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Sizing Wood Stoves In Oregon

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Choose a wood stove as you would any heating system: Base your decision on your home's size and weatherization level, and on your area's winter temperatures. This publication will help you choose a model that's right for your home.

Stove performance

A properly sized wood stove offers the best performance—and value. It matches the heating needs of your home, and it generally operates more efficiently and emits fewer pollutants.

Obtain performance data for any stove you are considering buying. Stoves display two labels, certifying that they've been tested and that they meet the Oregon Department of Environmental Quality (DEQ) pollution-control standards.

A removable "show room" label, attached to the top or front of the stove, describes the heat output range, average emissions, and overall efficiencies.

A permanent label, usually displayed on the back of the stove, indicates its efficiency and emissions performance.

A complete list of qualifying stoves, with accompanying performance data, is available from your nearest DEQ office.

Figure 1 shows a typical stove performance (permanent) label. It includes this useful information:

a. the delivered heat output range in Btu/hour (a Btu is a small unit of heat, about equal to the heat given off from one wooden match); and
b. stove efficiency and smoke levels over the heat output range.

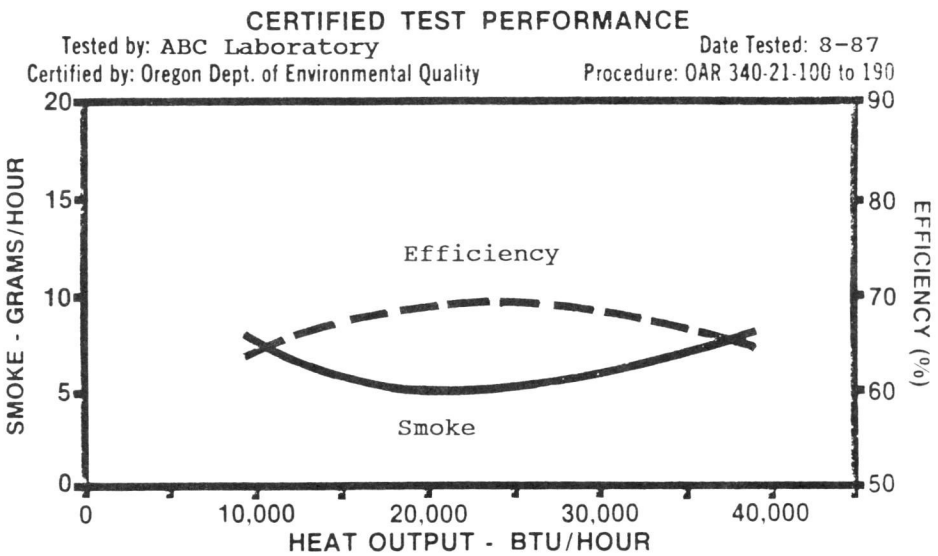

Figure 1.—Example of a wood stove performance (permanent) label

The stove in figure 1 has a delivered heat output range between 10,000 and 40,000 Btu/hour. The stove efficiency varies from 65% to 70%, and the smoke varies from 5 to 8 grams/hour over the stove's heat output range.

Sizing

The following step-by-step guide will show you how to select a wood stove that meets your needs.

Step 1. Estimate floor area

Wood stoves are limited in their ability to move heated air around walls and over long distances. Estimate the floor area (in square feet) that you can heat with a wood stove.

Evaluate your home's floor plan to determine which rooms you can heat with a wood stove. Basically, a stove placed in one room will heat adjacent rooms if there is an unobstructed air flow at both ceiling and floor, such as through an open doorway.

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A wood stove can heat larger areas of your home if you use a fan or furnace blower to distribute heated air. You can also heat rooms above the stove if you have floor registers, stairwells, or both, to move air to and from the space.

Step 2. Select weatherization level

There are four basic weatherization levels:

Poor — No wall, ceiling, or floor insulation; single-pane windows.

Average — 3½ inches of insulation in walls, 6 inches of insulation in ceiling, no floor insulation; single-pane windows.

Good — 3½ inches of insulation in walls, 6 inches of insulation in ceiling, 6 inches of floor insulation; double-pane windows.

High — 6 inches of insulation in walls, 12 inches of insulation in ceiling, 6 inches of insulation in floor; double-pane windows.

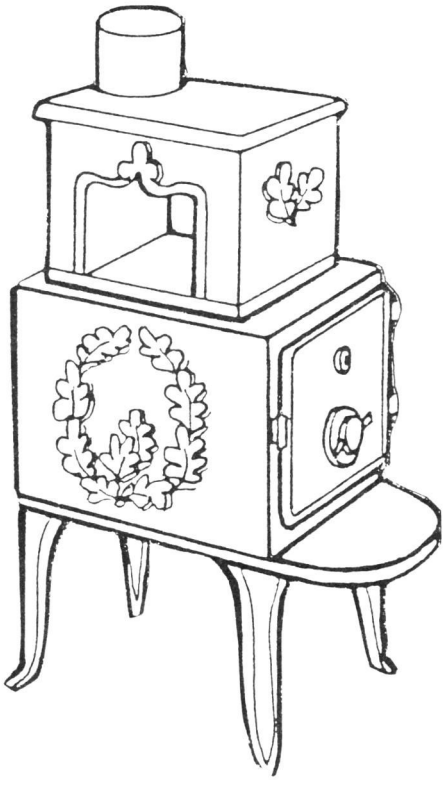
Which level most closely resembles your home? If your home really falls between two levels, choose the lesser (poorer) one.

Step 3. Determine average and maximum heat outputs

Use figure 2 to work out your stove's average and maximum heat outputs.

Step 4. Compare your results with DEQ performance data

A properly sized wood stove should operate at its highest efficiency for the average winter temperatures of your locale. The stove must also have sufficient capacity to supply needed heat during the coldest periods of the year.



Select a stove with a burn-time that meets your expected use. For example, if you like to hold a fire overnight, you'll need to select a stove with at least an 8-hour burn-time at low-burn rates. All DEQ-certified wood stoves list the burn-time between refuelings.

You may choose to use your conventional heating system as backup on very cold days. If so, your wood stove could provide less than the maximum heat output determined from the graph.

Note: Stove-performance data are based on uniform test conditions. Your actual home conditions may require a wider range of heat outputs, depending on the type of wood you use and the way you install and operate your stove.

Example

A 1,400-square-foot home in Eugene will be partially heated by a wood stove. The floor plan lends itself to heating 900 square feet of floor space. The homeowner has decided that the selected stove should be able to heat the space on the coldest day of the year.

The home has double-pane windows, no insulation in the floor, 3½ inches in the walls, and 6 inches in the ceiling. The homeowner is considering stoves A and B.

To make this decision, we apply the four steps outlined in the last section.

Step 1

We need to heat 900 square feet.

Step 2

Although this home has double-pane windows, its weatherization level is closest to the "average" level.

Step 3

Locate 900 square feet on figure 2 and read across to the "average" weatherization level. Read down to "average" winter conditions in the Willamette Valley, then to the left to a stove heat output of 9,000 Btu/hour. This value is an estimate of the stove's output necessary to heat the home during average winter conditions.

As the weather gets colder, your stove should have the capacity to meet the increased heating requirements of the home. To determine the necessary maximum heat output of the stove, extend the line from the "average" down to the "extreme winter conditions" line for the Willamette Valley. Now read across to 22,000 Btu/hour.

In this example, a properly sized stove should operate most efficiently and with lowest pollution rates at around 9,000 Btu/hour, and it should be capable of producing 22,000 Btu/hour on extremely cold days.

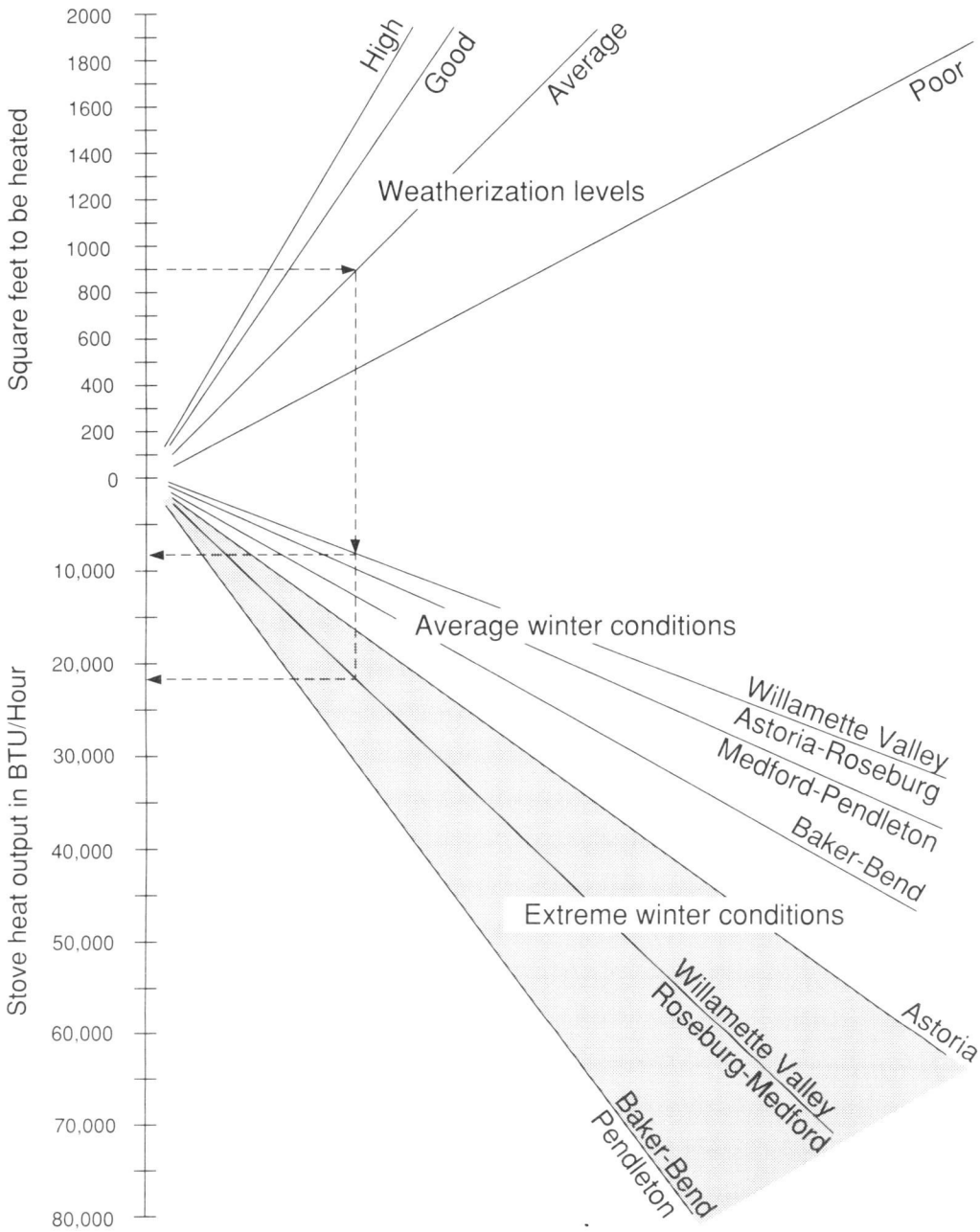
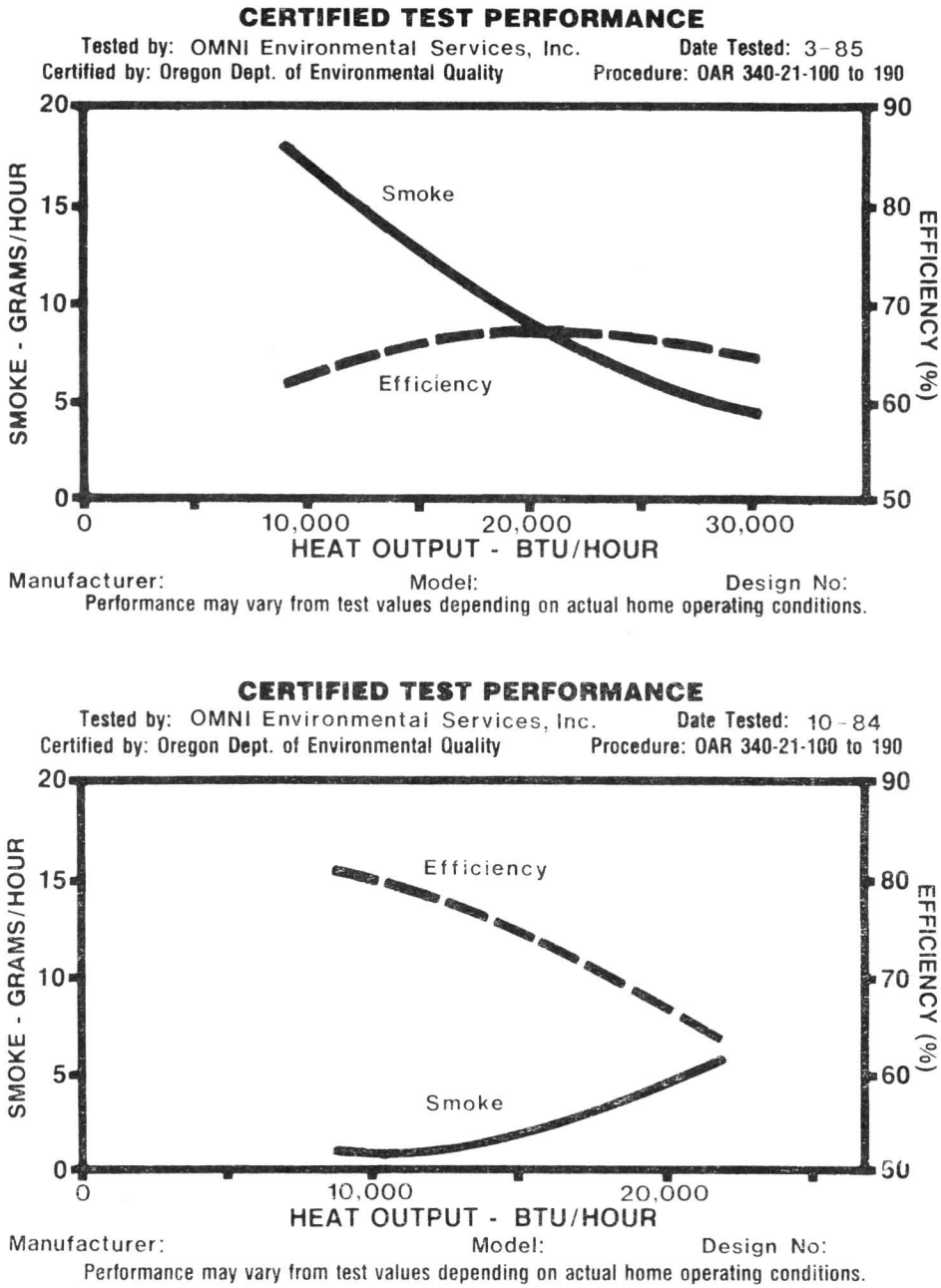


Figure 2.—Wood stove sizing graph (based on a house of 1,800 square feet, single story, and window area 15% of floor area)

Figure 3.—Performance (permanent) labels for stove A (above) and stove B (below)



Step 4

Figure 3 shows the performance labels for both stoves. We see that Stove A has a heat output range from 9,000 to 30,000 Btu/hour, and that stove B has a range of 8,000 to 22,000 Btu/hour.

Comparing the heat output requirements to the stove performance labels, we see that stoves A and B both meet the home's extreme winter heat requirement of 22,000 Btu/hour.

Stove A will operate at 9,000 Btu/hour, but this output is at the low end of its efficiency range, and it suffers from correspondingly high smoke rates.

Stove B is the better choice because it offers its highest efficiency and lowest emissions at the desired average operating conditions.

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