UL 730

STANDARD FOR SAFETY

Oil-Fired Wall Furnaces

UL Standard for Safety for Oil-Fired Wall Furnaces, UL 730

Fifth Edition, Dated August 29, 2003

Summary of Topics

This revision of ANSI/UL 730 is being issued to reaffirm approval as an American National Standard. No changes in requirements are involved.

The revisions are substantially in accordance with Proposal(s) on this subject dated September 30, 2016.

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

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AUGUST 29, 2003
(Title Page Reprinted: November 22, 2016)

UL/ANSI 730-2008 (R2016)

UL 730

Standard for Oil-Fired Wall Furnaces

First Edition – August, 1955
Second Edition – September, 1974
Third Edition – June, 1987
Fourth Edition – December, 1994

Fifth Edition

August 29, 2003

This ANSI/UL Standard for Safety consists of the Fifth Edition including revisions through November 22, 2016.

The most recent designation of ANSI/UL 730 as a Reaffirmed American National Standard (ANS) occurred on November 22, 2016. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

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

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INTRODUCTION

1 Scope

1.1 These requirements apply to oil-fired, vented, fan-type wall furnaces. Requirements for the installation and use of oil-burning equipment are included in the Standard for the Installation of Oil-Burning Equipment, NFPA 31.

1.2 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involves a risk of fire or of electric shock or injury to persons shall be evaluated using appropriate additional component and end-product requirements to maintain the level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard does not comply with this standard. Revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

2 General

2.1 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.

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

3.7 BASE – The main supporting frame or structure of the wall furnace, exclusive of legs.

3.8 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 burners.

3.9 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.

3.10 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.

3.11 BURNER, VAPORIZING TYPE – A burner consisting of an oil vaporizing bowl or other receptacle to which liquid fuel may be fed in controllable quantities; the heat of combustion being used to vaporize the fuel, with provision for admitting air and mixing it with the oil vapor in combustible proportions.

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

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

3.14 CHIMNEY CONNECTOR – The pipe which connects a solid or liquid fuel burning appliance to a chimney.

3.15 COMBUSTIBLE MATERIAL – Combustible material as pertaining to materials adjacent to or in contact with heat producing appliances, chimney connectors and vent connectors, 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 though flame-proofed, fire-retardant treated, or plastered.

3.16 COMBUSTION – The rapid oxidation of fuel accompanied by the production of heat, or heat and light. Complete combustion of a fuel is possible only in the presence of an adequate supply of oxygen.

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

3.18 COMBUSTION (FLAME) SAFEGUARD – A safety combustion control.

3.19 CONSTANT LEVEL VALVE – A device for maintaining within a reservoir a constant level of fuel for delivery to the burner.

3.20 CONTROL – A device intended to regulate the fuel, air, water, or electrical supply to the controlled equipment. It may be automatic, semiautomatic, or manual.

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

3.22 CONTROL, SAFETY – Automatic controls, including relays, switches, and other auxiliary equipment used in conjunction therewith to form a safety control system, which are intended to prevent unsafe operation of the controlled equipment.

3.23 CONTROL, PRIMARY SAFETY – The automatic safety control intended to prevent abnormal discharge of oil at the burner in case of ignition failure or flame failure.

3.24 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.

3.25 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.

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

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

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

3.29 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 peak or direct current) and supplied by a primary battery or by a standard Class 2 transformer or other suitable transforming device, or by a suitable combination of transformer and fixed impedance having output characteristics in compliance with what is required for a Class 2 transformer. 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.

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

3.31 FLUE – The general term for the conduit or passageway through which flue gases pass from the combustion chamber to the outer air.

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

3.33 FLUE GASES – Combustion products and excess air.

3.34 FUEL OIL – Any hydrocarbon oil as defined by the Standard for Specification for Fuel Oils, ANSI/ASTM D396.

3.34 revised October 1, 2008

3.35 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, and held in close contact with the combustion chamber walls. It is a self-contained combustion and heat transfer device, hence a direct heat transfer device.

3.36 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. It is an indirect heat transfer device.

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

3.38 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.

3.39 LIMIT CONTROL – See Control, Limit – 3.21.

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3.40 LINER – See Radiation Shield – 3.46.

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

3.42 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, and the like. 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.

e) Replacing igniter cable.

3.43 OIL-FIRED WALL FURNACE – A wall furnace 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 complete unit. This definition does not include oil stoves.

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

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

3.46 RADIATION SHIELD – A separate panel or panels interposed between heating surfaces and adjacent objects to reduce heat transmission by radiation.

3.47 RADIATOR – Auxiliary heat transfer surfaces within the casing, connected between the combustion chamber and the flue collar.

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

3.49 SAFETY CONTROL – See Control, Safety – 3.22.

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

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

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

3.53 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.

3.54 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.

3.55 VENTED APPLIANCE – An indirect fired appliance provided with a flue collar to accommodate a flue pipe for conveying flue gases to the outer air.

3.56 WALL FURNACE – A self-contained indirect-fired appliance intended for incorporation in, insertion into, or permanent attachment to a wall or partition, and furnishing heated air circulated by gravity or by a fan directly into the space to be heated through openings in the casing.

3A Undated References

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.1 added October 1, 2008

4 Components

4.1 Except as indicated in 4.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

4.2 A component 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 covered by this standard, or

b) Is superseded by a requirement in this standard.

4.3 A component shall be used in accordance with its rating established for the intended conditions of use.

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.

CONSTRUCTION – MECHANICAL

5 Assembly

5.1 A wall furnace shall be factory built as a group assembly and shall include all the essential components necessary for its normal function when installed as intended. A wall furnace may be shipped as two or more major subassemblies.

5.2 A wall furnace, if not assembled by the manufacturer as a unit, shall be arranged in major subassemblies. Each subassembly shall be capable of being incorporated readily into the final assembly without requiring alteration, cutting, drilling (except to the extent indicated in 5.3), threading, welding, or similar tasks by the installer. Two or more subassemblies, which must bear a definite relationship to each other for the proper and safe installation or operation of the furnace, 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 wall furnace are deemed to be the:

a) Burner;

b) Heat exchanger, including its base, combustion chamber, casing, and safety controls;

c) Blower assembly, including the base, filters, and casing; and

d) Blower motor if not included as part of the blower assembly.

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:

a) Assembled as part of the furnace;

b) Part of a subassembly that must be attached to the furnace for its normal operation; or

c) Such that the furnace cannot be assembled for operation without first attaching a required shield or baffle in its proper position.

5.5 The design of a wall furnace 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 wall furnace shall afford convenient operation by the user of those parts requiring attention or manipulation by him in normal usage.

5.7 Adjustable or movable parts shall be provided with locking devices to prevent accidental 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	(39.5)
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 A wall furnace shall be such that no portion of the products of combustion nor any portion of the heated circulating air or air from the space being heated will be discharged into spaces within walls, floor, or ceiling. Openings in the jacket, top, or sides, through which the chimney connector extends, shall be sufficiently close fitting to comply with this requirement.

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