

# The installation of wood-burning heaters



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## Bsaunas recommends following the Federal Government guideline for "Uncertified Wood Stoves".

This section on the installation of wood stoves gives more detail than is provided on the other categories of wood-heating equipment. There are two reasons for this extra detail. First, wood stoves are the most common type of wood burning equipment in Canada, accounting for more than half of all wood heating equipment. Second, many householders choose to install and maintain their own wood stoves. The information provided here is not complete, but is provided as a general safety guide. If you intend to install your own wood stove, first get advice from a wood heat dealer whose staff is trained and certified under the WETT program. Have the system inspected by someone who is WETT-certified after the work is complete.

### Maintaining Safe Clearances to Combustible Material

Combustible materials in walls, floors and ceilings must be protected from the heat from wood burning systems. Protection can be in the form of a minimum distance from combustibles or in the form of shielding that blocks the heat from reaching combustibles.

The installation guidelines for wood stoves can be grouped into two categories. The first is stoves that have been tested and certified as meeting safety standards. The tests determine minimum installation clearances and other guidelines. This information is found in the manufacturer's installation instructions. All new wood stoves currently offered for sale in Canada have been safety certified and most insurance companies will only accept certified appliances.

The second group is those appliances that are not tested and certified. These include used or antique stoves or stoves built before about 1980. There are several good reasons to avoid using uncertified stoves.

- They are less efficient than safety certified, advanced-technology stoves and they produce a lot more air pollution.



The clearance for an uncertified radiant stove is 1200 mm (48 in.) and for a stove with a sheet metal jacket or casing the clearance is 900 mm (36 in.). The clearances are large because they apply to all shapes, sizes and designs of stoves that have not been tested to determine the actual clearances.



- Their installation rules are much more complicated and their installation clearances are much larger. The minimum clearances to combustable materials for uncertified appliances are quite large — 1200 mm (48 in.) to the sides and rear of radiant stoves and 900 mm (36 in.) for stoves surrounded by jackets behind which convection air can flow.
- Uncertified stoves are often less attractive and more difficult to use.
- Many insurance companies will not provide coverage to houses that have uncertified stoves installed.

Guidelines for the installation of these uncertified stoves are found in the CSA solid fuel installation code, CSA B365. If you decide to install an uncertified stove, such as an antique cooking range, get assistance from a qualified wood heating dealer, installer or chimney sweep.

## Reducing Minimum Clearances Safely

Most homeowners want their wood stove installation to take up as little floor space as possible. Even though the clearances for safety certified stoves are small, it is possible to reduce them further using special shields. The clearances for both certified and uncertified stoves can be reduced safely using the rules set out in CSA standard B365. The common feature of the clearance reduction rules provided in B365 is the air space between the shield material and the wall or ceiling. This space sets up a convection flow of air as the stove is operating and prevents the stove's heat from reaching the surface behind it. The percentage in Table 4 is the amount that the minimum clearance may be reduced with the particular shield system that is described. Both wall and ceiling clearances may be reduced using shields.

A variety of materials can be used for clearance-reducing shields, from simple sheet metal to more decorative shields using brick, stone slices or ceramic tiles. Shields must be permanently mounted to walls or ceilings. Free-standing, folding panels are not acceptable as clearance-reducing shields.

Safety tested and labelled shields are also available for the reduction of minimum clearances. These shields are put through a series of tests to determine how well they can reduce clearances. They are certified and carry a label that confirms they have passed the tests and gives clearance reduction details. Some of these commercial shields are designed so that they can be attached directly to combustible walls without the need for an air space.

The first step in reducing clearances is to determine the minimum clearance from the appliance label or stove installation instructions. Then, calculate the allowed clearance reduction for the type of shield you plan to use from the table on clearance reduction.

| Clearances may be reduced by these percentages  |                 |       |
|---|-----------------|-------|
| Type of protection (Shield)   |                 |       |
|   | Sides and Rear% | Top % |
| Sheet metal, a minimum of 29 gauge in thickness, spaced out at least 21 mm (7/8 in) by noncombustible spacers   | 67              | 50    |
| Ceramic tiles, or equivalent noncombustible material, on noncombustible supports spaced out at least 21 mm (7/8 in) by noncombustible spacers   | 50              | 33    |
| Ceramic tiles, or equivalent noncombustible material, on noncombustible supports, with a minimum of 29 gauge sheet metal backing spaced out at least 21 mm (7/8 in) by noncombustible spacers | 67              | 50    |
| Brick, spaced out at least 21 mm (7/8 in) by noncombustible spacers   | 50              | N/A   |
| Brick, with a minimum of 29 gauge sheet metal backing, spaced out at least 21 mm (7/8 in) by noncombustible spacers   | 67              | N/A   |
| Reducing Clearances with Shielding  |                 |       |

Source: CSA Standard B365, Table 3 "Reduction in Appliance and Ductwork Clearance from Combustible Material with Specified Forms of Protection"



### Shield Construction Rules

- 1) Minimum space between shield and combustibles: 21 mm (7/8 in.).
- 2) Minimum clearance along the bottom of shield: 25 mm (1 in.).
- 3) Maximum clearance along the bottom of shield: 75 mm (3 in.).
- 4) Minimum clearance along the top of shield at ceiling: 75 mm (3 in.).
- 5) Shield extension beyond each side of appliance: 450 mm (18 in.).
- 6) Shield extension above appliance: 500 mm (20 in.).
- 7) Edge clearance for ceiling shields: 75 mm (3 in.).
- 8) Adhesives used in shield construction must not ignite or lose adhesive qualities at temperatures likely to be encountered.
- 9) Mounting hardware must allow full vertical ventilation.
- 10) Mounting hardware must not be located closer than 200 mm (8 in.) from the vertical centre line of the appliance.
- 11) Mounting hardware that extends from the shield surface into combustibles may be used only at the lateral extremities of the shield.

The channel spacers (page 31) shown are the most effective type to use because they give good support to the shield and do not transmit heat through the mounting hardware to the combustible wall. Metal wall strapping, available from most building supply stores, is made of light steel channels that work well as shield spacers. The shield must extend 450 mm (18 in.) beyond each edge of the appliance and 500 mm (20 in.) above the top of the appliance. When the stove clearance is reduced by the use of a suitable shield, flue pipe clearances must still comply with the rules listed in the flue pipe section.



The floor pad protects flooring from hot embers that might fall from the appliance during fuel loading or servicing. The pad must extend at least 200 mm (8 in.) beyond the sides and rear and 450 mm (18 in.) in front of the loading door(s). The floor pad must be a continuous, non-combustible surface.

The rules for their installation are different than the rules for single-wall flue pipe, especially installation clearances which are much less than those for single-wall pipe. Also, the maximum length of a double-wall flue pipe assembly may be greater than is permitted for single-wall pipe.

front of the loading door and 200 mm (8 in.) beyond the other sides and back. Floor pads must not be installed on carpet unless the pad is structurally supported so that it does not move, crack or distort.

Uncertified stoves have not passed safety tests, so heat from the bottom may overheat floors. The rules for floor protection for uncertified stoves are complicated, with several different types depending on how high the legs support the stove from the floor. If you are installing an uncertified stove, you should contact a qualified professional for details.

## The Safe Installation of Flue Pipes

Flue pipes carry the exhaust gases from the stove (or furnace or boiler) flue collar to the base of the chimney. They have been referred to as the “weak link” in the wood-burning system because they are too often installed improperly. There are two common problems with flue pipe installations. One is that they are often installed too close to combustible material and the other is that sometimes they are not securely fastened and can come apart when put under stress. If your wood-heating appliance has a single wall flue pipe assembly, make sure it is installed exactly according to the list of safety rules provided here.

Flue pipe assemblies should be as short and direct as possible between the stove and the entrance to the chimney. The ideal assembly is one that rises straight up from the stove flue collar and directly into the chimney with no elbows. A straight flue pipe assembly offers the least restriction to gas flow and results in stronger draft. Straight assemblies also need less maintenance because there are no horizontal sections where creosote deposits can build up.

Certified double-wall flue pipe systems are tested to determine the minimum clearance at which they can be installed. The clearance information is found on the labels attached to the pipe and in the manufacturer’s installation instructions. The labels on flue pipe should not be removed because they are the proof that the pipe is certified for the purpose.



The ideal single-wall flue pipe assembly runs straight up from the stove. Straight venting systems produce stronger draft and will need less maintenance than if the assembly has elbows. A straight single-wall flue pipe assembly needs an inspection sleeve or telescopic section so it can be installed and removed without having to move the appliance. The sleeve also allows some movement for expansion when the flue pipe gets hot.

### Rules for Single-Wall Flue Pipe Assemblies

- Minimum clearance from combustible material: 450 mm (18 in.).
- The minimum clearance may be reduced by 50 per cent to 225 mm (9 in.) if suitable shielding is installed either on the pipe or on the combustible surface.
- Maximum overall length of straight pipe: 3 m (10 ft.).
- Maximum unsupported horizontal length: 1 m (3 ft.).
- Maximum number of 90 degree elbows: 2
- Minimum upward slope towards the chimney: 20 mm/m (1/4 in./ft.).
- The crimped ends (male) of the sections must be oriented towards the appliance.
- Each joint in the assembly must be fastened with at least three screws, including the connections at the appliance flue collar and chimney.
- 6, 7, and 8 in. diameter flue pipes must be at least 24 gauge in thickness.
- Galvanized flue pipes must not be used because the coatings vaporize at high temperatures and release dangerous gases. Use black painted flue pipes.
- The assembly must have allowance for expansion. Elbows in assemblies allow for expansion. Straight assemblies should include an inspection sleeve with one end unfastened, or a telescopic section.



Certified double-wall flue pipes have a stainless steel inner liner and a sealed or vented outer shell. These pipes cost more than single-wall pipe, but last longer and produce a more stable assembly. Double-wall pipes can normally be placed much closer to combustible materials than single-wall pipe.

The rules for their installation are different than the rules for single-wall flue pipe, especially installation clearances which are much less than those for single-wall pipe. Also, the maximum length of a double-wall flue pipe assembly may be greater than is permitted for single-wall pipe.