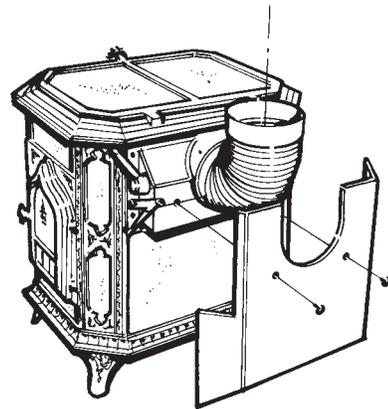


Planning Your Hearth

One of the words we repeat often when speaking with customers about wood stove installation is “clearances”. To talk about clearances, we need to define two words: clearance and combustible. Clearance is the open space between your stove (or stove pipe) and a combustible surface. A combustible surface is a surface that burns (like wood, sheetrock, etc.). Obviously, wood stoves get hot - hot enough to heat an entire home. All that heat can be a wonderful thing, but too much in the wrong place can lead to a dangerous situation, often without your knowledge. A wood stove itself isn’t dangerous, but a poor installation is. It is a good idea to take a careful look at the walls in the area where you’d like to install a wood stove. In many cases, combustible walls covered by brick, stone, tile, etc. are still considered combustible because the stone or brick transfers the heat right through to the combustible wall. Your stove installation needs to conform to certain clearances for safety, not just around it, but under it as well. The focus of this article is to help you determine how close you can safely install your stove to a wall and what should go under it.

1. How Close To The Wall?

With no protection, Woodstock Soapstone wood stoves require at least 30 inches of clearance between the stove and combustible walls, furniture, etc. both in front of and behind the stove. Clearance must be 18 inches from each side. The distance from the back of the stove to the wall is of greatest interest. This distance can be reduced in one of two ways: by putting a heat shield on the back of the stove or by putting a heat shield on the wall. The clearance table below shows the various options at a glance and the clearance to combustibles for each option.



The rear heat shield mounts right to the back of the stove reflecting heat forward, and providing a significant reduction in clearances to combustible walls. It is painted to match the castings of the stove and is very inconspicuous.

A. Heat Shields on the Stove

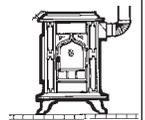
At Woodstock Soapstone, we make a rear heat shield kit to reduce clearance to combustibles. The kit consists of a rear heat shield that mounts to the back of the stove and a half moon shaped pipe shield that mounts to the back of the pipe. They are attached to the stove and pipe with spacers, which provides a cooling effect and also reflects heat into the room. Once installed, the shields are barely visible from the front and sides and provides an easy and inexpensive way to install your stove closer to the wall. The heat shield kit reduces the clearance behind the stove to 18 inches for the Fireview and Classic, and to 14 ½ inches for the Keystone and Palladian. The pipe shield reduces the pipe clearance to 10 inches.

The Clearance Table

Flat Wall Installation (Parallel to Wall)

The clearances below are the minimum distance between the back of the stove (or stove pipe) and a combustible wall. The Fireview and Classic stoves are rear vent only. The Keystone and Palladian stoves can be vented from the top or the rear.

	<u>Stove Back</u>	<u>Stove Pipe</u>	
No Protection on Wall or Stove	30"	20"	
Rear Heat Shield Kit on Stove (rear vent)	18"	10"	
Heat Shield <i>Directly on Wall</i>	20"	16"	
Heat Shield with 1" Ventilated Airspace	12"	12"	
Rear Heat Shield Kit on Stove (top vent*)	14 ½"	14 ½"	* Keystone & Palladian stoves only



Corner Installation

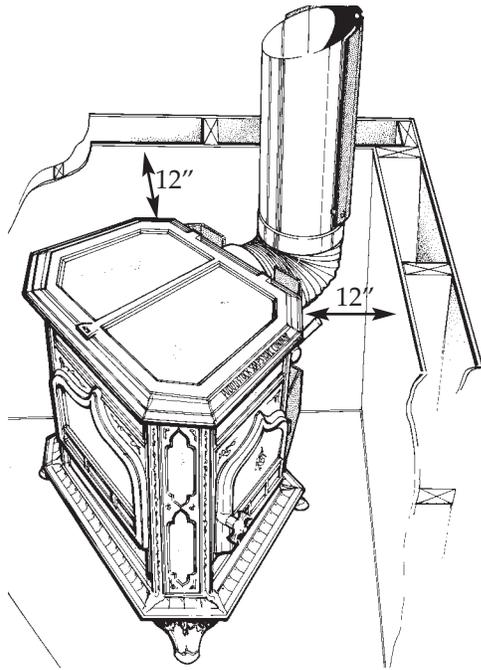
The clearances below are for stoves installed “kitty corner” to the walls. In a corner installation, clearances are measured from the back corners of the stove to the nearest walls. These clearances apply to the Fireview, Classic, Keystone, and Palladian stoves.

	<u>Back Stove Corners</u>
No Protection on Wall or Stove	18"
Rear Heat Shield Kit on Stove	12"



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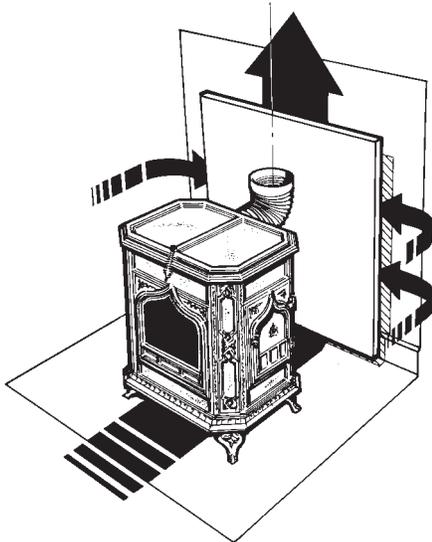
B. Heat Shields on the Wall

Another option for protecting walls is to construct a heat shield on the wall itself. Constructing a non-combustible shield on the wall can reduce clearances and provide a beautiful backdrop for the stove. Before you embrace this option, it is important to understand the different ways that wall shield construction affects clearances.

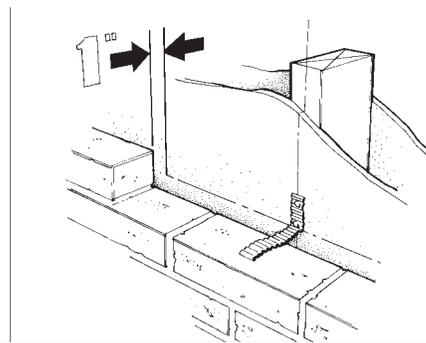
The most effective wall shields are built with an airspace between the shield and the wall to allow for ventilation. If you simply mount non-combustible material (brick, stone, tile, etc.) directly onto a combustible wall, the wall is still considered combustible. This is a common mistake. Most walls have some combustible material in them, typically sheetrock or wood studs. Even plaster on metal lath is considered combustible if the lath is fastened to wood framing. The reason these walls are still considered combustible is that the heat shields themselves conduct heat. Over the long term, enough heat can be transmitted to building materials to lower their ignition point. The ignition point refers to the point at which combustible material can spontaneously combust - meaning catch on fire without direct flame contact! This doesn't happen overnight. It can take years of exposure to excessive heat for spontaneous combustion. It is for this reason the argument "We've had a stove installed next to that wall for 20 years and never had a problem" is so dangerously wrong.

Using the heat shield on the back of the stove and pipe allows you to place the stove 12" from the back corners of the stove to the closest walls in a "kitty corner" installation.

In a corner installation, the rear corners of the stove would require 18" of clearance from each wall with no protection. This would put the center of the pipe 30" from the corner of the room for the Fireview and Classic or 33" from the corner of the room for a rear vented Keystone and Palladian stoves. Mounting the rear heat shield and pipe shield on the back of the stove and pipe, respectively, allows you to reduce this clearance to 12" from the back corners of the stove to the wall. At this reduced clearance, the center of the pipe on the Fireview or Classic would be 22" from the corner of the room, 24" for the rear vented Keystone or Palladian stoves.



Wall shields should be open on top and bottom or both sides and top in order to provide adequate ventilation.



The wall shield is attached to the wall with noncombustible wall spacers or wall ties. These spacers maintain the 1" airspace and provide adequate support for the wall shield.

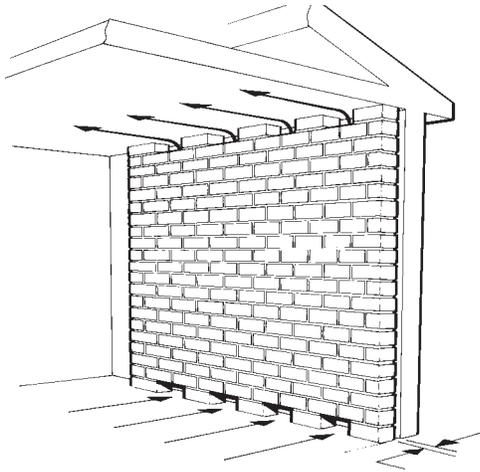
The conduction problem is solved, and approved by fire codes, if a noncombustible shield is mounted to the wall with a 1 inch airspace behind it. If you are venting straight back through the wall, this will reduce the required clearance from the back of the stove to 12 inches to the combustible wall. The space taken up by the shield itself does not need to be included in the measurement.

A wall shield can be made of many different materials (stone, brick, tile mounted on cement backer-board, sheet metal, etc.). The air space is created between the wall and the shield by using one inch spacers. Non-conductive ceramic spacers are available from Woodstock Soapstone Company or can also be found at building sup-

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ply stores. If you choose to build a masonry wall shield, you'll need metal strips, called "wall ties", laid between the courses of brick or stone at regular intervals, usually from 18 to 24". Several inches of the tie extend out from the masonry and are bent up, to be fastened to the wall at stud locations. These will provide structural stability.



Staggering the bottom row of bricks allows air to enter the bottom of the wall shield, travel up through the 1" air space and vent through the top.

The top of the shield and either the sides or bottom must be left open to allow for air flow behind the shield. The free movement of air provides the cooling necessary to reduce the clearances. Bottom ventilation can be achieved by alternating each brick in the bottom row with an airspace. The second row bridges the alternating bricks to allow for a solid wall from there on up. Again, the brick or stone wall itself does not need to be included in the 12 inch clearance measurement to the combustible wall.

Building a wall shield that is mounted directly to a combustible wall will reduce your clearance from the back of the stove to 20". The rear heat shield that goes on the back of the stove reduces the clearance to the back wall to 18" (14 1/2" for a top vented Keystone or Palladian). Building a wall shield with the 1" ventilated airspace will allow you to place the stove within 12" of a combustible wall as long as you can meet the clearance requirements on the pipe. Single wall pipe alone has an 18" clearance to combustibles. Single wall pipe with the pipe shield reduces the clearance to 10". The only way to get your pipe closer to the wall is to use double wall or "close clearance pipe." Close clearance pipe can be within 6" of a combustible wall. You always need to consider the clearance requirements of both the stove and the stovepipe.

Note: Clearances cannot be further reduced by combining methods. For example, installing brick directly on a combustible wall and installing a rear heat shield on the back of the stove doesn't allow you to reduce the clearance beyond the 18" provided by the rear heat shield kit.

2. What Does The Stove Sit On?

All of our wood stoves come with a sheet metal bottom heat shield. Although this provides a good amount of thermal protection underneath the stove, no stove should be placed directly on wood, carpet, vinyl or any other combustible material. The stove needs to sit on a non-combustible surface that will provide both spark and ember protection and prevent heat from being conducted over time to the floor materials. We call this floor protection a hearth. Hearths are easy to build or can be purchased and really add to the decor of your installation. If your stove will be sitting on a concrete slab, it will meet safety standards without any additional protection, although you might want to add tile or brick under and around the stove for a more attractive installation.

The National Fire Protection Agency (NFPA) has established standards for floor protection. These standards vary, depending on the height of the stove legs and the type of surface under the stove. Based on these standards, and independent testing of our own stoves, we have determined the minimum accepted clearances and hearth construction for our stoves.

Once you have determined how close to the wall your stove can be, you can start to plan out the size of your hearth pad. The hearth pad should extend beyond the perimeter of the stove at least: 16" on the loading door side, 8" on the left hand side (non-door side), and 8" in front of the stove. The extra space on the loading door side is to catch any hot embers or ashes that may escape during re-loading of the stove or ash removal. You may want to extend the pad 16" on both the right and the left so the stove will be centered. Again, the purpose is to provide spark and ember protection as well as to prevent heat from being conducted to the floor materials. These measurements are minimums. We actually prefer larger hearths, about 4' by 5', to allow plenty of room for storing wood and hearth tools, re-loading the firebox safely, drying boots, or just sitting near the stove to warm up after being outside on a cold winter day. A larger hearth also provides a visual cue so children and other members of the household give it a wide berth when passing by.

Hearth pads can be raised up above the floor or can be flush with it, depending on location and your personal preference. You can build one on site or purchase pre-fab pads directly from us. These are made from different materials such as mica, brick, and ceramic tile. Several styles are pictured in our accessories brochure, all of which meet the UL 1482 test for floor protection. If you choose to build your own hearth pad, there are a few important things you'll need to know.

A. Building A Hearth Pad

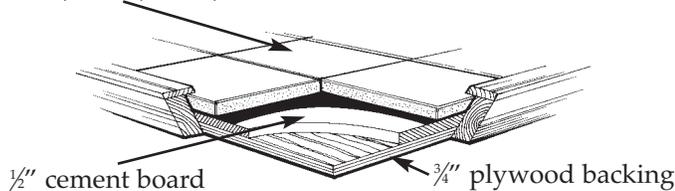
Hearth pads provide a non-combustible surface directly under the stove, most commonly a masonry material. All masonry materials conduct heat however, so they will need to be insulated from the floor with a low conductivity material, such as cement backer board at least a half-inch thick. Two of the best, readily available brands of cement board are Durock and Wonderboard. Cement backer board was specifically designed to serve as underlayment for ceramic tile to provide a stable surface for adhesion of tile cement. Other masonry materials can also be used over it, such as brick or flagstone. Backer board is available in most home supply centers. It is inexpensive and can be cut to size with a utility knife or circular saw.

Technical Note: Conductivity

Cement backer board is an ideal material for a hearth pad because of its low "k", or conductivity value. Conductivity is the ability to conduct heat. The lower the "K" factor, the less heat is conducted through the material. For example, Durock has a k-value of 1.92 per inch, as compared to the k-value of common brick, which is 5.00 per inch, or marble, which has a k-value of 15.00 to 20.00 per inch.

Your hearth pad will be an open-faced "sandwich" composed of plywood or subfloor, $\frac{1}{2}$ " of approved floor protection (cement board), and then $\frac{1}{4}$ " or more of the decorative noncombustible finishing material of your choice.

$\frac{1}{4}$ " tile, stone, brick, etc.

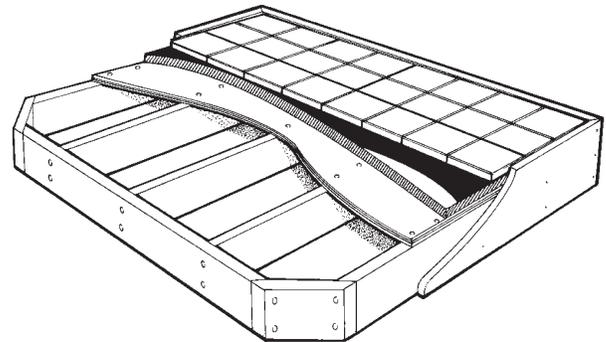


Begin your project by determining the finished size of the hearth. You'll have to choose your non-combustible finish material ahead of time so you can use its dimensions to arrive at the correct number of tiles, etc. for the planned size. For example, five 10" (nominal) tiles x six 10" (nominal) tiles will provide a final product of 50" x 60". The tiles will actually measure slightly smaller than their nominal size, which is compensated for by the joints between them. You can then cut your cement board to this overall dimension. The cement board should be nailed to a base of $\frac{3}{4}$ " plywood of the same dimensions. Trowel out the cement or mortar onto the cement board to provide a smooth bed for the finishing material and set it into the wet cement, using spacers to keep even rows, if necessary. After the masonry has set hard, usually overnight, the tile should be thoroughly grouted. Brick, flagstone, or stone should be mortared at all joints to prevent sparks and embers from falling through cracks. After grouting and sealing is complete, you can finish the pad by adding

wood trim around the perimeter, nailing it to the plywood base. Your finished product can be laid directly on your existing floor. If you are building a new home or addition, you can construct the hearth pad directly on the subfloor, and lay your finished floor or carpet right up to it for a flush installation.

If the finishing materials are simply fitted together "dry", with no mortar or grout, the NFPA requires that a piece of at least 24 gauge sheet metal be placed under the cement board in order to prevent embers from making their way down to the plywood base.

Many stove owners enjoy having their stove on a raised hearth. A raised pad provides elevation to the stove, which makes it easier to load the stove and easier to view the fire. It's also nice to have a place to sit close to the stove.



Building a raised hearth is just a matter of constructing a simple framework to put under your purchased or homemade hearth pad. Framing should be 16" on center or closer to support the weight of the stove and hearth pad.

The frame can be built with 2 x 4's, 2 x 6's, 2 x 8's, etc. nailed together to the same size as your finished pad. You can also frame it with cut corners in the front for a better appearance and to minimize a possible tripping hazard. A purchased pad can then be placed on top of the framework and trimmed. A homemade hearth pad can be constructed directly on top of the frame, starting with the plywood base. Again, trim the finished product with stained or varnished pine, oak, or other wood of your choice, so that it's flush with the top of the finishing material.

If you have additional questions about clearances, hearth pad requirements, or other installation questions, please let us know. Our customer service team members are all NFI Certified Woodstove Specialists and have years of experience planning safe, beautiful stove installations. We are available by phone at 800-866-4344 from 9-5 ET Monday - Saturday. E-mail us anytime at info@woodstove.com. Or stop by our factory, take a tour, and look at our bulletin board filled with photos from stove owners.

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