

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**

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**

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: January 17, 2025

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

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards and it is an American National Standard. The standards committee that approved the code or standard was balanced to ensure that individuals from competent and concerned interests had an opportunity to participate. The proposed code or standard was made available for public review and comment, which provided an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not “approve,” “certify,” “rate,” or “endorse” any item, construction, proprietary device, or activity. ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor does ASME assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representatives or persons affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

The endnotes and preamble in this document (if any) are part of this American National Standard.



ASME Collective Membership Mark

All rights reserved. “ASME” and the above ASME symbol are registered trademarks of The American Society of Mechanical Engineers. No part of this document may be copied, modified, distributed, published, displayed, or otherwise reproduced in any form or by any means, electronic, digital, or mechanical, now known or hereafter invented, without the express written permission of ASME. No works derived from this document or any content therein may be created without the express written permission of ASME. Using this document or any content therein to train, create, or improve any artificial intelligence and/or machine learning platform, system, application, model, or algorithm is strictly prohibited.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

Copyright © 2025 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
Printed in U.S.A.

CONTENTS

Foreword	v
Committee Roster	vi
Correspondence With the CSDAFB Committee	vii
Summary of Changes	ix
Part CG	General
CG-100	General Requirements
CG-200	General Provisions
CG-300	Material Requirements
CG-400	Testing and Maintenance
CG-500	Certification and Reporting
CG-600	Operation
CG-700	Definitions
Part CM	Testing and Maintenance
CM-100	Periodic Testing and Maintenance
Part CE	Electrical
CE-100	Electrical Requirements
Part CW	Steam and Waterside Control
CW-100	Automatic Low-Water Fuel Cutoff and/or Combined Water Feeding Device
CW-200	Automatic Fuel Cutoff for Forced Circulation Boilers
CW-300	Pressure Controls
CW-400	Temperature Controls
CW-500	Safety and Safety Relief Valves
CW-600	Modular Boilers
CW-700	Vacuum Boilers
Part CF	Combustion Side Control
CF-100	Gas-Fired Boiler Units, Equipment
CF-200	Gas-Fired Boiler Units, Purging
CF-300	Gas-Fired Boiler Units, Safety Controls
CF-400	Oil-Fired Boiler Units, Equipment
CF-500	Oil-Fired Boiler Units, Safety Controls
CF-600	Low Fire Start, Gas- or Oil-Fired Boiler Units
CF-700	Combination Gas- and Oil-Fired Units
CF-800	Electrically Heated Boilers
CF-900	Combustion Side Controls for Modular Boilers
Nonmandatory Appendices	
A	Comparison of This Standard and ANSI Z21.13/CSA 4.9
B	Typical Fuel Trains

C	Manufacturer's/Installing Contractor's Report for ASME CSD-1	48
D	Recommended Preventive Maintenance Schedule	51
E	References	57
F	Guidance for the Use of U.S. Customary and SI Units in ASME CSD-1	58

Figures

CG-700-1	Sediment Trap	8
B-1	Typical Gas Fuel Train With Pilot Ignition System and Atmospheric Burners [Greater Than 400,000 Btu/hr (117 kW) and Less Than or Equal to 2,500,000 Btu/hr (733 kW)]	37
B-2	Typical Gas Fuel Train With Pilot Ignition System [Greater Than 400,000 Btu/hr (117 kW) and Less Than or Equal to 2,500,000 Btu/hr (733 kW)]	38
B-3	Typical Gas Fuel Train With Direct Ignition System [Greater Than 400,000 Btu/hr (117 kW) and Less Than or Equal to 2,500,000 Btu/hr (733 kW)]	40
B-4	Typical Gas Fuel Train With Pilot Ignition System [Greater Than 2,500,000 Btu/hr (733 kW) and Less Than or Equal to 5,000,000 Btu/hr (1 465 kW)]	41
B-5	Typical Gas Fuel Train With Pilot Ignition System [Greater Than 5,000,000 Btu/hr (1 465 kW) and Less Than 12,500,000 Btu/hr (3 663 kW)]	43
B-6	Typical Gas Fuel Train With Pilot Ignition System and Negative (Zero Governor) Main Manifold Gas Pressure [Greater Than 400,000 Btu/hr (117 kW) and Less Than 12,500,000 Btu/hr (3 663 kW)]	44
B-7	Typical Gas Fuel Train With Direct Ignition System and Negative (Zero Governor) Main Manifold Gas Pressure [Greater Than 400,000 Btu/hr (117 kW) and Less Than 12,500,000 Btu/hr (3 663 kW)]	45
B-8	Typical Oil Fuel Train	46
B-9	Example for Sizing of Manifolded Lines	46
B-10	Typical Gas Fuel Train Safety Shutoff Valve Arrangements for Multiple-Burner Boiler Units Complying With CF-180(b)	47

Tables

CF-110-1	400,000 Btu/hr (117 kW) and Smaller (Gas — Natural Draft)	20
CF-110-2	400,000 Btu/hr (117 kW) and Smaller (Power Gas Burners, Mechanical Draft Atmospheric Gas Burners, and Pulse Combustion Systems), 3 gph (11.4 L/h) [Approximately 400,000 Btu/hr (117 kW)] and Smaller (Oil)	21
CF-163-1	Safety Controls for Automatically Fired Units: Power Gas Burners, Mechanical Draft Atmospheric Gas Burners, and Pulse Combustion Systems	23
CF-163-2	Safety Controls for Automatically Fired Units: Atmospheric Gas Burners — Natural Draft	25
CF-460-1	Safety Controls for Automatically Fired Units: Oil-Fired Burners	32
B-1	Figure Index	36
D-1-1	Periodic Testing Recommended Checklist	53