

ASME BOILER AND PRESSURE VESSEL CODE
AN AMERICAN NATIONAL STANDARD

1989 CODE CASES

Nuclear Components

1989 EDITION

JULY 1, 1989

MAR 2 1992

ENGINEERING SOCIETIES LIBRARY



THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
United Engineering Center 345 East 47th Street New York, N.Y. 10017

Copyright © 1989 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All Rights Reserved

Date of Issue — July 1, 1989
(Includes all Code Case actions published through
Supplement 12 to the 1986 Edition)

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, 1989

1989 ASME BOILER AND PRESSURE VESSEL CODE

SECTIONS

- I Power Boilers
- II Material Specifications
 - Part A — Ferrous Materials
 - Part B — Nonferrous Materials
 - Part C — Welding Rods, Electrodes and Filler Metals
- III Subsection NCA — General Requirements for Division 1 and Division 2
- III Division 1
 - Subsection NB — Class 1 Components
 - Subsection NC — Class 2 Components
 - Subsection ND — Class 3 Components
 - Subsection NE — Class MC Components
 - Subsection NF — Component Supports
 - Subsection NG — Core Support Structures
 - Appendices
- III Division 2 — Code for Concrete Reactor Vessels and Containments
- IV Heating Boilers
- V Nondestructive Examination
- VI Recommended Rules for Care and Operation of Heating Boilers
- VII Recommended Guidelines for the Care of Power Boilers
- VIII Pressure Vessels
 - Division 1
 - Division 2 — Alternative Rules
- IX Welding and Brazing Qualifications
- X Fiber-Reinforced Plastic Pressure Vessels
- XI Rules for Inservice Inspection of Nuclear Power Plant Components

ADDENDA

Colored-sheet Addenda, which include additions and revisions to individual Sections of the Code, are published annually and will be sent automatically to purchasers of the applicable Sections up to the publication of the 1992 Code. The 1989 Code is available only in the loose-leaf format; accordingly, the Addenda will be issued in the loose-leaf, replacement-page format.

INTERPRETATIONS

ASME issues written replies to inquiries concerning interpretation of technical aspects of the Code. The Interpretations for each individual Section will be published separately and will be included as part of the update service to that Section. They will be issued semiannually (July and December) up to the publication of the 1992 Code. Interpretations of Section III, Divisions 1 and 2, will be included with the update service to Subsection NCA. Interpretations are not part of the Code or the Addenda.

CODE CASES

The Boiler and Pressure Vessel Committee meets 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 which have been adopted will appear in the appropriate 1989 Code Cases book: (1) Boilers and Pressure Vessels and (2) Nuclear Components. Supplements will be sent automatically to the purchasers of the Code Cases books up to the publication of the 1992 Code.

Currently in preview, click buy full version

INDEX TO NEW AND REVISED CASES

Section III, Divisions 1 and 2, and Section XI

Numeric Index	vii
Subject Index	xiii

NOTES TO NUMERIC INDEX

- Code Cases automatically expire three years after their approval date unless reaffirmed, revised, or annulled, or an earlier expiration date is specified. When a Case is revised, a new expiration is scheduled.

NOTE: Latest Approval Date is identified with an asterisk (*) and indicates the approval of an early expiration.

- Cases may be used beginning with the date of approval shown on the Case.
- Cases which are reaffirmed without change are not reprinted in Supplements. The Numeric Index provides the reaffirmation date and new expiration date of reaffirmed Cases.
- Annulled Cases will remain in the Numeric Index until the next Edition, at which time they will be deleted.
- The digit following a Case Number is used to indicate the number of times a Case has been revised.
- The Cases are arranged in numerical order, and each page of a Case is identified at the top with the appropriate Case Number.

Legend of Abbreviations

Supp. = Supplement

R = Reinstated

S = Superseded

NUMERIC INDEX

Case	Approval Date	Errata	Reaffirmed or *Latest App. Date	Expiration Date	Annulled
N-4-11	7-13-81	...	7-13-87	7-13-90	...
N-7-1	12-13-82	...	2-20-86	2-20-89	...
N-17	1-21-82	...	1-21-88	1-21-91	...
N-20-3	11-30-88	...	...	11-30-91	...
N-26	1-21-82	...	1-21-88	1-21-91	...
N-31-1	7-18-85	...	7-18-88	7-18-91	...
N-47-28	11-30-88	...	...	11-30-91	...
N-48-2	7-27-88	...	...	7-27-91	...
N-49-4	7-30-86	...	...	7-30-89	...
N-50-1	12-13-82	...	2-20-86	2-20-89	...
N-51-2	1-21-82	...	1-21-88	1-21-91	...
N-60-3	9-5-85	...	7-27-88	7-27-91	...
N-62-4	9-5-85	...	7-27-88	7-27-91	...
N-71-15	12-16-86	...	...	12-16-89	...
N-98	1-21-82	...	12-5-87	12-5-90	...
N-106-2	9-16-81	...	9-17-87	9-17-90	...
N-113-1	12-13-82	...	2-14-88	2-14-91	...
N-118	1-21-82	...	1-21-88	1-21-91	...
N-119-6	9-5-85	...	7-27-88	7-27-91	...
N-122	1-21-82	...	1-21-88	1-21-91	...
N-127	1-7-80	...	2-20-86	2-20-89	...
N-131-1	12-11-81	...	12-5-87	12-5-90	...
N-133-3	7-18-85	...	7-18-88	7-18-91	...
N-154-1	12-5-85	...	12-5-88	12-5-91	...
N-155-2	1-21-82	...	1-21-88	1-21-91	...
N-160-1	7-18-85	...	7-18-88	7-18-91	...
N-171	8-25-80	...	12-16-86	...	...
	...	...	3-17-86(ACI)	12-16-89	...
N-188-1	7-13-81	...	7-13-87	7-13-90	...
N-192-2	9-16-81	...	9-17-87	9-17-90	...
N-196-1	1-21-82	...	1-21-88	1-21-91	...

Case	Approval Date	Errata	Reaffirmed or *Latest App. Date	Expiration Date	Annulled
N-201-2	7-27-88	...	...	7-27-91	...
N-205	7-13-81	...	7-13-87	7-13-90	...
N-208	3-16-81	...	2-20-87	2-20-90	...
N-209	7-13-81	...	7-13-87	7-13-90	...
N-211	7-13-81	...	5-7-87	5-7-90	...
N-213	8-14-81	...	8-14-87		...
	3-6-78(ACI)	...	3-26-87(ACI)	8-14-90	...
N-216	7-13-81	...	5-7-87	5-7-90	...
N-222	7-16-82	...	*12-7-87		...
	8-17-79(ACI)	...	7-10-87(ACI)	7-1-89	...
N-224-1	5-11-81	...	4-5-87	4-5-90	...
N-231	1-21-82	...	12-5-87		...
	10-21-78(ACI)	...	7-10-87(ACI)	12-5-90	...
N-234	1-21-82	...	12-5-87	12-5-90	...
N-235	4-2-82	...	2-14-88	2-14-91	...
N-236-1	9-5-85	...	9-5-88	9-5-91	...
N-240	1-21-82	...	9-17-87	9-17-90	...
N-241	1-21-82	...	9-17-87	9-17-90	...
N-243	7-16-82	...	5-19-88	5-19-91	...
N-246-2	5-25-83	...	7-30-86	7-30-89	...
N-247	1-21-82	...	1-21-88	1-21-91	...
N-249-9	12-16-86	...	...	12-16-89	...
N-250	11-17-80	...	7-30-86		...
	7-18-80(ACI)	...	7-10-86	7-30-89	...
N-251	7-16-82	...	5-19-88		...
	9-14-79(ACI)	...	7-10-87(ACI)	5-19-91	...
N-253-5	12-16-86	...	...	12-16-89	...
N-254	5-7-87	...	...	5-7-90	...
N-257	8-25-80	...	7-30-86	7-30-89	...
N-258-2	7-30-86	...	...		...
	3-17-86(ACI)	...	...	7-30-89	...
N-262	9-7-82	...	7-27-88	7-27-91	...
N-265-1	5-19-85	...	5-19-88	5-19-91	...
N-278	5-25-83	...	2-19-89	2-19-92	...
N-282	5-15-80	...	7-30-86	7-30-89	...
N-284	8-25-80	...	7-30-86	7-30-89	...
N-290-1	4-4-83	...	7-30-86	7-30-89	...
N-292	12-5-80	...	7-30-86	7-30-89	...
N-294	8-25-80	...	7-30-86	7-30-89	...
N-304-4	2-23-87	...	...	2-23-90	...

Case	Approval Date	Errata	Reaffirmed or *Latest App. Date	Expiration Date	Annulled
N-306	1-15-81	...	5-7-87	5-7-90	...
N-307-1	12-5-84	...	12-5-87	12-5-90	...
N-308	9-30-81	...	9-30-87	9-30-90	...
N-309-1	12-5-85	...	7-27-88	7-27-91	...
N-311	5-11-81	...	5-7-87	5-7-90	...
N-312	5-25-83 9-26-83(ACI)	... ...	7-30-86 7-10-86	7-30-89	......
N-313	5-11-81	...	11-28-86	11-28-89	...
N-315	2-14-83	...	2-19-86	2-19-89	...
N-316	12-11-81	...	9-17-87	9-17-90	...
N-318-3	9-5-85	...	7-27-88	7-27-91	...
N-319	7-13-81	...	7-13-87	7-13-90	...
N-322	7-16-82	...	10-23-88	10-23-91	...
N-323	9-16-81	...	5-7-87	5-7-90	...
N-324	9-7-82 3-21-83(ACI)	... ...	7-30-86 3-17-86(ACI)	7-30-89	......
N-329	12-11-81	...	12-5-87	12-5-90	...
N-334	7-16-82	...	10-23-88	10-23-91	...
N-335-1	6-20-85	...	6-20-88	6-20-91	...
N-337-1	7-18-85	...	7-18-88	7-18-91	...
N-343	4-2-82	...	2-14-88	2-14-91	...
N-345-1	12-13-82	...	6-30-88	6-30-91	...
N-348-1	R 2-20-86	...	...	2-20-89	...
N-351	7-16-82	...	5-19-88	5-19-91	...
N-354-1	5-25-83 3-21-83(ACI)	... ...	7-30-86 3-17-86(ACI)	7-30-89	......
N-355	7-16-82	...	2-14-88	2-14-91	...
N-356	7-16-82	...	10-23-88	10-23-91	...

N-367	2-14-83	...	2-19-86	2-19-89	...
N-368	7-6-83	...	6-30-87	6-30-90	...
N-369	2-14-83	...	2-19-86	2-19-89	...
N-370-2	12-5-85	...	12-5-88	12-5-91	...
N-373-1	4-5-84	...	4-5-87	4-5-90	...
N-375-2	4-5-84	...	5-7-87	5-7-90	...
N-379-1	7-18-85	...	7-18-88	7-18-91	...

Case	Approval Date	Errata	Reaffirmed or *Latest App. Date	Expiration Date	Annulled
N-384-1	12-5-85 7-11-85(ACI)	...	...	7-27-91	...
...
...
N-387	7-25-83 3-21-83(ACI)	...	12-16-86 3-26-87(ACI)	12-16-89	...
N-389	7-25-83	...	5-14-89	5-14-92	...
N-390	11-28-83	...	7-30-89	7-30-92	...
N-391	11-28-83	...	7-30-86	7-30-89	...
N-392	11-28-83	...	7-30-86	7-30-89	...
N-393	11-28-83	...	7-30-86	7-30-89	...
N-394	2-20-84	...	7-30-86	7-30-89	...
N-395	2-20-84	...	2-20-87	2-20-90	...
N-396	9-17-84	...	9-17-87	9-17-90	...
...
...
N-401-1	5-4-88	...	...	5-4-91	...
N-402	2-20-84	...	2-23-87	2-23-90	...
N-403	2-14-85	...	8-17-88	8-17-91	...
N-404	4-5-84	...	4-5-87	4-5-90	...
N-405	9-17-84	...	9-17-87	9-17-90	...
N-406	4-5-84	...	5-7-87	5-7-90	...
N-408-1	3-8-89	...	...	3-8-92	...
N-409-2	7-27-88	...	...	7-27-91	...
N-410	12-5-84	...	7-27-88	7-27-91	...
N-411-1	2-20-86	...	...	2-20-89	...
N-412	4-15-85	...	4-15-88	4-15-91	...
N-414	2-20-86	...	...	2-20-89	...
N-415	9-5-85	...	9-5-88	9-5-91	...
N-416	12-5-84	...	12-5-87	12-5-90	...
...
N-418-1	7-30-86	...	...	7-30-89	...
N-419	7-18-85	...	7-18-88	7-18-91	...
N-420	2-14-85	...	2-14-88	2-14-91	...
...

Case	Approval Date	Errata	Reaffirmed or *Latest App. Date	Expiration Date	Annulled
...
...
N-426	7-18-85	...	7-18-88	7-18-91	...
N-427	12-5-85	...	12-5-88	12-5-91	...
N-429-1	2-23-87	...	...	2-23-90	...
N-430	2-28-86	...	...	2-28-89	...
N-432	2-20-86	...	2-20-89	2-20-92	...
N-433	12-16-86	...	...	12-16-89	...
...
N-435-1	7-30-86	...	7-30-89	7-30-92	...
N-436-1	12-7-87	...	...	12-7-90	...
N-437	7-30-86	...	7-30-89	7-30-92	...
N-438-1	3-8-89	...	...	3-8-92	...
N-439	2-23-87	...	...	2-23-90	...
N-440	2-23-87	...	...	2-23-90	...
N-441	2-23-87	...	...	2-23-90	...
N-442-1	3-8-89	...	...	3-8-92	...
N-443-1	3-8-89	...	...	3-8-92	...
N-444	12-7-87	...	...	12-7-90	...
N-445	5-7-87	...	...	5-7-90	...
N-446	5-7-87	...	...	5-7-90	...
...
N-448	7-27-87	...	...	7-27-90	...
N-449	7-27-87	...	...	7-27-90	...
...
N-451	7-27-87	...	...	7-27-90	...
...
N-453-1	11-30-88	...	...	11-30-91	...
N-454	12-7-87	...	...	12-7-90	...
N-455	12-7-87	...	...	12-7-90	...
...
N-457	12-7-87	...	...	12-7-90	...
...
N-459	5-4-88	...	...	5-4-91	...
N-460	7-27-88	...	...	7-27-91	...
N-461	11-30-88	...	...	11-30-91	...
N-462	7-27-88	...	...	7-27-91	...

Case	Approval Date	Errata	Reaffirmed or *Latest App. Date	Expiration Date	Annulled
N-463	11-30-88	...	...	11-30-91	...
N-464	3-8-89	...	...	3-8-92	...
N-465	11-30-88	...	...	11-30-91	...
N-466	3-8-89	...	...	3-8-92	...
...
...
N-469	3-8-89	...	...	3-8-92	...
N-470	3-8-89	...	...	3-8-92	...
...
N-472	3-8-89	...	...	3-8-92	...
N-473	3-8-89	...	...	3-8-92	...

SUBJECT INDEX

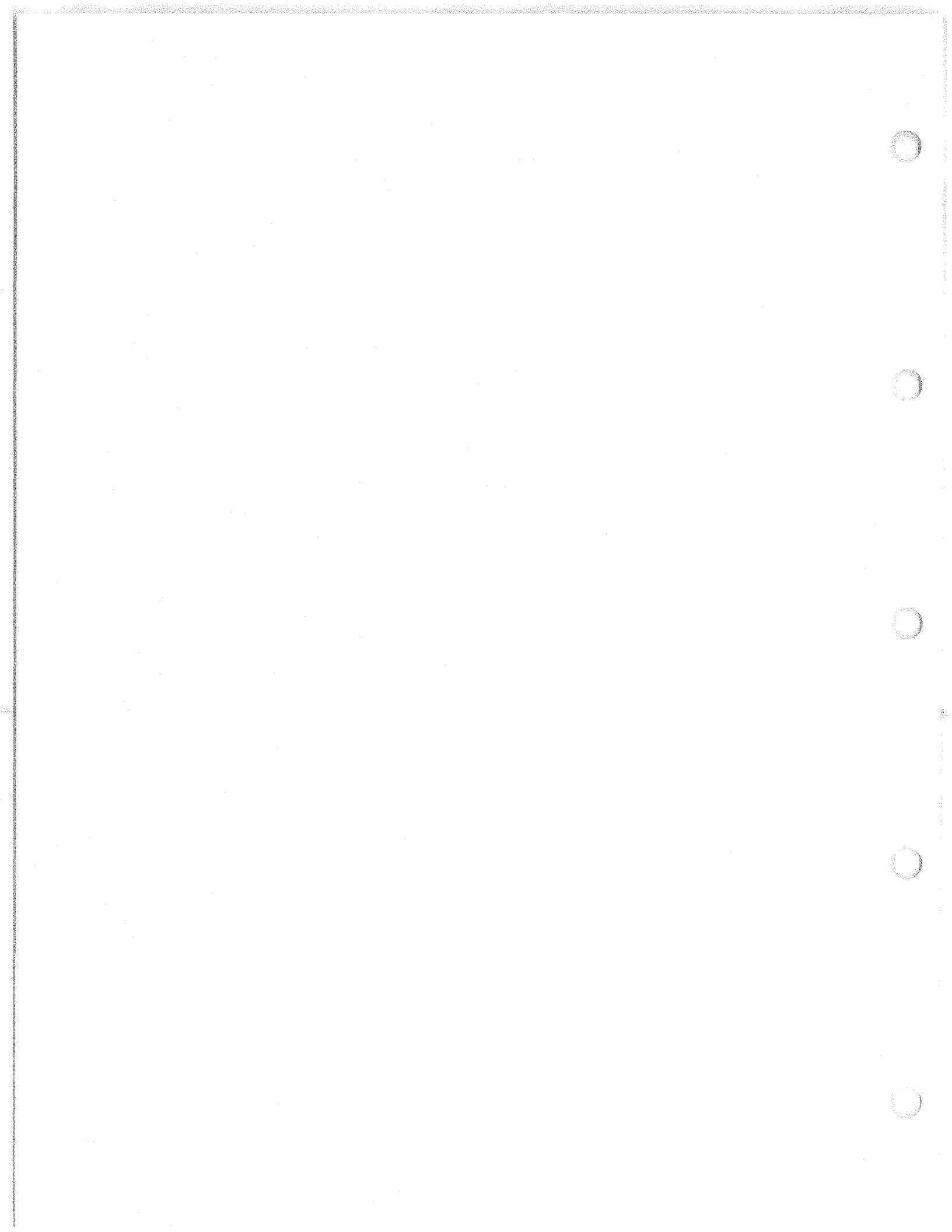
Subject	Case	Subject	Case
SECTION III — DIVISION 1 NUCLEAR POWER PLANT COMPONENTS			
Additional Materials for		Construction of Class 2 or Class 3 Components for Elevated Temperature Service	N-253
Subsection NF Class 1, 2, 3, and MC Component		Depositing Weld Metal Prior to Preparing Ends for Welding	N-292
Supports Fabricated by Welding	N-71	Elastomer Diaphragm Valves	N-31
Subsection NF Class 1, 2, 3, and MC Component		Electric Resistance Spot Welding for Structural Use in Component Supports	N-262
Supports Fabricated Without Welding	N-249	Examination of	
Alternate Procedure for Evaluation of Stresses in Butt Welding Elbows in Class 1 Piping	N-319	Bar Materials	N-329
Alternative		Elevated Temperature Nuclear Components	N-49
Damping Values for Response Spectra Analysis of Class 1, 2, and 3 Piping Sections	N-411	Exemption from the Shakedown Requirements When Plastic Analysis Is Performed	N-196
Examination of Full-Penetration Butt Welded Joints in Built-Up Members of Subsection NF, Class 1, Piping Supports	N-396	Expansion Joints in Class 1, Liquid Metal Piping	N-290
PWHT Time at Temperature for P-No. 5 Material Requirements for Welding Workmanship and Visual Acceptance Criteria for Class 1, 2, 3, and MC Linear-Type and Standard Supports	N-373	Fabrication and Installation of Elevated Temperature Components	N-48
Alternative Rules for		Fabrication and Installation of Elevated Temperature Components, Class 2 and 3	N-254
Analysis of Piping Products Under Seismic Loading, Class 2 and 3 Piping Systems	N-462	Fatigue Analysis for Precipitation Hardening Nickel Alloy Bolting Material to Specification SA-637 Grade 718	N-208
Analysis of Piping Under Seismic Loading, Class 1	N-451	Fiberglass Reinforced Thermosetting Resin Pipe	N-155
Examination of Welds in Piping	N-127	Finned Tubing for Construction	N-160
Fillet Weld Dimensions for Socket Welded Fittings	N-316	High Yield Strength Cr-Mo Steel, Class 1 Components	N-443
Half-Coupling Branch Connections	N-313	High Yield Strength Steel	N-7
Witnessing the Piping System Pressure Tests of Classes 1, 2, and 3 Piping Systems	N-412	Hydrostatic Testing of	
Annealed Alloy UNS N06625 Over UNS N06600		Internal Piping	N-237
Bimetallic Tubing	N-404	Open Ended Piping	N-240
Application of ANSI/ASME PTC 25.3-1976, Safety and Relief Valves, Including the 1977 Addendum, Class 1, 2, 3, and MC	N-442	Piping	N-241
Attachment of AMS 5382 Alloy 31 Seat Rings by Friction Welding	N-345	Identification of Material for Component Supports	N-309
Bimetallic Tubing	N-379	Integrally Finned Tubes	N-17, 26
Boundaries Within Castings Used for Core Support Structures	N-243	Internal and External Valve Items	N-62
Certified Design Report Summary for Component Standard Supports	N-247	Laser Welding	N-395
Certified Relieving Capacities of Pressure Relief Valves Having Set Pressure of 3 psig Up to but Not Including 15 psig Installed for Overpressure Protection of Compressible Fluid Systems	N-410	Laser Welding of Lap Joints	N-464
Class CS Components in Elevated Temperature Service	N-201	Linear Energy Absorbing Supports for Subsection NF, Class 1, 2, and 3 Construction	N-420
Class MC Material Requirements [NE-2121(c)]	N-470	Martensitic Stainless Steel for Class 1, 2, and 3 Components	N-469
Class 1 Components in Elevated Temperature Service	N-47	Material for	
		Core Support Structures	N-60
		Internal Pressure Retaining Items for Pressure Relief Valves	N-131
		Metal Containment Shell Buckling Design Methods	N-284
		Modified 9Cr-1Mo Material	N-466
		Modified SA-487 Castings	N-265
		Modified SA-705 Type XM-13 Forgings	N-370
		Nameplates for Valves	N-282
		1977 Addendum to ANSI/ASME PTC 25.3-1976, Safety and Relief Valves, Class 1, 2, 3, and MC	N-442
		Nickel-Chromium-Molybdenum-Copper Stainless Steel	

Subject	Case	Subject	Case
Rules for Pump Testing	N-465	Ultrasonic Examination of Similar and Dissimilar Metal Piping Welds	N-335
Rules for Reactor Vessel Closure Stud Examination	N-216	Time Between Ultrasonic Calibration Checks	N-234
Rules for Repairs, Replacements, or Modifications	N-389	Ultrasonic Calibration Checks per Section V	N-235
Rules for Replacement	N-406	Ultrasonic Examination — Calibration Block Tolerances, Divisions 1 and 2	N-98
Rules for Testing Pressure Relief Devices	N-415	Use of Digital Readout and Digital Measurement Devices for Performing Pressure Tests	N-437
Rules for Ultrasonic Instrument Calibration	N-429	Use of Digital Readout and Digital Measurement Devices for Performing Pump Vibration Testing	N-472
Scope of Examination of Attachment Welds for Examination Categories B-H, B-K-1, and CC	N-343	Use of Later Editions of SNT-TC-1A for Qualification of Nondestructive Examination Personnel	N-445
Ultrasonic Calibration Block Configuration	N-278		
Basic Calibration Block for Ultrasonic Examination of Weld 10 In. to 14 In. Thick	N-113		
Calibration Block for Angle Beam Ultrasonic Examination of Large Fittings in Accordance with Appendix III-3410	N-355	INDEX OF MATERIAL SPECIFICATIONS REFERRED TO IN CASES	
Calibration Block Material Selection, Appendix I, I-3121	N-306	ASME Specification	
Certification Period for Level III NDE Personnel	N-356	SA-36	N-71
Code Cases in Inspection Plans	N-427	SA-105	N-253
Conditional Acceptance of Identifiable Isolated or Random Rounded Indications	N-209	SA-106 Grades B, C	N-253
Documentation of Repairs and Replacements of Components in Nuclear Power Plants	N-308	SA-178 Grade C	N-253
Eddy Current Calibration Standard Material	N-402	SA-181 Classes 60, 70	N-253
Eddy Current Examination	N-401	SA-182	N-439
Evaluation Criteria for Flaws Located in a Flange or Shell Region Near a Structural Discontinuity	N-390	SA-182 Grades F1, F12, F22, F321, F321H	N-253
Evaluation Procedures and Acceptance Criteria for Flaws in Class 1 Ferritic Piping That Exceed the Acceptance Standards of IWB-3514.2	N-463	SA-182 Grade F22	N-47
Examination Requirements for		SA-182 Grades F11 and F22a	N-201
Integrally Welded or Forged Attachments to Class 1 Piping at Containment Penetrations	N-322	SA-182 Grade F91	N-466
Integrally Welded or Forged Attachments to Class 2 Piping at Containment Penetrations	N-334	SA-182 Grades F304, F304H, F316, F316H	N-47, 201, 253
Examination — Acceptance Standards for Surface Indications in Cladding	N-118	SA-182 Grade F347	N-60
Extent of VT-1 Examinations, Category B-G-1 of Table IWB-2500-1	N-419	SA-193 Grades B5, B7, B16	N-253
Extent of VT-1 Examinations, Category B-G-2 of Table IWB-2500-1	N-426	SA-193 Grades B8, B8M	N-47, 60, 71, 201, 253
Preparation of Inspection Plans	N-444	SA-193 Grade B8C	N-60, 71
Procedure and Personnel Qualification Requirements for Ultrasonic Detection and Sizing of Flaws in Piping Welds	N-409	SA-193 Grade B8T	N-60, 71, 253
Qualification of VT-2 and VT-3 Visual Examination Personnel	N-448	SA-193 Grades B8A, B8CA, B8MA, B8TA	N-71
Qualification of VT-4 Visual Examination Personnel	N-449	SA-193 Type B16	N-201
Qualification Specimen Notch Location for Ultrasonic Examination of Bolts and Studs	N-457	SA-194	N-60, 71, 202, 249
Recalibration of Ultrasonic Equipment Upon Change of Personnel	N-211	SA-204 Grades A, B, C	N-253
Recertification of Visual Examination Personnel	N-446	SA-210 Grade A-1	N-253
Repair and Replacement of Class MC Vessels	N-236	SA-213	N-17
Repair Welding Using Automatic or Machine Gas Tungsten-Arc Welding (GTAW) Temperbead Technique	N-432	SA-213 Grades T9, T12	N-253
Revised Ultrasonic Examination Volume for Class 1 Bolting, Table IWB-2500-1, Examination Category B-G-1, When the Examinations Are Conducted From the Center-Drilled Hole	N-307	SA-213 Grade T22	N-47, 201, 253
Rules for		SA-213 Grade T91	N-466
Ultrasonic Examination of Bolts and Studs	N-375	SA-213 Grades TP304, TP304H, TP316, TP316H	N-47, 201, 253
		SA-213 Grades TP304N, TP316N, TP321, TP321H	N-253
		SA-216 Grades WCA, WCB, WCC	N-253
		SA-217 Grade C12	N-71, 249
		SA-217 Grades WC1, WC9	N-253
		SA-234	N-47, 253
		SA-234 Grades WP22 and WP22W	N-201
		SA-240	N-439, 441
		SA-240 Grades 304, 304H, 316, 316H	N-47, 201, 253
		SA-240 Grades 304N, 316N, 321, 321H	N-253
		SA-240 Grades 410, XM-19	N-60
		SA-240 Type XM-17	N-249
		SA-249	N-439
		SA-249 Grades TP304, TP304H, TP316, TP316H	N-47, 201, 253
		SA-266 Class 2	N-253
		SA-283 Grade C	N-71
		SA-290	N-441
		SA-299	N-171

Subject	Case
SA-302 Grade B	N-253
SA-304 Grades WP304W & WP304HW	N-201
SA-307 Grade A	N-249
SA-312	N-439
SA-312 Grades TP304, TP304H, TP316, TP316H	N-47, 201, 253
SA-312 Grades TP304N, TP316N, TP321, TP321H	N-253
SA-320	N-71, 249
SA-325 Type 1	N-249
SA-335 Grades P1, P9, P12, P22	N-253
SA-335 Grade P22	N-47, 201
SA-335 Grade P91	N-466
SA-336	N-201, 253
SA-336 Classes F8, F8M	N-47
SA-336 Class F22a	N-47, 201
SA-336 Grades F304 & F304H and F316 & F316H	N-201
SA-351	N-440
SA-351 Grades CF8, CF8M, CF3M	N-253
SA-354 Grades BC, BD	N-249
SA-354 Grade BD	N-353
SA-358	N-439
SA-358 Grades 304 and 316, Class 1	N-201
SA-358 Grade 304N	N-253
SA-358 Grades 304, 304H, 316, 316H	N-47
SA-369 Grade FP22	N-47, 201
SA-369 Grades FP1, FP9, FP12, FP22	N-253
SA-370	N-351
SA-372 Type V, Grade 1, Class B	N-367
SA-376 Grades TP304, TP304H, TP316, TP316H	N-47, 201, 253
SA-376 Grades TP304N, TP316N, TP321, TP321H	N-253
SA-387 Grades 11 and 22	N-201
SA-387 Grade 12 Classes 1, 2; Grade 22 Classes 1, 2	N-253
SA-387 Grade 22 Class 1	N-47
SA-387 Grade 91	N-466
SA-395	N-295
SA-403	N-47, 201, 253, 441
SA-403 Grades WP304 & WP304H, WP316 & WP316H, and WP316W & WP316HW	N-201
SA-426 Grade CP22	N-201
SA-430 Grades FP304, FP304H, FP316, FP316H	N-47, 201, 253
SA-430 Grades FP304N, FP316N, FP321, FP321H	N-253
SA-442 Grade 60	N-253
SA-449	N-249
SA-452 Grades TP304H, TP316H	N-253
SA-453 Grades 651, 660	N-253
SA-453 Grade 660	N-60, 249
SA-479	N-60, 192
SA-479 Types 304, 316	N-47, 201, 253
SA-479 Types 304H, 316H	N-47, 201, 253
SA-479 Types 321, 321H	N-253
SA-479 Type XM-30	N-62
SA-487 Class 10 Q	N-71, 265, 407
SA-508	N-459
SA-508 Class 2	N-253
SA-508 Class 4	N-7
SA-508 Class 4a	N-71
SA-515 Grades 60, 65, 70	N-253
SA-516 Grades 60, 65, 70	N-71, 171
SA-517 Grades A, B, D, E, F, J, P	N-71

Subject	Case
SA-524 Grades I, II	N-71
SA-533 Type C Class 1	N-253
SA-540 Grades B21, B22, B23, B24	N-249
SA-540 Type B21	N-201
SA-541 Class 2	N-253
SA-541 Class 6	N-71
SA-541 Class 22C	N-443
SA-542 Classes 1, 2, 3, 4	N-71
SA-563	N-249
SA-564 Grade 630 Types XM-12, XM-13	N-249
SA-574	N-249, 348
SA-592 Grades A, E, F	N-71
SA-637 Grade 718	N-47, 208, 253
SA-638 Grade 660	N-60
SA-675 Grades 65, 70	N-71
SA-691 Grade 2¼ Cr	N-47, 253
SA-691 Grade 2.25	N-201
SA-705 Type XM-13 Modified	N-370
SB-62 Alloy 836	N-294
SB-148 Alloy 954	N-229
SB-148 Alloys 952, 954	N-133, 294
SB-150 Alloys 614, 630	N-133, 249
SB-150 Alloy C64200	N-249
SB-150 Alloys C61400, C63000	N-249
SB-163	N-26
SB-163 Alloys 600, 690, 800	N-20
SB-163 Alloys 600, 800, 800H	N-253
SB-163 Alloy 800H	N-47, 201
SB-163 (UNS N06600)	N-379, 404
SB-166 Alloy 600	N-3, 253
SB-167 Alloy 600	N-253
SB-168 Alloy 600	N-60, 253
SB-169 Alloy C61400	N-246, 249
SB-271 Alloy C95400	N-249
SB-271 Alloy C95000	N-249
SB-366	N-438
SB-407 Alloy 800H	N-47, 201, 253
SB-408 Alloy 800H	N-47, 201, 253
SB-409 Alloy 800H	N-47, 201, 253
SB-423 Alloy 825	N-188
SB-435 Alloy X	N-253
SB-444 Alloy 625	N-188
SB-444 (UNS N06625)	N-404
SB-462	N-438
SB-513	N-379
SB-564	N-201, 438
SB-564 Alloys 600, 800, 800H	N-253
SB-564 Alloy 800H	N-47, 201
SB-572 Alloy X	N-253
SB-584 Alloy 937	N-249
SB-637 Grade 688	N-60
SB-668 (UNS N08028)	N-418
SB-675	N-304, 438
SB-676	N-438
SB-677 (UNS N08904)	N-418
SB-688	N-438
SB-690	N-438
SB-691	N-438
SFA-5.4	N-47
SFA-5.5	N-47, 407
SFA-5.9	N-47
SFA-5.11	N-47, 453, 454, 455

Subject	Case	Subject	Case
SFA-5.14	N-47, 453, 454, 455	A 513-84a	N-71, 249
SFA-5.22	N-47	A 514-84a	N-71
SFA-5.23	N-47	A 519-84a	N-71, 249
SFA-5.28	N-47	A 521-76 Classes CC, CE	N-71
SFA-5.29	N-47	A 521-76 Class CG	N-249
ASTM Specification		A 541-81 Class 6	N-71
A 108-81	N-71, 249, 433	A 543-72a Type B Class 1	N-7
A 148-84	N-71, 249	A 543-79a Types B, C Classes 1, 2, 3	N-71
A 182-75 Grade F6	N-62	A 543-82 Types B, C Classes 1, 2, 3	N-71
A 182-76a	N-119	A 546-82	N-249
A 217-75 Grade CA15	N-62	A 554-72 Grades MT304, MT304L, MT316, MT316L	N-60
A 217-76 Grade CA15	N-119	A 564-74 Grades 630, XM-25	N-119, 131
A 228-83	N-249	A 565-74 Grades 615, 616	N-62, 119, 131
A 240-75 Grades 410, 410S	N-62	A 567-74 Grade 1	N-62
A 240-76a Grades 410, 410S	N-119	A 570-84a Grades 36, 45	N-71
A 268-74a Grade TP410	N-119	A 572 Grades 60, 65	N-213
A 268-75 Grade TP410	N-62	A 572-76 Grade 55	N-71
A 276-73 Type 403	N-131	A 572-84 Classes 42, 50	N-71
A 276-75 Types 316, 403, 410, 420, 440C	N-62	A 579-84 Grade 12a	N-249
A 276-76a Grades 316, 403, 410, 414, 420, 440A, 440C	N-119	A 580-75	N-192
A 276-84 Type 440C	N-249	A 580-83 Grades 302, 304, 316, 317 Class B	N-249
A 296-76 Grades CA6NM, CA15, CA40	N-119	A 581-80	N-249
A 314-75 Grades 403, 410, 416, 416Se	N-62	A 582-75 Grades 403, 410, 416, 416Se	N-119
A 314-76 Grades 403, 410, 416, 416Se	N-119	A 582-75 Grades 416, 416Se	N-62
A 322-82 Grade 4150	N-249	A 582-80 Grades 303, 303Se, 416, 416Se	N-249
A 331-74 Grades 4140, 41L40, 4340	N-119	A 588-84a Grades A, B	N-71
A 331-74 Grades 4140, 4340	N-62	A 611-84 Grades A, B, C	N-71
A 331-81 Grade 8620CW	N-71	A 618-84 Types II, III	N-71
A 351-76 Grade CN7M	N-119	A 633 Grade E	N-213
A 381-81 Class Y35	N-81	A 633-84 Grades A, C, D, E	N-71
A 412-84 Grade 201	N-249	A 637-70 Grades 718, 688 Type II	N-62, 119
A 416-74	N-222	A 638-70 Grade 660	N-62, 119
A 434-81 Classes BB, BC, BD	N-249	A 668-83 Classes B, C, D, F, K, L	N-71
A 441-84 Groups 1, 2	N-71	A 668-83 Classes B, C, D, F, K, L, M, N	N-249
A 446-83 Grade A	N-71	A 668-83 Grade 75	N-71
A 453-75 Grade 660	N-62, 119	A 675-82 Grade 75	N-71
A 457-82 Grade 651	N-249	A 693-84 Grade 630	N-249
A 458-71 Grade 651	N-131	A 706	N-213
A 471 Classes 2 through 9	N-249	A 710-84 Grade A	N-71
A 471-81 Classes 2 through 9	N-249	B 16-85 Alloys C36000, C36000 Class H02	N-249
A 477-71 Grade 651	N-131	B 124-84 Alloy C37700, C37700 Class M30	N-249
A 479-74 Grade XM-19	N-60	B 139-71a Grade 544	N-119
A 479-75 Grade 410	N-62, 131	B 148-76a Grades 952, 955	N-119
A 479-76 Grade 410	N-119	B 164-75 Grade 400 Class A	N-119
A 487-74d Grade CA15M	N-119	B 165-75	N-119
A 487-76 Grade CA6NM	N-119	B 366	N-454
A 490-84a	N-249	B 462	N-455
A 498-68	N-17, 26	B 464	N-453
A 500-76 Grade B	N-224	B 525-70 Grade II, Type II	N-337
A 500-84 Grades B, C	N-71	B 584-77 Grades 836, 932, 937	N-119
A 501-81	N-224	B 625	N-454
A 501-83	N-71	B 649	N-454, 455
A 501-84	N-71	B 668-84	N-418
A 511-71 Grades MT304, MT304L, MT316, MT316L	N-60	B 670-80	N-249
		B 673	N-453
		B 688-81	N-304



APPLICABILITY INDEX FOR SECTION XI CASES

This Index provides the range of Section XI Editions and Addenda applicable to each Section XI Case.

Code Case No.	Title	Applicability	
		From	Up To and Including
N-34	Inservice Inspection of Welds on Nuclear Components	1970 Edition	1971 Edition with the Summer 1973 Addenda
N-72	Partial Postponement of Category B-C Examinations for Class 1 Components	1974 Edition	1974 Edition with the Summer 1975 Addenda
N-73	Partial Postponement of Category B-D Examinations for Class 1 Components	1974 Edition	1974 Edition with the Winter 1976 Addenda
N-98	Ultrasonic Examination — Calibration Block Tolerances [Note (1)]: (a) For Division 1	1974 Edition	1977 Edition with the Summer 1978 Addenda
		(b) For Division 2	1974 Edition with the Winter 1975 Addenda
N-112	Acceptance Standards Class 2 and 3 Components	1974 Edition	1974 Edition with the Winter 1976 Addenda
N-113	Basic Calibration Block for Ultrasonic Examination of Welds 10 in. to 13 in. Thick	1971 Edition with the Summer 1973 Addenda	1974 Edition with the Summer 1976 Addenda
N-113-1	Basic Calibration Block for Ultrasonic Examination of Welds 10 in. to 14 in. Thick	1971 Edition with the Summer 1973 Addenda	1974 Edition with the Summer 1976 Addenda
N-118	Examination — Acceptance Standards for Surface Indications in Cladding	1974 Edition with the Summer 1974 Addenda	1974 Edition with the Winter 1975 Addenda
N-166	Reference by Section XI to N626.1-1975 for Qualification and Duties of Authorized Nuclear Inservice Inspection	1974 Edition	1977 Edition
N-167	Minimum Section Thickness Requirements for Repair of Nozzles	1974 Edition	1977 Edition with the Winter 1977 Addenda

Code Case No.	Title	Applicability	
		From	Up To and Including
N-198	Exemption From Examination for ASME Class 2 Piping Located at Containment Penetrations	1974 Edition with the Summer 1976 Addenda	1977 Edition with the Winter 1977 Addenda
N-209	Conditional Acceptance of Identifiable Isolated or Random Rounded Indications (a) For Class 1 Systems (b) For Class 2 Systems	1974 Edition 1974 Edition with the Summer 1976 Addenda	1980 Edition with the Winter 1980 Addenda 1983 Edition
N-210	Exemptions to Hydrostatic Test After Repairs	1974 Edition	1977 Edition with the Winter 1977 Addenda
N-211	Recalibration of Ultrasonic Equipment Upon Change of Personnel (a) To meet requirements of I-4230 (b) To meet requirements of III-3330	1971 Edition with the Summer 1973 Addenda 1977 Edition	1974 Edition with the Summer 1976 Addenda 1980 Edition
N-216	Alternative Rules for Reactor Vessel Closure Stud Examination	1977 Edition	1977 Edition with the Winter 1977 Addenda
N-234	Time Between Ultrasonic Calibration Checks (a) To meet requirements of I-4230 (b) To meet requirements of III-3330	1971 Edition with the Summer 1973 Addenda 1977 Edition	1974 Edition with the Summer 1976 Addenda 1980 Edition
N-235	Ultrasonic Calibration Checks per Section V	1974 Edition with the Winter 1976 Addenda	1977 Edition with the Summer 1979 Addenda
N-236-1	Repair and Replacement of Class MC Vessels	1974 Edition	1983 Edition
N-252	Low Energy Capacitive Discharge Welding Method for Temporary or Permanent Attachments to Components and Supports	1971 Edition	1980 Edition with the Winter 1981 Addenda
N-278	Alternative Ultrasonic Calibration Block Configuration, I-3131 and T-434.3 (a) To meet requirements of I-3131 (b) To meet requirements of T-434.3	1974 Edition 1977 Edition	1974 Edition with the Summer 1976 Addenda 1977 Edition with the Winter 1979 Addenda

Code Case No.	Title	Applicability	
		From	Up To and Including
N-288	Hydrostatic Test Requirements for Class 1 and 2 Components	1974 Edition	1977 Edition with the Summer 1977 Addenda
N-306	Calibration Block Material Selection, Appendix I, I-3121 [Note (2)]	1974 Edition with the Summer 1975 Addenda	1974 Edition with the Summer 1976 Addenda
N-307	Revised Ultrasonic Examination Volume for Class 1 Bolting, Examination Category B-G-1, When the Examinations Are Conducted From the Center-Drilled Hole	1974 Edition	1983 Edition with the Winter 1984 Addenda
N-307-1	Revised Ultrasonic Examination Volume for Class 1 Bolting, Table IWB-2500-1, Examination Category B-G-1, When the Examinations Are Conducted From the Center-Drilled Hole	1974 Edition	1986 Edition with the 1986 Addenda
N-308	Documentation of Repairs and Replacements of Components in Nuclear Power Plants	1974 Edition	1980 Edition with the Winter 1981 Addenda
N-311	Alternative Examination of Outlet Nozzle on Secondary Side of Steam Generators	1977 Edition with the Winter 1977 Addenda	1986 Edition with the 1986 Addenda
N-322	Examination Requirements for Integrally Welded or Forged Attachments to Class 1 Piping at Containment Penetrations	1977 Edition with the Summer 1978 Addenda	1986 Edition with the 1986 Addenda
N-323	Alternative Examinations for Integrally Welded Attachments to Vessels	1974 Edition	1974 Edition with the Winter 1976 Addenda
N-334	Examination Requirements for Integrally Welded or Forged Attachments to Class 2 Piping Containment Penetrations	1977 Edition with the Summer 1978 Addenda	1980 Edition with the Winter 1980 Addenda
N-335	Rules for Ultrasonic Examination of Similar and Dissimilar Metal Piping Welds	1974 Edition	1980 Edition with the Winter 1981 Addenda
N-335-1	Rules for Ultrasonic Examination of Similar and Dissimilar Metal Piping Welds	1974 Edition	1986 Edition with the 1986 Addenda
N-343	Alternative Scope of Examination of Attachment Welds for Examination Categories B-H, B-K-1, and C-C	1974 Edition	1980 Edition with the Winter 1981 Addenda

Code Case No.	Title	Applicability	
		From	Up To and Including
N-355	Calibration Block for Angle Beam Ultrasonic Examination of Large Fittings in Accordance With Appendix III-3410 [Note (3)]	1974 Edition with the Winter 1975 Addenda	1983 Edition
N-356	Certification Period for Level III NDE Personnel	1977 Edition with the Winter 1977 Addenda	1983 Edition
N-375	Rules for Ultrasonic Examination of Bolts and Studs	1980 Edition	1980 Edition with the Winter 1981 Addenda
N-375-1	Rules for Ultrasonic Examination of Bolts and Studs	1980 Edition	1980 Edition with the Winter 1981 Addenda
N-375-2	Rules for Ultrasonic Examination of Bolts and Studs	1971 Edition	1983 Edition
N-389	Alternative Rules for Repairs, Replacements, or Modifications	1974 Edition with the Summer 1975 Addenda	1986 Edition with the 1986 Addenda
N-390	Evaluation Criteria for Flaws Located in a Flange or Shell Region Near a Structural Discontinuity	1974 Edition with the Summer 1975 Addenda	1986 Edition with the 1986 Addenda
N-401	Eddy Current Examination	1974 Edition with the Summer 1976 Addenda	1986 Edition with the 1986 Addenda
N-401-1	Eddy Current Examination	1974 Edition with the Summer 1974 Addenda	1986 Edition with the 1987 Addenda
N-402	Eddy Current Calibration Standard Material	1980 Edition with the Winter 1980 Addenda	1983 Edition with the Winter 1983 Addenda
N-406	Alternative Rules for Replacement	1977 Edition with the Summer 1978 Addenda	1986 Edition with the 1986 Addenda
N-408	Alternative Rules for Examination of Class 2 Piping	1974 Edition	1983 Edition
N-409	Procedure and Personnel Qualification for Ultrasonic Detection and Sizing of Intergranular Stress Corrosion Cracking in Austenitic Piping Welds	1974 Edition	1986 Edition with the 1986 Addenda
N-409-1	Procedure and Personnel Qualification for Ultrasonic Detection and Sizing of Intergranular Stress Corrosion Cracking in Austenitic Piping Welds	1974 Edition	1986 Edition with the 1986 Addenda

Code Case No.	Title	Applicability	
		From	Up To and Including
N-409-2	Procedure and Personnel Qualification Requirements for Ultrasonic Detection and Sizing of Intergranular Stress Corrosion Cracking in Austenitic Piping Welds	1974 Edition	1986 Edition with the 1987 Addenda
N-415	Alternative Rules for Testing Pressure Relief Devices	1974 Edition	1983 Edition with the Winter 1984 Addenda
N-416	Alternative Rules for Hydrostatic Testing of Repair or Replacement of Class 2 Piping	1974 Edition	1986 Edition with the 1986 Addenda
N-419	Extent of VT-1 Examinations, Category B-G-1 of Table IWB-2500-1	1977 Edition with the Summer 1978 Addenda	1983 Edition with the Winter 1984 Addenda
N-426	Extent of VT-1 Examinations, Category B-G-2 of Table IWB-2500-1	1977 Edition with the Summer 1978 Addenda and the 1980 Edition with Addendas	1983 Edition with the Winter 1984 Addenda
N-427	Code Cases in Inspection Plans	1971 Edition	1986 Edition
N-429	Alternate Rules for Ultrasonic Instrument Calibration	1980 Edition with the Winter 1980 Addenda	1983 Edition with the Winter 1983 Addenda
N-429-1	Alternative Rules for Ultrasonic Instrument Calibration	1980 Edition with the Winter 1980 Addenda	1986 Edition
N-432	Repair Welding Using Automatic or Machine Gas Tungsten-Arc Welding (GTAW) Temperbead Technique	1971 Edition with the Summer 1973 Addenda	1986 Edition with the 1986 Addenda
N-435	Alternative Examination Requirements for Vessels With Wall Thickness 2 in. or Less	1974 Edition with the Summer 1975 Addenda	1986 Edition with the 1986 Addenda
N-436	Alternative Methods for Evaluation of Flaws in Austenitic Piping	1983 Edition	1986 Edition
N-436-1	Alternative Methods for Evaluation of Flaws in Austenitic Piping	1983 Edition	1986 Edition
N-437	Use of Digital Readout and Digital Measurement Devices for Performing Pressure Tests	1974 Edition	1986 Edition
N-444	Preparation of Inspection Plans	1974 Edition with the Summer 1975 Addenda	1986 Edition with the 1986 Addenda

Code Case No.	Title	Applicability	
		From	Up To and Including
N-445	Use of Later Edition of SNT-TC-1A for Qualification of Nondestructive Examination Personnel	1977 Edition with the Summer 1978 Addenda	1986 Edition with the 1986 Addenda
N-446	Recertification of Visual Examination Personnel	1977 Edition with the Summer 1978 Addenda	1986 Edition with the 1986 Addenda
N-448	Qualification of VT-2 and VT-3 Visual Examination Personnel	1977 Edition with the Summer 1978 Addenda	1986 Edition with the 1986 Addenda
N-449	Qualification of VT-4 Visual Examination Personnel	1977 Edition with the Summer 1978 Addenda	1983 Edition with the Summer 1984 Addenda
N-457	Qualification Specimen Notch Location for Ultrasonic Examination of Bolts and Studs	1983 Edition with the Winter 1983 Addenda	1986 Edition with the 1986 Addenda
N-460	Alternative Examination Coverage for Class 1 and Class 2 Welds	1974 Edition	1986 Edition with the 1987 Addenda
N-461	Alternative Rules for Piping Calibration Block Thickness	1974 Edition through the Summer 1975 Addenda	1986 Edition with the 1987 Addenda
N-465	Alternative Rules for Pump Testing	1974 Edition with the Winter 1975 Addenda	1986 Edition with the 1987 Addenda
N-472	Use of Digital Readout and Digital Measurement Devices for Performing Pump Vibration Testing	1974 Edition	1986 Edition with the 1987 Addenda
N-473	Alternate Rules for Valve Testing	1974 Edition through the Summer 1975 Addenda	1986 Edition with the 1987 Addenda

NOTES:

- (1) Applies to the 1974 Edition of Section V.
- (2) Applies to the 1974 Edition with the Winter 1976 Addenda of Section V.
- (3) Applies to the 1980 Edition of Section V.

CASES OF ASME BOILER AND PRESSURE VESSEL CODE

Approval Date: July 13, 1981

*See Numeric Index for expiration
and any reaffirmation dates.*

Case N-4-11
Special Type 403 Modified Forgings or Bars
Section III, Division 1, Class 1 and CS

Inquiry: May Special Type 403 Modified forgings or bars be used in the construction of Class 1 and CS components in accordance with Section III, Division 1, and what special requirements apply to this material?

Reply: It is the opinion of the Committee that Special Type 403 Modified forgings or bars may be used for Section III Class 1 and CS components, and the following specified special requirements apply in addition to the applicable requirements specified in Section III.

Steel forgings or bars (AISI Type 403 Modified) conforming to the following chemical analysis, having specified minimum mechanical properties shown below, and complying with the specified additional requirements may be used in the construction.

(1) Chemistry
(AISI Type 403 Modified)

	Percent
Carbon	0.06 to 0.13
Manganese	0.25 to 0.80
Phosphorus, max.	0.03
Sulfur, max.	0.03
Chromium	11.50 to 13.00
Nickel	0.50
Silicon, max.	0.50

(2) Mechanical properties in the annealed condition as received shall conform to the following requirements:

Tensile strength, psi, min.	70,000
Yield strength, psi, min.	40,000
Elongation in 2 in., percent, min.	22.0
Reduction of area, percent, min.	50.0

(3) Mechanical properties, after an austenitizing heat treatment, followed by air cooling or quenching in liquid media, salt bath, or oil and air cooled to room temperature, and then tempered at 1125°F minimum for four hours, shall conform to the following requirements:

Tensile strength, psi, min.	110,000
Yield strength, psi, min.	90,000
Elongation in 2 in., percent, min.	16.0
Reduction in area, percent, min.	50.0
Hardness	Brinell 226 to 277 or equivalent

Toughness requirements shall be per NB-2300 for Class 1, and NG-2300 for Class CS, except that the drop-weight tests are not required. The acceptance standards of NB-2332 or NG-2331 and NG-2332 shall apply.

(4) The material shall conform to all other requirements of SA-182 Grade F6 for forgings, and ASTM A 276-73 for bars.

(5) The maximum operating temperature shall not exceed 700°F.

(6) Design stress intensity and yield strength values as shown in Table 1 for the heat-treated condition may be used when the material has enhanced properties due to the special heat treatment described in *(3)* above.

(7) Where the method of fabrication requires welding after heat treatment, it shall be done by applying austenitic stainless steel or nickel alloy weld deposits prior to heat treatment and only on regions designed to the allowable stresses in Table 1 for annealed properties. The minimum thickness of this weld shall be $\frac{3}{16}$ in., and the maximum $\frac{1}{2}$ in. Such weld deposits shall be liquid penetrant examined. Attachments to these weld deposits may be made by austenitic stainless or nickel alloy welds subsequent to heat treatment, and the thickness shall not exceed that of the previously deposited weld. No welding on the ferritic base metal is permitted after heat treatment, and no welding is permitted at any time in the regions designed to allowable stresses higher than those given in Table 1 for annealed properties. All welding shall meet the requirements of Section IX except that the tests shall be made after final heat treatment of the specimen, and longitudinal bend test specimen of QW-160, Section IX, may be used.

(8) For Class 1, machined transitions between adjoining heavy and thin-walled sections shall consist of a taper of at least 3 to 1, with a radius at each end of at least twice the thickness of the thin wall. It is not the intent of this paragraph to eliminate integral flanges