



REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

REGULATORY GUIDE 1.85

CODE CASE ACCEPTABILITY ASME SECTION III MATERIALS

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 that 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 Branch.

The guides are issued in the following ten broad divisions:

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

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
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
1644-6	3/3/77	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 1644-6 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 as-

sembly 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
1690	4/28/75	Stock Materials for Section III Construction, Section III, Division 1
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
1754	1/14/77	Hard Surfacing by the Spray-Fuse Method, Section III, Class 1, 2 and 3 Construction
1759	8/13/76	Material for Internal Pressure Retaining Items for Pressure Relief Valves, Section III, Division 1, Class 1, 2, and 3

Code Case 1759 is acceptable subject to the following condition in addition to those conditions specified in the Code Case: Applicants using this case should also use Code Case 1711 for the design of pressure relief valves.

1773	8/13/76	Use of Other Product Forms of Materials for Valves, Section III, Division 1
1781	9/10/76	Use of Modified SA-487 Grade CA6NM, Section III, Division 1, Class 1, 2, 3, MC or CS
1782	9/10/76	Use of Copper-Nickel Alloy 962 for Castings, Section III, Division 1, Class 3 Construction
1798	1/14/77	Use of ASTM A352-75, Grades LCA and LCC, Section III, Division 1, Class 1, 2, and 3
1810	3/3/77	Testing Lots of Carbon Steel Solid, Bare Welding Electrode or Wire, Section III, Division 1, Class 1, 2, 3, MC, and CS
1819	3/23/77	Use of Type XM-19 for Construction, Section III, Division 1, Class 1, 2, 3

Code Case 1819 is acceptable subject to compliance with the recommendations contained in Regulatory Guides 1.31, "Control of Ferrite Content in Stainless Steel Weld Metal," and 1.44, "Control of the Use of Sensitized Stainless Steel."

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
1795	1/14/77	Examination of Weld Repairs in Forgings, Section III, Division 1, Class 1, 2, 3, MC and CS

(3) Code Cases involving pipe and tubes:

1616	12/17/73	Ultrasonic Examination of Seamless Austenitic Steel Pipe, Section III, Class 1 Construction
1634-2	8/13/76	Use of SB-359 for Section III, Division 1, Class 3 Construction
1755-1	1/14/77	Alternative Rules for Examination of Welds in Piping, Section III, Class 1 and 2 Construction

(4) Code Cases involving general usage:

1741-1	1/14/77	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
1770	8/13/76	Testing of Electroslag Wire and Flux for Class 1, 2, 3, MC and CS Construction, Section III, Division 1
1820	3/23/77	Alternative Ultrasonic Examination Technique, 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.**

1141-1	8/31/61 7/23/76	Foreign Produced Steel
1412-4	11/3/75 1/1/77	Modified High Yield Strength Steel for Section III, Division 1, Class 1 Vessels

Code Case 1412-4 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. The material given in the Inquiry section of the Code Case should be SA-508, Class 4b, instead of SA-508, Class 4.

1531	8/14/72 3/21/77	Electrical Penetrations, Special Alloys for Electrical Penetration Seals, Section III
1583	6/25/73 3/21/77	Use of 80-40 Carbon Steel Castings, Section III
1590	8/13/73 3/21/77	Chemical Analysis Variations, Section III Construction
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

* 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.

1608-1	12/17/73 3/21/77	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, Class 2 and 3 Components
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
1648	8/12/74 7/1/76	SA-537 Plates for Section III, Class 1, 2, 3, and MC Components
1650	8/12/74 12/31/74	Use of SA-414 Grade C for Class 2 and 3 Components, Section III, Division 1
1664	11/4/74 3/21/77	Use of Cr-Ni-Fe-Mo-Cu-Cb, Stabilized Alloy Cb-3 for Section III Class 2 and 3 Construction
1666	11/4/74 7/1/75	Use of SB-12, Alloy 122 for Section III, Class 2 and 3 Construction
1682-1	8/11/75 12/31/75	Alternate Rules for Material Manufacturers and Suppliers, Section III, Subarticle NA-3700.
1713	8/11/75 12/31/75	Small Material Items, Section III, Division 1, Class 1, 2, 3, CS and MC
1740	12/22/75 7/1/76	Weld Metal Test, Section III, Class 1, 2, 3, MC and CS
1742	3/1/76 7/1/76	Use of SB-75 Annealed Copper Alloy 122, Section III, Division C, Class 2 Construction
1743	3/1/76 7/1/76	Use of SB-98 Cu-SiB Rod CDA651 Section III, Division 1, Class 2 Components
1767	4/26/76 1/1/77	Examination of Tubular Products Without Filler Metal—Class 1 Construction, Section III, Division 1

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***

* 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.

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
1484-2	11/4/74 8/13/76	SB-163 Nickel-Chromium Iron Tubing (Alloy 600 and 690) 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
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:

- 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.
- 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
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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
1634-1	8/12/74 8/13/76	Use of SB-359 for Section III, Class 3 Construction

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

- 1644 8/12/74 Additional Materials for Component Supports—Section III, Subsection NF, Class 1, 2, 3, and MC Construction
4/28/75

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

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

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

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.

- 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
8/13/76

Code Case 1644-4 was 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.

- 1644-5 8/13/76 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
3/3/77

Code Case 1644-5 was 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.

- 1682 1/29/75 Alternate Rules for Material Manufacturers and Suppliers, Section III, Subarticle NA-3700
8/11/75
1741 12/22/75 Interim Rules for the Required Number of Impact Tests for Rolled Shapes, Section III, Division 1, Subsection NF, Component Supports
1/14/77
1755 4/26/76 Alternative Rules for Examination of Welds in Piping, Class 1 and 2 Construction, Section III, Division 1
1/14/77

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 use 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*

1332-6	1456-2	1557-2	1622	1728	1773
1334-3	1474-1	1567	1626	1741-1	1777
1335-9	1475-1	1568	1634-2	1746	1781
1337-10	1484-3	1571	1644-6	1747	1782
1344-5	1498-1	1578	1645	1748	1787
1345-2	1515	1587	1649	1754	1793
1358-5	1521-1	1605	1684	1755-1	1794
1395-3	1527	1612	1690	1759	1795
1407-3	1528-3	1613	1691	1760	1798
1414-4	1529	1615	1714	1766	1810
1423-2	1532	1616	1722	1770	1819
1434-1	1542-1	1618-2	1724	1772	1820

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

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