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REGULATORY GUIDE 1.85

CODE CASE ACCEPTABILITY ASME SECTION III MATERIALS

MASTER

A. INTRODUCTION

Section 50.55a, "Codes and Standards," of 10 CFR Part 50, "Licensing of Production and Utilization Facilities," requires, in part, that components of the reactor coolant pressure boundary be designed, fabricated, erected, and tested in accordance with the requirements for Class 1 components of Section III, "Nuclear Power Plant Components,"* of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code or equivalent quality standards. Footnote 6 to §50.55a states that the use of specific Code Cases may be authorized by the Commission upon request pursuant to §50.55a(a)(2)(ii), which requires that proposed alternatives to the described requirements or portions thereof provide an acceptable level of quality and safety.

General Design Criterion 1, "Quality Standards and Records," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 requires, in part, that structures, systems, and components important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety function to be performed. Where generally recognized codes and standards are used, Criterion 1 requires that they be identified and evaluated to determine their applicability, adequacy, and sufficiency and be supplemented or modified as necessary to ensure a quality product in keeping with the required safety function.

Criterion 30, "Quality of Reactor Coolant Pressure Boundary," of the same appendix requires, in part, that components which are part of the reactor coolant pressure boundary be designed, fabricated, erected, and tested to the highest quality standards practical.

Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50 requires, in part, that measures be established for the control of special processing of materials and that proper testing be performed.

This regulatory guide lists those Section III ASME Code Cases oriented to materials and testing that are generally acceptable to the NRC staff for implementation in the licensing of light-water-cooled nuclear power plants.

B. DISCUSSION

The Boiler and Pressure Vessel Committee of the ASME publishes a document entitled "Code Cases."* Generally, the individual Code Cases that make up this document explain the intent of Code rules or provide for alternative requirements under special circumstances.

Most Code Cases are eventually superseded by revision to the Code and then are annulled by action of the ASME Council. In such cases, the intent of the annulled Code Case becomes part of the revised Code, and therefore continued use of the Code Case intent is sanctioned under the rules of the Code. In other cases, the Code Case is annulled because it is no longer acceptable or there is no further requirement for it. A Code Case that was approved for a particular situation and not for a generic application should be used only for construction of the approved situation because annulment of such a Code Case could result in construction that would not meet Code requirements.

* Copies may be obtained from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, New York 10017.

USNRC REGULATORY GUIDES

Regulatory Guides are issued to describe and make available to the public methods acceptable to the NRC staff of implementing specific parts of the Commission's regulations, to delineate techniques used by the staff in evaluating specific problems or postulated accidents, or to provide guidance to applicants. Regulatory Guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience. This guide was revised as a result of substantive comments received from the public and additional staff review.

Comments should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Section.

The guides are issued in the following ten broad divisions:

1. Power Reactors
2. Research and Test Reactors
3. Fuels and Materials Facilities
4. Environmental and Siting
5. Materials and Plant Protection
6. Products
7. Transportation
8. Occupational Health
9. Antitrust Review
10. General

Copies of published guides may be obtained by written request indicating the divisions desired to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Office of Standards Development.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

The Code Cases listed in this guide are limited to those cases applicable to Section III that are oriented toward materials and testing.

All published Code Cases in the area of materials and testing that are applicable to Section III of the *| Code and were in effect on May 1, 1976, were reviewed for inclusion in this guide. In addition to the listing of acceptable Code Cases, this revision of the guide includes listings of (1) Code Cases that were identified as acceptable in a prior version of this regulatory guide and that were annulled after the original issuance of this guide (June 1974) and (2) Code Cases that were identified as acceptable in a prior version of this regulatory guide and that were superseded by revised Code Cases after the original issuance of this guide (June 1974). Code Cases that are not listed herein are either not endorsed or will require supplementary provisions on an individual basis to attain endorsement status.

The endorsement of a Code Case by this guide constitutes acceptance of its technical position for applications not precluded by regulatory or other requirements or by the recommendations in this or other regulatory guides. Contingent endorsement is indicated in regulatory position C.1.a for specific cases. However, it is the responsibility of the user to make certain that no regulatory requirements are violated and that there are no conflicts with other recommended limitations resulting from Code Case usage.

Acceptance or endorsement by the NRC staff applies only to those Code Cases or Code Case revisions with the date of "Council Approval" as shown in the regulatory position of this guide. Earlier or later revisions of a Code Case are not endorsed by this guide. New Code Cases will require evaluation by the NRC staff to determine if they qualify for inclusion in the approved list. Because of the continuing change in the status of Code Cases, it is planned that this guide will require periodic updating to accommodate new Code Cases and any revisions of existing Code Cases.

C. REGULATORY POSITION

1. The Section III ASME Code Cases** listed below (by number, date of Council approval, and title) are acceptable to the NRC staff for application in the construction of components for water-cooled nuclear power plants. Their use is acceptable within the limitations stated in the "Inquiry" and "Reply" sections of each individual Code Case, within the limitations of such NRC or other requirements as may exist, and within the additional limitations recommended by the NRC staff given with the individual Code Cases in the list. The categorization of Code Cases used in this guide is intended to facilitate the Code Case listing and is not intended to indicate a limitation on its usage.

a. Materials-oriented Code Cases (Code Case number, date of Council approval, and title):

(1) Code Cases involving plate:

1141-1	8/31/61	Foreign Produced Steel
1358-5	11/3/75	High Yield Strength Steel, Section III

Code Case 1358-5 is acceptable subject to the following condition in addition to those conditions specified in the Code Case: The information required to be developed by Note 1 in the Code Case should be provided in each referencing Safety Analysis Report.

1414-4	3/1/76	High Yield Strength Cr-Mo Steel for Section III, Division 1, Class 1 Vessels

Code Case 1414-4 is acceptable subject to the following condition in addition to those conditions specified in the Code Case: The information required to be developed by Note 1 in the Code Case should be provided in each referencing Safety Analysis Report.

1571	3/3/73	Additional Material for SA-234 Carbon Steel Fittings, Section III.
1648	8/12/74	SA-537 Plates for Section III, Class 1, 2, 3, and MC Components

(2) Code Cases involving pipe and tubes:

1423-2	3/9/72	Wrought Type 304 and 316 with Nitrogen Added, Sections I, III, VIII, Division 1 and 2

Code Case 1423-2 is acceptable subject to compliance with the recommendations contained in Regulatory Guides 1.31, "Control of Stainless Steel Welding," and 1.44, "Control of the Use of Sensitized Stainless Steel."

1474-1	10/29/71	Integrally Finned Tubes for Section III
1475-1	3/2/74	Ferritic-Austenitic Stainless Steel Seamless Tubes for Section III, Class 2 and 3 Construction
1484-2	11/4/74	SB-163 Nickel-Chromium-Iron Tubing (Alloy 600 and 690) at a Specified Minimum Yield Strength of 40.0 Ksi, Section III, Class 1

* Lines indicate substantive changes from previous issue.

** A numerical listing of the Code Cases appears in the appendix.

Code Case 1484-2 is acceptable subject to the following condition in addition to those conditions specified in the Code Case: Alloy 690 is not acceptable on a generic basis.

1527	6/6/72	Integrally Finned Tubes, Section III
1529	6/26/72	Materials for Instrument Line Fittings, Section III
1578	6/25/73	SB-167 Nickel-Chromium Iron (Alloy 600) Pipe or Tube, Section III
1615	12/17/73	Use of A587-73, Section III, Class 3 Construction
1748	3/1/76	Low Carbon Austenitic Stainless Steel Pipe Welded With Filler Metal Section III, Division 1, Construction

(3) Code Cases involving bars and forgings:

1332-6	3/9/72	Requirements for Steel Forgings, Section III and VIII, Division 2
1334-3	4/29/74	Requirements for Corrosion-Resisting Steel Bars and Shapes, Section III
1335-9	4/29/74	Requirements for Bolting Materials, Section III
1337-10	4/28/75	Special Type 403 Modified Forgings or Bars, Section III
1395-3	11/6/72	SA-508, Class 2 Forgings with Modified Manganese Content, Section III or Section VIII, Division 2
1412-4	11/3/75	Modified High Yield Strength Steel for Section III, Division 1, Class 1 Vessels

Code Case 1412-4 is acceptable subject to the following condition in addition to those conditions specified in the Code Case: The information required to be developed by Note 1 in the Code Case should be provided in each referencing Safety Analysis Report. The material given in the Inquiry section of the Code Case should be SA-508, Class 4b instead of SA-508, Class 4.

1498-1	11/6/72	SA-508 — Class 2 and 3, Minimum Tempering Temperature, Section III
1528-3	11/3/75	High Strength Steel SA-508, Class 2 and SA-541, Class 2 Forgings, Section III, Class 1 Components

Code Case 1528-3 is acceptable subject to the following condition in addition to those conditions specified in the Code Case: The information required to be developed by Note 1 in the Code Case should be provided in each referencing Safety Analysis Report.

1542-1	4/29/74	Type 403 Forgings or Bars for Bolting Material, Section III
1587	8/13/73	SA-508 — Class 3 Forgings with 0.4/1.0 Ni for Section III and VIII, Division 2 Construction
1605	11/5/73	Cr-Ni-Mo-V Bolting Material for Section III, Class 1 Components
1612	12/17/73	Use of Type 308 Stainless Steel Rod and Bar for Section III, Class 1,2,3, and CS Construction
1613	12/17/73	Use of SA-372 Class IV Forgings, Section III Construction
1626	3/2/74	Normalized and Tempered 1-1/4 Cr Low Alloy Steel Forgings, Section I, Section III, and Section VIII, Division 1 and 2
1649	8/12/74	Modified SA 453-GR 660 for Class 1, 2, 3, and CS Construction
1684	3/3/75	A637 Grade 718 for Bolting Class 1 and 2 Construction
1722	11/3/75	Vacuum, Carbon Deoxidized SA-508 Forgings Section III, Division 1, and VIII, Division 1 and 2
1724	11/3/75	Deviation from the Specified Silicon Ranges in ASME Material Specifications, Section III, Division 1, and VIII, Division 1 and 2
1747	3/1/76	Requirements for Martensitic Stainless Steel Forgings with 13% Chromium and 4% Nickel, Section III, Division 1

(4) Code Cases involving general usage:

1344-5	4/29/74	Nickel-Chromium, Age-Hardenable Alloys, (Alloy X750) Section III
1345-2	3/9/72	Requirements for Nickel-Molybdenum-Chromium-Iron Alloys, Section III
1434-1	3/9/72	Postweld Heat Treatment of SA-487 Class 8N Steel Castings, Section III
1521-1	4/29/74	Use of H-Grades of SA-240, SA-479, SA-336, and SA-358, Section III

Code Case 1521-1 is acceptable subject to compliance with the recommendations contained in Regulatory Guides 1.31, "Control of Stainless Steel Welding," and 1.44, "Control of the Use of Sensitized Stainless Steel."

1531	8/14/72	Electrical Penetrations, Special Alloys for Electrical Penetration Seals, Section III
1532	8/14/72	Section III, Class 3 Components Made of 8 Percent and 9 Percent Nickel Steel
1557-2	12/17/73	Steel Products Refined by Secondary Remelting
1567	3/3/73	Testing Lots of Carbon and Low Alloy Steel Covered Electrodes, Section III
1568	3/3/73	Testing Lots of Flux Cored and Fabricated Carbon and Low Alloy Steel Welding Electrodes, Section III
1583	6/25/73	Use of 80-40 Carbon Steel Castings Section III
1590	8/13/73	Chemical Analysis Variations, Section III Construction
1608-1	12/17/73	Use of ASME SB-265, SB-337, SB-338, SB-348, and SB-381, Grades 1, 2, 3, and 7 Unalloyed Titanium and ASTM B-363 Titanium Welding Fittings, Section III, Classes 2 and 3 Components
1618-2	3/1/76	Material for Core Support Structures — Section III, Division 1, Subsection NG

Code Case 1618-2 is acceptable subject to the following condition in addition to those conditions specified in the Code Case: Welding of age hardenable alloy SA-453 Grade 660 and SA-637 Grade 688 should be performed when the material is in the solution-treated condition.

1622	3/2/74	PWHT of Repair Welds in Carbon Steel Castings, Section III, Class 1, 2, and 3
1644-4	3/1/76	Additional Materials for Component Supports and Alternate Design Requirements for Bolted Joints, Section III, Division 1, Subsection NF, Class 1, 2, 3 and MC Construction

Code Case 1644-4 is acceptable subject to the following conditions in addition to those specified in the Code Case: The maximum measured ultimate tensile strength (UTS) of the component support material should not exceed 170 Ksi in view of the susceptibility of high-strength materials to brittleness and stress corrosion cracking. Certain applications may exist where a UTS value of up to 190 Ksi could be considered acceptable for a material and, under this condition, the Design Specification should specify impact testing for the material. For these cases, it should be demonstrated by the applicant that (1) the impact test results for the material meet code requirements and (2) the material is not subject to stress corrosion cracking by virtue of the fact that (a) a corrosive environment is not present and (b) the component that contains the material has essentially no residual stresses or assembly stresses, and it does not experience frequent sustained loads in service.

1645	8/12/74	Use of DeLong Diagram for Calculating the Delta Ferrite Content of Welds in Section III, Class 1, 2, and CS Construction
1664	11/4/74	Use of Cr-Ni-Fe-Mo-Cu-Cb Stabilized Alloy Cb-3 for Section III Class 2 and 3 Construction
1682-1	8/11/75	Alternate Rules for Material Manufacturers and Suppliers, Section III, Subarticle NA-3700
1690	4/28/75	Stock Materials for Section III Construction, Section III, Division 1
1713	8/11/75	Small Material Items, Section III, Division 1, Class 1,2,3, CS and MC
1714	8/11/75	Postweld Heat Treatment of P-1 Material, Section III, Class MC
1728	11/3/75	Steel Structural Shapes and Small Material Products for Component Supports, Section III, Division 1 Construction
1742	3/1/76	Use of SB-75 Annealed Copper Alloy 122, Section III, Division 1, Class 2 Construction
1743	3/1/76	Use of SB-98 Cu-SiB Rod CDA651 Section III, Division 1, Class 2 Components

b. Testing-oriented Code Cases (Code Case number, date of Council approval, and title):

(1) Code Cases involving plates:

1407-3	7/1/74	Time of Examination for Classes 1, 2, and 3 Section III Vessels
1456-2	6/25/73	Substitution of Ultrasonic Examination for Progressive Penetrant or Magnetic Particle Examinations of Partial Penetration and Oblique Nozzle Attachment Welds, Section III
1691	4/28/75	Ultrasonic Examination in

		Lieu of Radiography of Repair Welds for Vessels Section III, Class 1

(2) Code Cases involving bars and forgings:

1515	3/9/72	Ultrasonic Examination of Ring Forgings for Shell Sections, Section III, Class 1 Vessels

(3) Code Cases involving pipe and tubes:

1616	12/17/73	Ultrasonic Examination of Seamless Austenitic Steel Pipe, Section III, Class 1 Construction
1634-1	8/12/74	Use of SB-359 for Section III, Class 3 Construction
1755	4/26/76	Alternative Rules for Examination of Welds in Piping-Class 1 and 2 Construction, Section III, Division 1
1767	4/26/76	Examination of Tubular Products Without Filler Metal—Class 1 Construction, Section III, Division 1

(4) Code Cases involving general usage:

1740	12/22/75	Weld Metal Test Section III, Class 1, 2, 3, MC and CS
1741	12/22/75	Interim Rules for the Required Number of Impact Tests for Rolled Shapes, Section III, Division 1, Subsection NF, Component Supports
1746	3/1/76	Leak Testing of Seal Welds, Section III, Division 1, Class 1, 2, and 3 Construction
1760	4/26/76	Maximum Dimension for Isolated Pores in Welds — Class 1 Components, Section III, Division 1.
1766	4/26/76	Testing Requirements for Welding Materials Class 1, 2, 3, MC and CS Construction, Section III, Division 1

2. Code Cases that were endorsed by the NRC in a prior version of this guide and were later annulled by action of the ASME Council should be considered as deleted from the list of acceptable Code Cases as of the date of the ASME Council action that approved the annulment. Such Code Cases that were annulled on or after July 1, 1974, are listed in the following by number, effective dates,* and title.**

1602-1	4/29/74 12/31/74	Use of SB-42 Alloy 122, SB-111 Alloys 122, 715 and 706, SB-171 Alloys 715 and 706 and SB-466 Alloys 706 and 715, Section III, Class 2 and 3 Components
1603	12/17/73 7/1/74	Toughness Tests When Cross-Section Limits Orientation and Location of Specimens
1625	3/2/74 12/31/74	Repair of Section III Class 2 and 3 Tanks
1637***	4/29/74 1/1/75	Effective Date for Compliance with NA-3700 of Section III
1650	8/12/74 12/31/74	Use of SA-414 Grade C for Class 2 and 3 Components, Section III, Division 1
1666	11/4/74 7/1/75	Use of SB-12, Alloy 122 for Section III, Class 2 and 3 Construction

3. Code Cases that were endorsed by the NRC in a prior version of this guide and were superseded by revised Code Cases on or after July 1, 1974, should be considered as not endorsed as of the date of the Council action that approved the revised version of the Code Cases. These Code Cases that are no longer endorsed are listed in the following by number, effective dates,† and title.††

1337-9	4/29/74 4/28/75	Special Type 403 Modified Forgings or Bars Section III
1407-2	6/26/72 7/1/74	Time of Examination for Class 1, 2, and 3, Section III Vessels
1414-3	11/3/75 3/1/76	High Yield Strength Cr-Mo Steel for Section III, Division 1, Class 1 Vessels

Code Case 1414-3 was acceptable subject to the following condition in addition to those conditions specified in the Code Case: The information required to be developed by Note 1 in the Code Case should be provided in each referencing Safety Analysis Report.

1484-1	4/29/74 11/4/74	SB-163 Nickel-Chromium Iron Tubing (Alloy 600) at a Specified Minimum Yield Strength of 40.0 Ksi, Section III, Class 1
1492†††	10/29/71 3/3/75	Post Weld Heat Treatment Section I, III and VIII, Division 1 and 2

* Earlier date—date Code Case approved by ASME Council; later date—date Code Case was annulled.

** Code Cases 1401-1, 1493-1, and 1599, which were listed in the original issue of this guide, were annulled by Council action prior to July 1, 1974.

*** Code Case 1637 has been accepted only on a case-by-case basis.

† Earlier date—date Code Case approved by ASME Council; later date—date revision of Code Case was approved by ASME Council.

†† Code Cases 1334-2, 1337-7, 1344-3, 1484, 1521, and 1542, which were listed in the original issue of this guide, were revised by the ASME prior to July 1, 1974.

††† Code Case 1492 is no longer listed by ASME as a Section III Code Case and is therefore deleted from the acceptable listing.

1618	3/2/74 3/3/75	Material for Core Support Structures—Section III, Subsection NG

Code Case 1618 was acceptable subject to the following conditions in addition to those specified in the Code Case:

a. Welding of age hardenable alloy SA-453 Grade 660 and SA-637 Grade 688 should be performed when the material is in the solution-treated condition.

b. Use of alloy ASTM A-564 Grade 631 is not acceptable on a generic basis.

1618-1	3/3/75 3/1/76	Material for Core Support Structures Section III, Subsection NG

Code Case 1618-1 was acceptable subject to the following condition in addition to those specified in the Code Case: Welding of age hardenable alloy SA-453 Grade 660 and SA-637 Grade 688 should be performed when the material is in the solution-treated condition.

1634	7/1/74 8/12/74	Use of SB-359 for Section III, Class 3 Construction
1644	8/12/74 4/28/75	Additional Materials for Component Support—Section III, Subsection NF, Class 1, 2, 3, and MC Construction

Code Case 1644 was acceptable subject to the following condition in addition to those conditions specified in the Code Case: The maximum measured ultimate tensile strength of the component support material should not exceed 170 Ksi.

1644-1	4/28/75 6/30/75	Additional Materials for Component Supports—Section III, Subsection NF, Class 1, 2, 3, and MC Construction

Code Case 1644-1 was acceptable subject to the following condition in addition to those conditions specified in the Code Case: The maximum measured ultimate tensile strength of the component support material should not exceed 170 Ksi.

1644-2	6/30/75 11/3/75	Additional Materials for Component Supports—Section III, Subsection NF, Class 1, 2, 3, and MC Construction

Code Case 1644-2 was acceptable subject to the following condition in addition to those conditions specified in the Code Case: The maximum measured ultimate tensile strength of the component support material should not exceed 170 Ksi.

1644-3	11/3/75 3/1/76	Additional Materials for Component Supports—Section III, Subsection NF, Class 1, 2, 3 and MC Construction

Code Case 1644-3 was acceptable subject to the following condition in addition to those conditions specified in the Code Case: The maximum measured ultimate tensile strength of the component support material should not exceed 170 Ksi.

1682	1/29/75 8/11/75	Alternate Rules for Material Manufacturers and Suppliers, Section III, Subarticle NA-3700

4. Code Cases for Class 1 components that are not on the approved list of this guide (paragraph C.1) or other regulatory guides, or for which authorization by the Commission has not been granted, are not acceptable for Class 1 components.

5. Code Cases for other classes of components that are not on the approved list of this guide (paragraph C.1) or other regulatory guides should be considered not acceptable on a generic basis.

D. IMPLEMENTATION

The purpose of this section is to provide information to applicants regarding the utilization of this regulatory guide.

1. Except for those Code Cases that have been annulled by action of the ASME Council, the NRC staff will authorize appropriate use of the Code Cases listed in this guide under regulatory position C.1 upon specific request by the applicant in accordance with footnote 6 to §50.55a of the Codes and Standards rule.

2. Components ordered to a specific version of a Code Case need not be changed because a subsequent revision of the Code Case is listed as the approved version in this guide.

3. Components ordered to a Code Case that was previously approved for use need not be changed because the Code Case has been subsequently annulled.

4. Code Cases on the approved list may be applied to components that were in process of construction prior to the effective date of the Code Case within the limits specified in the Code Case and applicable regulations or recommended in other regulatory guides.

APPENDIX

NUMERICAL LISTING OF CODE CASES*

1141-1	1531	1648
1332-6	1532	1649
1334-3	1542-1	1664
1335-9	1557-2	1682-1
1337-10	1567	1684
1344-5	1568	1690
1345-2	1571	1691
1358-5	1578	1713
1395-3	1583	1714
1407-3	1587	1722
1412-4	1590	1724
1414-4	1605	1728
1423-2	1608-1	1740
1434-1	1612	1741
1456-2	1613	1742
1474-1	1615	1743
1475-1	1616	1746
1484-2	1618-2	1747
1498-1	1622	1748
1515	1626	1755
1521-1	1634-1	1760
1527	1644-4	1766
1528-3	1645	1767
1529		

* Code Case 1624 was inadvertently listed in the appendix of Regulatory Guide 1.85, Revision 1.

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