

Chapter 5

Foundations

Structural requirements for masonry heater installations

Why Masonry Heaters Require Engineered Foundations

A masonry heater is not a piece of furniture you set on the floor. Depending on configuration, a fully finished heater with facing stone, foundation, and chimney can weigh 6,000 to 12,000 pounds or more. In virtually every case, the heater's foundation must be structurally independent of the house framing - it sits on its own footing and does not transfer load to the floor joists.

The foundation layout, including chimney placement, must be determined during the design phase of your project, before the house framing is complete. Your structural engineer or architect should be provided with the heater specifications and anticipated finished weight before they design the floor system around the heater footprint.

Standard foundation specification: 4,500 psi concrete or better, 8 inches deep, with 1/2-inch rebar at 12 inches on center. This applies to the concrete slab that the heater core sits on. The footing below may require additional depth depending on frost depth and soil conditions in your area.

Foundation Types

Slab on Grade

For homes built on a concrete slab, the heater foundation is typically a thickened, reinforced section of slab poured to the heater's footprint - at least 6 inches thick with additional rebar, poured on compacted soil, and tied into the main slab. Clearances from the slab's combustible bottom form to the bottom of the heater must be observed: a minimum 2-inch clearance between the foundation and any combustible materials.

Full Basement - CMU and Poured Concrete Wall Foundations

For homes with full basements, the heater foundation typically rises from a footing poured at or near the basement floor level up to the main floor subfloor level, then supports a reinforced concrete slab on which the heater core is built. Concrete masonry unit (CMU) foundations are most common.

Making Use of the Foundation Interior

The hollow interior space inside a CMU foundation is some of the most useful square footage in the house if you plan for it. We routinely help clients incorporate access doors into the CMU foundation walls to create root cellars, firewood storage areas, secure storage for valuables, or space for a basement stove installed in front of the foundation.

For large heaters, we typically install a structural steel I-beam down the center of the foundation, just below the top concrete slab, to support the slab and carry the full heater weight. This is especially important for SR-22 configurations and any heater with an extended heated bench.

Outside Combustion Air

In most homes, dedicated outside combustion air is not required. Because the burn cycle is short - approximately two hours - and air consumption during firing is relatively modest, a standard house with normal air infiltration provides adequate combustion air. We typically do not install dedicated outside combustion air except in super-tight homes under approximately 1,000 square feet where air infiltration has been reduced to near zero. In those cases, a 6-inch diameter dedicated outside air supply may be specified.

Reference: Norbert Senf, Air Requirements and Related Parameters for Masonry Heating Systems, prepared for The Research Division, Canada Mortgage and Housing Corporation, Ottawa, 1994. Available through the MHA technical library at mha-net.org.

Masonry heater building codes and clearances: <https://solidrockmasonry.com/masonry-heater-building-codes/>

Download the complete guide at:

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