

2021 Virginia Construction Code

CHAPTER 21 MASONRY

SECTION 2111 MASONRY FIREPLACES

2111.1 General.

The construction of masonry fireplaces, consisting of concrete or masonry, shall be in accordance with this section.

2111.2 Fireplace drawings.

The *construction documents* shall describe in sufficient detail the location, size and construction of masonry fireplaces. The thickness and characteristics of materials and the clearances from walls, partitions and ceilings shall be indicated.

2111.3 Footings and foundations.

Footings for masonry fireplaces and their chimneys shall be constructed of concrete or *solid masonry* not less than 12 inches (305 mm) thick and shall extend not less than 6 inches (153 mm) beyond the face of the fireplace or foundation wall on all sides. Footings shall be founded on natural undisturbed earth or engineered fill below frost depth. In areas not subjected to freezing, footings shall be not less than 12 inches (305 mm) below finished grade.

2111.3.1 Ash dump cleanout.

Cleanout openings, located within foundation walls below fireboxes, where provided, shall be equipped with ferrous metal or masonry doors and frames constructed to remain tightly closed, except when in use. Cleanouts shall be accessible and located so that ash removal will not create a hazard to combustible materials.

2111.4 Seismic reinforcement.

In structures assigned to *Seismic Design Category A* or *B*, seismic reinforcement is not required. In structures assigned to *Seismic Design Category C* or *D*, masonry fireplaces shall be reinforced and anchored in accordance with [Sections 2111.4.1](#), [2111.4.2](#) and [2111.5](#). In structures assigned to *Seismic Design Category E* or *F*, masonry fireplaces shall be reinforced in accordance with the requirements of [Sections 2101](#) through [2108](#).

2111.4.1 Vertical reinforcing.

For fireplaces with chimneys up to 40 inches (1016 mm) wide, four No. 4 continuous vertical bars, anchored in the foundation, shall be placed in the concrete between *wythes* of *solid masonry* or within the *cells* of hollow unit masonry and grouted in accordance with [Section 2103.3](#). For fireplaces with chimneys greater than 40 inches (1016 mm) wide, two additional No. 4 vertical bars shall be provided for each additional 40 inches (1016 mm) in width or fraction thereof.

2111.4.2 Horizontal reinforcing.

Vertical reinforcement shall be placed enclosed within $\frac{1}{4}$ -inch (6.4 mm) ties or other reinforcing of equivalent net cross-sectional area, spaced not to exceed 18 inches (457 mm) on center in concrete; or placed in the *bed joints* of unit masonry at not less than every 18 inches (457 mm) of vertical height. Two such ties shall be provided at each bend in the vertical bars.

2111.5 Seismic anchorage.

Masonry fireplaces and foundations shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above grade with two $\frac{3}{16}$ -inch by 1-inch (4.8 mm by 25 mm) straps embedded not less than 12 inches (305 mm) into the chimney. Straps shall be hooked around the outer bars and extend 6 inches (152 mm) beyond the bend. Each strap shall be fastened to not fewer than four floor joists with two $\frac{1}{2}$ -inch (12.7 mm) bolts.

Exception: Seismic anchorage is not required for the following:

1. In structures assigned to *Seismic Design Category A* or *B*.
2. Where the masonry fireplace is constructed completely within the *exterior walls*.

2111.6 Firebox walls.

Masonry fireboxes shall be constructed of *solid masonry units*, hollow *masonry units* grouted solid, stone or concrete. Where a lining of firebrick not less than 2 inches (51 mm) in thickness or other *approved* lining is provided, the minimum thickness of back and sidewalls shall each be 8 inches (203 mm) of *solid masonry*, including the lining. The width of joints between firebricks shall be not greater than $\frac{1}{4}$ inch (6.4 mm). Where a lining is not provided, the total minimum thickness of back and sidewalls shall be 10 inches (254 mm) of *solid masonry*. Firebrick shall conform to [ASTM C27](#) or [ASTM C1261](#) and shall be laid with medium-duty refractory *mortar* conforming to [ASTM C199](#).

2111.6.1 Steel fireplace units.

Steel fireplace units are permitted to be installed with *solid masonry* to form a masonry fireplace provided that they are installed according to either the requirements of their listing or the requirements of this section. Steel fireplace units incorporating a steel firebox lining shall be constructed with steel not less than $\frac{1}{4}$ inch (6.4 mm) in thickness, and an air-circulating chamber that is ducted to the interior of the building. The firebox lining shall be encased with *solid masonry* to

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provide a total thickness at the back and sides of not less than 8 inches (203 mm), of which not less than 4 inches (102 mm) shall be of *solid masonry* or concrete. Circulating air ducts employed with steel fireplace units shall be constructed of metal or masonry.

2111.7 Firebox dimensions.

The firebox of a concrete or masonry fireplace shall have a minimum depth of 20 inches (508 mm). The throat shall be not less than 8 inches (203 mm) above the fireplace opening. The throat opening shall be not less than 4 inches (102 mm) in depth. The cross-sectional area of the passageway above the firebox, including the throat, damper and smoke chamber, shall be not less than the cross-sectional area of the flue.

Exception: Rumford fireplaces shall be permitted provided that the depth of the fireplace is not less than 12 inches (305 mm) and not less than one-third of the width of the fireplace opening, and the throat is not less than 12 inches (305 mm) above the lintel, and not less than $\frac{1}{20}$ the cross-sectional area of the fireplace opening.

2111.8 Lintel and throat.

Masonry over a fireplace opening shall be supported by a lintel of noncombustible material. The minimum required bearing length on each end of the fireplace opening shall be 4 inches (102 mm). The *fireplace throat* or damper shall be located not less than 8 inches (203 mm) above the top of the fireplace opening.

2111.8.1 Damper.

Masonry fireplaces shall be equipped with a ferrous metal damper located not less than 8 inches (203 mm) above the top of the fireplace opening. Dampers shall be installed in the fireplace or at the top of the flue venting the fireplace, and shall be operable from the room containing the fireplace. Damper controls shall be permitted to be located in the fireplace.

2111.9 Smoke chamber walls.

Smoke chamber walls shall be constructed of solid *masonry units*, hollow *masonry units* grouted solid, stone or concrete. The total minimum thickness of front, back and sidewalls shall be 8 inches (203 mm) of *solid masonry*. The inside surface shall be parged smooth with refractory mortar conforming to [ASTM C199](#). Where a lining of firebrick not less than 2 inches (51 mm) thick, or a lining of vitrified clay not less than $\frac{5}{8}$ inch (15.9 mm) thick, is provided, the total minimum thickness of front, back and sidewalls shall be 6 inches (152 mm) of *solid masonry*, including the lining. Firebrick shall conform to [ASTM C1261](#) and shall be laid with refractory *mortar* conforming to [ASTM C199](#). Vitrified clay linings shall conform to [ASTM C315](#).

2111.9.1 Smoke chamber dimensions.

The inside height of the smoke chamber from the *fireplace throat* to the beginning of the flue shall be not greater than the inside width of the fireplace opening. The inside surface of the smoke chamber shall not be inclined more than 45 degrees (0.76 rad) from vertical where prefabricated smoke chamber linings are used or where the smoke chamber walls are rolled or sloped rather than corbeled. Where the inside surface of the smoke chamber is formed by corbeled masonry, the walls shall not be corbeled more than 30 degrees (0.52 rad) from vertical.

2111.10 Hearth and hearth extension.

Masonry fireplace hearths and hearth extensions shall be constructed of concrete or masonry, supported by noncombustible materials, and reinforced to carry their own weight and all imposed *loads*. Combustible material shall not remain against the underside of hearths or hearth extensions after construction.

2111.10.1 Hearth thickness.

The minimum thickness of fireplace hearths shall be 4 inches (102 mm).

2111.10.2 Hearth extension thickness.

The minimum thickness of hearth extensions shall be 2 inches (51 mm).

Exception: Where the bottom of the firebox opening is raised not less than 8 inches (203 mm) above the top of the hearth extension, a hearth extension of not less than $\frac{3}{8}$ -inch-thick (9.5 mm) brick, concrete, stone, tile or other *approved* noncombustible material is permitted.

2111.11 Hearth extension dimensions.

Hearth extensions shall extend not less than 16 inches (406 mm) in front of, and not less than 8 inches (203 mm) beyond, each side of the fireplace opening. Where the fireplace opening is 6 square feet (0.557 m²) or larger, the hearth extension shall extend not less than 20 inches (508 mm) in front of, and not less than 12 inches (305 mm) beyond, each side of the fireplace opening.

2111.12 Fireplace clearance.

Any portion of a masonry fireplace located in the interior of a building or within the *exterior wall* of a building shall have a clearance to combustibles of not less than 2 inches (51 mm) from the front faces and sides of masonry fireplaces and not less than 4 inches (102 mm) from the back faces of masonry fireplaces. The airspace shall not be filled, except to provide

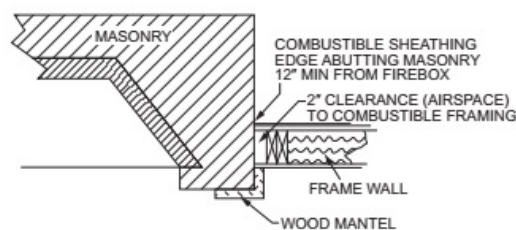
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fireblocking in accordance with [Section 2111.13](#).

Exceptions:

1. Masonry fireplaces *listed* and *labeled* for use in contact with combustibles in accordance with [UL 127](#) and installed in accordance with the manufacturer's instructions are permitted to have combustible material in contact with their exterior surfaces.
2. Where masonry fireplaces are constructed as part of masonry or concrete walls, combustible materials shall not be in contact with the masonry or concrete walls less than 12 inches (306 mm) from the inside surface of the nearest firebox lining.
3. Exposed combustible *trim* and the edges of sheathing materials, such as wood siding, flooring and drywall, are permitted to abut the masonry fireplace sidewalls and hearth extension, in accordance with [Figure 2111.12](#), provided that such combustible *trim* or sheathing is not less than 12 inches (306 mm) from the inside surface of the nearest firebox lining.
4. Exposed combustible mantels or *trim* is permitted to be placed directly on the masonry fireplace front surrounding the fireplace opening, provided that such combustible materials shall not be placed within 6 inches (153 mm) of a fireplace opening. Combustible material directly above and within 12 inches (305 mm) of the fireplace opening shall not project more than $\frac{1}{8}$ inch (3.2 mm) for each 1-inch (25 mm) distance from such opening. Combustible materials located along the sides of the fireplace opening that project more than $1\frac{1}{2}$ inches (38 mm) from the face of the fireplace shall have an additional clearance equal to the projection.



For SI: 1 inch = 25.4 mm

FIGURE 2111.12
ILLUSTRATION OF EXCEPTION TO FIREPLACE CLEARANCE PROVISION

2111.13 Fireplace fireblocking.

All spaces between fireplaces and floors and ceilings through which fireplaces pass shall be fireblocked with noncombustible material securely fastened in place. The *fireblocking* of spaces between wood joists, beams or headers shall be to a depth of 1 inch (25 mm) and shall only be placed on strips of metal or metal lath laid across the spaces between combustible material and the chimney.

2111.14 Exterior air.

Factory-built or masonry fireplaces covered in this section shall be equipped with an exterior air supply to ensure proper fuel combustion unless the room is mechanically ventilated and controlled so that the indoor pressure is neutral or positive.

2111.14.1 Factory-built fireplaces.

Exterior combustion air ducts for factory-built fireplaces shall be *listed* components of the fireplace, and installed according to the fireplace manufacturer's instructions.

2111.14.2 Masonry fireplaces.

Listed combustion air ducts for masonry fireplaces shall be installed according to the terms of their listing and manufacturer's instructions.

2111.14.3 Exterior air intake.

The exterior air intake shall be capable of providing all combustion air from the exterior of the *dwelling*. The exterior air intake shall not be located within a garage, *attic*, *basement* or crawl space of the *dwelling* nor shall the air intake be located at an elevation higher than the firebox. The exterior air intake shall be covered with a corrosion-resistant screen of $\frac{1}{4}$ -inch (6.4 mm) mesh.

2111.14.4 Clearance.

Unlisted combustion air ducts shall be installed with a minimum 1-inch (25 mm) clearance to combustibles for all parts of the duct within 5 feet (1524 mm) of the duct outlet.

2111.14.5 Passageway.

The combustion air passageway shall be not less than 6 square inches (3870 mm²) and not more than 55 square inches

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(0.035 m²), except that combustion air systems for *listed* fireplaces or for fireplaces tested for emissions shall be constructed according to the fireplace manufacturer's instructions.

2111.14.6 Outlet.

The exterior air outlet is permitted to be located in the back or sides of the firebox chamber or within 24 inches (610 mm) of the firebox opening on or near the floor. The outlet shall be closable and designed to prevent burning material from dropping into concealed combustible spaces.