

SECTION III
Rules for Construction of
Nuclear Facility Components

2021 ASME Boiler and
Pressure Vessel Code
An International Code

Division 1 — Subsection NCD
Class 2 and Class 3 Components

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AN INTERNATIONAL CODE

2021 ASME Boiler & Pressure Vessel Code

2021 Edition

July 1, 2021



RULES FOR CONSTRUCTION OF NUCLEAR FACILITY COMPONENTS

Division 1 - Subsection NCD

Class 2 and Class 3 Components

ASME Boiler and Pressure Vessel Committee
on Construction of Nuclear Facility Components



The American Society of
Mechanical Engineers

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: July 1, 2021

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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 2021.

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

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TABLE OF CONTENTS

List of Sections	x
Foreword	iii
Statement of Policy on the Use of the ASME Single 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	xix
Organization of Section III	xl
Summary of Changes	xliv
NC- and ND- Paragraphs, Figures, and Tables Renumbered for Subsection NCD	xlvi
Cross-Referencing and Stylistic Changes in the Boiler and Pressure Vessel Code	xlix
Article NCD-1000	
NCD-1100	1
Article NCD-2000	
NCD-2100	1
NCD-2200	6
NCD-2300	6
NCD-2400	9
NCD-2500	13
NCD-2600	20
NCD-2700	24
Article NCD-3000	
NCD-3100	37
NCD-3200	37
NCD-3300	38
NCD-3400	38
NCD-3500	46
NCD-3600	79
NCD-3700	117
NCD-3800	143
NCD-3900	152
Article NCD-4000	
NCD-4100	189
NCD-4200	189
NCD-4300	202
NCD-4400	202
NCD-4500	242
NCD-4600	242

NCD-4700	Mechanical Joints	303
NCD-4800	Expansion Joints	304
Article NCD-5000	Examination	305
NCD-5100	General Requirements for Examination	305
NCD-5200	Examination of Welds	307
NCD-5300	Acceptance Standards	312
NCD-5400	For Class 3 Only — Spot Examination of Welded Joints	314
NCD-5500	Qualifications and Certification of Nondestructive Examination Personnel	315
NCD-5600	For Class 2 Only — Final Examination of Components	316
NCD-5700	Examination Requirements for Expansion Joints	316
Article NCD-6000	Testing	318
NCD-6100	General Requirements	318
NCD-6200	Hydrostatic Tests	320
NCD-6300	Pneumatic Tests	321
NCD-6400	Pressure Test Gages	321
NCD-6500	Atmospheric and 0 psig to 15 psig (0 kPa gage to 100 kPa gage) Storage Tanks	322
NCD-6600	Special Test Pressure Situations	324
NCD-6900	Proof Tests to Establish Design Pressure	324
Article NCD-7000	Overpressure Protection	329
NCD-7100	General Requirements	329
NCD-7200	Overpressure Protection Reports	331
NCD-7300	Relieving Capacity Requirements	332
NCD-7400	Set Pressures of Pressure Relief Devices	333
NCD-7500	Operating and Design Requirements for Pressure and Vacuum Relief Valves	333
NCD-7600	Nonreclosing Pressure Relief Devices	338
NCD-7700	Certification	340
NCD-7800	Marking, Stamping With Certification Mark, and Data Reports	342
Article NCD-8000	Names, Stamping With Certification Mark, and Reports	344
NCD-8100	General Requirements	344
Figures		
NCD-1132.2-1	Attachments in the Component Support Load Path That Do Not Perform a Pressure-Retaining Function	3
NCD-1132.2-2	Attachments That Do Not Perform a Pressure-Retaining Function and Are Not in the Component Support Load Path (Nonstructural Attachments)	4
NCD-1132.2-3	Attachments That Perform a Pressure-Retaining Function	5
NCD-2433.1-1	Weld Metal Delta Ferrite Content	23
NCD-2575.1-1	Typical Pressure-Retaining Parts of Pumps and Valves	35
NCD-315.4-1	For Class 3 Only — Length <i>L</i> of Some Typical Conical Sections	43
NCD-315.3.8-1	Chart for Determining Wall Thickness of Tubes Under External Pressure	47
NCD-3217-1	Example of Acceptable Local Primary Membrane Stress Due to Pressure	51
NCD-3224.6-1	Design Curves for Torispherical Heads and 2:1 Ellipsoidal Heads for Use With NCD-3224.8 and NCD-3224.6	56
NCD-3224.13(b)(6)(-a)-1	Inherent Reinforcement for Large End of Cone-Cylinder Junction	58

NCD-3224.13(b)(6)(-b)-1	Values for Q for Large End of Cone–Cylinder Junction	59
NCD-3224.13(c)(6)(-a)-1	Inherent Reinforcement for Small End of Cone–Cylinder Junction	60
NCD-3224.13(c)(6)(-b)-1	Values for Q for Small End of Cone–Cylinder Junction	61
NCD-3224.13(d)-1	Cone–Cylinder Junction at Small End Treated as Opening	62
NCD-3225-1	Typical Flat Heads and Supported and Unsupported Tubesheets With Hubs	64
NCD-3225-2	Some Acceptable Types of Unstayed Flat Heads and Covers	65
NCD-3225-3	Attachment of Pressure Parts to Plates to Form a Corner Joint	66
NCD-3234.2(a)-1	Nozzle Nomenclature and Dimensions	69
NCD-3239.1(b)-1	Examples of Acceptable Transition Details	70
NCD-3239.4-1	Limits of Reinforcing Zone	72
NCD-3324.2-1	Principal Dimensions of Typical Heads	81
NCD-3324.11(a)(6)-1	Large Head Openings, Reverse Curve, and Conical Shell Reducer Sections	86
NCD-3325-1	Some Acceptable Types of Unstayed Flat Heads and Covers	88
NCD-3326.1-1	Spherically Dished Covers With Bolting Flanges	92
NCD-3329.1(b)-1	Example of Tube Spacing With Pitch of Holes Equal in Every Row	94
NCD-3329.1(b)-2	Example of Tube Spacing With Pitch of Holes Unequal in Every Second Row	95
NCD-3329.1(b)-3	Example of Tube Spacing With Pitch of Holes Varying in Every Second and Third Row	95
NCD-3329.1(d)-1	Example of Tube Spacing With Tube Holes on Diagonal Lines	96
NCD-3329.1(d)-2	Diagram for Determining the Efficiency of Longitudinal and Diagonal Ligaments Between Openings in Cylindrical Shells	97
NCD-3329.1(g)-1	Diagram for Determining Equivalent Longitudinal Efficiency of Diagonal Ligaments	99
NCD-3329.2.1-1	Acceptable Proportions for Ends or Through Stays	100
NCD-3332.2-1	Chart for Determining Value of F	102
NCD-3335.1(b)-1	Some Representative Configurations Describing the t_e Reinforcement Dimension	104
NCD-3335.2-1	Arrangement of Multiple Openings	105
NCD-3335.3(b)-1	Minimum Depth for Flange of Flued Openings	106
NCD-3351-1	Welded Joint Locations Typical of Categories A, B, C, and D	107
NCD-3352-1	Typical Butt Joints	108
NCD-3358.1(a)-1	Heads Attached to Shells	112
NCD-3361.1-1	Butt Welding of Plates of Unequal Thicknesses	115
NCD-3423-1	Typical Single Volute Casing	119
NCD-3423-2	Typical Double Volute Casing	119
NCD-3433.4-1	Minimum Tangential Inlet and Outlet Wall Thickness	120
NCD-3441.1-1	Type A Pump	121
NCD-3441.1-2	Type A Pump	122
NCD-3441.1(a)-1	Type A Pump	122
NCD-3441.2-1	Type B Pump	123
NCD-3441.3-1	Type C Pump	123
NCD-3441.3-2	Type C Pump	124
NCD-3441.4(a)-1	Type D Pump	125
NCD-3441.5-1	Type E Pump	125
NCD-3441.6(a)-1	Type F Pump	126
NCD-3441.7(a)-1	Axially Split Casing, Volute Pump, Type G	126

NCD-3441.7(a)-2	Axially Split Casing, Volute Pump, Type G	127
NCD-3441.7(c)-1	Axially Split Casing, Volute Pump, Type G	127
NCD-3441.7(c)(2)-1	Typical Section of Type G Pumps	128
NCD-3441.7(c)(2)-2	Typical Section of Type G Pumps	128
NCD-3441.7(c)(2)-3	Typical Loads on Type G Pumps	129
NCD-3441.8-1	Longitudinal Section Through Type H Pump	131
NCD-3441.8-2	Transverse Section Through Type H Pump	131
NCD-3441.9-1	Type K Pump	132
NCD-3441.9-2	Type K Pump	133
NCD-3441.10-1	Type L Pump	137
NCD-3441.10-2	Type L Pump Bowl	139
NCD-3441.11-1	Type N Pump	141
NCD-3451(a)-1	Horizontal Single-Acting Power Pump Liquid Ends	142
NCD-3521-1	Typical Sections of Valve Bodies	146
NCD-3591.2-1	Typical Pressure Relief Devices	149
NCD-3591.2-2	Typical Pressure Relief Devices	150
NCD-3595.3-1	Valve Nozzle	151
NCD-3622-1	Examples of Reversing and Nonreversing Dynamic Loads	156
NCD-3643.2(b)-1	Typical Welded Branch Connections	159
NCD-3643.2(b)-2	Typical Right Angle Branch Connections Made Using a Fillet Weld or a Partial Penetration Weld	160
NCD-3643.3(c)(1)-1	Reinforcement of Branch Connections	162
NCD-3643.3(c)(1)-2	Some Representative Configurations Describing the t_e Reinforcement Dimension	163
NCD-3643.4(a)-1	Reinforced Extruded Outlets	165
NCD-3647.2-1	Types of Permanent Manholes	167
NCD-3653.3-1	Reducing or Full Outlet Branch Connections, or Tees	173
NCD-3673.2(b)-2	Branch Connection Nomenclature	187
NCD-3861-1	Roof Manholes	203
NCD-3862(a)-1	Flanged Roof Nozzles	204
NCD-3862(a)-2	Socketed or Socket Weld Roof Nozzles	205
NCD-3863-1	Welded Bottom Outlet Elbow	206
NCD-3922.1-1	Biaxial Stress Chart for Combined Tension and Compression, 30,000 psi to 38,000 psi (205 MPa to 260 MPa) Yield Strength Steels	210
NCD-3922.1-2	Reduction of Design Stresses Required to Allow for Biaxial Stresses of Opposite Sign	211
NCD-3932.1-1	Some Typical Free Body Diagrams for Certain Shapes of Tanks	217
NCD-3933.4(a)-1	Compression Ring Region	222
NCD-3933.5(a)-1	Permissible Details of Compression Ring Construction	224
NCD-3944-1	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 25 ksi at Temperatures $\leq 300^\circ\text{F}$	229
NCD-3944-1M	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 175 MPa at Temperatures $\leq 150^\circ\text{C}$	230

NCD-3944-2	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 30 ksi at Temperatures $\leq 300^{\circ}\text{F}$	231
NCD-3944-2M	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 210 MPa at Temperatures $\leq 150^{\circ}\text{C}$	232
NCD-3944-3	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 35 ksi at Temperatures $\leq 300^{\circ}\text{F}$	233
NCD-3944-3M	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 245 MPa at Temperatures $\leq 150^{\circ}\text{C}$	234
NCD-3944-4	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 40 ksi at Temperatures $\leq 300^{\circ}\text{F}$	235
NCD-3944-4M	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 280 MPa at Temperatures $\leq 150^{\circ}\text{C}$	236
NCD-3944-5	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 45 ksi at Temperatures $\leq 300^{\circ}\text{F}$	237
NCD-3944-5M	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 315 MPa at Temperatures $\leq 150^{\circ}\text{C}$	238
NCD-3944-6	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 50 ksi at Temperatures $\leq 300^{\circ}\text{F}$	239
NCD-3944-6M	Design Factor Times Allowable Axial Membrane Compressive Stress Versus Radius Over Thickness for Ferrous Materials With Yield Strengths of 345 MPa at Temperatures $\leq 150^{\circ}\text{C}$	240
NCD-3947-1	Meridional Strength Tolerance	241
NCD-4221.1-1	Maximum Difference in Cross-Sectional Diameters	245
NCD-4221.2(a)-1	Maximum Permissible Deviation e From a True Circular Form	246
NCD-4221.2(a)-2	Maximum Arc Length for Determining Plus or Minus Deviation	247
NCD-4233-1	Butt Weld Alignment and Mismatch Tolerances for Unequal I.D. and O.D. When Components Are Welded From One Side and Fairing Is Not Performed	249
NCD-4243.1-1	For Class 2 Only — Acceptable Full Penetration Weld Details for Category C Joints	251
NCD-4243.1-2	For Class 2 Only — Attachment of Pressure Parts to Plates to Form a Corner Joint	252
NCD-4243.2-1	For Class 3 Only — Attachment of Pressure Parts to Plates to Form a Corner Joint	253
NCD-4243.3-1	Typical Flat Heads and Supported and Unsupported Tubesheet With Hubs	255
NCD-4244.1-1	Nozzles, Branch, and Piping Connections Joined by Full Penetration Butt Welds	256
NCD-4244.1-2	Nozzles, Branch, and Piping Connections Joined by Full Penetration Corner Welds	257
NCD-4244.1-3	Deposited Weld Metal Used as Reinforcement of Openings for Nozzles, Branch, and Piping Connections	258

NCD-4244.1-4	Some Acceptable Types of Welded Nozzles, Branch, and Piping Connections	259
NCD-4244.1-5	Some Acceptable Types of Welded Nozzles	261
NCD-4244.1-6	Some Acceptable Types of Small Fitting	262
NCD-4244.2-1	Tube Connections	263
NCD-4244.2-2	Some Acceptable Types of Welded Nozzles, and Branch and Piping Connections	264
NCD-4245.2-1	Attachment Welds	266
NCD-4246.1(a)-1	Typical Bottom and Bottom-to-Shell Joints	269
NCD-4246.3-1	Typical Roof and Roof-to-Shell Joints	270
NCD-4246.5-1	Roof Manholes	271
NCD-4246.5-2	Flanged Roof Nozzles	272
NCD-4246.5-3	Screwed or Socket Weld Roof Nozzles	272
NCD-4246.5-4	Welded Bottom Outlet Elbow	273
NCD-4250-1	Welding End Transitions Maximum Envelope	274
NCD-4265-1	Acceptable Full Penetration Details to Form a Corner Joint	276
NCD-4265-2	Acceptable Full Penetration Weld Details for Category 2 Joints	277
NCD-4266(a)-1	Nozzles Attached by Full Penetration Butt Weld	277
NCD-4266(b)-1	Full Penetration Corner Welded Attachments	278
NCD-4266(c)-1	Pad and Screwed Fitting Types of Welded Nozzles and Other Connections to Shells, Drums, and Headers	280
NCD-4266(d)-1	Partial Penetration Weld Connections	281
NCD-4267-1	Attachments	282
NCD-4427-1	Fillet and Socket Weld Details and Dimensions	290
NCD-4433-1	Types of Attachment Welds	292
NCD-4437.2(b)-1	Some Acceptable Methods of Attaching Stiffening Rings to Shells of Cylindrical Vessels Subjected to External Pressure	293
NCD-4470-1	For Class 3 Only — Welded Stayed Construction	295
NCD-4511-1	Brazed Connections for Appurtenances and Piping	296
NCD-4730-1	Penetration Assembly	304
NCD-4810(c)-1	Permissible Attachment Welds for Bellows	304

Tables

NCD-2311-1	For Class 2 Only — Exemptions From Impact Testing Under NCD-2311(a)(8)	14
NCD-2311-2	For Class 3 Only — Exemptions From Impact Testing Under NCD-2311(a)(9)	15
NCD-2332.1-1	For Class 2 Only — Required C_v Lateral Expansion Values for Pressure-Retaining Material Other Than Bolting Material	15
NCD-2332.1-2	For Class 2 Only — Required C_v Energy Values for Pressure-Retaining Material Other Than Bolting Material	16
NCD-2332.2-1	For Class 2 Only — Required C_v Values for Bolting Material Tested in Accordance With NCD-2332.3	16
NCD-2333.1-1	For Class 3 Only — Required C_v Lateral Expansion Values for Pressure-Retaining Material Other Than Bolting Material	17
NCD-2333.1-2	For Class 3 Only — Required C_v Energy Values for Pressure-Retaining Material Other Than Bolting Material	18

NCD-2333.2-1	For Class 3 Only — Required C_v Values for Bolting Material	18
NCD-2432.1-1	Sampling of Welding Materials for Chemical Analysis	22
NCD-2432.2-1	Welding Material Chemical Analysis	22
NCD-2571.1-1	Required Examinations for Class 2 Castings	30
NCD-2571.2-1	Required Examinations for Class 3 Castings	31
NCD-3215.1(a)-1	Pressure and Temperature Relationships	49
NCD-3217-1	Stress Intensity k Factors for Design and Service Load Combinations	50
NCD-3239.3(a)-1	Required Minimum Reinforcing Area, A_r	71
NCD-3239.7-1	Stress Indices for Internal Pressure Loading	72
NCD-3266-1	Minimum Number of Pipe Threads for Connections	78
NCD-3321-1	Stress Limits for Design and Service Loadings	79
NCD-3321-2	Classification of Stress in Vessels for Some Typical Cases	80
NCD-3324.2-1	Values of Factor K	82
NCD-3324.8(b)-1	Values of Factor M	84
NCD-3324.11(b)(2)-1	Values of Δ for Junctions at the Large Cylinder for $\alpha \leq 30$ deg	86
NCD-3324.11(b)(3)-1	Values of Δ for Junctions at the Small Cylinder for $\alpha \leq 30$ deg	86
NCD-3332.2-1	Values of Spherical Radius Factor K_1	102
NCD-3361.2.2-1	Minimum Number of Pipe Threads for Connections	115
NCD-3416-1	Stress and Pressure Limits for Design and Service Loadings	118
NCD-3521-1	Service Loading Limits	147
NCD-3592.2(b)-1	Pressure Relief Devices Service Loading Limits	151
NCD-3611.2(e)-1	Stress Range Reduction Factors	152
NCD-3613.4-1	For Class 3 Only — Weld Joint Efficiency Factor	154
NCD-3641.1(a)-1	Values of A	157
NCD-3673.2(b)-1	Stress Indices, Flexibility, and Stress Intensification Factors	181
NCD-3821.5-1	Design and Service Limits	190
NCD-3852.7-1	For Class 3 Aluminum Storage Tanks Only — Allowable Tensile Stresses for Roof Supports	194
NCD-3852.7-2	For Class 3 Aluminum Storage Tanks Only — Allowable Axial Compression Stresses for Roof Supports	195
NCD-3852.7-3	For Class 3 Aluminum Storage Tanks Only — Allowable Bending Stresses for Roof Supports	197
NCD-3852.7-4	For Class 3 Aluminum Storage Tanks Only — Allowable Shear Stresses for Roof Supports	199
NCD-3852.7-5	For Class 3 Aluminum Storage Tanks Only — Allowable Shear and Tension Stresses for Bolts for Roof Supports	200
NCD-3852.7-6	For Class 3 Aluminum Storage Tanks Only — Allowable Bearing Stresses for Bolts for Roof Supports	200
NCD-3861-1	Roof Manholes	204
NCD-3862(a)-1	Flanged Roof Nozzles	204
NCD-3862(a)-2	Screwed or Socket Weld Roof Nozzles	205
NCD-3863-1	Welded Bottom Outlet Elbow	206
NCD-3865-1	Platforms and Walkways	207
NCD-3865-2	Stairways	207
NCD-3865-3	Stairway Rise, Run, and Angle Relationships	208
NCD-3921.8-1	Design and Service Limits for Steel Tanks	209

NCD-3923.1-1	Maximum Allowable Stress Values for Structural Members	214
NCD-3932.2(d)-1	Factors for Determining Values of R_1 and R_2 for 2:1 Ellipsoidal Roofs and Bottoms	218
NCD-3933.5(h)-1	Some Values for k Based on n, θ	225
NCD-4232(a)-1	Maximum Allowable Offset in Final Welded Joints	248
NCD-4245.2-1	265
NCD-4247.6(d)-1	Minimum Size for Fillet Welds	273
NCD-4524-1	Maximum Design Temperatures for Brazing Filler Metal, °F (°C)	297
NCD-4622.1-1	Mandatory Requirements for Postweld Heat Treatment of Welds	298
NCD-4622.4(c)-1	Alternative Holding Temperatures and Times	299
NCD-4622.7(b)-1	Exemptions to Mandatory PWHT	300
NCD-5111.1-1	Thickness, IQI Designations, and Essential Holes, and Wire Diameters	305
NCD-5211.2-1	For Class 3 Only — Thickness Above Which Full Radiographic Examination of Butt-Welded Joint Is Mandatory	308
Endnotes	345

LIST OF SECTIONS

(21)

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 NCD — Class 2 and Class 3 Components*
 - Subsection NE — Class MC Components
 - Subsection NF — Supports
 - Subsection NG — Core Support Structures
 - Division 2 — Code for Concrete Containments
 - Division 3 — Containment Systems for Transportation and Storage of Spent Nuclear Fuel and High-Level Radioactive Material
 - 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
 - Division 1 — Rules for Inspection and Testing of Components of Light-Water-Cooled Plants
 - Division 2 — Requirements for Reliability and Integrity Management (RIM) Programs for Nuclear Power Plants
- XII Rules for Construction and Continued Service of Transport Tanks
- XIII Rules for Overpressure Protection

* In the 2021 Edition, Subsections NC and ND have been incorporated into one publication, Subsection NCD (BPVC.III.1.NCD), Class 2 and Class 3 Components.

INTERPRETATIONS

Interpretations are 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 2021 Code Cases book: "Boilers and Pressure Vessels" or "Nuclear Components." Each Code Cases book is updated with seven Supplements. Supplements will be sent or made available automatically to the purchasers of the Code Cases books up to the publication of the 2023 Code. Annulments of Code Cases become effective six months after the first announcement of the annulment in a Code Case Supplement or Edition of the appropriate Code Case book. Code Case users can check the current status of any Code Case at <http://go.asme.org/BPVCCDatabase>. Code Case users can also view an index of the complete list of Boiler and Pressure Vessel Code Cases and Nuclear Code Cases at <http://go.asme.org/BPVCC>.

FOREWORD*

(21)

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) Committee on Overpressure Protection (XIII)
- (l) 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 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. For nuclear items other than pressure-retaining components, the Committee also establishes rules of safety related to structural integrity. 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 and, for nuclear items other than pressure-retaining components, structural 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 components addressed by the Code. 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 judgment* 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

* 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 overpressure protection.

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 the ASME Single 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.

The words "shall," "should," and "may" are used in this Standard as follows:

- *Shall* is used to denote a requirement.
- *Should* is used to denote a recommendation.
- *May* is used to denote permission, neither a requirement nor a recommendation.

STATEMENT OF POLICY ON THE USE OF THE ASME SINGLE 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 ASME Single 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 ASME Single Certification Mark for the benefit of the users, the enforcement jurisdictions, and the holders of the ASME Single 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 ASME Single 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 ASME Single 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 ASME Single 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 ASME Single Certification Mark who may also use the facsimile in advertising to show that clearly specified items will carry the ASME Single Certification Mark.

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 ASME Single Certification Mark described in the governing Section of the Code.

Markings such as “ASME,” “ASME Standard,” or any other marking including “ASME” or the ASME Single 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.

(21) **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 applicable Boiler and Pressure Vessel (BPV) Standards Committee (hereinafter referred to as the Committee). See the guidelines on approval of new materials under the ASME Boiler and Pressure Vessel Code in Section II, Part D for requirements for requests that involve adding new materials to the Code. See the guidelines on approval of new welding and brazing materials in Section II, Part C for requirements for requests that involve adding new welding and brazing materials (“consumables”) to the Code.

Technical inquiries can include requests for revisions or additions to the Code requirements, requests for Code Cases, or requests for Code Interpretations, as described below:

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

(2) *Code Cases.* Code Cases represent alternatives or additions to existing Code requirements. 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 regulators, jurisdictions, or Owners automatically accept Code Cases. The most common applications for Code Cases are as follows:

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

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

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

(3) *Code Interpretations*

(-a) Code Interpretations provide clarification of the meaning of existing requirements in the Code and are presented in Inquiry and Reply format. Interpretations do not introduce new requirements.

(-b) Interpretations will be issued only if existing Code text is ambiguous or conveys conflicting requirements. If a revision of the requirements is required to support the Interpretation, an Intent Interpretation will be issued in parallel with a revision to the Code.

(b) Code requirements, Code Cases, and Code Interpretations established by the Committee 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 requirements.

(c) Inquiries that do not comply with the following guidance or that do not provide sufficient information for the Committee’s full understanding may result in the request being returned to the Inquirer with no action.

2 INQUIRY FORMAT

Submittals to the Committee should include the following information:

(a) *Purpose.* Specify one of the following:

(1) request for revision of present Code requirements

(2) request for new or additional Code requirements

(3) request for Code Case

(4) request for Code Interpretation

(b) *Background.* The Inquirer should 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. This information should include a statement indicating why the included paragraphs, figures, or tables are ambiguous or convey conflicting requirements. Preferably, the Inquirer should provide a copy of, or relevant extracts from, the specific referenced portions of the Code.