Installing Factory-Built Fireplaces

by John Nunes

Zero-clearance in name only, these products require careful attention to manufacturers' specs and details.

Factory-built fireplaces can offer the warmth and romantic appeal of a traditional fireplace, versatility of designs, and economy. Installation is straightforward, but requires familiarity with manufacturers' standards and some basic engineering. The manufacturers and models vary significantly, so no single set of instructions can cover all factory-built fireplaces. But some guidelines, which I'll cover here, are universally applicable to all factory-built systems.

Manufacturing Standards

All factory-built fireplace models are designed and tested to conform to the Underwriters Laboratories Inc. safety standard UL 127 for factory-built fireplaces. UL 127, which is uniformly accepted as the standard guide by all major model-code groups, is the basis for the manufacturer's installation instructions. So, the manufacturer's installation instructions, which are written specifically for the model you are installing, are the installer's bible.

Local building officials occasionally have additional requirements for factory-built fireplaces, so check with the local inspection official before installation.

Fireplace Components

A typical factory-built fireplace installation "package" consists of a fireplace box (firebox), flue system, flashing, and termination device (chimney top). See Figure 1 for a schematic of a typical installation.

Fireboxes. Firebox styles vary greatly. There are corner-opening, see-through, four-sided, and three-sided units, units with cast-iron faces, and

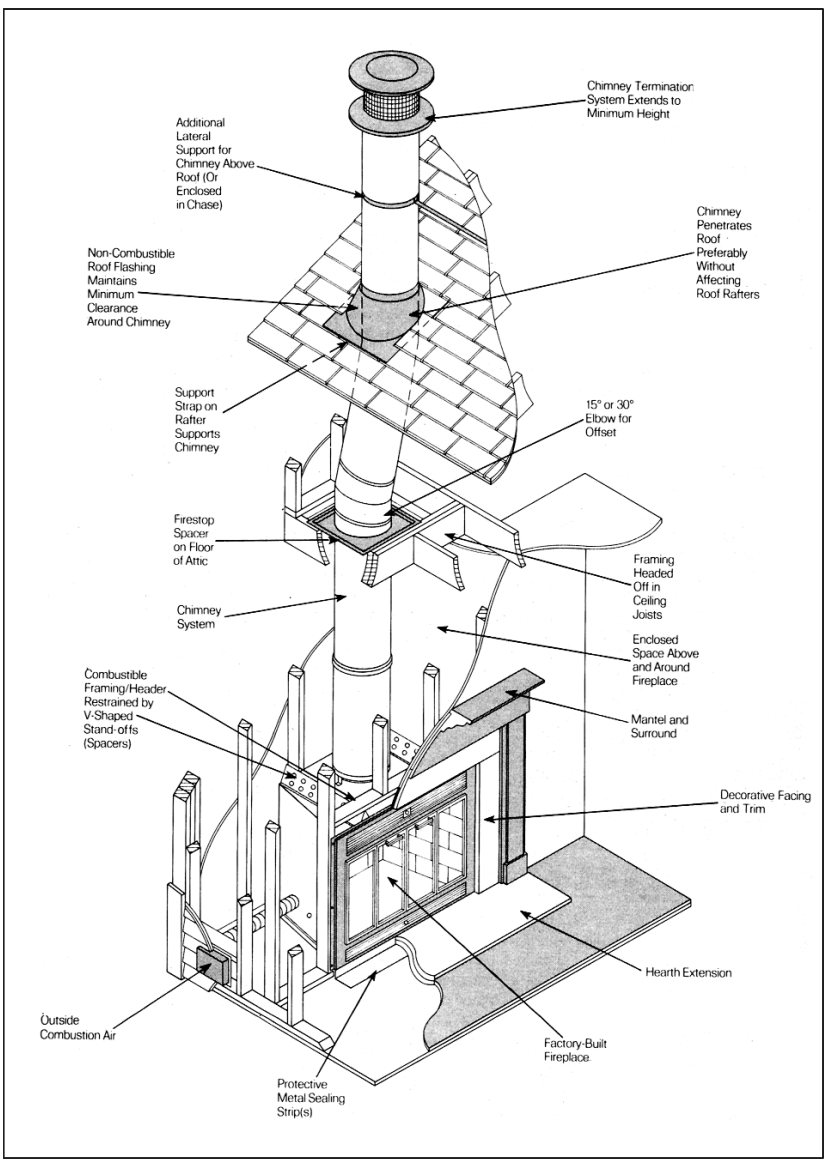

Figure 1. *A typical factory-built-fireplace installation "package" consists of a fireplace box, flue system, flashing, and chimney top. All models have individually written instructions that conform to UL standards and must be followed to the letter.*

variously sized front-opening units. But there are essentially two basic designs: radiant and circulating.

The radiant design (see Figure 2) directly radiates heat into the area in front of it. Radiant fireplaces have a smooth metal face that allows you to run fireplace finish material to the opening of the fireplace.

Circulating fireplaces (see Figure 3) transfer heat by circulating room air around the fire chamber. The heated air flows into the room through louvers or grills. Circulating systems may be passive—relying on natural convection—or active with an electric forced-air kit moving the air. Finish materials cannot block the airflow around the grills.

Flue. Flue systems used with factory-built fireplaces come in two basic types: air-cooled and insulated (see Figure 4). All flue sections are available in varying lengths and with offset angles of 15 or 30 degrees.

Air-cooled chimneys are double- or triple-walled, with the innermost wall acting as the flue exhaust and the outer wall (or walls) acting as a cooling chamber that allows air to move between the inner and outer walls.

Insulated chimneys have solid insulation between two concentric pipes and rely on insulation value to maintain safety.

Most manufacturers use double-wall air-cooled chimneys. They are economical to make and have proven safe and reliable. Both systems have required clearances that must be maintained from combustible materials (called "clearance to combustibles"). For the flue, the clearance is generally 1 to 2 inches; for the fireplace, anywhere from 1/2 to 1 inch. These clearances are specified by the manufacturer.

Firestops. All systems need to be "firestopped" as they pass through floor systems. A firestop is a bracket made of noncombustible materials. It maintains the required clearances to combustibles such as joists and other framing members, and it stabilizes the flue.

Flashing. There are two basic types: roof flashing and chase flashing.

Roof flashing is used when the flue exits the roof but is not contained inside a chase. It is generally available from the manufacturer in two sizes: one for pitches between 0/12 and 6/12, and another for pitches of 7/12 or greater. When properly installed, the roof flashing provides protection from leaks and helps maintain clearance to combustibles.

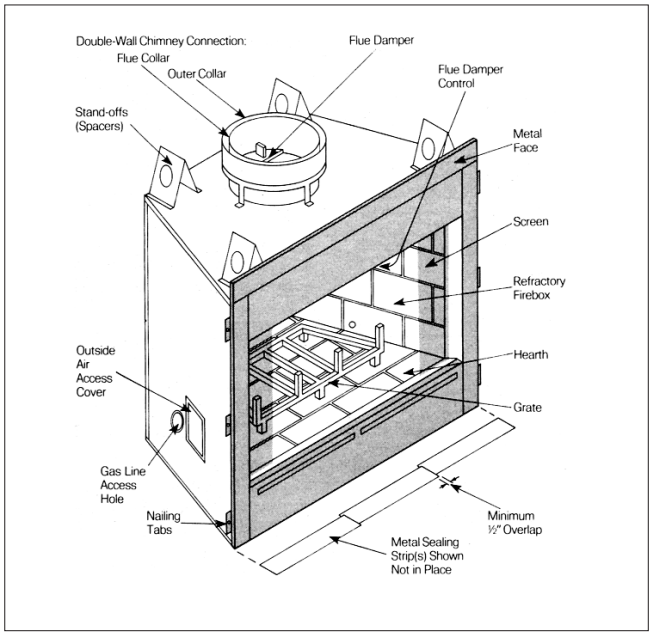

Figure 2. *The radiant-design fireplace has a smooth metal face that allows you to run finish material right to the opening of the firebox.*

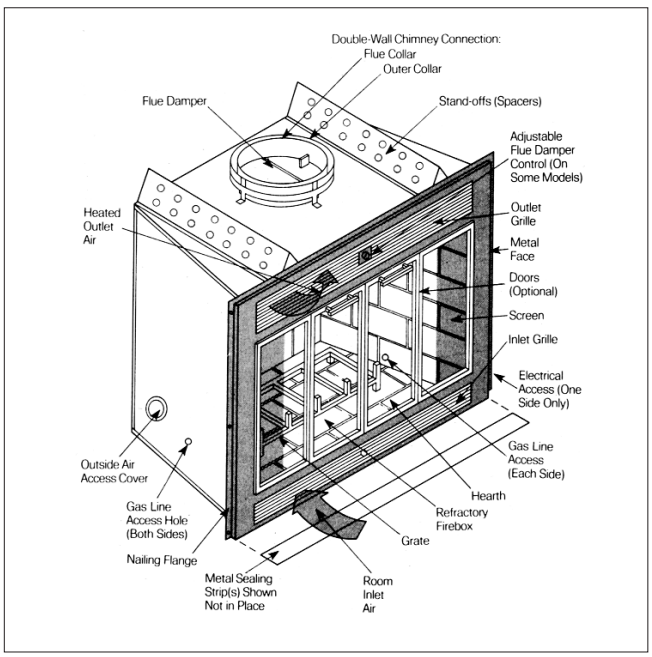

Figure 3. *Circulating fireplaces heat by circulating room air around the fire chamber. The heated air flows through louvers or grilles that can't be covered by finish materials.*

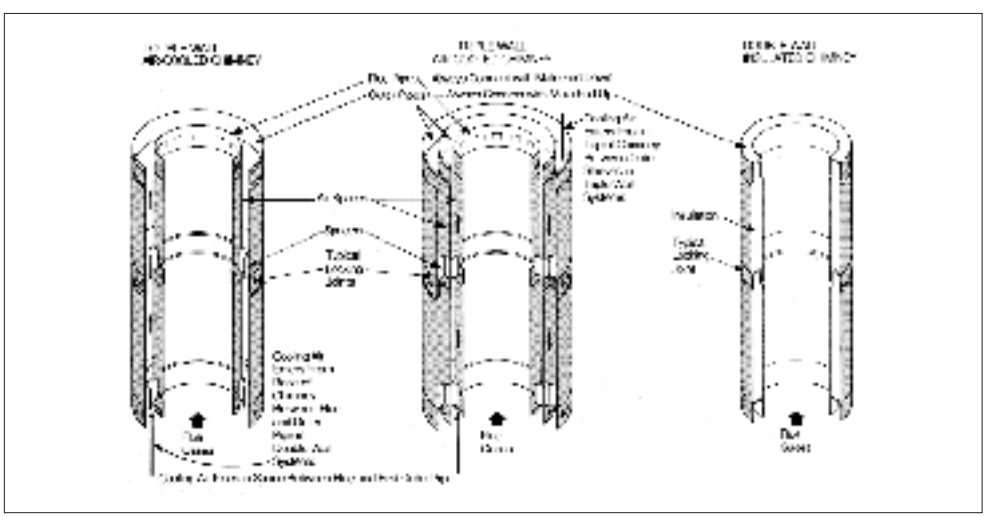

Figure 4. *Flue systems used with factory-built fireplaces come in two basic types: air-cooled (double- or triple-wall) and insulated. Most manufacturers use the double-wall air-cooled chimneys, which are the most economical.*

Chase flashing is put on top of the chase. It consists of a sheet of galvanized metal with a flue collar. Not all manufacturers have chase flashing available, and your chase may not accommodate the available flashing. If so, you may need to have a sheet-metal mechanic fabricate one. Your local distributor may help you find a sheet-metal shop.

Termination device. The termination device is installed on top of the last section of flue. These come in many shapes and sizes, but they all protect the flue system by preventing the entry of foreign material into the chimney. The devices serve as an exhaust for the flue gases (many come equipped with a spark arrestor), and they help cut down on the effects of air turbulence on fireplace draw.

Each fireplace model is designed to take a specific type of termination device; do not mix and match materials. Use the specs in the installation instructions when selecting materials.

Planning Is Important

Planning is critical for safe installation. Most problems occur because the customer, supplier, and installer don't communicate with each other. Here's a list of information to get and questions to ask to avoid problems.

Know what your clients want the fireplace to do. Some customers want the fireplace strictly for looks, some want it to be a secondary heat source, and others want to increase the value of their home. Before installing a fireplace, review with them what the product can and can't do.

Where will the fireplace be installed? Pinpoint where your customer wants to have the fireplace installed by physically laying it out in the house or marking it on the architect's plans. Then refer to the installation instructions and review the framing dimensions, the necessary chimney height, and the feasibility of flue offsets. If the proposed location doesn't conform with the information in the installation instructions, propose an alternative location or product. Sometimes customers want a fireplace that is impossible or impractical to install. For instance, you can't carry a 28-inch-wide unit through a 24-inch door jamb, nor deliver a 400-pound fireplace to a loft.

What finish are you going to apply? Find out how the customer wants the unit finished: slate, stone, marble, brick, and tile are most common. Make sure the fireplace can safely accommodate the finish they want. The installation instructions provide this information.

Customers frequently desire mantels to trim out the fireplace. Your local distributor can help you find a mantel that conforms with clearance requirements. Many distributors sell the mantels and "surround materials" (decorative trim or finishes).

Review local building requirements. Some code jurisdictions require a mechanical fireplace permit; some have special installation requirements. If you aren't familiar with these requirements, meet with an inspection official.

Construction Details

Before installing the fireplace, address the following framing and construction-detail issues.

On exterior chase cavities, ensure that:

1) The chase is built to the required framing dimensions.

2) The chase is tied in tightly to the house. This adds stability and cuts down on cold-air infiltration.

3) The plywood platform where the fireplace sits should be level with the slope of the floor inside the house. If the fireplace will sit on a concrete slab, it must be smooth so the fireplace can be properly leveled.

4) Follow manufacturer's instructions for chase installations to prevent cold-air infiltration (see Figure 5). If the chase is cantilevered (that is, built on joist kick-outs with plywood on top and bottom), the cantilever should be filled with insulation. Most installation instructions call for the exterior chase to be insulated to the first firestop. Do not use blown insulation; it will violate the required clearance to combustibles. Also, stay away from conventional Kraft or foil-faced insulation, as the mastic used to secure the insulation to the face is combustible. Unfaced fiberglass insulation is adequate. Owens Corning FS-25 is a good product as well; it uses a non-combustible mastic to secure a foil face to the insulation, and it is better than unfaced because it provides a vapor barrier.

5) A step flashing at least 3 inches wide should be installed between the chase and roof to eliminate potential leaks.

6) Install plywood on top of the chase to support the chase flashing. This prevents sagging and leaks. When installing the flue, simply cut the plywood hole large enough to maintain clearance to combustibles.

7) Install plywood draftstops as indicated by the installation instructions.

8) A trim board or band preferably of 2x4 or 2x6 material should be installed around the exterior perimeter of a framed chase using vinyl, aluminum or wood siding to provide a drainage point outside of the siding. On masonry-veneer and stone chases, trim should also be installed outside the threshold of the finish materials to prevent leakage.

9) For fireplaces sitting in interior walls or in corners, check clearances to floor joists and roof trusses. They must conform to installation instructions. Be sure these fireplaces can accommodate a chimney route. If any roof trusses or bearing joists are in the way of the chimney route, consult local building officials before making any modifications.

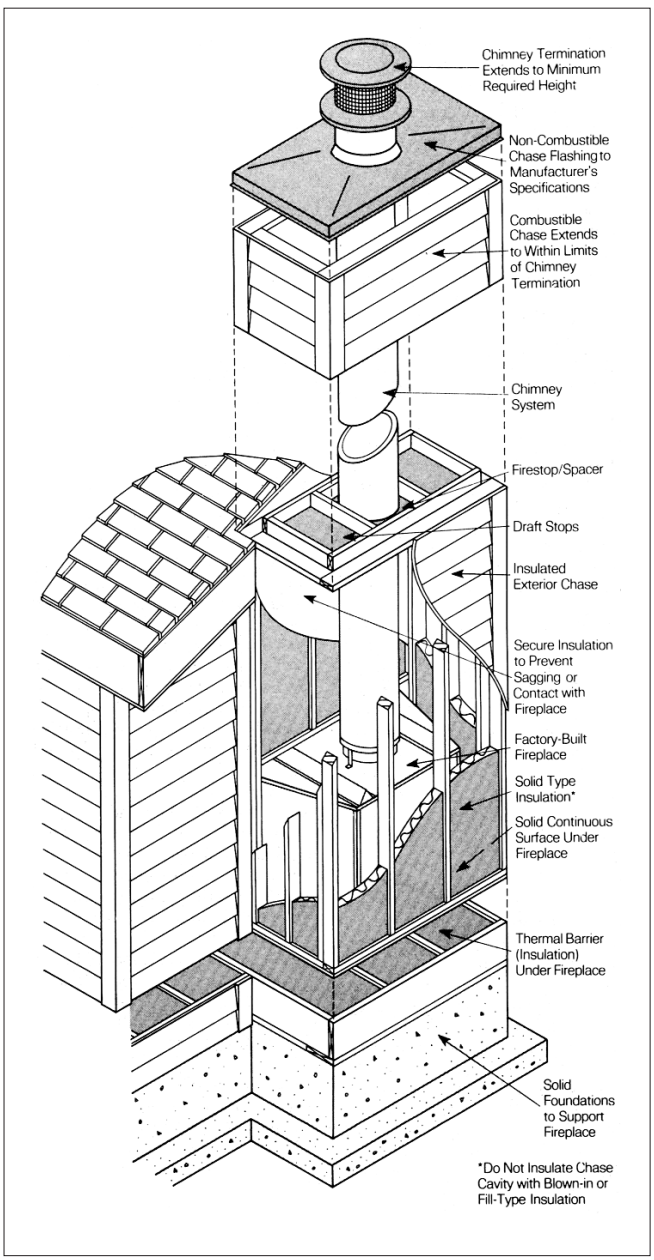

Figure 5. *An exterior chase should be constructed with typical stud walls following the details specced in the installation instructions. Pay careful attention to attaching the chase structurally to the house.*

Step-by-Step Installation

When setting the fireplace box, be sure to:

1) Maintain prescribed clearance to combustibles called for in installation instructions. Often a unit will have stand-off brackets, which maintain the minimum clearance to combustibles. Check to make sure they have not been damaged in shipping or handling.

2) Plumb the fireplace to framed walls using wood shims.

3) Secure the fireplace to flooring at sides and front.

4) On circulating fireplaces, ensure that inlet and outlet grilles are free of obstruction.

5) On combustible floors, install a 4-inch-wide park guard 2 inches under and 2 inches out from the face across the entire width of the fireplace.

When installing the flue system:

1) Confirm the chimney route and height; lay it out accordingly. See the instructions. There are minimum and maximum chimney heights.

2) If you are comfortable with the layout, cut holes at each floor or draft stop level (depending upon whether it's an exterior or interior route) with a reciprocating saw or chainsaw to make room for installation of firestop spacers.

If you're a new installer, you may wish to connect chimney sections until you're close to the respective floor or draft stop, then find the center of the chimney, mark it with a plumb line, and drive a plumb nail through the plywood to find the center point of the firestop spacer.

After the route is laid out and cut, you're ready to set the firestop spacers. Firestop spacers maintain clearance to combustibles and provide lateral support for the chimney.

3) If your installation requires the use of offsets (elbows), remember they may not be used in combinations that make the flue incline more than 30 degrees from vertical. The installation instructions spec the maximum length between the offset and return elbow. All elbows are to be used in pairs. The offset elbow inclines the chimney, and the return elbow brings the chimney back to vertical. The return elbow has support straps. Always secure these to framing members. The straps keep the chimney from sagging at elbows and maintain clearance to combustibles.

4) Terminate the chimney outside of the dwelling at least 3 feet above where the chimney exits the roof and 2 feet above the nearest structure within 10 feet. A good way to determine this height is to find the pitch of the roof, multiply it by 10 and add 24 inches.

For example, for a roof pitch of 7/12: 10 x 7 = 70. 70 + 24 = 94. The flue

Fireplace Follow-Up

To encourage proper use of factory-built fireplaces and long life for the system, review this information with your client after the product is installed.

Warranty. Virtually all factory-built fireplaces have a limited warranty that entitles the consumer to replacement parts and, in some cases, labor. Encourage your client to read the warranty. It is found inside the information packet that comes with the fireplace.

Wood selection. For best results, only dry wood seasoned at least one year should be burned in factory-built fireplaces. Hardwoods like oak burn more thoroughly than softwoods like pine. Softwoods tend to form creosote in the flue liner, and this creosote must be cleaned out frequently because it increases the potential for a chimney fire. They shouldn't use construction materials or pre-fabricated logs in the fireplace; the chemical contents of these woods may corrode the stainless-steel chimney liner over time.

Starting a fire. When the damper is opened to start a fire, cold air in the flue will "fall" into the room making a good draft harder to obtain. To avoid this, the user should make a torch from old newspaper, stick it up into the flue, and light its end. This will heat up the flue and create a positive draft as the heat rises. Then the fire will draw well.

Blowers of fans. For circulating-type fireplaces, the user needs to wait 30 minutes after the fire has started before turning on the forced-air blowers. This gives the firebox chamber time to heat up. Customers may comment that the blower doesn't seem to blow out much air. But the airflow is kept small to allow adequate heating of the air.

Cleaning the flue. The flue should be inspected visually at least twice during the burning season by opening the damper and checking the flue liner for creosote. If buildup greater than the thickness of a fingernail consistently occurs, the flue should probably be cleaned. The homeowner should retain a chimney sweep who uses a flue brush made of a soft cloth or spongelike material. Metal chimney brushes will scrape the stainless-steel flue liner, creating indentations that will allow for the buildup of unremovable creosote; this increases the likelihood of a chimney fire.

Cracks in firebricks or "refractories." Fireboxes are generally lined with mortared slabs known as refractories. It is common for these materials to develop hairline cracks stemming from expansion caused by heat inside the fireplace. This is common and not a cause for alarm. Unless a crack opens to a width greater than the thickness of a quarter, no replacement is necessary. When replacement is required, the customer should contact the manufacturer or local distributor for replacement parts.

In addition to these basic tips, the manufacturer provides a care and operations manual tailored specifically to the particular fireplace model.

therefore must extend 94 inches from the roof, regardless of whether it's exposed or in a chase. Proper chimney height reduces the risk from flying sparks.

5) Depending upon the height of the flue above the roof, the flue may require a chimney-support bracket at a flue joint. Also, guy wires or bracing may be needed from the support bracket to the roof to brace the flue against high winds. Follow these instructions to the letter.

6) When installing the termination device, and roof or chase flashing, use a "storm collar" to seal the join between the flue and flashing collar; caulk as needed with roof cement.

Consider an outside-air source. Installing an outside-air source to provide combustion air is optional. The combustion-air source uses a flex-duct system to vent external air into the firebox. This reduces the amount of heated room air drawn up the flue. Some local codes require these kits on all factory-built fireplaces, and most fireplaces are designed to accept them. Never terminate the combustion-air source in a garage or any place where combustible liquids or gas are stored.

Decorative Finishes

After installing the fireplace, but before installing the finished hearth, surround materials, and glass doors, complete the necessary framing and run drywall around the perimeter of the fireplace as specified in the installation instructions. Finish the drywall and paint accordingly before installing the fireplace finish materials. This eliminates potential cold-air infiltration around the fireplace and will keep the fireplace surround materials from being marked up during painting.

Glass doors. Some fireplaces come standard with glass doors, and some don't, but most fireplaces accept glass doors as an option. Only install glass doors that have been tested and listed by the manufacturer for use with the specific model fireplace. It could be hazardous otherwise.

Finished surround materials. There's a lot to know about fireplace finishes, so I'll just cover some general points. When installing finishes, maintain required clearances to the firebox opening. Do not cover inlet or outlet grilles on circulating fireplaces.

Clearances for wood mantels vary from fireplace to fireplace, so check the instructions. Maximum depths for surround materials may also be specced. Install a non-combustible hearth extension that satisfies the installation instructions. The manufacturer may also require that a factory-produced hearth extension be installed under your proposed hearth materials to provide the necessary insulating value.

Seal all joints between the drywall materials and the fireplace to prevent air infiltration around the fireplace. Use non-combustible caulk, like Rutland's "Code 63" fireplace mortar, between the surround materials and fireplace, or aluminum duct tape installed at the seam between the drywall and the fireplace and covered by the surround material.

For more information on this topic, contact the Wood Heating Education and Research Foundation (WHERF), 1101 Connecticut Ave., N.W., Suite 700, Washington, DC 20036; 800/942-2887. For a fee, WHERF offers a training program for factory-built fireplace installers. ■

John Nunes is Corporate Director of Production for Hearth and Home Distributors, Inc. in Columbia, Md.