**Revision 2** June 1975

# U.S. NUCLEAR REGULATORY COMMISSION TORY GUIDE

## **OFFICE OF STANDARDS DEVELOPMENT**

**REGULATORY GUIDE 1.84** 

# CODE CASE ACCEPTABILITY **ASME SECTION III DESIGN AND FABRICATION**

#### 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.

## 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 evalu sting specific problems or postulated encidents, or to provine buidance to appli cants. Regulatory Guides are not substitutes for regulations, and compliance with them is not required. Mithuids and salutions 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 improvemients in these guides are encouraged et all times, and guides will be revised, as appropriate, to accommodate com ments and to reflect new information or experience. This quide was revised as a result of substantive comments received from the public and additional staff enviaw.

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 design and fabrication that are generally acceptable to the NRC staff for implementation in the licensing of light-water-cooled nuclear power plants.

#### **B. DISCUSSION**

The ASME Boiler and Pressure Vessel Committee publishes a document entitled "Code Cases."\* Generally, the individual Code Cases that make up this document explain the intent of Cede 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 design and fabrication.

All published Code Cases in the area of design and fabrication that are applicable to Section III of the Code

Comments should be sent to the Secretary of the Commission, U.S. Ruclear Regulatory Commission, Washington, D.C. 2055, Attention: Docketing and Service Section

The guides are issued in the following ten broad divisions

1	Pawer Reartons	6.	Products
2	Research and Tust Reactors	1	Transportation
j.	Fuels and Materials Facilities	Ð	Occupational Health
ā.	Environmental and Siting	9	Antitrust flaview
ŝ	Materials and Plant Protection	10	General

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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

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

21 and were in effect on March 31, 1975, were reviewed for nelusion 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.

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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.c 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 Case 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. Design-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.

Systems 3-2-74 Design by Analysis for 1623 Section III, Class 1 Sleeve-Coupled and Other Patented Piping Joints Interconnection of Two 1659 11-4-74 Piping Systems for Section III, Class 1, 2 and 3 Construction 1676 12-16-74 Clarification of Stress Intensities in Curved Pipe or Welded Elbows, Section 111 Clarification of Flange De-1677 12-16-74 sign Loads, Section III, Class 1, 2 and 3 1533

Andres Samera

1477-1

1506

1614

(2) Code Cases applicable to valve design:

(1) Code Cases applicable to piping design:

Use of 1970 Addenda of

Stress Intensification Factors, Section III, Class 2

Hydrostatic Testing of Pip-

ing Prior To or Following

the Installation of Spray

Nozzles for Section III, Classes 1, 2, and 3 Piping

ANSI B31.7, Section III

and 3 Piping

3-9-72

12-13-71

11-5-73

• • •	••	-	1
1533	6-14-72	Pressure Temperature Rat-	1633
1000	0.11.2	ings of SA-351 Grades	
		CF8A. CF3, and CF3M.	1 1 4 5 7
		Section III	1057
1539	11-6-72	Metal Bellows and Metal	
		Diaphragm Stem Sealed	
		Valves, Section III, Classes	1660
		1, 2, and 3	1.000
1540-1	3-3-73	Elastomer Diaphragm	
		Valves, Section III, Classes	1
		2 and 3	
1552	12-18-72	Design by Analysis of Sec-	o. Fal
		tion III, Class I Valves	ber
1555	12-18-72	Certification of Safety Re-	1
		lief Valves on Liquids	(1)
1573	4-30-73	Vacuum Relief Valves,	1461 1
		Section III	1-101-1
1581	6-25-73	Power-Operated Pressure	
		Relief Valves, Section III	1471-1
1665	11-4-74	Pressure-Temperature Rat-	
		ings for Class I Valves	
		Made from 5 Cr-1/2 Mo,	1494.1
1670		Section III	
10/2	11-4-74	Nuclear valves for Section	
	·	111, Division 1, Class 1, 2	
		and 3 Construction	·

16

147

150

1536

1620

1630

	1 1678	12-16-74	Butterfly Valves of Circu-	1516-1	6-25-73	Welding of Seats in Valves
			lar Cross Section Larger	•		for Section III Applica
			tion III, Class 2 and 3	1580-1	11-5-73	Buttwelded Alignment
			Construction			Tolerance and Acceptable
	(3)	Other Code Case	s related to design:	1 A.		terlines for Section III
2	1470-2	12.18.72	External Pressure Charts			Classes 1, 2 and 3 Con
	14702		for High-Strength Carbon			struction
<b>•</b> ,			Steels and for Low-Alloy	1001	11-4-74	for P.No. I Materials for
8 ·			Steels, Section VIII, Divi-			Section III. Class 1 Vessel
			III	1675	12-16-74	Tubesheet to Shell o
B .	1508	12-13-71	Allowable Stresses, Design			Formed Head Weld Joint
			Stress Intensity and/or	1686	3-3-75	Furnace Brazing, Section
4 -			Section I III and VIII			III, Subsection NF. Com
l•			Division 1 and 2			ponent Supports
. 1	1536	8-14-72	<b>Closing Seam for Electrical</b>	(2) (	)ther Code Case	s related to fabrication.
0			Penetration for Section	(2) (		s related to rabilication.
n. 1-	1620	3-2-74	Stress Category for Partial	1535-2	4-30-73	Hydrostatic Testing o
			Penetration Welded Pene-	1541.1	8-13-73	Section III, Class I Valve
n-			trations, Section III, Class	1241-1	0-15-15	Embedded Class 2 an
	1 1630	11-4-74	I Construction External Pressure Charts			Class 3 Piping for Sectio
	1.000		for High Yield Strength	1552 1	2 2 75	III Construction
e-			Carbon Steels and Low	1222-1	3-3-73	Threading of SA-453 fo
1.			Alloy Steels. (Yield Strength phoya 38 Ksi to			Bolting in Section III
			60 Ksi Inclusive.) For Sec-	1588	8-13-73	Electro-Etching of Section
			tion III, Class 1, 2, 3, and	1651	8.12.74	Interim Requirements for
Ť			MC; and Section VIII. Di-	1001	01274	Certification of Compor
}	1633	4-29-74	Brazing of Seats to Class 1.			ent Supports, Section III
at-			2, and 3 Valve Body or	1662	11.4.74	Subsection NF
les M	1 1657	11 4.74	Bonnets, Section III	100#	11	ponents, Appurtenance
	1057	11-4-/4	and 3 Atmospheric and			and Piping Subassemblie
tal			Low Pressure (0-15 psig)			for Section III Class 1, 2,
led	1000		Steel Storage Tanks	1681-1*	3-3-75	Organizations Accentin
ses	1000	11-4-74	Uverpressure Protection		0010	Overall Responsibility fo
gm			ing Conditions for Section			Section III Constructio
ises			III, Class 1	1683	3-3-75	Bolt Holes for Section III
	a Fahri	action original	Code Cases (Code Core aum			ponent Supports
	ber. d	late of council a	pproval, and title):			Policii Bappolio
Re-			PP: - · · · · · · · · · · · · · · · · · ·	c. Code	Cases with con	tingent approval:
	(1) C	Code Cases relate	ed to welding and brazing:	1361.2	3.6.72	Socket Wolds Services I
ves,	1461-1	3-9-72	Electron Beam Welding,	1001-2	5-2-12	Socket weigs, Section in
sure			Sections I, III, and VIII,	Code	Case 1361-2	is approved when used in
111	1471 1	2072	Division I and 2	conno	ection with Sec	tion III, paragraph NB-3356
Rat-	14/1-1	3-9-12	Welding of Tube Sheet	rniet	welds.	
Mo.			Joints, Section III	*Code Care	1681 wat upper	ved by Council on 1216 24
	1494-1	3-3-73	Weld Procedure Qualifi-	revised on 3	-3-75. Because Co	ode Case 1681 was not in effect of
tion			cation Tests, Section III	March 31, 1	1975, the Code C	use was not included in this good

a start of

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1569

3-3-72

## Design of Piping for Pressure Relief Valve Station, Section III

Code Case 1569 is approved subject to compliance with the recommendations contained in Regulatory Guide 1.67, "Installation of Overpressure Protection Devices."

1606-1

12-16-74 Stress Criteria Section III, Classes 2 and 3 Piping Subject to Upset, Emergency, and Faulted Operating Conditions

Code Case 1606-1 is approved subject to the interpretation that the stress limit designations of "Upset," "Emergency." and "Faulted" do not necessarily imply agreement with specified plant operating conditions applicable to ASME Code Class 2 and 3 components for fluid systems. These designations should be established and justified in the design specifications.

1607-1 11-4-74 Stress Criteria for Section III, Classes 2 and 3 Vessels Designed to NC/ND-3300 Excluding the NC-3200 Alternate

Code Case 1607-1 is approved subject to the interpretation that the stress limit designations of "Upset," "Emergency," and "Faulted" do not necessarily imply agreement with specified plant operating conditions applicable to ASME Code Class 2 and 3 components for fluid systems. These designations should be established and justified in the design specifications.

1635-1\*

8-12-74

Stress Criteria for Section III, Class 2 and 3 Valves Subjected to Upset, Emergency, and Faulted Operating Conditions

Code Case 1635-1 is approved subject to the interpretation that the stress limit designations of "Upset," "Emergency," and "Faulted" do not necessarily imply agreement with specified plant operating conditions applicable to ASME Code Class 2 and 3 components for fluid systems. These designations should be established and justified in the design specifications.

8-12-74

Stress Criteria for Section III, Class 2 and 3 Pumps Subjected to Upset, Emergency, and Faulted Operating Conditions

Code Case 1636-1 is approved subject to the interpretation that the stress limit designations of "Upset," "Emergency," and "Faulted" do not necessarily imply agreement with specified plant operating conditions applicable to ASME Code Class 2 and 3 components for fluid systems. These designations should be established and justified in the design specifications.

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 which were annulled on or after July 1, 1974, are listed below by number, date of Council action, and title.\*\*

1574	12-31-74	Hydrostatic Test Pressure for Safety Relief Valves, Section III
1601	7-1-74	Limits of Reinforcement for Two-thirds Area, Sec- tion III, Class 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, 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.

1553	3-3-75	Upset Heading and Roll Threading of SA-453 for Bolting, Section III
1606	12-16-74	Stress Criteria for Section III, Classes 2 and 3 Piping Subjected to Upset, Emer- gency, and Faulted Oper- ating Conditions

Code Case 1606 was approved subject to the interpretation that the stress limit designations of "Upset," "Emergency," and "Faulted" do not





<sup>\*</sup>Code Cases 1635 and 1636 were approved by Council on July 1, 1974, and revised on August 12, 1974. Because Code Cases 1635 and 1636 were not in effect on September 1, 1974, they are not included in this guide.

<sup>1636-1\*</sup> 

<sup>\*</sup>Code Cases 1355-3, 1534, and 1554, which were listed in the original issue of this guide, were annulled by Council action prior to July 1, 1974.



necessarily imply agreement with specified plant operating conditions applicable to ASME Code Class 2 and 3 components for fluid systems. These designations should be established and justified in the design specifications.

11-4-74

1607

Stress Criteria for Section III, Classes 2 and 3 Vessels Subjected to Upset, Emergency, and Faulted Operating Conditions

1.84-5

Code Case 1607 was approved subject to the interpretation that the stress limit designations of "Upset," "Emergency," and "Faulted" do not necessarily imply agreement with specified plant operating conditions applicable to ASME Code Class 2 and 3 components for fluid systems. These designations should be estat "limed and justified in the design specifications.

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

# NUMERICAL LISTING OF CODE CASES\*

1361-2	1553-11	1651
1461-1	1555	1657
1470-2	1569	1659
1471-1	1573	1660
1477-1	1580-1	1661
1494-1	1581	1662
1506	1588	1665
1508	1606-1	1672
1516-1	1607-1	1675
1533	1614	1676
1535-2	1620	1677
1536	1623	1678
1539	1630	1681-1
1540-1	1633	1683
1541-1	1635-1	1686
1552	1636-1	

\*1625 was inadvertently listed in the appendix of Regulatory Guide 1.84, Revision 1. This Code Case is covered in Regulatory Guide 1.85, Revision 1.

Code Case 1575 is a Section VIII Case and therefore has been eliminated from this regulatory guide, which covers Section III Cases.

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