RECOMMENDED STANDARDS for the INSTALLATION of WOODBURNING STOVES

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This guide has been prepared to inform the people of the State of Maine of the recommended standards for the installation of wood burning stoves. These standards have been approved by the Office of State Fire Marshal in accordance with the National Fire Protection Association's standards.

These standards cover all wood burning appliances with the exception of on-site constructed masonry stoves and fireplaces; stoves with water jackets or coils; and wood fueled central heating systems utilizing pipes, ducts, or similar distribution systems. Stoves for use in mobile homes should be specifically listed for such use. All listed wood burning stoves should be installed according to the manufacturers' recommendations.

DEFINITIONS

APPROVED: Acceptable to the authority having jurisdiction.

ASBESTOS MILLBOARD: A soft insulating board made with compressed asbestos fibers capable of being cut with knife or hand saw.

CHIMNEY: A vertical shaft enclosing one or more flues for conveying smoke, hot air, and other gases to the outside atmosphere.

CHIMNEY CONNECTION: The conduit connecting the wood stove with the vertical flue (generally stovepipe).

CIRCULATING STOVE: A wood burning appliance surrounded by an outer jacket with openings at the top and bottom so that room air passes between the stove and the jacket.

COMBUSTIBLE WALL: Any wall section that has the potential to burn. Only solid masonry or corrugated steel walls are considered non-combustible. Merely covering a wood studded wall with a non-combustible material does not constitute a non-combustible wall.

COOK STOVE: A wood burning stove used for cooking which includes an oven and surface heating areas.

DRAFT: The natural force which conducts smoke, hot air, and other gases to the outside atmosphere.

FIRE RESISTANT INSULATING BOARD: Listed or approved materials suitable for protecting combustible surfaces.

FLUE: A tube, pipe, or shaft for passage of smoke, hot air, gas, etc., as in a chimney.

FLUE COLLAR: That portion of an appliance designed for attachment to the chimney connector.

FLUE LINER: A material which resists high temperatures and is designed specifically for lining chimneys or connectors.

LISTED: Equipment or materials which meet nationally recognized standards or tests which determine suitability of usage in a specified manner.

RADIANT STOVE: Any wood burning appliance not designed as a circulating stove.

THIMBLE: Liner for the passageway where the chimney connector enters the chimney flue.

WOOD BURNING APPLIANCE: Any free-standing unit which utilizes wood as a fuel to produce heat. This includes stoves installed into fireplace openings.

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I. CLEARANCES FROM WOOD BURNING STOVES

Stoves must be provided with adequate clearances from combustible materials. The minimum clearances needed for safety are specified in National Fire Protection Association Standard # 211, Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances, 2003 Edition.

a. Clearances to Walls and Ceilings

Clearances indicated in Table 1 (below) are the minimum clearances from wood burning stoves to unprotected combustible wall and ceiling surfaces.

TABLE 1
Minimum Clearances from Wood Burning Stoves to Combustible Surfaces with No Added Protection

	Radiant	Circulating	Cookstove Clay lined Firepot	Cookstove Unlined Firepot	Stovepipe	Listed Stoves
Ceiling	**36"**	**36"**	**30"**	**30"**	**18"**	**Install According to Manufacturers Recommendations**
Front	**36"**	**24"**			**18"**	
Side	**36"**	**12"**	**Firing side 24" Opposite side 18"**	**Firing side 36" Opposite side 18"**	**18"**	
Rear	**36"**	**12"**	**24"**	**36"**	**18"**	

NOTE
Stoves may be installed with clearances less than those specified in Table 1 provided the combustible material is protected as described in Table 2 or Figure 1.

TABLE 2
Minimum Clearances from Wood Burning Stoves with Specified Forms of Protection
(See Footnotes)

Clearance reduction applied to and covering all combustible surfaces within the distance specified as required clearance with no protection	Maximum allowable reduction in clearance (%)		Where the required clearance with no protection is 36 in. the clearances below the minimum allowable clearances. For other required clearances with no protection, calculate minimum allowable clearances from maximum allowable reduction.	
	As Wall Protector		As Ceiling Protector	
	As Wall Protector (%)	As Ceiling Protector (%)	inches	inches
(a) 3 1/2 in. thick masonry wall without ventilated air space	33	-	24	-
(b) ½ in. thick noncombustible insulation board over 1-in. glass fiber or mineral wool batts without ventilated air space	50	33	18	24
(c) 0.024-in., 24 gauge sheet metal over 1-in. glass fiber or mineral wool batts reinforced with wire or equivalent, on rear fact with ventilated air space	66	50	12	18
(d) 3 ½ in. thick masonry wall with ventilated air space	66	-	12	-
(e) 0.024-in., 24 gauge sheet metal with ventilated air space	66	50	12	18
(f) ½ in. thick noncombustible insulation board with ventilated air space	66	50	12	18
(g) 0.024-in., 24 gauge sheet metal with ventilated air space over 0.024-in. 24 gauge sheet metal with ventilated air space	66	50	12	18
(h) 1-in. glass fiber or mineral wool batts sandwiched between two sheets 0.024-in., 24 gauge metal with ventilated air space	66	50	12	18

Table 2 Guidelines and Details continued on next page:

Table 2 Guidelines and Details

Notes:

1. Spacers and ties shall be of noncombustible material. No spacers or ties shall be directly behind appliance or conductor.

2. With all clearance reduction systems using a ventilated air space, adequate air circulation shall be provided as described in section 9-6.2.4 of NFPA # 211. There shall be a least 1 in. between the clearance reduction system and combustible walls and ceilings for clearance reduction systems using a ventilated air space.

3. Mineral wool batts (blanket or board) shall have a minimum density of 8 lb/ft^3 and have a minimum melting point of 1500˚F (816ºC).

4. Insulation material used as part of clearance reduction system shall have a thermal conductivity of 1.0 (Btu-in.)/(ft^2-hr-ºF) or less. Insulation board shall be formed of noncombustible material.

5. If a single-wall connector passes through a masonry wall used as a wall shield, there shall be at least ½ in. (13mm) of open, ventilated air space between the connector and the masonry.

6. There shall be at least 1 in. (25.4 mm) between the appliance and the protector. In no case shall the clearance between the appliance and the wall surface be reduced below that allowed in this table.

7. Clearances in front of the loading door or ash removal door, or both, of the appliance shall not be reduced from those in Section 9-5, NFPA 211.

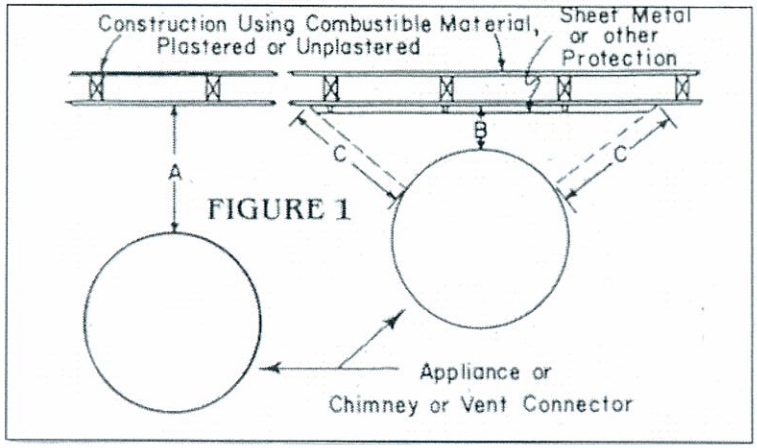
8. All clearances and thickness are minimums; larger clearances and thickness shall be permitted.

9. To calculate the minimum allowable clearance, the following formula can be used: C⑧r = C③n x [1 – (R/100]. C⑧r is the minimum allowable clearance, C③n is the required clearance with no protection, and *R* is the maximum allowable reduction in clearance.

10. Refer to Figures 9-6.2.1(e) and 9-6.2.1 (f), NFPA 211, for other reduced clearances using materials found in (a) through (h) of this table.

FIGURE 1

"A" equals the required clearance with no protection as specified in Table 1.



"B" equals the reduced clearance permitted in accordance with Table 2. The protection, applied to the construction using combustible material, should extend far enough in each direction to make "C" equal to "A".

b. **Clearances To Floors**

General Requirements

Residential-type solid fuel-burning appliances that are tested and listed by a recognized testing laboratory for installation on floors constructed of combustible materials shall be placed on floors in accordance with the requirements of the listing and conditions of approval. Such appliances that are not listed by a recognized testing laboratory shall be provided with floor protection in accordance with the provisions of 9-5.1.2 or 9-5.1.3 of NFPA # 21 1.

Exception: Residential-type solid fuel-burning appliances shall be permitted to be placed without floor protection in any one of the following manners:

(a) On concrete bases adequately supported on compacted soil; crushed Rock, or gravel
(b) On concrete slabs or masonry arches that do not have combustible materials attached to the underside.
(c) On approved assemblies constructed of only noncombustible materials and having a fire resistance rating of not less than 2 hours, with floors constructed of noncombustible material
(d) On properly stabilized ground that can support the load of the Appliance

Any floor assembly, slab, or arch shall extend not less than 18 in. (457 mm) beyond the appliance on all sides.

See Table Below for Standard Floor Clearances:

FLOOR CLEARANCES
FOR LISTED AND UNLISTED APPLIANCES

FLOOR CLEARANCES	
Length of Stove Leg	**Floor Clearance and Protection**
Less than 2 inches	**Fire resistant floor**
2 – 6 inches	**Combustible floor protection by 4 inches of hollow masonry, laid to provide circulation through the masonry layer, covered by 24-guage sheet metal.**
Over 6 inches	**Combustible floor protected by 2 inch thick masonry, placed over a sheet of 24-gauge sheet metal.**

- **Listed fire-resistant insulating board can be installed according to the manufacturer's recommendations.**

II. CHIMNEY CONNECTORS

A chimney connector links a stove to the chimney flue. Chimney connectors should be made from steel of minimum 24 gage thickness. Lower gage numbers indicate thicker stovepipe.

a. Clearances from Connectors

The clearance from a chimney connector to a combustible material should be not less than three times the diameter of the connector. Where the combustible material is protected, the clearance may be reduced to that indicated in Figure 1.

There are three methods for passing a chimney connector through a combustible wall. Figures 2, 3, & 4 illustrate these methods. In Figure 2 sheet metal or metal lathe and plaster finish may be used. When installing as illustrated in Figures 2 & 3, the distance from the connector to combustible materials must be equal to three times the diameter of the connector.

FIGURE 2

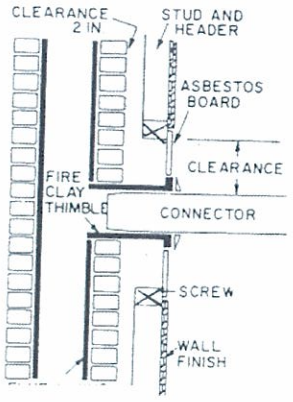
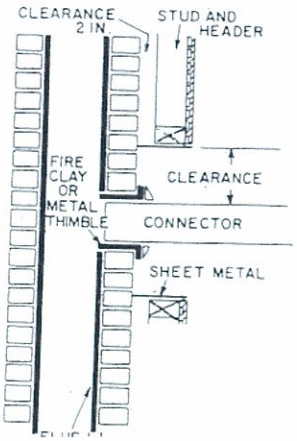
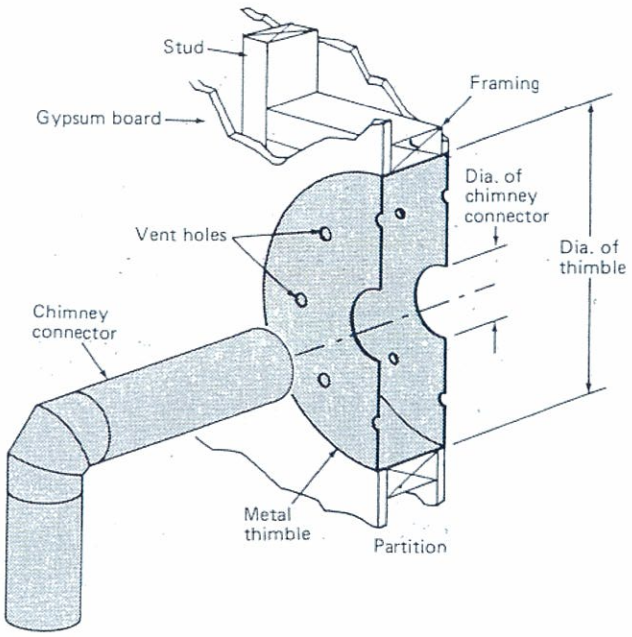


FIGURE 3



Try to avoid passing a connector pipe through an interior wall. If this must be done, use a ventilating thimble (See Figure 4). The thimble diameter must be at least 12 inches larger than that of the stovepipe, thus giving at least 6 inches of metal-lined, ventilated clearance. If you do not use a thimble, the clearance must be three times the pipe diameter. A 6 inch pipe would need a 42 inch diameter hole cut through a combustible wall.

FIGURE 4



Listed solid fuel pre-fabricated metal chimneys can also be used to pass through a combustible wall when installed according to manufacturers' recommendations.

b. Connector Pipe Installation

* Keep the connector pipe as short as possible. It should be no longer than 75% of the vertical chimney height above the thimble where the connector pipe enters the chimney.
* The stovepipe should be straight as well as short. Use no more than two right-angle bends in the stovepipe installation. Additional bends cause soot and creosote to collect in the stovepipe or chimney, block flue gas flow, and increase the danger of fire.
* The connector pipe's horizontal runs should rise ¼" for each foot of pipe, with the highest point being at the thimble.
* When joining the pipe, overlap the joints at least two inches, with the crimped end pointing down to prevent creosote drips or leaks. Secure each joint with three sheet metal screws. A fireproof sealant may be used in addition.
* All connector pipe joints should fit snugly, including connections with the stove and thimble. The connector pipe must not stick into the chimney flue itself because this would hamper the draft.
* Connector pipe should not pass through ceilings. Factory built, listed, all-flue chimneys should be utilized when passing through ceilings. Follow manufacturers' installation instructions for these chimneys.
* Connector pipe should not pass through closets. A closet fire could smolder and spread undiscovered.

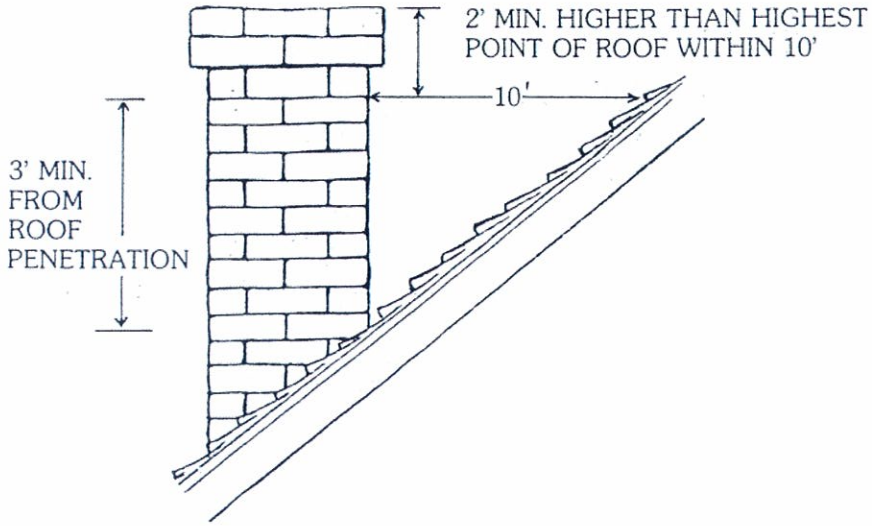
III. CHIMNEYS

The condition of a chimney should always be carefully evaluated before considering the installation of a wood-burning appliance. Beware of cracks, deteriorated mortar, and unsealed openings in any chimney before attaching a wood burning unit to it.

a. Chimney Draft

For sufficient draft a chimney should extend at least two feet higher than any portion of the building within ten feet horizontally from it (See Figure 5). The flue area should not be smaller than the largest connector pipe plus 50% of the additional area of a second connector entering the same flue.

FIGURE 5



b. Multiple Connections

More than one wood burning appliance should not be connected to a common flue. A chimney connector should not be connected to a flue serving a fireplace or an oil furnace. They should have their own individual flues.

One reason for this is that the sparks can enter the house through a fireplace opening serving a woodstove elsewhere along the line. Both a fireplace opening and an oil furnace's barometric damper will furnish large quantities of air to their flues. In the event of a chimney fire, this will hamper any attempts to extinguish the fire by restricting airflow to the flue. Using a wood-burning stove on a flue serving an oil furnace may also reduce the efficiency of the oil furnace, due to the change in draft characteristics of the flue. Multiple connections sometimes result in insufficient draft. If two or more stoves are connected to the same chimney flue, despite the recommendations against doing so, the connectors must enter the chimney at different elevations.

c. Listed Solid Fuel Pre-Fabricated Metal Chimneys

The use of pre-fabricated metal chimneys listed for installation with solid fuel heaters (not furnaces) are within the guidelines of the State Standard. Care should be taken, however, with the use of such chimneys to avoid creosote accumulation and the associated potential danger of a chimney fire. Air-controlled wood burning appliances should be operated in accordance with manufacturers' instructions to reduce the potential for creosote build up. Pre-fabricated metal chimneys can break down under the intense heat of a chimney fire, resulting in possible structural fire damage. They should always be installed in accordance with the manufacturers' recommendations.

IV. ORGANIZATIONS GOVERNING THE INSTALLATION OF WOOD BURNING EQUIPMENT

Certain Maine communities have ordinances governing the installation of wood burning equipment. Always check with your local Fire Department or Building Inspector before attempting installation. It is also important to consult with your insurance company regarding any restrictions they may have on wood burning appliance installation. All installations in public buildings must meet standards set by the Office of State Fire Marshal.

The wood burning appliances listed below are not covered by this recommended standard. For information on their installation, refer to the appropriate agency.

When Installing:	Consult With:
Site Built Masonry Flues and Fireplaces	Office of State Fire Marshal
Wood Fueled Furnaces or Boilers	Oil and Solid Fuel Burner Technicians Licensing Board
Wood Burning Units with Water Jackets or Coils	Plumbing Code Enforcement Officers
Listed Wood Fueled Mobile Home Heaters	State Manufactured Housing Board or Office of State Fire Marshal
Listed Wood Burning Stoves	The manufacturers' installation recommendations