



Designation: **E1509—04 E1509 – 12**

Standard Specification for Room Heaters, Pellet Fuel-Burning Type¹

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1. Scope

1.1 This specification covers performance requirements, test methods, and marking requirements for automatic feed, pellet fuel-burning room heaters that are intended to burn wood pellets or other suitable solid fuel. These room heaters shall be drafted by forced or natural means.

1.2 Exhaust venting systems and associated externally mounted draft inducers are not evaluated by this specification unless they are part of an engineered system provided as part of the room heater. Parts specifically evaluated and determined to be acceptable for use with pellet fuel-burning room heaters are required to be specified in the room heater manufacturer's instructions and are to be used in evaluating the room heater.

1.3 Pellet fuel-burning room heaters covered by this specification are intended for installation in accordance with the applicable requirements of NFPA 211 and in accordance with the applicable building and mechanical codes.

1.4 Pellet fuel-burning room heaters covered by this specification are acceptable for use in manufactured homes when installed in accordance with the Manufactured Home Construction and Safety Standards published by the Department of Housing and Urban Development (HUD). See 24 CFR 3280.

1.5 The terms "product" or "room heater," as used in this specification, refer to all pellet fuel-burning room heaters or any part thereof covered by the requirements of this specification, unless specifically noted otherwise.

1.6 No information provided in this specification is intended to prevent the use of other methods or devices, provided that sufficient technical data are submitted to the authority having jurisdiction to demonstrate that the proposed method or device is equivalent in quality, strength, fire endurance, effectiveness, durability, and safety to that prescribed in this specification.

1.7 The notes incorporated into this specification are not prescriptive requirements. They are given for clarification and informational purposes only.

1.8 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only: mathematical conversions to SI units that are provided for information only and are not considered standard.

1.9 The following safety hazards caveat pertains only to the test methods portion, Section 10, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

~~D1102 Test Method for Ash in Wood~~

~~D2015C1057 Test Method for Gross Calorific Value of Coal and Coke by the Adiabatic Bomb Calorimeter~~
Practice for Determination of Skin Contact Temperature from Heated Surfaces Using a Mathematical Model and Thermesthesiometer
(Withdrawn 2000)

~~D3211 Test Method for Relative Density of Black Smoke (Ringelmann Method)~~ (Withdrawn 1990)³

~~D3286 Test Method for Gross Calorific Value of Coal and Coke by the Isoperibol Bomb Calorimeter~~ (Withdrawn 2000)³

~~E136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C~~

¹ This specification is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.54 on Solid Fuel Burning Appliances.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

[E871E631 Test Method for Moisture Analysis of Particulate Wood Fuels Terminology of Building Constructions](#)

[E873 Test Method for Bulk Density of Densified Particulate Biomass Fuels](#)

2.2 *ASME Standard:*⁴

[ASME B36.10M Welded and Seamless Wrought Steel Pipe](#)

2.3 *U.S. Code of Federal Regulations—Housing and Urban Development:*⁵

[24 CFR 3280 CFR 3280—Manufactured Home Construction and Safety Standards](#)

2.4 *Federal Communications Commission:*⁵

[47 CFR Part 15, Subpart B FCC Regulations](#)

2.5 *NFPA Standards:*⁶

[NFPA 70 National Electrical Code](#)

[NFPA 211 Chimneys, Fireplaces, Vents and Solid-Fuel Burning Appliances](#)

2.6 *UL Standards:*⁷

[UL 103 Chimneys, Factory-Built, Residential Type and Building Heating Appliance](#)

[UL 181 Factory Made Air Ducts and Connectors](#)

[UL 641 Low-Temperature Venting Systems, Type L](#)

[UL 907 Fireplace Accessories](#)

[UL 969 Marking and Labeling Systems](#)

[UL 1482 Room Heaters, Solid Fuel Type](#)

2.7 *ULC Standards:*⁸

[ULC S609 Low Temperature Vents, Type L](#)

[ULC S629M 650°C Factory-Built Chimneys](#)

2.8 *ICES Standards:*⁹

[ICES-003 Digital Apparatus](#)

2.9 *PFI Standards:*¹⁰

[PFI Standard Specification for Residential/Commercial Densified Fuel, June 1, 2011](#)

3. Terminology

3.1 *Definitions*—Terms used in this test method are defined in Terminology [E631](#).

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *chimney*—one or more passageways, vertical or nearly so, for conveying flue gases to the outside atmosphere to which the appliance exhaust is capable of being connected.

3.2.2 *combustible material*—material made of or surfaced with wood, compressed paper, plant fibers, plastics, or other material that will ignite and burn, whether flameproofed or not, or whether plastered or unplastered.

3.2.3 *combustion air control*—a valve or plate or motor speed control, operated manually or automatically, that regulates the draft or flow of flue gases or inlet combustion air.

3.2.4 *connector pipe*—a flue pipe that is part of the exhaust venting system that ducts combustion products from the room heater to a chimney.

3.2.5 *exhaust venting system*—a flue pipe, either horizontal, vertical, or a combination of horizontal and vertical, that ducts combustion products from the room heater to the outside.

⁴ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990-10016-5990, <http://www.asme.org>.

⁵ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, <http://dodssp.daps.dla.mil>.

⁶ Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02269-9101-02169-7471, <http://www.nfpa.org>.

⁷ Available from Underwriters Laboratories (UL), Corporate Progress, 333 Pfingsten Rd., Northbrook, IL 60062-60062-2096, <http://www.ul.com>.

⁸ Available from Underwriters' Laboratories of Canada, 7 Crouse Road, Scarborough, ON Canada M1R3A9-MIR3A9, <http://www.ul.com/canada>.

⁹ Available from Industry Canada Web Service Centre, Industry Canada, C.D. Howe Building 235 Queen Street, Ottawa, Ontario K1A 0H5, Canada.

¹⁰ Available from Pellet Fuels Institute (PFI), 1901 North Moore Street, Suite 600, Arlington, VA 22209, <http://pelletheat.org>.

3.2.5.1 *Discussion*—

An exhaust venting system consists of a listed vent system, or connector pipe and a listed factory-built chimney, or a masonry chimney, or an engineered vent system provided as part of the pellet fuel-burning room heater.

3.2.6 *floor protector (stove mat)*—the noncombustible material applied to the combustible floor area located beneath the product and extending beyond the front and sides and to the rear of the product. The area is to be of the dimensions specified in the installation instructions.

3.2.7 *grate*—a frame for supporting the fuel within a room heater.

3.2.7.1 Discussion—

The grate in a pellet fuel-burning room heater is also referred to as a burn pot or fire pot.

3.2.8 *hearth*—the floor area within the fire chamber of a room heater.

3.2.9 *hopper*—an on-unit fuel reservoir that is gravity feeding through a bottom outlet to a controllable pellet fuel feed assembly.

3.2.10 *listed*—equipment or materials included in a list, published by an organization acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of the production of listed equipment or materials and whose listing states either that the equipment or material meets the appropriate standards or has been tested and found to be suitable for use in a specified manner.

3.2.11 *noncombustible material*—a material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat. Materials reported as passing the test, when tested in accordance with Test Method E136, shall be considered noncombustible materials.

3.2.12 *pellet fuel*—a solid processed biomass fuel of specified size and composition capable of being fed to the room heater combustion system at a controlled rate.

3.2.13 *room heater, pellet fuel type*—a closed combustion, exhaust venting system connected, pellet fuel-burning room heater incorporating a fuel feed control mechanism.

4. Materials

4.1 The materials used shall be free of defects that will affect the performance and maintainability of individual components of the overall assembly.

4.2 A room heater and an exhaust venting system, if provided, shall be made of noncombustible corrosion-resistant materials. Metals shall not be used in combinations that have the potential to cause galvanic action at any location within the assembly.

4.3 The minimum metal thickness of room heater nondecorative parts, including any coatings, shall comply with the requirements given in Table 1.

4.4 Aluminum alloys containing more than 1 % magnesium shall not be used if the reflectivity of the material is employed to reduce fire risk.

4.5 The fire chamber and other parts of the room heater that are in contact with flue gases and are visible after installation shall be of material having the durability and resistance to fire and heat equivalent to fireclay tile, Series 300 or 400 stainless steel, aluminum-coated steel, cast iron, or 0.042-in. (1.07-mm) thick unprotected or painted steel.

NOTE 1—Cast iron and unprotected and painted sheet steel complying with the requirements of Footnotes K and L of Table 2 comply with the requirements of 4.5.

4.6 If required, chimney connectors shall be of materials and thicknesses complying with the requirements of NFPA 211 and applicable building and mechanical codes.

4.7 Thermal insulation material shall be of metal or mineral base. Asbestos materials shall not be used.

4.8 Thermal insulation shall comply with the following conditions when the room heater is tested in accordance with the following requirements:

4.8.1 The products resulting from the combustion or volatilization of any combustible binder shall be discharged to the exhaust venting system.

4.8.2 Insulating material shall remain in the intended position.

4.8.3 The insulation shall not show evidence of softening, melting, or deterioration in a manner that will inhibit its function or create a hazard.

4.9 Thermal insulation, other than firebox refractory materials, shall be protected from contact with combustion products.

TABLE 1 Minimum Metal Thickness

	in.	mm
Aluminum-coated steel Type T1-40 (Regular, 0.40 oz/ft ² (0.12 kg/m ²))	0.018	0.46
Aluminum alloys	0.016	0.41
Cast iron	0.125	3.17
Galvanized steel G60 coating class	0.018	0.45
Porcelain-enameled steel	0.032	0.81
Stainless steel	0.012	0.30
Steel, uncoated or painted	0.042	1.07