U.S. NUCLEAR REGULATORY COMMISSION **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 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

#### 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 eveluating specific problems or postulated accidents, or to provide guidence 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 Intelings requisite to the issuence 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 com ments and to reflect new information or experiance. This guide was revised as a result of substantive comments received from the public and additional staff review. 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.

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

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

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

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- Research and Test Reactors
- Environmental and Siting
- 7. Transportation 8. Occupational Health 9. Antitrust Review

6. Products

5 Materials and Plant Protection 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.

Revision 2 June 1975 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 March 31, 1975, 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, such NRC or other requirements as may exist, and 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):

\*Lines indicate substantive changes from previous issue.

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

(1) Code Cases involving plate:

1141-1	8/31/61	Foreign Produced Steel
1571	3/3/73	Additional Material for SA-234 Carbon Steel Fit-
1648	8/12/74	tings, Section III 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 Stanless 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 Stain- less 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

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
1578	6/25/73	SB-167 Nickel-Chromium Iron (Alloy 600) Pipe or
1615	12/17/73	Tube, Section III Use of A587-73, Section III, Class 3 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 Corro-
		sion-Resisting Steel Bars
		and Shapes, Section III

1335-9	4/29/74	Requirements for Bolting Materials, Section III Special Type 403 Modified	Steel Sensi	Welding," and itized Stainless S	1.44, "Control of the Use of teel."
	-1271-	Forgings or Bars, Section	1531	8/14/72	Electrical Penetrations, Special Alloys for Elec-
1395-3	11/6/72	SA-508, Class 2 Forgings with Modified Manganese			trical Penetration Seals, Section III
1408 1	11/6/22	Content, Section III or Section VIII, Division 2	1532	8/14/72	Section III, Class 3 Com- ponents Made of 8 Percent
1470-1	11/0/72	Minimum Tempering Tem- perature, Section III	1557-2	12/17/73	Steel Products Refined by Secondary Remelting
1542-1	4/29/74	Type 403 Forgings or Bars for Bolting Material, Sec-	1567	3/3/73	Testing Lots of Carbon and Low Alloy Steel Cov-
1587	8/13/73	SA-508 – Class 3 Forgings with 0.4/1.0 Ni for Sec- tion III and VIII, Division	1568	3/3/73	III Testing Lots of Flux Cored and Fabricated
1605	11/5/73	2 Construction Cr-Ni-Mo-V Bolting Ma- terial for Section III, Class			Carbon and Low Alloy Steel Welding Electrodes, Section 111
1010	12 (19/92	1 Components	1583	6/25/73	Use of 80-40 Carbon Steel
1012	12/17/75	Steel Rod and Bar for Sec- tion III, Class 1, 2, 3, and	1590	8/13/73	Chemical Analysis Varia- tions, Section III Con-
1613	12/17/73	Use of SA-372 Class IV Forgings, Section III Con-	1608-1	12/17/73	Use of ASME SB-265. SB-337, SB-338, SB-348, and SB-381 Grades 1, 2
1626	3/2/74	Normalized and Tempered 1 1/4 Cr Low Alloy Steel Forgings, Section I, Sec- tion III, and Section VIII, Division 1, and 2			3, and 7 Unalloyed Titan- ium and ASTM B-363 Ti- tanium Welding Fittings, Section 111, Classes 2 and 3 Components
1649	8/12/74	Modified 3.453-GR 660 for Class 1, 2, 3, and CS Construction	1618-1	3/3/75	Material for Core Support   Structures – Section III, Subsection NG
1684	3/3/75	A637 Grade 718 for Bolt- ing Class 1 and 2 Con- struction	Code	e Case 1618-1 wing condition	is acceptable subject to the in addition to those specified

(4) Code Cases involving general usage:

1344-5	4/29/74	Nickel-Chromium, Age- Hardenable Alloys, (Alloy
1345-2	3/9/72	X750) Section III Requirements for Nickel- Molybdenum-Chromium-
1434-1	3/9/72	Iron Alloys, Section III Postweld Heat Treatment of SA-487 Class 8N Steel
1521-1	4/29/74	Castings, Section III 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 Code Case 1618-1 is 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.

1622	3/2/74	PWHT of Repair Welds in Carbon Steel Castings, Sec-
1644	8/12/74	tion III, Class 1, 2, and 3 Additional Materials for Component Supports – Section III, Subsection NF, Class 1, 2, 3, and MC Construction

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

1645	8/12/74	Use of DeLong Diagram for Calculating the Delta Ferrite Content of Welds in Section III, Class 1, 2,	1602-1	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
1664	11/4/74	and CS Construction Use of Cr-Ni-Fe-Mo-Cu-Cb			tion III, Class 2 and 3
	:	Stabilized Alloy CD-3 for Section III Class 2 and 3 Construction	1603	7/1/74	Toughness Tests When Cross-Section Limits Ori-
1666	11/4/74	Use of SB-12, Alloy 122 for Section III, Class 2 and			entation and Location of Specimens
1687	1/29/75	3 Construction Alternate Rules for Ma-	1625	12/31/74	Repair of Section III Class 2 and 3 Tanks
	.,22,,10	terial Manufacturers and Suppliers	1637**	1/1/75	Effective Date for Compli- ance with NA-3700 of Sec- tion III
b. Test date	ing-oriented Co	de Cases (Code Case number, pval. and title):	1650	12/31/74	Use of SA-414 Grade C for Class 2 and 3 Components,

(1) Code Cases involving plates:

7/1/74

6/25/73

1456-2

1407-3

Time of Examination for Classes 1, 2, and 3, Section III Vessels Substitution of Ultrasonic Examination for Progressive Penetrant or Magnetic Particle Examinations of Partial Penetration and Oblique Nozzle Attachment Welds, Section III

- (2) Code Cases involving bars and forgings:
- 1515

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

(3) Code Cases involving pipe and tubes:

1616	12/17/73	Ultrasonic Examination of Seamless Austenitic Stee
		Seamess Austennic Stee
		Pipe, Section III, Class
		Construction
1634-1	8/12/74	Use of SB-359 for Section
		III, Class 3 Construction

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, date of Council action, and title.\*

1407-2	7/1/74	Time of Examination for
	•	Class 1, 2, and 5, Section
		TH VESSELS
484-1	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
49211	3/3/75	Post Weld Heat Treatment
		Section I, III and VIII,
		Division 1 and 2
618	3/3/75	Material for Core Support

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, date of Council action that approved the new revision of the particular Code

Case and thus specifies the date when the Code Case no

longer has NRC endorsement, and title.<sup>T</sup>

Section III, Division 1

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

Structures - Section III,

Subsection NG

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

<sup>\*</sup>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.

<sup>\*\*</sup>Case 1637 had been accepted only on a case-by-case basis.

<sup>&</sup>lt;sup>†</sup>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.

<sup>&</sup>lt;sup>††</sup>Code Case 1492 is no longer listed by ASME as a Section III Code Case and is therefore deleted from the acceptable listing.

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

1634

8/12/74 Use of SB-359 for Section III, Class 3 Construction

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 Code Cases listed in this guide under regulatory position C.1 may be used by the applicant in complying with the Commission's regulations.

2. Components ordered to a specific version of a Code Case need not be changed because a subsequent revision to 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

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NUM	ERICAL LISTING OF CODE CA	SES*
1141-1	1521-1	1613
1332-6	1527	1615
1334-3	1529	1616
1335-9	1531	1618-11
1337-9	1532	1622
1344-5	1542-1	1626
1345-2	1557-2	1634-1
1395-3	1567	1644
1407-3	1568	1645
1423-2	1571	1648
1434-1	1578	1649
1456-2	1583	1664
1474-1	1587	1666
1475-1	1590	1682
1 1484-2	1605	1684
1498-1	1608-1	
1515	1612	

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