ASME CSD-1–2024
(Revision of ASME CSD-1–2021)

Controls and Safety Devices for Automatically Fired Boilers

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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Two Park Avenue • New York, NY • 10016 USA

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The next edition of this Standard is scheduled for publication in 2027.

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FOREWORD

The major perils in operating automatically fired boilers are loss of water (low water), furnace explosion, overpressure and overtemperature. Principal causes of accidents to automatically fired boilers are lack of proper controls and safety devices, lack of adequate maintenance, improperly trained operators, failure to test controls and safety devices, and complacency on the part of the operator due to long periods of trouble-free operation. It is believed that improved instrumentation, controls and safety devices, proper operating procedures, and a clearer understanding of installation requirements by the manufacturers, installers, and operators can greatly reduce the chances of personal injury, damage to property, and loss of equipment from accidents.

It should be pointed out that any governmental jurisdiction has authority over any particular installation. Inquiries dealing with problems of a local character should be directed to the proper authorities of such jurisdictions.

Safety codes and standards are intended to enhance public health and safety. Revisions result from the committee's consideration of factors such as technological advances, new data, and changing environmental and industry needs. Revisions do not imply that previous editions were inadequate.

The Committee on Controls and Safety Devices for Automatically Fired Boilers of The American Society of Mechanical Engineers (ASME) approved the first edition of this ASME Standard on April 29, 1977.

The second edition, which was approved by the American National Standards Institute (ANSI) on October 4, 1982, was issued on December 31, 1982. An addenda to the edition, CSD-1a–1984, was approved on August 17, 1984 and issued on November 15, 1984.

The third edition, which was approved by ANSI on November 17, 1988, was issued on February 15, 1989. The CSD-1a–1989 Addenda was approved on October 3, 1989, and issued on February 15, 1990. The CSD-1b–1990 Addenda was approved on June 21, 1990, and issued on December 1, 1990.

The fourth edition, which was approved by ANSI on February 28, 1992, was issued on June 15, 1992. The CSD-1a–1993 Addenda was approved on August 18, 1993, and issued on November 30, 1993. The CSD-1b–1994 Addenda was approved on June 20, 1994, and issued on September 30, 1994.

The fifth edition, which was approved by ANSI on February 6, 1995, was issued on June 30, 1995. The CSD-1a–1996 Addenda was approved on February 5, 1996, and issued on July 31, 1996. The CSD-1b–1996 Addenda was approved on July 16, 1996, and issued on December 20, 1996.

The sixth edition, which was approved by ANSI on January 30, 1998, was issued on April 14, 1998. The CSD-1a–1999 Addenda was approved on November 2, 1999, and issued on March 10, 2000. The CSD-1b–2001 Addenda was approved on July 30, 2001, and issued on November 20, 2001.

The seventh edition, which was approved by ANSI on January 17, 2002, was issued on April 15, 2002.

The eighth edition, which was approved by ANSI on August 9, 2004, was issued on April 15, 2005.

The ninth edition, which was approved by ANSI on September 13, 2006, was issued on December 29, 2006.

The tenth edition, which was approved by ANSI on February 24, 2009, was issued on May 8, 2009.

The eleventh edition, which was approved by ANSI on January 13, 2012, was issued on May 10, 2012.

The twelfth edition, which was approved by ANSI on December 21, 2015, was issued on March 24, 2016.

The thirteenth edition, which was approved by ANSI on August 23, 2018, was issued on October 12, 2018.

The fourteenth edition, which was approved by ANSI on September 21, 2021, was issued on November 17, 2021.

This fifteenth edition of ASME CSD-1, which was approved by ANSI on December 12, 2024, was issued on January 17, 2025.

ASME CSDAFB COMMITTEE
Controls and Safety Devices for Automatically Fired Boilers

(The following is the roster of the committee at the time of approval of this Standard.)

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Revisions and Errata. The committee processes revisions to this Standard on a continuous basis to incorporate changes that appear necessary or desirable as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive email notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Standard

(4) to permit the use of a new material or process

(b) Users are cautioned that not all jurisdictions or owners automatically accept cases. Cases are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Standard.

(c) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Standard and the paragraph, figure, or table number

(4) the editions of the Standard to which the proposed case applies

(d) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Approved cases are posted on the committee web page.

Interpretations. Upon request, the committee will issue an interpretation of any requirement of this Standard. An interpretation can be issued only in response to a request submitted through the online Inquiry Submittal Form at https://go.asme.org/InterpretationRequest. Upon submitting the form, the inquirer will receive an automatic email confirming receipt.

ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the information submitted, it is the opinion of the committee that the inquirer should seek assistance, the request will be returned with the recommendation that such assistance be obtained. Inquirers can track the status of their requests at https://go.asme.org/Interpretations.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME committee or subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Interpretations are published in the ASME Interpretations Database at https://go.asme.org/Interpretations as they are issued.

Committee Meetings. The CSDAFB Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the committee. Information on future committee meetings can be found on the committee web page at https://go.asme.org/CSDAFBcommittee.

ASME CSD-1–2024
SUMMARY OF CHANGES

Following approval by the ASME CSDAFB Standards Committee and ASME, and after public review, ASME CSD-1–2024 was approved by the American National Standards Institute on December 12, 2024.

ASME CSD-1–2024 includes the following changes identified by a margin note, **(24)**.

Page	*Location*	*Change*
1	CG-130	(1) Subparagraph (c) revised
		(2) Subparagraph (d) added
1	CG-140	(1) Subparagraphs (a) through (c) corrected by errata
		(2) Subparagraph (a)(2) revised
2	CG-420	Revised
3	CG-700	(1) Definitions of *boiler, low-pressure* and *gas* revised
		(2) Definitions of *component, design pressure, flue gas recirculation (FGR), heat recovery steam generator (HRSG),* and *supply pressure* added
		(3) Term *pool heater* changed to *pool heater, direct-type* and definition revised; term *valve, proof-of-closure* changed to *switch, proof-of-closure* and definition revised
11	CE-110	Subparagraph (i) revised
19	CF-110	Subparagraph (a) revised
19	CF-150	Revised
22	CF-160	Added and subsequent paragraphs redesignated
22	CF-162	Former CF-161 revised in its entirety
22	CF-163	Former CF-162 revised in its entirety
23	Table CF-163-1	(1) Former Table CF-162-1 redesignated
		(2) Last entry in second column revised
25	Table CF-163-2	(1) Former Table CF-162-2 redesignated
		(2) Last entry in second column revised
26	CF-180	Subparagraphs (b)(1), (b)(2), (b)(3)(-b)(-2), (c)(2)(-b), and (d) revised
30	CF-710	Subparagraph (a) revised
33	CF-710	Revised
33	CF-810	Subparagraph (b) revised
37	Figure B-1	(1) Illustration and Legend revised
		(2) Note (1) added and subsequent Note redesignated
38	Figure B-2	(1) Illustration and Legend revised
		(2) Note (1) added and subsequent Notes redesignated
40	Figure B-3	(1) Illustration and Legend revised
		(2) Note (1) added and subsequent Notes redesignated

Page	*Location*	*Change*
41	Figure B-4	(1) Illustration and Legend revised
		(2) Note (1) added and subsequent Notes redesignated
43	Figure B-5	(1) Illustration and Legend revised
		(2) Note (1) added and subsequent Note redesignated
44	Figure B-6	(1) Illustration and Legend revised
		(2) Note (1) added and subsequent Note redesignated
45	Figure B-7	(1) Illustration and Legend revised
		(2) Note (1) added and subsequent Note redesignated
48	Nonmandatory Appendix C	“Installation and Design Notes” section added to the form

Part CG
General

CG-100 GENERAL REQUIREMENTS

CG-110 Scope

The rules of this Standard cover requirements for the assembly, installation, maintenance, and operation of controls and safety devices on automatically operated boilers directly fired with gas, oil, gas–oil, or electricity, subject to the service limitations, exclusions, and acceptance of other listings in CG-120, CG-130, and CG-140, respectively. Burners or burner assemblies installed on boilers or as replacement burners shall comply with the requirements of CF-110 and CF-410 for gas and oil firing, respectively. The use of a gaseous or oil fuel not listed in the definitions has not been evaluated, and special considerations may be required.

CG-120 Service Limitations

The rules of this Standard are applicable to the following service:

(a) all automatically fired boilers and burner assemblies, regardless of fuel input ratings, subject to the exclusions and acceptance of other listings in CG-130 and CG-140, respectively

(b) burners field-installed in automatically fired boilers

(24) ### CG-130 Exclusions

The following are excluded from the requirements of this Standard:

(a) boilers with fuel input ratings greater than or equal to 12,500,000 Btu/hr (3 663 kW), falling within the scope of NFPA 85

(b) water heaters (see CG-700)

(c) direct-type, gas-fired pool heaters that are labeled and listed by a nationally recognized testing agency or other organization that is acceptable to the authority having jurisdiction as complying with ANSI Z21.56/CSA 4.7

(d) heat recovery steam generators (HRSGs)

(24) ### CG-140 Acceptance of Other Listings

The following other listings are acceptable:

(a) automatically operated boilers fired with gas having inputs of 400,000 Btu/hr (117 kW) or less that

(1) comply with Part CW, CE-110(a), CE-110(b), and CE-110(j)

(2) are labeled and listed by a nationally recognized testing agency or other organization that is acceptable to the authority having jurisdiction as complying with ANSI Z21.13/CSA 4.9 or ANSI Z21.56/CSA 4.7; meet the remaining requirements of this Standard (see Nonmandatory Appendix A)

(b) automatically operated boilers fired with oil having inputs of 3 gph (11.4 L/h) or less that

(1) comply with Part CW, CE-110(a), CE-110(b), and CE-110(j)

(2) are labeled and listed by a nationally recognized testing agency or other organization that is acceptable to the authority having jurisdiction as complying with UL 726; meet the remaining requirements of this Standard

(c) automatically operated, electrically heated boilers having inputs of 115 kW or less that

(1) comply with Part CW, CE-110(a), and CE-110(b)

(2) are labeled and listed by a nationally recognized testing agency or other organization that is acceptable to the authority having jurisdiction as complying with UL 834; meet the remaining requirements of this Standard

CG-150 Jurisdictional Adoption of ASME CSD-1

Adoption of this Standard by a jurisdiction shall not preclude the jurisdiction adopting and accepting boilers listed or certified to other safety standards or codes acceptable to the jurisdiction beyond the limitations contained in CG-140. Where other such safety codes and/or standards are adopted/accepted and overlap with the scope of this Standard shall be the responsibility of the jurisdiction to define the application of this Standard and those other codes and/or standards.

CG-160 Metric (SI) Units

This Standard uses U.S. Customary units. The acceptable equivalent SI units are shown in parentheses for information only and have been converted from the U.S. Customary units according to Nonmandatory Appendix F.