411-1	Inspection Program	183
IWD-2500-1 (D-A)	Examination Category D-A, Welded Attachments for Pressure Vessels , Piping, Pumps, and Valves	186
IWD-2500-1 (D-B)	Examination Category D-B, All Pressure Retaining Components	187
IWD-3410-1	Acceptance Standards	190
IWE-2411-1	Inspection Program	197
IWE-2500-1 (E-A)	Examination Category E-A, Containment Surfaces	199
IWE-2500-1 (E-C)	Examination Category E-C, Containment Surfaces Requiring Augmented Examination	200
IWE-2500-1 (E-G)	Examination Category E-G, Pressure Retaining Bolting	201
IWF-2410-1	Inspection Program	210
IWF-2500-1 (F-A)	Examination Category F-A, Supports	212
IWL-2500-1 (L-A)	Examination Category L-A, Concrete	220
IWL-2500-1 (L-B)	Examination Category L-B, Unbound Post-Tensioning System	221
IWL-2521-1	Number of Tendons for Examination	223
IWL-2521-2	Augmented Examination Requirements Following Post-Tensioning System Repair/Replacement Activities	224
IWL-2525-1	Corrosion Protection Medium Analysis	226

FORMS

NIS-1	Owner’s Report for Inservice Inspections	243
NIS-2	Owner’s Report for Repair/Replacement Activity	246
RRA-1	Report of Contracted Repair/Replacement Activity	521

ENDNOTES	555
-----------------------	-----

(13)

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

INTERPRETATIONS

ASME issues written replies to inquiries concerning interpretation of technical aspects of the Code.

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

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 2013 Code Cases book: "Boilers and Pressure Vessels" or "Nuclear Components." Supplements will be sent automatically to the purchasers of the Code Cases books up to the publication of the 2015 Code.

FOREWORD

(This Foreword is provided as an aid to the user and is not part of the rules of this Code.)

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)

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. 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 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.

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

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://cstools.asme.org/csconnect/public/index.cfm?PublicReview=Revisions> 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.

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

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.