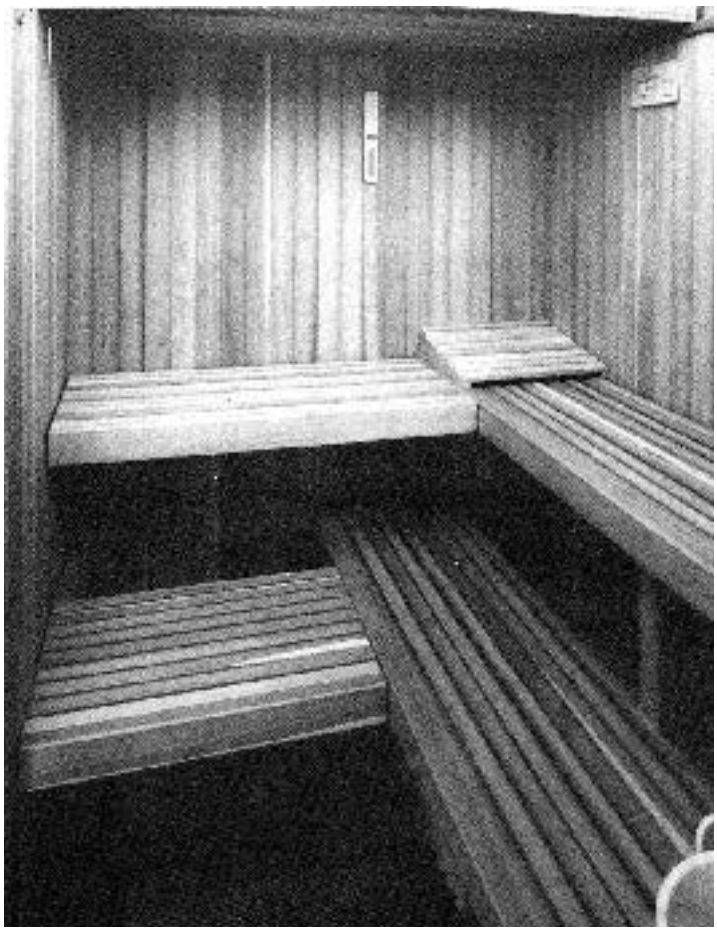
Traditional design and grade-A materials will guarantee you a successful product

by Steve Andrews



The explosive growth of health clubs during the past decade has introduced an increasing number of Americans to sauna bathing. Total U.S. sauna heater sales are roughly 25,000 units per year.

SAUNA Design & Construction

The word "sauna" refers to a special kind of cleansing, relaxing, dry-heat bath and to the room in which it is taken. Sauna rooms must be built to withstand temperatures in the 170 to 200°F range, plus exposure to sweat, splashed water, and frequent pulses of humidity.

The explosive growth of health clubs during the past decade has introduced an increasing number of Americans to sauna bathing. For convenience and privacy, more affluent Americans are bringing the sauna and exercise rooms into their homes.

Proper design and installation of saunas require planning, the right selection of building products, and quality finish work. Costs vary and can be a bit steep, often $75 to $100 per square foot of floor area. Yet when the job is done right, a good sauna adds a touch of luxury to your home product.

The Basic Product Choice

If you haven't built a sauna before, buying a product through a manufacturer may help you sort through some of the design issues. Also, some manufacturers buy lumber directly from mills and have access to higher-grade materials than your average local lumberyards.

A pre-fab kit (called a "modular system" by some manufacturers) comes with preassembled structural walls that include insulation, wiring, and control boxes. The walls can be ordered with either one or both surfaces of finish-grade material, because you may want the sauna to look good from both inside and outside. Assembling a modular system should be the fastest approach, unless you missed on your measurements. A prefab's shipping and purchase price may run 30% more, though that should be offset somewhat by quick installation time—a few hours plus wiring hookup.

A second option is to purchase a precut package, which typically provides the finish material with which to line your sauna. You supply the framed enclosure. Usually, someone with experience can install the finished unit in eight hours.

With both the prefab and the precut approaches, you have to build your frame to exact dimensions if you want to avoid re-cutting the precut material you've already paid for. If your schedule allows it, finish the framing before you order a custom precut.

A third approach is the custom route. You can either order a custom package or shop the parts yourself through local lumberyards and a sauna heater manufacturer. Buying from a manufacturer eliminates the need to order materials from various sources, but you will pay handling, shipping, and overheard.

A Design Comment

Keep in mind the objective of designing and building a relaxing environment. The sauna bather is there to escape the day's stress, so there's no need for electrical outlets or phone jacks.

When pressed to identify the most common problem with American saunas, Finnish craftsmen and manufacturers will answer, "The location is wrong." A sauna should be near a shower and should have space for a relaxation chair just outside the door. A lot of bathers take a quick, cool shower between each 10- to 20-minute session in the hot sauna room. After finishing up, the homeowner won't want to walk to a shower at the home's far end, dripping sweat all along.

For whatever reason, Finns seem to feel comfortable in a relatively dark, simple sauna. The stateside buyer may want a more visually inviting room, especially where it is added as part of a larger exercise/hot tub space. Distinctive touches can strike a chord with U.S. buyers: selecting a wood that retains its bright color; picking a door with a large light of etched glass; adding a window for borrowed outside light, more connection to adjacent spaces, and a less shut-in feeling. One sauna manufacturer, Amerec, sees a lot of interest in its sauna design that has one wall of solid glass.

Design Layout

The first design criterion is size. How many people will the sauna hold? Figure at least 2 feet of upper bench space per seated person, and 5 feet per person

lying down. A 6x6-foot sauna—the minimum for L-shaped benches—will hold three people comfortably, four if none lie down. Today's homeowners tend to use the sauna in ones or twos rather than as a family. This drives demand toward smaller sauna models, typically a 5x7-foot or 6x6-foot unit.

Saunas generally have a 7-foot ceiling height to conserve energy and keep the heat down near the benches. Since a bather either lies or sits in a sauna, always maximize bench area. Layout will require two levels of approximately 20-inch-wide benches with the lower level 20 inches off the floor and the higher level up an additional 18 inches (see Figure 1). Finlandia Sauna's Reino Tarkiainen stresses the need for two levels, since a sauna with 195°F air at the ceiling drops off to 155°F for someone lying on the upper bench.

Floors will be exposed to sweat plus a bit of water splashed on the rocks in the sauna heater. Concrete, masonry, ceramic tile, or seamless vinyl are appropriate floor surfaces; avoid solid wood floors or carpeting which would soak up and hold perspiration. Removable duckboards, which can be taken out periodically and washed, are provided for areas in front of benches. A floor drain will facilitate sauna cleanup, but it is not critical.

Typical layout will include a sauna heater, door, and window along one wall. For safety, the wood door should be an out-swinger with wooden handles and ball-catch closure. Most sauna heaters require a wooden guard rail around the heater. Lighting should be subdued.

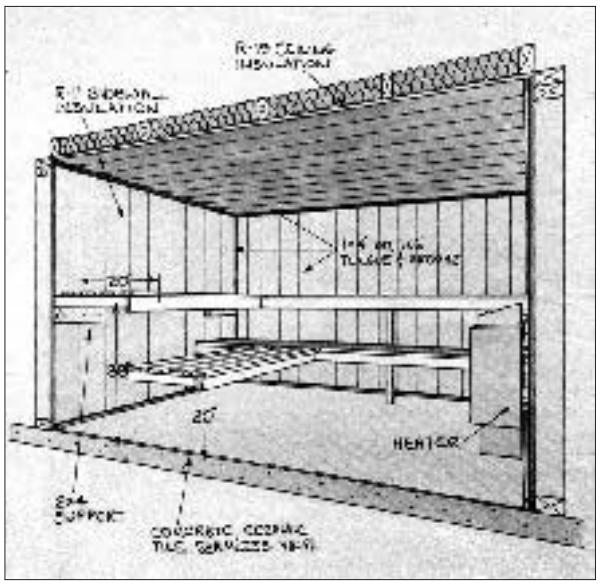


Figure 1. *Home saunas often measure 5x7 feet or 6x6 feet, which is comfortable for three people. Ceilings are 7 feet high to conserve energy. Typical bench heights are 20 and 38 inches—the higher seat sits in hotter air. Tongue and groove wood lining should be blind nailed and seats should be screwed and glued from beneath to avoid exposed metal screw or nail heads.*

Sauna Heaters

A good heater must be capable of raising temperatures from 65°F to 180°F within about 30 minutes in a moderately insulated small sauna. Typical residential heaters are wall-mounted and have between 4.5 and 9 kilowatt output; a 6x6-foot sauna will usually require a 6 kilowatt heater that draws 25 amps. Most heaters are wired for 240-volt, single-phase current or three-phase, 208-volt current; they should be UL-listed.

Sauna heaters typically come with thermostat, heat indicator light, and 60-minute timer controls which are built into the unit or mounted on a separate pre-wired panel outside the sauna. (Since sauna lighting is intentionally dim, exterior controls are easier to read.) If the 60-minute timer is not standard, it is good to buy it as an option; it is a good safety and energy-control feature. Expect the heater and controls to cost $400 to $600.

The heat control should be by natural convection, not radiation. Most sauna heaters provide electric resistance heat to coils running through a double- or triple-shell steel box (see Figure 2). The box is filled with 10 to 70 pounds of fracture-resistant igneous rock, often imported from Finland. Usually, air enters at the bottom, flows up through rocks in direct contact with heating coils, and flows out the top. Water periodically ladled on the heated rocks flashes to steam. Most units have a built-in high-limit control that will automatically cut off power to prevent overheating. There are variations among heater designs. Traditionalists insist on direct contact between rocks and heating elements. Others prefer designs that isolate heating elements from the rocks (and water ladled on them) in a stainless steel pan atop the heater, claiming this results in less maintenance.

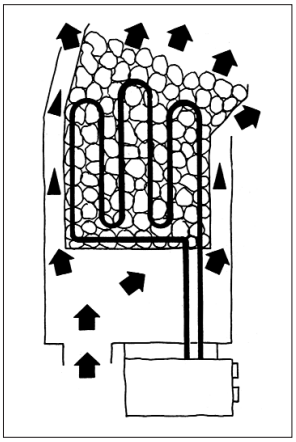


Figure 2. *Most sauna heaters are electric with a double- or triple-wall steel box filled with igneous rocks. The heater coil either runs through the rocks, or sits atop them in a stainless-steel pan. Most units are mounted behind a guard rail to prevent accidental burns, and most are wired with a high-limit shutoff.*

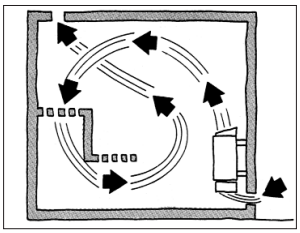
When shopping for heaters, follow these guidelines:

- Check the length of heater warranties. A few manufacturers provide 5-year protection.
- Some manufacturers (Tylo) provide triple-wall construction and a heat-resistant finishing layer that eliminates the need for a sauna heater guard rail.
- If space is tight (and it often is) an optional triangular heater design (Amerec) takes up less space.
- A few companies (Finnleo, Finlandia) offer wood stoves, and at least one (Vico) offers sealed combustion gas-heated models. Both wood and gas models take up slightly more space than an electric heater with the same output, but the wood and gas models will require flue venting.

Ventilation

While some American installers don't bother with sauna room ventilation, and codes often don't require it, Finns would never build a sauna without it. The American argument seems to be: Why allow the heat built up in a sauna to escape so quickly? But Finns counter that in a confined space where breathing increases, you must introduce fresh air to keep up the oxygen content for a healthy sauna.

In standard Finnish practice, vents are closed during sauna warmup. Once people enter the sauna, a small vent near the sauna heater is opened to allow air from adjacent rooms to enter the sauna; a vent of the same size exhausts stale air from high on the opposite wall (see Figure 3). Introducing air from the home rather than from outside will prevent any cold-air drafts; venting sauna exhaust air back into the home will at least help offset winter heating needs.



Helo Sauna & Fitness

Figure 3. *Finns highly recommend circulating household air through the sauna by natural convection. Place vents high and low, as shown, with the low inlet feeding the bottom of the heater.*

Cedarbrook recommends up to 15 square inches for each vent. Finlandia specifies 4x10-inch adjustable vents both high and low. The Finnish Sauna Society recommends at least six air changes per hour.

Wood and Materials

Wood used in a sauna should be light in color, low density, and resistant to stains. At high sauna temperatures, hardwoods get too hot to sit on or lean against. The wood also should be kiln-dried (specify below 15% moisture content), clear heart, vertical grain, grade-A material—expensive stuff. Types of wood used in a sauna include redwood, western red cedar, Alaska yellow cedar, Nordic white spruce, hemlock, aspen, birch, and pine (see Table).

On the West Coast, sauna manufacturers and installers tend to favor western red cedar over redwood. Besides costing less, they say, cedar is more aromatic, resists staining, and remains lighter in color. Over time, the heat in a sauna draws tannic acid out of redwood, which darkens it; to some users, dark saunas feel smaller.

Dimension choices vary significantly. Most wall and ceiling material is 1x4 or 1x6 tongue-and groove; stay away from fragile 1/2-inch tongue-and-groove material. Base, corner, and ceiling molding is typically 1x2.

You'll want to order a wood door that matches your walls. Including a large window in the door (a popular feature with buyers) reduces the possibility of warping.

If you decide to assemble your own package rather than work through a manufacturer, be picky at the lumberyard. Avoid knots and exposed resin, which get very hot in a heated sauna. If you order tongue-and-groove material with more than 12% moisture content, especially 1x6, you may find it susceptible to splitting.

Make sure other materials are designed to survive in a hot and occasionally humid environment. Fasteners and hardware, including vents, should be rustproof. Lights must be vapor-proof by code.

Construction Tips

For framing, use relatively dry 2x4s at 16 inches on-center. Use rot-resistant wood for bottom plates.

Use at least R-11 sidewall and R-19 ceiling insulation; upgrade the insulation where you are against a cold basement wall or an exterior wall, or where electric rates or cooling loads are high. For a vapor barrier, a number of installers favor a sturdy foil radiant barrier, figuring it will slow down heat loss (if adjacent to an airspace) and outlast polyethylene in the warmer-than-normal wall system. Some codes require an interior 5/8-inch layer of standard gypsum board over the framing before nailing up the wallboards.

The ceiling should go up first. Face-nail the first piece close enough to the edge for trim to cover the nail heads. Then blind-nail through the tongues into ceiling joists and rip the last board to fit.

Next, install the back wall, then the side wall, moving from the floor up and hiding any blemishes in courses below the benches. Exposed fasteners, on trim or elsewhere, should be countersunk, since nail or screw heads are very hot to the touch in a heated sauna.

To minimize exposed screws, especially on benches, pick thicker (2x) bench top boards; then glue and screw them through the bottom of the horizontal 2x4 supports.

Unless your sauna heater manufacturer specifies otherwise, install a guard rail around the heater. Finnleo advises holding the rail 4 inches away from the heater; check your sauna heater specs for guard rail requirements.

Don't treat the interior surfaces with any stains, polyurethanes, or preservatives which might emit toxic fumes at high temperatures. Helo recommends "curing" the sauna after construction is completed, by leaving the door slightly open with the sauna heater on high for six hours.

Costs

Quotes from manufacturers for a 6x6-foot precut sauna it ranged from $1,500 to $2,000. Opting for the prefab package—normally a do-it-yourselfer

Wood Performance Saunas

Wood	Reactions Under Sauna Conditions: Movement & Expansion	Warping	Resistance To Decay, & Fungus	Color of Heartwood	Advantages	Disadvantages
Western Red Cedar	very small	stable	very high	Very colorful, cream to dark brown	pleasant cedary odor, no pitch or resin	wood can be stained by metal
Atlantic White Cedar	very small	stable	very high	straw brown	pleasant odor	splits easily
Redwood	very small	stable	very high	light red to deep reddish-brown	straight grained, strong, nice smell	stains easily from perspiration
Eastern White Pine	small	stable	moderate	cream to light reddish-brown		subtle resinous odor
Sugar Pine	small	stable	very low	light creamy-brown		faint resinous odor
Aspen	large	stable	very low	greyish-white to light greyish-brown	straight grained, resists splintering	
Western White Pine	moderate-large	stable	very low	cream to light reddish-brown		can be knotty, slight resin content
Ponderosa Pine	moderate-small	stable	very low	orange to reddish-brown	straight grained	quite resinous with distinct resinous odor
Red Pine	moderate-large	stable	very low	pale red to reddish-brown	straight-grained	strong resinous odor, may leech resin
Sitka Spruce	moderate-small	slight	very low	light pinkish-brown	uniform texture, straight grained	
Hemlock	moderate-large	slight	very low	very pale; pale-brown with reddish tinge	even grained, strong	faint sour smell when fresh
Cypress (Bald Cypress)	small	slight	high	light yellowish-brown to dark brownish-red	quite strong	slight musty smell, very dense

option—increases costs by as much as $800. If you ask the dealer or distributor to install your precut kit, add another $400 to $600. The most common quote JLC was given for an installed precut kit was around $2,500. Generally, the precuts do not include the cost of framing, insulation, and a finished floor, so you have to factor them into your tab. If you work through a manufacturer, make sure you compare apples to apples in terms of features provided at a given price for the same-sized models. What is standard with one manufacturer can be optional with another.

A word about operating costs: One Swedish study found that each warmup and use of a four-person sauna consumes about 4 kilowatt hours of electricity (32¢ at the national average of 8¢ per kilowatt hour), while heating water for a bath typically consumes 6.5 kilowatt hours. Used three times a week, an electric sauna heater would cost $4 a month, and a gas unit would cost less. ■

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