

ASME CSD-1–2015
(Revision of ASME CSD-1–2012)

Controls and Safety Devices for Automatically Fired Boilers

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

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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 first edition of this Standard, which was approved by The American Society of Mechanical Engineers' Committee on Controls and Safety Devices for Automatically Fired Boilers, was approved and designated as an ASME Standard by The American Society of Mechanical Engineers 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 30, 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.

This twelfth edition of CSD-1, which was approved by ANSI on December 21, 2015, was issued on March 24, 2016.

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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General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions or a Case, and attending Committee meetings. Correspondence should be addressed to:

Secretary, CSDAFB Standards Committee
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
<http://go.asme.org/Inquiry>

Proposing Revisions. Revisions are made periodically to the Standard 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 periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Proposing a Case. Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard and the paragraph, figure, or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Interpretations. Upon request, the CSDAFB Standards Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the CSDAFB Standards Committee at go.asme.org/Inquiry.

The request for an interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

Subject: Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition: Cite the applicable edition of the Standard for which the interpretation is being requested.
Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

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.

Attending Committee Meetings. The CSDAFB Standards Committee regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of the CSDAFB Standards Committee.

IN MEMORIAM

Jules “Red” A. Wagner

The CSDAFB Standards Committee wishes to acknowledge one of the founding members who passed away during the production of this Edition. He was a major contributor to CSD-1, a member of ASME since 1955, and an active member of the Standards Committee for over 35 years. Jules “Red” A. Wagner passed away on August 16, 2013.

“Red” was a major contributor to the development of this document. In addition, he supported the CSDAFB Standards Committee as a tireless contributor and founding member. “Red” was well liked; someone you could rely on and trust. He lived by the United States Merchant Marine Academy motto: *Acta non Verba* (“Deeds not Words”), the officer’s creed and the honor code.

His presence and friendship, as well as his continual guidance to the Committee in the maintenance of the CSD-1 standard and straightforward attitude, will be truly missed.

ASME CSD-1–2015

SUMMARY OF CHANGES

Following approval by the ASME CSDAFB Standards Committee, and after public review, ASME CSD-1–2015 was approved by the American National Standards Institute on December 21, 2015.

The 2015 edition of ASME CSD-1 includes the following changes identified by a margin note, (15).

<i>Page</i>	<i>Location</i>	<i>Change</i>
1	CG-140	Subparagraphs (a)(1), (b)(1), and (c)(1) revised
2	CG-230	Revised
3–8	CG-700	(1) Definitions of <i>boiler</i> and <i>boiler, hot-water heating</i> revised (2) Definitions of <i>boiler, hot-water</i> and <i>pulse combustion</i> added (3) Definitions of <i>boiler, hot-water heating</i> and <i>boiler, hot-water supply</i> listed under newly added definition of <i>boiler, hot-water</i>
9	CM-110	Subparagraph (a) revised
10	CE-110	(1) Subparagraph (a) revised and new subpara. (b) added (2) Former subparas. (b) through (i) redesignated as (c) through (j), respectively
12	CW-110	Revised
14	CW-310	Subparagraph (d) revised
15	CW-410	(1) Title revised (2) Revised in its entirety
16	CW-640	Revised
17	CF-110	Second sentence of subpara. (a) revised
	CF-150	(1) New subpara. (a) added (2) Former subparas. (a) through (g) redesignated as (b) through (h), respectively
19	Table CF-2	(1) Title revised (2) Revised in its entirety (3) Note (3) added
20, 21, 23	CF-162	Subparagraph (h) revised
	Table CF-3	(1) Title revised (2) With sixth entry, second, third, and fourth columns revised (3) Note (3) added
25	CF-210	(1) First paragraph added

<i>Page</i>	<i>Location</i>	<i>Change</i>
		(2) Subparagraph (a) revised
26, 27	CF-310	Subparagraph (g) added
	CF-320	Subparagraph (d) revised
	CF-330	Subparagraphs (f) and (g) added
30	CF-810	Subparagraph (b) revised in its entirety
46	Nonmandatory Appendix E	Updated

SPECIAL NOTE:

The interpretations to ASME CSD-1 are included in this Edition as a separate section for the user's convenience.

CONTROLS AND SAFETY DEVICES FOR AUTOMATICALLY FIRED BOILERS

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. Burner or burner assemblies installed on boilers or as a replacement burner 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 to other listings of CG-130 and CG-140, respectively

(b) burners field-installed in automatically fired boilers

CG-130 Exclusions

(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, Boiler and Combustion Systems Hazard Code

(b) water heaters (see CG-700)

(c) direct gas-fired swimming 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, Standard for Gas-Fired Pool Heaters

(15) CG-140 Acceptance of Other Listings

(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), (b), and (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, Standard for Gas-Fired Low Pressure Steam and Hot Water Boilers; meet the remaining requirements of this Standard

(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), (b), and (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, Standard for Oil-Fired Boiler Assemblies; 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 and CE-110(a) and (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, Standard for Heating, Water Supply, and Power Boilers — Electric; meet the remaining requirements of this Standard

CG-150 Jurisdictional Adoption of CSD-1

Adoption of CSD-1 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 CSD-1, it 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 edition of the Standard uses U.S. Customary units. The acceptable equivalent SI units are shown in parentheses for information only and have been directly (soft) converted from the U.S. Customary units.