UL 726

STANDARD FOR SAFETY

Oil-Fired Boiler Assemblies

UL Standard for Safety for Oil-Fired Boiler Assemblies, UL 726

Seventh Edition, Dated November 30, 1995

Summary of Topics

This revision to UL 726 dated September 24, 2024 includes the following changes in requirements:

– Safety shut down on pressure limit on low pressure steam boilers: 13.2.2.

– Redundant LWCOs on low pressure steam boilers: 13.4.1, 13.4.2, and 13.4.5.

– Updates to align with ULSE style manual: Section 3A and Section 4.

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The revised requirements are substantially in accordance with Proposal(s) on this subject dated June 28, 2024 and August 9, 2024.

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1

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The Department of Defense (DoD) has adopted UL 726 on January 27, 1992. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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No Text on This Page

CONTENTS

INTRODUCTION

CONSTRUCTION

ELECTRICAL COMPONENTS

SPACINGS

PROTECTION OF USERS AND SERVICE PERSONNEL

PERFORMANCE

MANUFACTURING AND PRODUCTION TESTS

No Text on This Page

INTRODUCTION

1 Scope

1.1 These requirements apply to oil-fired boiler assemblies.

1.2 Requirements for the installation and use of oil-burning equipment are included in the Standard of the National Fire Protection Association for the Installation of Oil-Burning Equipment, NFPA 31.

1.3 *Deleted*

2 General

2.1 The term "appliance" refers to any equipment covered by this Standard.

2.2 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

3 Glossary

3.1 For the purpose of this Standard the following definitions apply.

3.1.1 AIR-INTAKE TERMINAL – The fitting which is located on the outside of the structure through which the air for combustion is taken from the outside atmosphere. The terminal is intended to be connected to the combustion air intake of the boiler with additional piping.

3.2 AIR SHUTTER – An adjustable device for varying the size of the air inlet or inlets regulating primary and/or secondary air.

3.3 ANTIFLOODING DEVICE – A primary safety control which causes the fuel flow to be shut off upon a rise in fuel level or upon receiving excess fuel, and which operates before the hazardous discharge of fuel can occur.

3.4 APPLIANCE FLUE – The flue passages within the appliance.

3.5 AUTOMATICALLY LIGHTED APPLIANCE – An appliance in which fuel to the main burner is normally turned on and ignited automatically.

3.6 BAFFLE – An object placed in an appliance to direct the flow of air or flue gases.

3.6A BIODIESEL – Any biodiesel blend stock as defined by Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels ASTM D6751, intended to be utilized as a complete fuel source (B100) or blended with a distillate fuel oil.

3.7 BOILER – A closed vessel in which water or some other liquid is heated or in which steam is generated or superheated, under pressure or vacuum, by direct application of heat.

3.8 BOILER, HIGH PRESSURE STEAM – A boiler in which steam is generated at a pressure higher than 15 psig (103 kPa).

3.9 BOILER, HIGH TEMPERATURE WATER – A boiler intended for operation at a pressure exceeding 160 psig (1103 kPa) or at a temperature exceeding 250°F (121°C) or both.

3.10 BOILER, HOT WATER – A boiler that furnishes hot water at a pressure not exceeding 160 psig (1103 kPa) and at a temperature not exceeding 250°F (121°C).

3.11 BOILER, LOW PRESSURE STEAM – A boiler in which steam is generated at a pressure not exceeding 15 psig (103 kPa).

3.12 BURNER, MECHANICAL ATOMIZING TYPE – A power-operated burner which prepares and delivers the oil and all or part of the air by mechanical process in controllable quantities for combustion. Some examples are air atomizing, high and low pressure atomizing, horizontal rotary, vertical rotary atomizing, and vertical rotary wall-flame burner.

3.13 BURNER, MECHANICAL DRAFT TYPE – A burner which includes a power-driven fan, blower, or other mechanism as the principal means for supplying air for combustion.

3.14 BURNER, NATURAL DRAFT TYPE – A burner which depends principally upon the natural draft created in the flue to induce into the burner the air required for combustion.

3.15 CASING – An enclosure forming the outside of the appliance, no parts of which are likely to be subjected to intense heat.

3.16 CENTRAL HEATING APPLIANCE – A stationary indirect-fired vented appliance comprising the following classes: boilers, central furnaces, floor furnaces, and recessed heaters. A floor-mounted unit heater to be connected to a duct system is categorized also as a central heating appliance.

3.17 COMBUSTIBLE MATERIAL – Combustible material as pertaining to materials adjacent to or in contact with heat-producing appliances, chimney connectors and vent connectors, steam and hot water pipes, refers to material made of or surfaced with wood, compressed paper, plant fibers, or other material that will ignite and burn. Such material shall be considered as combustible even through flameproofed, fire-retardant treated, or plastered.

3.18 COMBUSTION CHAMBER – The portion of an appliance within which combustion occurs.

3.19 CONTROL, LIMIT – An automatic safety control, responsive to changes in liquid level, pressure, or temperature, for limiting the operation of the controlled equipment.

3.20 CONTROL, SAFETY – Automatic controls, including relays, switches, and other auxiliary equipment used in conjunction therewith to form a safety control system, that is intended to reduce the risk of fire, electric shock, or injury to persons during operation of the controlled equipment.

3.21 CONTROL, PRIMARY SAFETY – An automatic control that monitors the operation of a gas-fired or an oil-fired burner. It normally consists of the following sections that may be integrated into a common unit or may be separate units, interconnected by wiring:

a) Programming Unit – A device that programs the burner through start-up and shutdown operations in response to signals from regulating, limiting, and monitoring devices. It also provides the necessary timings, in proper sequence, for purging, pilot flame ignition, main flame ignition, and in case of ignition or flame failure, for safety shutdown (lockout); or

b) Combustion Detector – A device that is responsive to flame properties. It monitors the flame at the point of flame supervision and transmits a signal to the programming unit, indicating absence or presence of flame.

3.22 CONTROL, SAFETY COMBUSTION – A primary safety control responsive directly to flame properties, sensing the presence of flame and causing fuel to be shut off in event of flame failure.

3.23 DAMPER – A valve or plate for regulating draft or flow of flue gases. A damper is generally considered as being located on the downstream side of the combustion chamber, usually in a flue passage of the appliance or in the chimney connector.

3.24 DAMPER, AUTOMATICALLY OPERATED – A damper operated by an automatic control.

3.25 DAMPER, MANUALLY OPERATED – An adjustable damper manually set and locked in the desired position.

3.25.1 DIRECT VENT SYSTEM, BOILER – A boiler which is constructed so that all air supplied for combustion, the combustion system of the boiler, and all products of combustion are completely isolated from the atmosphere of the space in which it is installed.

3.26 DRAFT – The differential in static pressure available, between any two locations, to provide the energy potential for the moving of air for combustion or products of combustion through a fuel-burning heat-exchanging apparatus, or both.

3.27 DRAFT REGULATOR – A device which functions to maintain a desired draft in the appliance by automatically reducing the chimney draft to the desired value.

3.28 ELECTRICAL CIRCUITS:

a) High-Voltage Circuit – A circuit involving a potential of not more than 600 volts and having circuit characteristics in excess of those of a low-voltage circuit.

b) Low-Voltage Circuit – A circuit involving a potential of not more than 30 volts alternating-current (42.4 volts peak) or direct current and supplied by:

1) A Class 2 transformer, or by a battery, by a battery and fixed impedance, or by a transformer and fixed impedance each of which, as a unit is in compliance with what is required for a Class 2 transformer; or

2) Is limited to a maximum of 100 volt-amperes.

A circuit derived from a source of supply classified as a high-voltage circuit, by connecting resistance in series with the supply circuit as a means of limiting the voltage and current, is not considered to be a low-voltage circuit;

c) Safety Control Circuit – A circuit involving one or more safety controls.

3.29 EXCESS AIR – Air which passes through the combustion area and the appliance flues in excess of that which is theoretically required for complete combustion.

3.30 FLUE – A general term for the conduit or passageway through which flue gases pass from the combustion chamber to the outside air.

3.31 FLUE COLLAR – That portion of an appliance designed for attachment of the chimney or vent connector.

3.32 FLUE GASES – Combustion products and excess air.

3.33 FUEL OIL – Any hydrocarbon oil as defined by the Standard Specification for Fuel Oils ASTM D396 any biodiesel as defined by the Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels, ASTM D6751, or any fuel oil/biodiesel blend.

3.33A FUEL OIL/BIODIESEL BLEND – Blended fuels composed of a No. 2 or lighter fuel oil component and a biodiesel component. The biodiesel component shall meet the Standard Specification for Biodiesel Fuel Blend Stock (B100) for middle Distillate Fuels, ASTM D6751. The numerical value corresponding to the biodiesel component determines the blend rating (such as B20 for 20 % biodiesel, 80 % diesel).

3.34 HEAT EXCHANGER, DIRECT – A heat exchanger in which heat generated in the combustion chamber of the appliance is transferred direct through walls of the appliance to the heating medium (such as air, steam or water) held in close contact with the combustion chamber walls. It is a self-contained combustion and heat transfer device, hence a direct heat exchanger.

3.35 HEAT EXCHANGER, INDIRECT – A heat exchanger which encloses or contains a heating medium, such as air, steam, or water, the heat from which is transferred to another heating medium separately contained in close contact with or directed through the heat exchanger.

3.36 HEATING SURFACES – All surfaces which transmit heat directly from flame or flue gases to the medium to be heated.

3.37 INDIRECT FIRED APPLIANCE – An appliance designed so that combustion products or flue gases are not mixed in the appliance with the medium to be heated and provided with a flue collar.

3.38 MANUALLY LIGHTED APPLIANCE – An appliance in which fuel to the main burner is turned on only by hand and ignited under supervision.

3.39 NORMAL CARE – The periodic tasks usually performed to operate and maintain an appliance, such as air, fuel, pressure, and temperature regulation, cleaning, lubrication resetting of controls, etc. Repair and replacement of parts other than those expected to be renewed periodically is not considered to be normal care. Some examples of normal care are:

a) Cleaning or replacing nozzles, atomizers, and pilots;

b) Setting ignition electrodes;

c) Cleaning strainers or replacing strainer or filter elements;

d) Resetting safety control; and

e) Replacing igniter cable.

3.40 OIL-FIRED BOILER ASSEMBLY – A boiler assembly as defined herein equipped with one or more oil burners, and all the necessary safety controls, electrical equipment as needed, and related equipment, manufactured for assembly as a unit.

3.41 PILOT – A flame which is utilized to ignite the fuel at the main burner or burners.

3.42 POSTPURGE PERIOD – The period of time after the fuel delivered to the burner is stopped and during which the burner motor or fan continues to run to supply air to the combustion chamber.

3.43 PREPURGE PERIOD – The period of time during the burner start-up in which air is introduced into the combustion chamber and the associated flue passages in such volume and manner as to completely replace the air or fuel-air mixture contained therein prior to initiating ignition.

3.44 PRIMARY AIR – The air introduced into a burner and which mixes with the fuel before it reaches the ignition zone.

3.45 RADIATION SHIELD OR LINER – A separate panel(s) interposed between heating surfaces and adjacent objects to reduce heat transmission by radiation.

3.46 READILY ACCESSIBLE – Capable of being reached easily and quickly for operation, adjustment, and inspection.

3.47 SAFETY SHUTDOWN (LOCKOUT) – The shutting off of all fuel and ignition energy to the burner by means of a safety control or controls so that restart cannot be accomplished without manual reset.

3.48 SECONDARY AIR – The air externally supplied to the flame at or beyond the point of ignition.

3.49 SPECIAL PARTS AND TOOLS – Those parts and tools that are not available on the open retail market.

3.50 THERMOSTAT – An automatic control actuated by temperature change to maintain temperatures between predetermined limits.

3.51 VALVE, MANUAL OIL SHUT-OFF – A manually operated valve in the oil line for the purpose of completely turning on or shutting off the oil supply to the burner.

3.52 VALVE, OIL CONTROL – An automatically or manually operated device consisting essentially of an oil valve for controlling the fuel supply to a burner:

a) Metering (Regulating) Valve – An oil control valve for regulating burner input;

b) Safety Valve – A normally closed valve of the ON and OFF type, without any bypass to the burner, that is actuated by a safety control or by an emergency device.

3.52.1 VENT-AIR INTAKE TERMINAL – The device used with a direct vent boiler which is located on the outside of the structure through which the air for combustion is taken from the outside atmosphere and from which flue gases are discharged.

3.53 VENTED APPLIANCE – An indirect fired appliance provided with a flue collar to accommodate a chimney connector for conveying flue gases to the outside air.

3.54 VENT TERMINAL – The fitting at the end of the vent pipe that directs the flue gases to the outdoor atmosphere.

3A Referenced Publications

3A.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

3A.2 The following publications are referenced in this Standard:

ASME Boiler and Pressure Vessel Code

ASTM A90, *Standard Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings*

ASTM A653/A653M, *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process*

ASTM D396, *Standard Specification for Fuel Oils*

ASTM D6751, *Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels*

NFPA 31, *Installation of Oil-Burning Equipment*

NFPA 70, *National Electrical Code*

UL 1, *Flexible Metal Conduit*

UL 6, *Electrical Rigid Metal Conduit – Steel*

UL 20, *General-Use Snap Switches*

UL 62, *Flexible Cords and Cables*

UL 83, *Thermoplastic-Insulated Wires and Cables*

UL 94, *Tests for Flammability of Plastic Materials for Parts in Devices and Appliances*

UL 98, *Enclosed and Dead Front Switches*

UL 224, *Extruded Insulating Tubing*

UL 248-1, *Low-Voltage Fuses – Part 1: General Requirements*

UL 248-5, *Low-Voltage Fuses – Part 5: Class G Fuses*

UL 296, *Oil Burners*

UL/ULC 331, *Strainers for Flammable Fluids, Anhydrous Ammonia and Non-potable Water*

UL 343, *Pumps for Oil Burning Appliances*

UL 353, *Limit Controls*

UL 372, *Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Burner Ignition Systems and Components*

UL 467, *Grounding and Bonding Equipment*

UL 486A-486B, *Wire Connectors*

UL 489, *Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures*

UL 498, *Attachment Plugs and Receptacles*

UL 508, *Industrial Control Equipment*

UL 508A, *Industrial Control Panels*

UL 514A, *Metallic Outlet Boxes*

UL 514B, *Conduit, Tubing, and Cable Fittings*

UL 514C, *Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers*

UL 574, *Electric Oil Heaters*

UL 746C, *Polymeric Material – Use in Electrical Equipment Evaluations*

UL 797, *Electrical Metallic Tubing – Steel*

UL 810, *Capacitors*

UL/ULC 842, *Valves for Flammable Fluids*

UL 969, *Marking and Labeling Systems*

UL 1004-1, *Rotating Electrical Machines – General Requirements*

UL 1004-3, *Thermally Protected Motors*

UL 1059, *Terminal Blocks*

UL 1277, *Power and Control Tray Cable*

UL 1569, *Metal Clad Cable*

UL 2111, *Overheating Protection for Motors*

UL 2250, *Instrumentation Tray Cable*

UL 4248-1, *Fuseholders – Part 1: General Requirements*

UL 4248-9, *Fuseholders – Part 9: Class K*

UL 5085-1, *Low Voltage Transformers – Part 1: General Requirements*

UL 5085-3, *Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers*

UL 60691, *Thermal-Links – Requirements and Application Guide*

UL 60730-1, *Automatic Electrical Controls – Part 1: General Requirements*

UL 60730-2-15, *Automatic Electrical Controls i– Part i2-15, iParticular Requirements for Automatic Electrical Air Flow, Water Flow and Water Level Sensing Controls*

UL 60947-1, *Low-Voltage Switchgear and Controlgear – Part 1: General Rules*

UL 60947-4-1, *Low-Voltage Switchgear and Controlgear – Part 4-1: Contactors and Motor-Starters – Electromechanical Contactors and Motor-Starters*

UL 60947-5-2, *Low-Voltage Switchgear and Controlgear – Part 5-2: Control Circuit Devices and Switching Elements – Proximity Switches*

UL 61058-1, *Switches for Appliances – Part 1: General Requirements*

4 Components

4.1 A component of a product covered by this Standard shall:

a) Comply with the requirements for that component as specified in this Standard;

b) Be used in accordance with its rating(s) established for the intended conditions of use; and

c) Be used within its established use limitations or conditions of acceptability.

4.2 A component of a product covered by this Standard is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product;

b) Is superseded by a requirement in this standard; or

c) Is separately evaluated when forming part of another component, provided the component is used within its established ratings and limitations

4.3 *Deleted*

4.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

4.5 *Deleted*

4.6 *Deleted*

4.7 *Deleted*

4.8 *Deleted*

CONSTRUCTION

5 Assembly

5.1 A boiler assembly shall be factory-built as a group assembly and shall include all the essential components necessary for its normal function when installed as intended. An oil-fired boiler assembly may be shipped as two or more major subassemblies. The boiler vessel of an oil-fired boiler assembly shall be constructed, equipped, inspected, tested, and marked in accordance with the ASME Boiler and Pressure Vessel Code, Section 1, Power Boilers or Section IV, Heating Boilers, whichever is appropriate. The oil burner of an oil-fired boiler assembly shall comply with the Standard for Oil Burners, UL 296.

5.2 A boiler assembly, if not assembled by the manufacturer as a unit, shall be arranged in major subassemblies. See 5.3. Each subassembly shall be capable of being incorporated into the final assembly without requiring alteration, cutting, drilling threading, welding, or similar tasks by the installer. Two or more subassemblies, which must bear a definite relationship to each other for the intended installation or operation of the boiler assembly, shall be arranged and constructed to permit them to be incorporated into the complete assembly only in the correct relationship with each other, without need for alteration or

alignment, or such subassemblies shall be assembled, tested, and shipped from the factory as one element.

5.3 To be in accordance with 5.2, major subassemblies of a boiler assembly are deemed to be the burner and the heat exchanger sections of a cast iron sectional boiler including its base, combustion chamber, casing, and safety controls. A wiring harness may be packaged with one of the major subassemblies.

5.4 A radiation shield or baffle employed to prevent excessive temperature shall be assembled as part of the boiler assembly; or be part of a subassembly that must be attached to the boiler assembly for its normal operation; or be designed so that the boiler assembly cannot be assembled for operation without first attaching a required shield or baffle in its proper position.

5.5 A boiler assembly shall be such that, for any normal installation, the alteration or removal of a baffle, insulation, or a radiation shield needed to prevent unsafe temperatures is not required.

5.6 A boiler assembly shall afford convenient operation by the user of those parts requiring attention or manipulation in normal usage.

5.7 Adjustable or movable parts shall be provided with locking devices to prevent unintentional shifting.

5.8 Screws or bolts used to attach parts which are detached for normal care or servicing of the appliance shall be capable of holding upon the application of the torques indicated in Table 5.1 after removal and replacement.

Table 5.1
Maximum torque requirements for screws

Screw size	(mm)	Torque, pound-inches	(N·m)
No. 8	(4.2)	20	(2.3)
No. 10	(4.8)	25	(2.8)
1/4 inch	(6.4)	100	(11.3)
5/16 inch	(7.9)	200	(22.6)
3/8 inch	(9.5)	350	(44.5)
7/16 inch	(11.1)	550	(62.1)
1/2 inch	(12.7)	800	(90.3)
9/16 inch	(14.3)	1200	(135.5)

5.9 An external door, providing access into the combustion chamber of a boiler assembly intended for installation with a clearance of less than 24 inches (610 mm) from the face of or 48 inches (1.22 m) above the door, shall be self-closing.

5.10 A burner shall be secured so it will not twist, slide, or drop out of position.

5.11 Fuel oil pumps provided as part of the burner shall comply with the Standard for Pumps for Oil Burning Appliances, UL 343.

5.12 Strainers supplied with the boiler assembly shall comply with the requirements of the Standard for Strainers for Flammable Fluids and Anhydrous Ammonia, UL 331.

6 Accessibility for Servicing

6.1 A boiler assembly shall be built to allow cleaning of parts such as heating surfaces in contact with combustion products, and oil strainers, without major dismantling of the boiler assembly or removal of parts required by 5.2 to be factory-assembled.

6.2 The removal of access panels, burners, caps, plugs, etc., specifically designed to permit ready removal and replacement for servicing, and the detachment of the chimney connector are not considered major dismantling as defined by 6.1.

6.3 Sufficient and reasonable accessibility shall be afforded for cleaning, inspection, repair, and replacement of all burners, controls, and safety devices when the boiler assembly is installed as recommended by the manufacturer. The disposition of parts in the assembly removed for normal care shall be such that their restoration, following removal, will not necessitate their realignment to secure their proper relationship with other parts of the assembly. Special facilities required for normal care to be done by the operator shall accompany the boiler assembly to the user.

6A Air-Intake Terminal

6A.1 The requirements in this section are applicable to boilers equipped to provide for separation (isolation) of the combustion air system from the indoor atmosphere by an installation method.

6A.2 A boiler shall be provided with a combustion air-intake assembly. The intake shall be provided with means for secure attachment to the boiler or building structure. An intake shall communicate with the outside atmosphere. The boiler shall be marked in compliance with 47.19.

6A.3 An air-intake assembly through the roof shall be such that, when the assembly is installed as intended, the air entrance will be at least 6 inches (152.4 mm) above the top surface of the roof and the exit will be at least 6 inches below the top surface of the roof.

6A.4 An air-intake assembly for installation through an outside wall shall extend at least 2 inches (50.8 mm) to 4-3/4 inches (121 mm) beyond the inside face of the wall and shall not project beyond the outside wall more than 3 inches (76.2 mm).

6A.5 The air entrance of an air-intake assembly shall be guarded, shielded, or located to exclude rain, snow, debris, and birds. A screen, if used, shall have a mesh of not less than 1/4 inch (6.4 mm).

6A.6 Openings in perforated or expanded metal panels provided over openings for combustion air shall be a minimum 1/4 inch (6.4 mm) diameter. If the openings are other than circular in shape, they shall be of such size that will permit entrance of a No. 3 DMS (5.4102 mm) drill.

6A.7 The design and path of an air-intake shall provide the intended amount of combustion air to the boiler and of dilution air to any draft regulator.

6A.8 An outer casing or other structural part of an air-intake assembly or connector exposed to the weather shall be made of material having durability and resistance to corrosion, fire, and heat equivalent to that of galvanized steel, 0.018 inch (0.46 mm) thick, and have a coating of zinc conforming with the coating Designation G90 in Table I of the Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, ASTM A653/A653M, with not less than 40 percent of the zinc on any side, based on the minimum single spot test requirement in this ASTM Designation. The weight of zinc coating may, in case of question, be established in accordance with the Standard Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings, ANSI/ASTM A90. Such parts that are always inside the structure shall comply with 8.1.

6B Vent-Air Intake Assemblies

6B.1 The requirements in this section are applicable to direct vented boiler systems that provide for separation (isolation) of the combustion system from the indoor atmosphere by an installation method.

6B.2 A boiler shall be provided with a vent-air intake. The intake for a boiler equipped with a draft regulator shall also provide air for draft regulator dilution. The intake shall be provided with means for secure attachment to the boiler or building structure. An intake shall communicate with the outside atmosphere. The boiler shall be marked in compliance with 47.20.

6B.3 Parts of flueways shall be joined in a manner to prevent disengagement and shall be tight when tested in accordance with this standard.

6B.4 The assembly shall be provided with a cap to prevent the entrance of debris or rain into the flue-gas conveying pipe and into any air passages terminating outside the structure.

6B.5 A cap shall be designed so that flue-gas or air passages will not be obstructed by soot accumulation, by leaves or debris falling or blown onto it, or by birds.

6B.6 A vent-air-intake assembly intended for installation through the roof or outside wall shall be designed for varying thicknesses of roof and wall construction in accordance with 6A.3 or 6A.4.

6B.7 An outer casing or other structural part of a vent-air intake assembly or connector exposed to the weather (exclusive of flue-gas conveying conduit) shall be made of material having durability and resistance to corrosion, fire, and heat equivalent to that of galvanized steel, 0.018 inch (0.46 mm) thick, and have a coating of zinc conforming with the coating Designation G90 in Table I of the Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, ASTM A653/A653M, with not less than 40 percent of the zinc on any side, based on the minimum single spot test requirement in this ASTM Designation. The weight of zinc coating may, in case of question, be established in accordance with the Standard Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings, ANSI/ASTM A90. Such parts that are always inside the structure shall comply with 8.1.

7 Casing

7.1 The outer casing or jacket shall be made of steel or equivalent material, braced, reinforced or formed so that it is not likely to be damaged through handling in shipment, installation, and use. Sheet metal casings shall be made of steel at least 0.020 inch (0.51 mm) (No. 24 MSG) thick if uncoated, or 0.023 inch (0.58 mm) (No. 24 GSG) if galvanized, or of nonferrous sheet metal having an average thickness of not less than 0.029 inch (0.74 mm).

7.2 Access panels that need to be removed for normal service and accessibility shall be constructed to permit removal and replacement repeatedly without causing damage or impairing any required insulating value.

7.3 A removable panel through which air is drawn for combustion shall be so constructed as to prevent it from being attached in a manner that may cause unsafe performance of the boiler assembly.

7.4 A removable panel shall be so constructed that it will not be interchangeable with other panels on the same boiler when interchange may allow unsafe operation of the boiler assembly.

7.5 The casing of a boiler assembly for installation on combustible flooring shall completely close the bottom or be constructed to provide an effective radiation barrier between the heat exchanger and the floor.