Prefab Masonry Fireplaces

by Gary R. Menia

A new breed of hybrid fireplace combines the benefits of a masonry firebox with the savings of a metal chimney

The prefabricated, factory-built fireplace was born in the building boom of the 1970s as a solution to the high demand for fireplaces and the severe shortage of masons. These new "builders boxes" were inexpensive, quick to install, and could be handled by carpenters — no masons were needed. They did not, however, satisfy customers looking for the quality and durability of a masonry firebox.

In response, manufacturers have developed new options that combine the quality of masonry with the low cost of a prefab installation. Some combine the masonry firebox with a metal chimney, making them a new breed of hybrid fireplace.

Early Prefabs

The original prefabricated chimneys were made of three interlocking pipes that circulated air to remove excess heat. The triple-wall chimney system was secured to the top of the firebox unit and continued to the roof, and the entire fireplace was enclosed in a wooden chase. These first-generation prefab fireplaces were actually safer, on average, than masonry fireplaces because pretesting in the lab replaced guesswork in the field. By comparison, many of the masonry chimneys built during this era were put up by poorly trained masons. A particularly confusing issue was the proper spacing between masonry materials and combustible framing. It didn't help that the code regulations on this were changing on a regular basis.

As the new prefabs evolved, however, several problems developed. Although the units were commonly called "zero-clearance," an air space was often required to make them safe. For example, many units required a 2-inch air space around the chimney to dissipate heat. Confusion over such clearances resulted in many units being installed improperly and unsafely.

A related problem was that the ignition point of wood was not well understood at the time. When these units were first gaining acceptance, the ignition point was thought to be about 450°F. Now we know that temperatures as low as 186°F will ignite wood that has been *pyrolyzed*, or slowly cooked, due to repeated exposure to high temperatures.

Material Problems

Other problems stemmed from the materials used. The inner liners of the original chimney systems were made from a less durable grade of steel than is used today. This caused the chimneys to collapse during chimney fires. This risk, coupled with the combustibility of wooden chases, led one major insurance company to stop insuring these chimneys altogether.

The most critical problem was in the firebox materials. Although the lightweight materials were acceptable for the low fires generated in the testing labs, we've seen many units warp and buckle under the intense heat created during actual use. This wasn't a problem for the casual user who had one or two fires a year. It was a big concern, however, for the owner who stokes the fire all weekend long. A warning label inside the metal fireboxes warns the user against over-firing, but most homeowners aren't aware of it. The prefab fireplace was never intended to serve as a major heating appliance.

Recently, we have noticed a problem in houses where the wooden chases are finished with brick veneer. In many of these, condensation inside the chase is deteriorating the metal fireplaces. Once the chase is finished and bricked up, there is no way to examine the condition of the metal components.

Another complaint we've heard in the field is that the metal fireplaces allow more air infiltration than their masonry counterparts. This problem is particularly acute with the air-cooled, double-wall chimneys, which are designed to draw ventilation air through inlets at the base of the chimney. When located on the first floor of a two-story house, the fireplace is in a negative pressure zone and may become the house's primary source of makeup air.

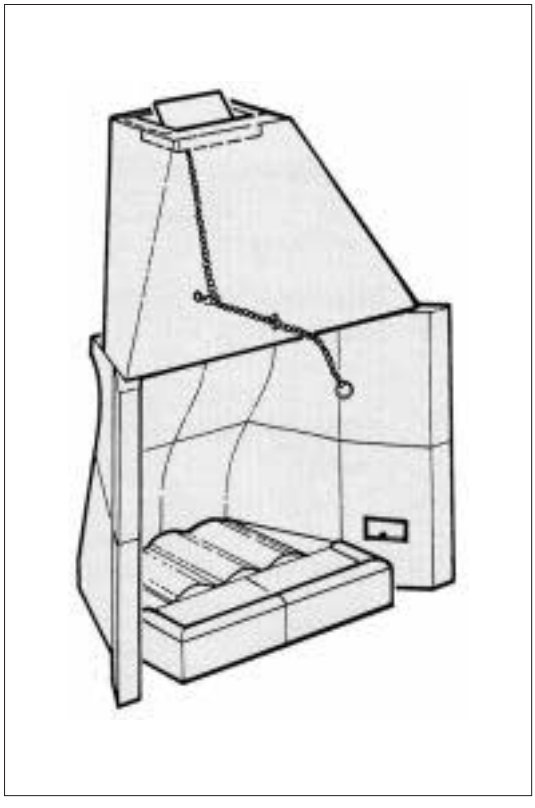
A worker installs the metal shroud of a Firecast masonry fireplace.

To combat the air leakage problem, contractors often insulated the wooden chase. While this is allowed, the air spaces around the firebox and chimney were often filled with insulation, too — which is not allowed. The air space is needed to cool the fireplace, and the insulation was often raising the temperatures to unsafe levels.

Perhaps the biggest problem, however, was the lack of confidence that customers had in these metal boxes. Homeowners often told us how unsafe these units made them feel.

Must Be Something Better

As a fireplace contractor, I felt



The Heat Force *unit is designed to burn hotter and cleaner than traditional fireplaces. The firebox and smoke shelf consist of 11 modular pieces that can be installed in just a few hours.*

The Firecast *system has good heat output and produces little creosote. An insulation-filled metal shroud around the firebox allows installation with zero clearance to combustibles.*

that there must be products that addressed these problems. A few years ago, I was happy to discover that there were, and have since installed a number of these and watched their performance in the field. Although a little more expensive than the original builders boxes, the new hybrid units appear to deliver performance comparable to that of a well-built traditional fireplace — at about one-third the cost.

A hybrid fireplace combines a masonry firebox and smoke chamber with a metal chimney system. This gives you the durability of masonry in the areas where heat is generated along with the ease of prefab chimney construction.

Although the original metal chimneys were a problem, this has been greatly improved. The new chimneys are tested and listed by Underwriters Laboratories to UL Standard 103 HT. This tests the chimneys' ability to withstand extremely high temperatures for extended periods of time — 1,000°F for six to seven hours, and as high as 2,100°F for short intervals.

Of the new generation of UL-listed solid-pack chimneys, I use the Security ASHT high-temperature chimneys or the Metalbestos Model SS2 chimneys. I also use Metal-Fab's Temp/Guard chimneys, which are insulated with a new ceramic fiber insulation that is much lighter than solid-pack insulation.

These new chimneys have given us a safe way to vent any wood-burning fireplace. Also, because steel chimneys heat up more quickly than masonry flues, they get less creosote buildup and so are less prone to chimney fires. Since creosote forms at about 250°F, most fireplace creosote forms in the first 25 minutes of burning.

Masonry Fireboxes

In addition to the increased durability and appeal of solid masonry, the new fireboxes have several advantages over the steel builders boxes. First, because masonry is a better heat-storing medium than steel, it has greater heating capacity. We are also able to surround the entire fireplace system with an insulated chase, which eliminates the air leakage of a builders box, as well as heat loss associated with the large masonry mass of an exposed brick fireplace. In some cases, the new hybrids provide burning efficiencies comparable to airtight wood stoves.

There are several types of masonry fireboxes, each with different characteristics. Some units have a metal shroud that is insulated after the firebox is fabricated, while others rely on a masonry surround for protection of the adjoining wooden chase.

Most of the systems are modular, consisting of as few as four pieces. The interlocking designs make it very easy for a nonmason to assemble them into a safe firebox. The few parts there are require only a gallon of high-temperature refractory cement to bond together. Furthermore, the masonry work is hidden by the chase, so the finished appearance isn't a factor.

High-Quality Hybrid

The *Heat Force* is a good hybrid fireplace made from high-quality refractory materials. The shape of the rear wall is designed to maximize the combustion process, raising the surface temperature of the firebox to 1,300°F. The high temperatures ensure that any unburned gases will ignite as they pass by the refractory surface. The flared side walls of the firebox reflect most of the heat generated into the living space.

The advantages of this type of firebox include lower firewood consumption and greater heat output. Also, the chimney stays cleaner — as does the environment. With a trend toward cleaner air requirements from regulatory agencies across the country, this type of fireplace will likely become the standard for future fireplaces. During testing, the Heat Force fireplace had particulate emissions of 21 grams per hour. This is much cleaner burning than a conventional fireplace, which under the same testing emitted 62 grams per hour.

The modular design of the firebox and smoke chamber allows the unit's 11 pieces to be installed in just a few hours. A pipe adapter fitting, which attaches to the top of the smoke chamber, makes for easy installation of a metal chimney system. The Heat Force fireplace can then be treated as any other prefabricated fireplace, and vented with a Class A chimney.

To fabricate this firebox and smoke chamber requires only one day of a mason's time — without a helper. The material cost with a one-story chimney is about $1,500. The installed cost over a slab would typically be $2,500, only $500 more than a metal firebox.

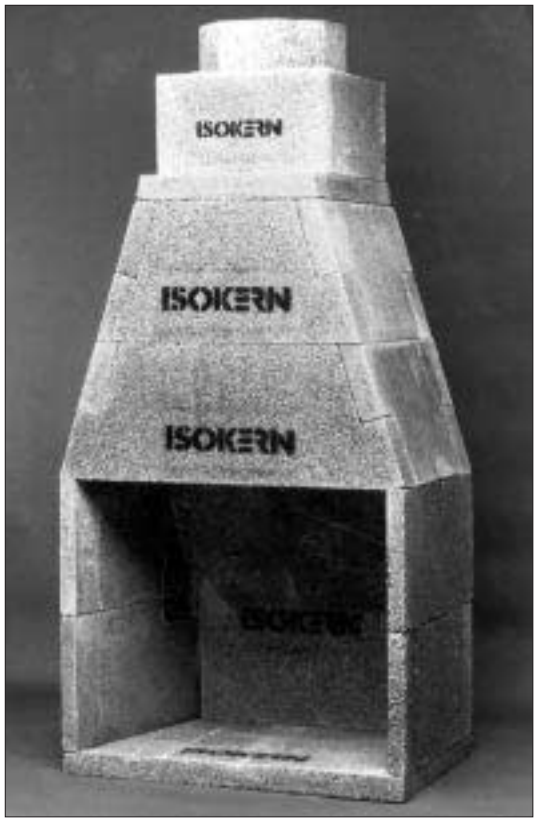
As with the standard prefab, the additional cost for the chase and siding would have to be added, but there are still considerable savings over building a $6,000 masonry fireplace. The cost savings give the customer a larger budget for the finished surround of the fireplace facing, which can be brick, stone, or marble, as with any prefabricated fireplace. This puts the major expense of building a fireplace on the finish work where it is appreciated by the owner.

True Zero-Clearance

A second type of refractory fireplace is the *Firecast* system. This fireplace is similar to the Heat Force but has a single-piece rear wall instead of the four pieces used in the Heat Force. An advantage of this system is that it installs with zero-clearance due to a metal shroud around the masonry system. The firebox and smoke chamber are fabricated inside the metal shroud, then a high-temperature insulation is poured between the masonry and the metal jacket. The insulation, similar to a mixture of vermiculite and cement, stays in place once it has set up. The metal chimney system is then attached to the top of the smoke chamber.

Like the Heat Force system, the Firecast has good heat output. In one case, we installed a Firecast unit in a 14x22-foot room with a 12-foot cathedral ceiling, and the owner had to install a fan to remove excess heat to other parts of his home. He needs the fan even with a small, two-log fire. Also, due to the hotter fires and smaller flue sizes, the metal chimney system has built up less than two cups of soot in the five years he has been burning the system.

We feel there is one disadvantage with the Firecast. Because the rear



The Isokern *fireplace, fashioned from volcanic pumice, features interlocking blocks that a novice can install. The chimney can be either modular masonry or insulated metal.*

wall is a single piece, there may be slight cracking in this area since any large piece of refractory material will crack when subjected to extreme temperatures.

The Firecast lists for around $1,250 without the chimney and can be installed in several hours.

Interlocking Blocks

A different type of modular fireplace, called the *Isokern* system, uses a firebox fabricated from volcanic pumice. This refractory material resists heat transfer so well that the unit has a real zero-clearance rating. Wood framing can be in direct contact with the back of the firebox. It also offers a unique see-through fireplace as an option.

The Isokern system includes a modular masonry chimney, but it can also be adapted to a metal chimney. Isokern is currently being used very successfully in large townhouse complexes throughout the Southwest. One builder in the area is installing complete units (masonry fireboxes and masonry chimneys) enclosed in a wooden chase for $2,000 per unit — based on a $1,500 material cost and one day's labor.

Isokern's masonry chimney uses interlocking blocks that can be installed by a novice. The masonry chimney is cost-effective when done in volume, or on taller-than-normal chimneys. The metal chimney costs more for materials, but since it does not require staging, is cost-effective on smaller jobs.

Although the Isokern is not a true hybrid when used with the masonry flue, it is a modular option that saves considerable labor and time compared with traditional site-built fireplaces. ■

Gary R. Menia is a masonry contractor in Albany, N.Y., who has specialized in chimneys and fireplaces for 22 years.

For More Information

Prefab Masonry Fireplaces

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