Frameless Shower Installation

We run a family-owned custom glazing business on Cape Cod in Massachusetts. One of the things we specialize in is the installation of frameless shower enclosures. The high style of a frameless glass shower enclosure also comes at a high price — about $2,000 to $5,000 on average. A successful installation requires a high degree of precision, and the margin for profit is tight. If you can't complete an average installation in a day, you're probably not going to make any money. Perhaps this is why few glazers in our immediate area seem to take on these jobs.

by Paul and Kathy McLellan

Most of our business comes by way of the homeowner, but we also work with several custom builders on a regular basis. These builders have become familiar with the important job-prep requirements for a frameless enclosure, which are the focus of this article.

Because we can give important advice to both the homeowner and the builder, we prefer to get involved on the ground floor, before the shower surround has been framed, boarded, and received a finished surface, usually of marble, granite, or solid-surface material.

Job Prep

We'll quote a job from plans or rough openings on the assumption that the walls and floor will end up being level, square, and true. However, we'll only proceed with an order after taking final on-site measurements, after the finished wall surface has been installed. If we uncover any abnormalities, such as an out-of-plumb wall, we'll have to make an adjustment to the price. But if we find that a supporting wall bows in or out, the whole enclosure might need to be redesigned. For

Precise planning and workmanship at every stage of work ensures a trouble-free job

Figure 1. Head channel joining plates for frameless enclosures come in fixed corners of 90- and 135-degrees (left). Off-angles, which drive the cost of an enclosure up, are handled with an adjustable corner (above). The authors measure, cut, and join the extruded header sections on site.

example, we can't use wall mount hinges on a bowed wall. The hinges must line up in a straight plane or they'll work against each other.

Most of the problems that arise can be dealt with, but the cost of imperfection can be significant. Once, we had to have a newly tiled surround rebuilt when unevenly installed tiles at the base interfered with the glass installation. So it's best if everyone's on the same page from the start of the job.

The basic guidelines that govern a successful installation can be quickly summarized as "plumb, level and square." No modification will make this type of enclosure inexpensive, but there are a few qualifiers to the guidelines that can have an effect on the appearance and performance of the enclosure, and on the economy of the job. The shower threshold should be dead-level side-to-side, but have a definite, minimum 5-degree slope to drain into the basin. It's best if the framer establishes the slope, but the tile-installer can always shim the threshold to compensate.

Angles in the enclosure work best at 90 degrees and 135 degrees, because the proprietary joining brackets come in these fixed angles (see Figure 1). Off angles can be accommodated with an adjustable bracket, but the level of difficulty and therefore the cost, goes up. Likewise, glass can be cut to conform to out-of-plumb and out-of-square conditions, but there's a penalty in the cost of fabrication.

A neoangle surround is a popular configuration, and often incorporates a half-height buttress wall on one or both sides of the opening. Instead of leaving the open end of the wall square to itself, the job comes out much nicer if the builder defines the opening jamb with a 135-degree wall return. This eliminates the need for a weak, narrow glass panel to make the corner transition. Instead, the glass panel on top of the buttress wall receives a 45-degree beveled edge that meets in parallel with the square edge of the door (Figure 2).

Design

The job begins with the design. Kathy consults with the homeowner, the builder, and anyone else who may have input into the appearance of the final product. Our hardware supplier, C.R. Laurence (2503 E. Vernon Ave., Los Angeles, CA 90058; 800/421-6144; www.crlaurence.com), provides us with worksheet forms on which Kathy records the thickness of the glass, the style and finish of the hardware, the handle and towel bar selection, the width of the door, and which edge seals will be used. Matching the finish of the enclosure hardware to faucets and towel bars has a definite effect on the quote — brushed or polished nickel and antique gold finishes have been major factors behind some of our most expensive units.

Critical accuracy. The most important aspect of installing a frameless enclosure is getting the measurement for the opening correct. You can be the best installer

Figure 2. A 135-degree return at the end of a buttress wall makes a clean, attractive detail that simplifies the enclosure design. A 45-degree miter on the glass edge lines up with the wall termination, creating a continuous interface for a square-edged door. After the glass has been accurately dry-installed, it is marked to facilitate repositioning after it's set in silicone caulk.

in the world, but if the initial measurements aren't right, the unit won't work.

Kathy takes about two hours to produce an on-site drawing, referring to a precise angle finder, a 4-foot level, a plumb bob, and a square to record all dimensions, angles, and transitions, and all plumb-and-level conditions. The basic drawing is usually nothing fancier than a shop sketch for our own use, although, occasionally, a client will want a more elaborate, finished perspective drawing as a visual aid.

Accuracy is critical; any error will make for a very unpleasant, perhaps impossible, installation later on. If the wall is out of plumb, the glass must be fabricated accordingly. Metal U-channels or clamps (Figure 3) hold the stationary panels at the wall, so we allow for the metal thickness and make a small deduction for clearance and adjustment. The fabricator cuts the glass to our exact dimensions, but edge-polishing usually knocks off another 1/16 inch, so we might get a touch more play than indicated.

Tempered glass. The glass in a frameless enclosure can be either 3/8-inch- or 1/2-inch-thick tempered panels. Tempered glass is nothing more than common float glass that's been raised close to the melting point — around 1,400°F — then quickly cooled by quenching, which alters its molecular composition.

Ordinary plate glass, when broken, produces heavy, sharp, potentially lethal shards. Tempered glass, on the other hand, is seven to ten times stronger than plate glass, and very difficult to break — in fact, you can drive a pickup truck on a panel without breaking it (we've done it).

Peculiarly, in spite of its strength, the corners and edges are very touchy. If you so much as nick the corner of a piece of tempered glass, it could explode, but only into thousands of small, lightweight granules that are unlikely to cause injury. This is why building codes require tempered glass in all shower enclosures, among other locations. It's also why we're extremely careful not to allow any metal or tile to come in contact with the edge of the glass.

Figure 3. Wall-mount hinges and clamps or a metal U-channel secure the glass to the wall, ceiling, and floor. Deductions must be made from the overall dimensions to accommodate hardware clearances (inset). A glass corner clamp requires 3/4-inch-diameter mounting holes in the adjacent panels. Glass corners may be mitered, butted, or overlapped.

Figure 4. Masking tape provides a legible base for marking the layout line, locating transitions, hardware, and termination points, as well as quick line removal. Clear plastic setting blocks are positioned over the countersunk screw heads in the U-channel to protect the vulnerable edge of the tempered glass panel from contact with the metal and tiles.

Figure 5. Trial assembly ensures that all of the components are positioned correctly, and that the door will operate freely, with the minimum necessary clearance to reduce water escape (above). With the header secured, the authors adjust and shim the door (right), using 1/8-inch-thick setting blocks to temporarily set the clearance gap (right, inset).

Hinge decisions. There are a few different ways to hinge a glass door. The size and weight of the door determines some of the options. For example, 3/8-inch glass weighs 5 pounds per square foot, so if the plan specifies a 32-inch-wide by 80-inch-high door, the weight would be approximately 88.9 pounds. The maximum weight allowable for a door using two Geneva hinges is 80 pounds, so we would need to add a third hinge or adjust the door dimensions.

If we are working with a header and the door is not wall-mounted, we use top and bottom pivot hinges. Both hinge types have a detent device that aligns the door in the closed position.

Data forms. With all of the final measurements established, we transfer the data for each panel onto preprinted template forms that represent the basic panel shapes and show all dimensions, holes, hinge cut-outs, and miters. Our glass manufacturer, Solar Seal (55 Bristol Dr., So. Easton, MA 02375; 508/238-0112; www.solarseal.com), which provides us with high-quality product and fabrication — important if you want your final product to be perfect — works from the information we provide on the template drawings. All of the cutting, shaping, and polishing is done before the glass is tempered. After tempering, no modifications are possible. Delivery time for the finished glass panels normally takes three to six weeks.

We order all of our header and channel extrusions in stock lengths, and cut them to size on the job site. The extrusions are available in all kinds of finishes, including solid nickel, brass, stainless steel, and even gold plate. Most of these are easily cut by a power miter saw equipped with a good quality triple-chip-grind carbide-tooth blade.

Installation

The first installation step is to establish a layout line on the sill, walls, and buttress wall. A 2-inch-wide strip of masking tape, applied first, provides a legible base for marking that's easy to remove later (Figure 4). We transfer our glass dimensions and any bisecting points to the tape from our worksheet, and double-check all of the angles.

Next, we cut and fasten the U-channels or clamps. To make sure that the screw heads don't project and contact

Figure 6. With the door gapped and shimmed, the authors trace the hinge location onto the threshold (above, left). It's difficult to completely seal a frameless enclosure, especially if the client doesn't like the look of the polycarbonate seals and edge wipes. The authors emphasize that wood floors and frameless enclosures make poor bathmates. Delicately handling heavy glass panels is always a two-person job (above, right). With the side panels permanently set and caulked, the pivot hinges can be secured and final-adjusted. Clearance around the hinge body allows minor adjustments to be made in the door's position (right).

the edge of the glass, we countersink the holes in the channel. A bead of silicone on the underside of the U-channel seals and helps to bond it to the tile surface. We install plastic wall anchors in the tile to capture the screws, and use a razor blade to slice the anchor flange off flush with the surface to eliminate any gap behind the channel. Likewise, a quick touch with the countersink bit cuts away the burr from the backside of the screw holes in the channel.

The glass rests on clear plastic setting blocks, which we position over the screw heads as an extra precaution against nicks. By using blocks of various thickness, we can perform minor shimming adjustments to level and align panels.

Trial fitting. The panels at either side of the door must be absolutely plumb and level to ensure that the door will align accurately and hang in a neutral attitude. Before we secure the panels into the channels with silicone sealant, we test fit the enclosure several times during the course of installation to make certain that everything aligns exactly, and that we'll have a $^1/_8$- to $^3/_{16}$-inch gap at the vertical edges of the door for clearance (Figure 5 and Figure 6).

The hinges, which clamp onto a cutout in the door, permit minor side-to-side adjustments before the set screws are tightened. We prefer to keep the gap around the door as narrow as possible, to reduce water escape, but it is always wise to hedge against the building settling, especially in new construction.

Working with demanding precision in tight quarters with heavy glass, and continually disassembling and reassembling the components is a little nerve-wracking, but fortunately we're married, so we're used to each other. For the most part, we've gotten our system down to a familiar routine, and the two of us can complete an average frameless installation in one long, 8-hour day.

Before we go, we always leave a gift of a shower squeegee and a bottle of surface protector, along with instructions on how to keep the enclosure looking as beautiful as it does when we're done.

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