SOLID ROCK MASONRY HEAT

The Complete Masonry Heater Planning Guide

Design, Sizing, Finishing and Construction for Homeowners, Builders, and Architects in North America

By Eric Moshier, Certified Heater Mason

Third-Generation Mason | MHA Voting Member | In Business Since 2003

2026 Edition

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Individual chapters are available as separate downloads at solidrockmasonry.com/masonry-heater-planning-guide/

Chapter 1

What Is a Masonry Heater?

A heating system unlike any other

> *A masonry heater burns a full load of dry wood in 2 to 3 hours, stores that heat in its masonry mass, and then radiates it slowly and evenly into your living space over the next 12 to 24 hours. It is the cleanest, most efficient way to burn cordwood available in North America today.*

A Heating System Unlike Any Other

A masonry heater is a wood-burning heating appliance built from dense, heat-storing masonry materials - firebrick, refractory castings, stone, or tile - that stores a large amount of heat energy from a short, hot fire and then radiates that heat slowly and evenly into your living space over the next 12 to 24 hours.

Because the heater stores heat in its mass rather than releasing it immediately, you can burn wood at its most efficient temperature - fast and hot, with near-complete combustion - without overheating your home. The fire is done in two hours. The warmth continues all day.

This is fundamentally different from every other wood-burning appliance available in North America. A wood stove releases heat as fast as it burns, which means to stay comfortable you constantly regulate the fire - often by damping it down, which produces smoke, creosote, and incomplete combustion. A fireplace sends roughly 80 to 90 percent of its heat straight up the chimney. A masonry heater does neither of these things.

A Brief History: 1,000 Years of Masonry Heating

Masonry heaters are not new technology. They are among the oldest and most refined heating systems in human history. From the 10th century onward, homes throughout Europe were heated with wood-burning masonry stoves. By the 15th century, wood shortages had become a serious crisis across the continent, and European governments began investing heavily in more efficient stove designs.

Kings in Prussia, Sweden, Norway, and Denmark commissioned their craftsmen and architects to develop better designs. This concentrated effort over two centuries produced the modern contraflow masonry heater - a design that has remained essentially unchanged because it is already close to optimal.

In Germany, roughly 19,000 masonry heaters are built every year by trained craftsmen working in a dedicated trade. All of North America builds fewer than 1,000. The gap is not about quality or performance. The gap is about education. That is why this guide exists.

How a Masonry Heater Works

Thermal Mass: The Secret to Masonry Heat

When you fire a masonry heater, the hot combustion gases travel through a series of internal channels that maximize their contact with the surrounding masonry before exiting through the chimney. By the time the

gases leave the heater, they have surrendered most of their heat to the mass. Exhaust temperatures from a masonry heater chimney typically run between 200 and 300 degrees Fahrenheit. A conventional wood stove or fireplace may exhaust gases at 600 to 900 degrees, sending most of that energy straight outdoors.

All of that captured heat then slowly radiates back into your living space over the next 12 to 24 hours, keeping your home at a comfortable, even temperature.

Rapid, Complete Combustion

Because the masonry mass stores the heat, you do not need to regulate the fire to control your room temperature. You burn a full fuel charge - typically 35 to 65 pounds of wood depending on your model - as hot and fast as the firebox allows. The fire burns completely in about two hours.

Wood gases must reach approximately 1,100 degrees Fahrenheit to ignite and burn completely. In a masonry heater operating at full fire, combustion temperatures routinely exceed 1,500 degrees Fahrenheit. Almost nothing escapes unburned. Particulate emissions have been independently tested at less than 1 gram per kilogram of wood burned. Open fireplaces average over 17 grams. Conventional wood stoves average over 15 grams. Even EPA Phase II certified wood stoves average over 7 grams.

The US EPA classifies masonry heaters as non-affected facilities - specifically excluded from certification requirements because they already meet or exceed the spirit of what certification is trying to achieve.

Emissions testing data: https://solidrockmasonry.com/particulate-emissions-testing/

View completed heater gallery: https://solidrockmasonry.com/gallery/

Download the complete guide at:
https://solidrockmasonry.com/masonry-heater-planning-guide/
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Chapter 2

The Benefits of Masonry Heating

Radiant heat, environmental performance, and long-term value

Radiant Heat: Why It Feels Different

The single most important thing to understand about masonry heating is that it is a radiant heating system, not a convective one. Your body loses heat through two mechanisms: convection (the air temperature around you) and radiation (the infrared energy emitted by surfaces in your environment). In an average winter house, about 60 percent of your body heat loss is through radiation.

This means that the temperature of the air in a room tells only part of the story about whether you feel comfortable. What matters equally is the mean radiant temperature - the average surface temperature of the walls, floors, and objects around you. When surfaces are warm, you feel warm even at lower air temperatures.

Research from the Tulikivi Radiant Heat Study and independent European studies consistently shows that radiantly heated rooms feel comfortable across a wider range of air temperatures than convectively heated rooms. People in radiantly heated spaces typically set their thermostats 2 to 4 degrees lower than in comparable forced-air homes.

Additional Comfort Benefits

Less Dust and Better Air Quality

Forced-air heating systems circulate dust, allergens, and fine particles throughout your living space every time the blower runs. Masonry heat does not move air at all. The gentle convection currents created by the warm heater surface are minimal, and there is no blower to push dust around. People with allergies and respiratory conditions consistently report significant improvement in winter air quality when switching to radiant masonry heat.

Even Temperature Throughout the Day

Because masonry heaters release heat slowly and steadily over many hours, room temperatures remain remarkably stable. There are no cycles of hot and cold, no periods of overheating followed by cool-down. The heater simply maintains a gentle, even warmth. Radiant heat also reduces stratification - that layering of warm air at the ceiling and cold air at the floor that forced-air systems create.

Environmental Benefits

Wood Is a Carbon-Neutral Fuel

When trees grow, they absorb carbon dioxide from the atmosphere and store it as cellulose. When you burn wood, you are releasing carbon that was recently taken from the atmosphere, not carbon that has been sequestered underground for millions of years like fossil fuels. Provided that trees are harvested

sustainably, burning wood has essentially zero net impact on atmospheric carbon dioxide.

The Cleanest Way to Burn Wood

Masonry heaters burn fast and hot, producing particulate emissions among the lowest of any solid fuel appliance you can legally install. Emissions data from Lopez Labs testing shows masonry heaters averaging under 1 gram of particulate matter per kilogram of wood burned - compared to 17.3 g/kg for open fireplaces and 15.3 g/kg for conventional wood stoves.

Full emissions testing data: https://solidrockmasonry.com/particulate-emissions-testing/

MHA Lopez Labs testing archive: https://www.mha-net.org/category/lopez-report/

Long-Term Value

A well-built masonry heater is a multigenerational investment. There are masonry heaters in Europe that have been heating homes continuously for over 100 years. The average forced-air furnace lasts 15 to 20 years before requiring replacement. The materials in a masonry heater - stone, clay brick, refractory ceramics - are essentially permanent. The only components that typically require replacement over the life of the heater are the firebox liner and door, both designed to be field-replaceable.

When you calculate total cost of ownership over 30 years - including replacement costs, maintenance, fuel, and operating expenses - a masonry heater typically compares very favorably to conventional heating systems for clients with access to affordable firewood.

Are masonry heaters worth it? (full cost analysis): https://solidrockmasonry.com/are-masonry-heaters-worth-it/

View completed heater gallery: https://solidrockmasonry.com/gallery/

Download the complete guide at:
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Chapter 3

Designing and Sizing Your Masonry Heater

Heat loss, model selection, and floor plan considerations

Start With a Heat Loss Calculation

Before selecting a masonry heater model, you need a reasonable estimate of how much heat your home requires. We recommend LoadCalc.net for initial planning. It is free and gives you the numbers you need.

> *Important: The BTU/hr figure from a heat loss calculation is peak demand - the worst-case hour on the coldest night of the year. A masonry heater's output is not measured in BTU/hr the way a furnace is. The heater stores heat and releases it over 12 to 24 hours. Compare the heater's total daily BTU output to your home's total daily heat demand, not the peak hourly figure. If you size a masonry heater against a peak BTU/hr number, you will overbuild every time.*

Free heat loss calculator: https://www.loadcalc.net/

Volume-Based Sizing

Square footage alone does not tell the full story. The volume of heated space - length times width times ceiling height - is a more accurate starting point. A 1,500-square-foot home with 8-foot ceilings has a heated volume of 12,000 cubic feet. The same footprint with a 14-foot vaulted ceiling has a heated volume of roughly 21,000 cubic feet - 75 percent more air to heat from the same floor area. Vaulted ceilings are one of the most common reasons a homeowner ends up needing a larger heater than the square footage would suggest.

Climate Zone

A home in northern Minnesota, northern Wisconsin, or the Upper Peninsula of Michigan has a significantly higher heat demand than the same home in Tennessee or North Carolina. For homes in heating degree day zones above 8,000 (northern Minnesota, the Dakotas, northern Wisconsin), we size conservatively and often recommend the next model up if the home has any unusual heat loss factors.

Open Floor Plans Perform Best

Masonry heat travels in straight lines like sunlight, warming everything in its direct path. An open floor plan allows radiant energy to reach more of your living space directly. Closed rooms behind walls and doors will be somewhat cooler. A bedroom behind a wall will typically run 5 to 8 degrees cooler than the main living area - which many clients find perfectly comfortable for sleeping.

Selecting the Right SR Core Model

We offer three standard firebox sizes: the SR-13, SR-18, and SR-22. All three are available in both Hybrid and Cast configurations and support the full range of design options, oven choices, and heated bench

additions. Heating area estimates assume 8-foot ceilings and Energy Star rated construction.

SR-13 (13" x 18" firebox): Covers approximately 1,000 to 1,200 square feet. Finished dimensions with 4" veneer: ~43" W x 32" D x 80" H.

SR-18 (17" x 18" firebox): Covers approximately 1,500 to 1,800 square feet. Finished dimensions: ~48" W x 32" D x 80" H.

SR-22 (22" x 18" firebox): Covers approximately 1,800 to 2,000 square feet. Finished dimensions: ~53" W x 32" D x 80" H.

For most new construction homes between 1,500 and 2,000 square feet, the SR-22HBO - the SR-22 with a black bake oven - is the model we recommend most often. It handles the heating load comfortably, adds the functionality of the oven, and is well-suited to Midwest and northern climates.

When One Heater Is Not Enough

A single masonry heater can typically heat 1,000 to 2,000 square feet of well-insulated living space depending on the model, climate, and ceiling heights. For larger homes, two masonry heaters or a heater-plus-in-floor-radiant combination is typically the right answer. Two SR-18 heaters can adequately heat a well-insulated 3,000 to 3,500 square foot home with proper floor plan design.

SR masonry heater systems and design: https://solidrockmasonry.com/masonry-heaters/

Chapter 4

The SR Core System

Hybrid vs. Cast Core, venting configurations, and options

Two Ways to Build: Hybrid Core vs. Cast Core

Every SR masonry heater is built around one of two core system types. Both deliver identical radiant heat performance. The difference is in the materials, the build time, and the kit cost.

SR Hybrid Core: Uses approximately 230 firebricks as the primary structural material with 18 cast refractory slabs. More economical kit cost with additional build time. Best for experienced builders, owner-builders comfortable with brickwork, or projects where kit cost is the primary consideration.

SR Cast Core: Uses approximately 40 firebricks with 55 precision refractory castings that fit together with minimal cutting. Fastest and least technically demanding system to build. Higher kit cost is typically offset by reduced labor time. Best for first-time builders, contractors without masonry backgrounds, or projects where speed and simplicity matter most.

Every kit ships with all materials needed to build the heater core: firebrick, refractory mortar, refractory slabs, insulation, gasketing, expansion material, and your SR doors. Also included: full course-by-course 2D SketchUp blueprint drawings in PDF format, 3D elevations, and custom architectural facade design services through our AIA-certified architect.

Design and Venting Configurations

We select the appropriate configuration for each project based on your floor plan, chimney placement, desired options, and heating goals. You do not need to choose this yourself.

Finnish Contraflow: Gases travel from the firebox through or around the oven into a channel above, then down both side channels evenly before venting. Highly efficient, especially with a 3-sided heated bench and side chimney connection. Our most popular configuration.

J-Loop Design: Gases travel down one side, under the firebox, up the opposite side, and out through a top chamber. Strong, versatile performer across a wide range of floor plans.

Swedish 5-Run Design: Most compact design. Gases travel through five runs within a small footprint. Works well where horizontal footprint is a concern.

Russian Bell Design: Uses a large upper chamber into which hot gases rise and collect before cooling and descending. Produces very even, sustained heat output. The only design that readily accommodates a black bake oven on the side of the heater.

German/Austrian Kachelofen and Grundofen: Full calculated designs with extraordinary design freedom. Every channel, every dimension, and every material specification is calculated for maximum thermal performance before a single brick is laid.

Bake Oven Options

Black Oven (Direct Fire - Most Recommended): Flames and hot gases pass directly through the oven chamber before entering the heat exchange channels. During fire: exceeds 1,000 F. Two hours after fire: approximately 650 to 700 F (pizza). Three hours after fire: 400 to 500 F (hearth bread). Eight or more hours after fire: 350 F (slow roasting). Twelve hours after a 65 lb fire: still near 250 F.

White Oven (Indirect Fire): Hot gases travel around the outside of the oven chamber rather than through it. Oven interior stays completely clean - no ash or soot. With one fire per day: 250 to 350 F. With two fires per day: 500 to 600 F. Ideal for roasting, casseroles, slow baking.

Heated Benches

We design heated benches into approximately 85 percent of our heaters. The bench becomes part of the heater's thermal mass. Additional gas channels run through the bench structure, slowing exhaust gases and extracting more heat from the same fire. Bench surface temperatures typically run between 100 and 140 degrees Fahrenheit - warm enough for comfortable seating or therapeutic use, but not hot enough to burn. Heated bench pricing: $250 per linear foot.

Cook Stove Integration

A steel cook top integrated directly above the firebox uses the same fire that heats your home to heat your cooktop surface. Available in SR-13 and SR-18 firebox sizes. Bake oven and heated bench options can be incorporated.

Domestic Hot Water

A stainless steel heat exchanger coil installed in the firebox can contribute to preheating your domestic hot water supply during the heating season. All domestic hot water systems must be engineered and installed by a licensed steam fitter. Important: a masonry heater will not adequately drive a glycol in-floor radiant system as a primary heat source.

SR DIY masonry heater kits: https://solidrockmasonry.com/solid-rock-diy-masonry-heater-kits/

View completed heater gallery: https://solidrockmasonry.com/gallery/

Download the complete guide at:
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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/

Chapter 6

Chimney Systems

Masonry, metal, and combination chimney design for masonry heaters

The Most Important Part of Your System

The chimney is not an afterthought. It is the engine that drives the entire combustion process. Good chimney draft makes lighting easy, produces complete combustion, and eliminates smoke spillage. Poor chimney design causes chronic startup problems, smoke spillage, creosote buildup, and in extreme cases, chimney fires.

Interior vs. Exterior Chimneys

An interior chimney passes through the conditioned space of your home before exiting through the roof. Because the chimney is surrounded by warm house air, it stays relatively warm and maintains strong draft throughout the heating season. An exterior chimney is surrounded by cold outdoor air during cold weather and can become very cold between fires. Cold chimneys are the primary cause of difficult starts, smoke spillage, and creosote problems.

> *Whenever possible, route your chimney through the interior of the building, exiting through the roof at or near the ridge. An interior chimney that stays warm performs reliably in all conditions. If an exterior chimney is unavoidable, an insulated factory-built chimney system is essential, and a bypass damper should be included in the design to allow preheating of the flue before opening the firebox door.*

Chimney Options

Masonry Chimneys

A fully masonry chimney - clay tile liner inside a brick or concrete block chase - performs excellently when built correctly and located inside the thermal envelope. Clay tile liners must be refractory-grade and laid with refractory mortar. The liner joints must be tight and smooth; no ledges should be formed from one tile to the next. A 1/2-inch space must be maintained between the liner and the surrounding masonry for thermal expansion. Minimum height: 18 feet of total height from the heater connection to the top of the chimney cap for adequate draft.

DuraVent DVL and Class A Factory-Built Systems

For most of our installations, we specify and supply DuraVent factory-built chimney systems. The connection from our SR chimney adapter to the DuraVent system uses DVL double-wall black stovepipe in the lower section. At the ceiling penetration, the system transitions to Class A insulated chimney pipe through the attic and out the roof. The ceiling support box carries the full weight of the Class A chimney above it - the SR adapter is designed so that none of the chimney weight bears on the heater itself. This weight transfer detail is critical: if chimney weight bears on the heater cap, thermal expansion during firing will crack the cap.

Combination - Clay Tile Plus DuraVent

For heated bench configurations with a side chimney connection, we often install approximately 8 feet of clay tile chimney rising from the bench before connecting to our SR chimney adapter and transitioning to DuraVent Class A. This combination gives excellent mass and thermal performance in the lower section.

Flue Sizing

SR-13: 7-inch round inside diameter, or equivalent 8x12 OD clay tile.

SR-18 and SR-22: 8-inch round inside diameter, or equivalent 8x12 ID clay tile.

The SR Chimney Adapter and Damper

Every SR heater using a metal chimney system is connected through our SR chimney adapter, which provides the transition from the heater's clay tile connection to the metal chimney pipe and incorporates a shutoff damper. Closing the damper after the fire is completely out is one of the most important operational steps for maximizing heat retention. With the damper closed, the heat stored in the mass radiates entirely into your living space.

> *Never close the damper while any combustion is still occurring. Closing the damper prematurely traps carbon monoxide in the heater and can allow it to enter the living space. Wait until the firebox coals are completely extinguished - typically 2 to 3 hours after loading - before closing the damper. When in doubt, wait.*

Masonry heater building codes: https://solidrockmasonry.com/masonry-heater-building-codes/

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Chapter 7

Finishing Options

Stone, brick, tile, stucco, and Kachelofen traditions

The exterior finishing material of your masonry heater is more than aesthetic. The outer facing is part of the active thermal mass of the heater. A minimum of 4 inches of solid masonry on all sides is required by code and for performance - this mass absorbs heat from the core during firing and radiates it slowly into your space over many hours.

Natural Stone Veneer

Full 4 to 5.5-inch natural stone veneer is the finishing material our clients choose most often. Natural stone has outstanding thermal mass properties, ages beautifully, requires essentially no maintenance, and creates a heater that looks like it has always been part of the home. Minnesota fieldstone, quartzite, granite, limestone, and sandstone all work well. Local sourcing is often possible in rural areas.

Thin stone veneer at 1 to 1.5 inches is not appropriate - it does not provide adequate thermal mass and is not code-compliant as a heater facing.

Brick Veneer

Common face brick at 4 inches is the second most common finishing choice. Brick is somewhat more economical than stone in most markets and available in a wide range of colors and textures. The mortar color selection is as important as the brick color - a gray or buff mortar with a warm red brick is very different from the same brick with a dark charcoal mortar.

Concrete Block with Stucco or Thin Veneer Stone

CMU construction with a stucco or thin real stone veneer finish is the most economical finishing approach and is well-suited to contemporary, Scandinavian, or farmhouse aesthetics. Thin real stone veneer at 3 to 4 inches applied over CMU combines the economics of CMU construction with the warmth and texture of natural stone.

Limewash and Stucco Finishes

Lime-based finishes - traditional lime plaster, natural hydraulic lime stucco, and limewash - are among the most historically authentic finishes for masonry heaters and are experiencing a strong resurgence in contemporary design. Lime finishes are vapor-permeable, working in harmony with the thermal cycling of the heater. Traditional portland cement stucco can develop hairline cracks over time due to the repeated heating and cooling cycles; lime-based finishes are more flexible and more forgiving.

Tile: Accent Use Only

Standard floor tiles are not designed for the thermal cycling stress that a masonry heater surface experiences. Even a small differential expansion between the tile and the setting bed can cause grout

cracking and tile failure over years of daily firing. If tiles are used as the primary facing, use soapstone tiles or purpose-made refractory tiles from a masonry heater supplier. Standard ceramic or porcelain tile is appropriate for accents only - a tile inset around the firebox opening, a decorative band above the oven door, or a tile sill on the heated bench.

Kachelofen and Kakelugn Tile Stoves

For clients who want a heater that is as much a work of art as it is a heating appliance, we build custom tile stoves in both the German/Austrian Kachelofen tradition and the Swedish Kakelugn style. Kachelofen tiles are purpose-made ceramic tiles - typically hollow-backed for thermal performance - available in hand-painted antique reproduction styles, smooth glazed contemporary styles, and everything in between.

The Swedish Kakelugn is typically taller and more slender, often white with minimal decoration, well-suited to the clean lines of Scandinavian interior design. Both traditions are relatively rare in North America because of cost - hand-made or imported European tiles combined with calculated design services make these projects premium investments. We build one to two per year. Contact us to discuss options.

View completed heater gallery: https://solidrockmasonry.com/gallery/

Chapter 8

Code, Clearances, and Building Permits

ASTM E1602, IRC, IBC, insurance, and permit requirements

Building Codes That Apply

ASTM E1602: Standard Guide for Construction of Solid Fuel Burning Masonry Heaters. This is the primary technical standard for masonry heater construction in North America. Defines construction requirements, clearances, and performance criteria specific to masonry heaters.

International Building Code (IBC) and International Residential Code (IRC): The IBC addresses masonry heaters in Chapter 21. Most states have adopted the IBC or IRC as their base building code. Your local building official has the authority to accept a masonry heater as equivalent to a masonry fireplace for code purposes.

IBC 2024 Chapter 21 - Masonry Heaters: https://codes.iccsafe.org/content/IBC2024V2.0/chapter-21-masonry

Full masonry heater building codes page: https://solidrockmasonry.com/masonry-heater-building-codes/

Clearances to Combustibles

The following are minimums required under ASTM E1602. Local codes may require additional clearances. Always verify with your local building official before construction.

Foundation to combustible framing: 2 inches.

Heater facing to combustible walls - sides and back: 4 inches, measured from face of masonry veneer.

Heater facing overhead clearance: 10 inches to combustible ceiling or framing above.

Chimney to combustible framing: 2 inches at ceiling and floor penetrations.

Hearth extension in front of firebox: 16 inches of non-combustible material.

Combustibles in front of firebox door: 48 inches - no combustible materials within 4 feet in front of the door.

Wing walls and partition walls may touch the heater by using metal stud framing with cement board attached directly to the heater face. Note: a combustible wall with non-combustible material applied to its surface without an intervening air space is still considered a combustible wall for clearance purposes.

Insurance and Liability

Contact your homeowner's insurance carrier before installing a masonry heater. Most major insurers cover them, particularly when installed with a building permit and built to ASTM E1602 standards. A building permit is the appropriate mechanism for code compliance - masonry heaters are not UL listed but are built under the masonry fireplace provisions of your local building code.

When hiring a masonry heater builder or ordering a kit, verify that they carry both general liability insurance and errors and omissions (E&O;) insurance specifically covering masonry heater design and manufacturing. General liability covers physical property damage during construction. E&O; insurance covers financial losses resulting from design errors or defective products.

> *Solid Rock Masonry Heat carries full insurance including errors and omissions coverage for heater design and manufacturing. We are happy to provide certificates of insurance upon request.*

Chimney Fires and Safe Operation

Confirmed chimney fires attributable to masonry heaters are extremely rare in the North American masonry heating community. In every case on record, the root cause was the same: a new homeowner purchased a home with an existing masonry heater, did not know how to operate it correctly, burned green or wet wood, damped the fire down to slow it causing smoldering combustion, and over time creosote accumulated in the chimney.

This sequence of events is essentially impossible when a masonry heater is operated correctly: hot, fast fires with properly seasoned dry wood at or below 20 percent moisture content, with the chimney damper left fully open during the entire burn cycle. Correct operation produces no creosote, period.

Full code and clearance details: https://solidrockmasonry.com/masonry-heater-building-codes/

Chapter 9

Working With a Builder or Going DIY

Three paths to a finished masonry heater

Your Path to a Finished Heater

Path 1 - Full Turn-Key Installation by Solid Rock: For clients in Wisconsin, the Upper Peninsula of Michigan, Minnesota, Idaho, Wyoming, and surrounding areas, we offer full turn-key installation including foundation design assistance, core assembly, chimney system supply and installation, and masonry facing in natural stone or brick. We travel for heater installations throughout the Midwest and western states. Contact us for a project-specific quote.

Path 2 - SR Core Kit Plus Local Mason: The most common path for clients outside our immediate installation area. You order an SR Core kit from us and hire a local mason for the foundation work and exterior facing. Our course-by-course assembly instructions are detailed enough that a mason with no previous masonry heater experience can build our core correctly. We provide support by phone and email throughout the build.

Path 3 - DIY Owner-Builder: Masonry heaters are among the most accessible major masonry projects for skilled owner-builders. You do not need to be a professional mason to build a masonry heater core, but you do need patience, attention to detail, and the willingness to follow detailed instructions carefully. The SR Cast Core is the better choice for first-time builders.

Working With Your Local Mason on Heater Facing

Most local masons have not built masonry heater facings before, but the work is well within the skill set of any experienced residential mason. The primary differences from standard masonry work:

The heater core expands and contracts with temperature. A small air gap is left between the core and the facing, which is grouted (slushed) with mortar as the facing rises around the core. Expansion joints at specified locations must be maintained.

All mortar used in contact with or within 4 inches of the heater facing must be heat-rated refractory mortar. Standard Type S or Type N mortar is not appropriate within this zone.

We provide detailed facing installation notes as part of every kit package and are available by phone to walk your mason through any questions during the build.

Workshops and Hands-On Training

If you are planning to build your own masonry heater - as an owner-builder or as a mason wanting to add masonry heating to your skill set - nothing replaces hands-on learning.

North House Folk School, Grand Marais, Minnesota: 3 to 4-day hands-on workshops covering core assembly, facing, and chimney connection. Classes have been running since 2010 and are open to both owner-builders and professional masons.

MHA Annual Meeting: The Masonry Heater Association of North America holds its annual meeting each spring and includes hands-on building workshops taught by members. This is the best networking and learning opportunity in the industry.

North House Folk School workshop schedule: https://www.northhouse.org

Masonry Heater Association of North America: https://www.mha-net.org

SR DIY masonry heater kits: https://solidrockmasonry.com/solid-rock-diy-masonry-heater-kits/

View completed heater gallery: https://solidrockmasonry.com/gallery/

Download the complete guide at:
https://solidrockmasonry.com/masonry-heater-planning-guide/
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Chapter 10

Frequently Asked Questions

The questions we hear most often

Why does a masonry heater cost so much more than a wood stove?

A finished masonry heater is not an appliance you buy at a hardware store. It is a custom-built, permanent masonry structure that weighs 6,000 to 12,000 pounds, requires an engineered foundation, and typically takes a skilled mason several days to a week to complete. The better question is: what does it cost over 30 years? A masonry heater is a one-time investment with a lifespan measured in generations. Compare that to a forced-air furnace at $8,000 to $15,000 every 15 to 20 years, plus annual maintenance and fuel costs.

Full cost analysis: are masonry heaters worth it?: https://solidrockmasonry.com/are-masonry-heaters-worth-it/

Can a masonry heater heat my whole house?

It depends on your house. A single masonry heater is well-suited to heating an open floor plan home of 1,000 to 2,000 square feet with standard 8-foot ceilings and good insulation. Bedrooms and other closed rooms behind walls will be somewhat cooler - typically 5 to 10 degrees, which many clients find perfectly comfortable for sleeping. For larger homes, two heaters or a heater-plus-in-floor-radiant combination is typically the right answer.

How much wood will I need?

For a reference point: an SR-18 fired once per day at 60 pounds of wood per fire, every day of the heating season, will use approximately one cord of wood per month in a northern Minnesota winter. Most clients in colder climates use 3 to 5 cords per heating season to cover the majority of their heat demand. The single most important factor is wood moisture content - at or below 20 percent moisture. Wet wood burns cooler, produces more smoke, and delivers significantly less usable heat per pound.

How do I control the heat output?

You control output by adjusting the size and frequency of your fuel charge. A smaller fire on a mild day, a larger fire on the coldest days. That is the entire control mechanism. The surface temperature of a masonry heater at full fire is typically between 140 and 180 degrees Fahrenheit - warm but not hot enough to burn you.

Can I install a masonry heater in my existing home?

Yes, in most cases. The primary considerations are floor structure to carry the weight, chimney routing to the exterior, and finding a central location with reasonable radiant exposure to the main living area. Retrofits are more complex and typically more expensive than new construction installations because of the structural work involved, but they are done regularly and successfully. Contact us with your floor plan and we can assess the feasibility quickly.

Does a masonry heater need EPA certification?

No. The US Environmental Protection Agency classifies masonry heaters as non-affected facilities - explicitly excluded from certification requirements because the EPA recognized that masonry heaters are inherently clean-burning due to their high combustion temperatures. They were excluded because they already meet or exceed what EPA certification is trying to achieve.

Emissions testing data: https://solidrockmasonry.com/particulate-emissions-testing/

What about insurance and permits?

Contact your homeowner's insurance company before installing a masonry heater. Most major insurers cover them, particularly with a building permit. A building permit is the appropriate mechanism for code compliance - masonry heaters are not UL listed but are built under the masonry fireplace provisions of your local building code.

Full code and permit information: https://solidrockmasonry.com/masonry-heater-building-codes/

How long does a masonry heater fire last?

You load the firebox once with 35 to 65 pounds of dry wood depending on your model. The fire burns completely in 2 to 3 hours. When the coals are fully extinguished, you close the chimney damper. The heat stored in the masonry mass then radiates steadily into your living space for the next 12 to 24 hours. Most clients fire once per day through mild weather and twice per day on the coldest days of the year.

Do masonry heaters need electricity?

No. Masonry heaters operate entirely without electricity. There are no blowers, ignitors, or controls. This is a meaningful advantage for off-grid applications and rural areas with frequent power outages.

What is the lifespan of a masonry heater?

A well-built masonry heater will outlast you. There are masonry heaters in Europe that have been heating homes continuously for over 100 years. The firebox liner and door are designed to be field-replaceable, but the masonry structure itself is essentially permanent with normal care and proper operation.

What is the difference between a black oven and a white oven?

The black oven is heated directly by combustion gases and reaches higher temperatures quickly, making it suitable for bread, pizza, and roasting. The white oven is heated indirectly through the surrounding masonry and holds a steadier lower temperature for slow baking. Both are integrated into the heater structure and require no separate fire.

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Chapter 11

SR Products, Services, and 2026 Pricing

Kit pricing, door options, shipping, and how to get started

2026 SR Hybrid Core Kit Pricing

The Hybrid Core uses approximately 230 firebricks with 18 cast refractory slabs. More economical kit cost with additional build time. Prices include all core materials, SR doors, and full drawing package. Installation is quoted separately.

SR-13H (SR-13 Hybrid, no oven): $7,016

SR-13HBO (SR-13 Hybrid with black oven): $8,175

SR-13HWO (SR-13 Hybrid with white oven): $8,465

SR-18H (SR-18 Hybrid, no oven): $8,769

SR-18HBO (SR-18 Hybrid with black oven): $10,073

SR-18HWO (SR-18 Hybrid with white oven): $10,363

SR-22H (SR-22 Hybrid, no oven): $9,204

SR-22HBO (SR-22 Hybrid with black oven): $10,508

SR-22HWO (SR-22 Hybrid with white oven): $10,798

2026 SR Cast Core Kit Pricing

The Cast Core uses approximately 40 firebricks with 55 precision refractory castings. Fastest to build with minimal cutting. Higher kit cost is typically offset by reduced labor time.

SR-13C (no oven): $9,157

SR-13CBO (with black oven): $10,600

SR-13CWO (with white oven): $10,756

SR-18C (no oven): $11,805

SR-18CBO (with black oven): $12,050

SR-18CWO (with white oven): $12,437

SR-22C (no oven): $12,614

SR-22CBO (with black oven): $13,314

SR-22CWO (with white oven): $13,612

Cook Stove Combinations

SR-13HCH (SR-13 Hybrid with cook top): $7,016

SR-13HCH-BO (with cook top and oven): $8,216

SR-18HCH (SR-18 Hybrid with cook top): $8,769

SR-18HCH-BO (with cook top and oven): $9,969

SR Firebox Doors: 2026 Pricing

All SR doors are fabricated in Duluth, MN using North American refractories and steel with pyroceramic glass sourced from Germany. Includes an air frame supplying 100 percent of required combustion air with proper preheated underfire and overfire air ratios, plus an air wash to keep the glass clean. Allow 6 to 8 weeks lead time on all door orders.

SR-13FB (13.25" x 18.75" glass): $1,622

SR-18FB (18.25" x 18.75" glass): $1,861

SR-22FB (22.25" x 18.75" glass): $2,008

SR-28FB (28.25" x 18.75" glass): $2,607

SR-32FB (32.25" x 18.75" glass): $2,901

Arched top doors: add $135 per door. Custom door sizes available for masonry heaters, bake ovens, cook stoves, fireplaces, and commercial wood-fired ovens.

Additional Options

Heated bench: $250 per linear foot (core materials only; facing by local mason)

SR-CO Cleanout Door with 4" deep air frame: $143

SR-A Gasketed Ash Door: $315

Design services: $200 to $1,500 depending on scope

Total Installed Cost Ranges

Stone masonry heater (Hybrid or Cast Core): $29,500 to $37,000

Brick masonry heater: $25,000 to $33,000

These ranges represent a standard installation including core kit, finish materials, foundation, chimney, and labor. Projects that are significantly larger, require complex foundations, involve remote travel, or include premium finishes will fall outside these ranges.

Shipping

We ship from Duluth, MN to all regions of the United States and Canada. Kit pallets typically weigh up to 2,000 pounds each and ship by freight. Three delivery options: shipping to a local business or hardware store with a forklift (preferred and most economical), shipping to a local freight transfer station for pickup, or shipping direct to your property if you have equipment to handle a 2,000-pound pallet from a semi-truck.

How to Get Started

Tell us about your project: square footage, ceiling height, construction type, location, floor plan if available, and what you are hoping to accomplish. We will identify the right model, configuration, and options for your layout and provide a detailed kit quote covering materials, doors, and shipping.

Eric Moshier, Certified Heater Mason | Third-Generation Mason | In Business Since 2003

Fully insured including Errors and Omissions coverage for heater design and manufacturing

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SR masonry heater systems and design: https://solidrockmasonry.com/masonry-heaters/

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