

Making mortar for glass block

Whether masons use jobsite-made mortar or premix formulas, they must control moisture content to get proper stiffness

By Jim Camillo

As in any masonry system, mortar is a crucial component of glass block construction. Masonry mortar bonds the glass units together to form a strong, sound, and attractive panel or wall. The basic ingredients of mortar—portland cement, lime, sand, and water—are the same regardless of the type of units being laid.

But several aspects of glass block construction are unusual. First, glass block are not porous, so they don't draw in or absorb moisture from the mortar as do most other masonry units. Second, glass block walls generally are designed and built without cavities or weep holes to allow water to drain out of the wall. Therefore, both the head and bed joints should be solidly packed with mortar. Third, most glass block are transparent or translucent, so the appearance of the joints through the full thickness of the wall is very important.

Each of these aspects affects the properties a mortar needs to work well in glass block construction. Following the recommendations of glass block manufacturers and masons experienced with glass block masonry construction can help ensure good results.



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After buttering a row of glass blocks with mortar, the mason slices the mortar at the block edges. A wooden mortar gauge is placed over the dry row of blocks before buttering to ensure a consistent $\frac{1}{4}$ -inch-thick bed of mortar.

Moisture content

Glass block mortar should be as workable as conventional mortar, but a bit drier and stiffer: It should be just wet enough not to fall off the block. Workability can be obtained by either adding a little more lime and sand or reducing the water content. Too-wet

mortar runs along the edge of glass block and causes stacked blocks to float, limiting masons to placing block only one course at a time. To prevent float, add support, and keep joints a consistent thickness, plastic spacers can be placed at each head joint.

To determine whether the mortar has the proper moisture content, a mason can perform the standard workability test—placing some mortar on the trowel, lifting it above the tub or wheelbarrow, then turning the trowel sideways. Because it is stiffer, glass block mortar should fall off the trowel in one uniform lump, instead of sliding off.

Bond strength

To develop strong bond between nonporous glass block and mortar, glass block manufacturers recommend using ASTM C 270 Type S portland cement-lime mortar, whether or not its high compressive strength is needed. This is especially important for exterior walls and panels. The recommended mortar proportions are 1 part portland cement, $\frac{1}{2}$ part Type S hydrated lime, and 4 parts sand by volume. Glass block manufacturers do not recommend using masonry cements.

To improve mechanical bond, some glass block manufacturers coat block edges with polyvinyl butyral (pvb) or latex paint. The manufacturers say this coating slightly improves bond and helps the block panel to accommodate thermal expansion and contraction.

Some contractors use Type N portland cement-lime mortar for interior walls. Their recommended mix is 1 part portland cement, 1 part lime, and 5 to 6 parts sand by volume. Benefits cited include lower cement content and cost, and less cracking, as lower-compressive-strength mortar is better able to flow in the hardened state.

Premix or jobsite mix

Mortar may be mixed on the jobsite from bulk materials or proprietary preblended mortar mixes specifically designed for glass block. Either way, glass block manufacturers recommend using white portland cement and white quartzite sand free of iron compounds to produce whiter, more aesthetically pleasing joints.

Premixed mortars usually are available in 25- and 50-pound bags and are formulated to meet ASTM C 270 Type S mortar requirements. Although premixed materials are more expensive than bulk materials, manufacturers say they offer more control over mix proportions and require

less labor and time spent preparing mortar.

Masons say it's important to follow mortar specs closely. Avoid using nonrecommended additives and retempering, both of which lessen mortar quality and strength. Accelerators should not be added to the mix. If the natural set-up time is reduced, the mason may not have enough time to properly plumb and align the glass block window or panel after placement. Workability time should range from 1 to 1½ hours.

Never add antifreeze to the mortar in order to lay block when the air temperature is below 40° F. According to manufacturers and masons, temperatures below 40° F will affect the mortar's workability, setting time, moisture content, bond strength, and overall quality, whether or not an antifreeze is used. Finally, don't use muriatic acid to clean the block, since it will wash away the smooth finish of the mortar, leaving the sand exposed and more prone to water absorption.

Water repellent

Glass block manufacturers recommend using a metallic-stearate admixture to increase water-repellency of the hardened mortar. According to admixture manufacturers, the activating agents are proprietary formulas of styrene butadiene rubber (SBR) latex or acrylic polymers. Pre-

mixed mortars might or might not contain such an integral water repellent; some premix manufacturers recommend adding one, diluted 1:1 with water, to increase water resistance and bond strength, improve curing, and lessen shrinkage. Admixture manufacturers say the products also contribute to shock and frost resistance.

Jobsite-made mortars might require using this liquid admixture in place of all or some of the water, depending on application. Dilution of the admixture at 1:1 generally is recommended for jobsite-made mortar for small prefabricated panels (up to 25 square feet); for large panels that need to be transported, full-strength admixture dosages generally are recommended to maximize bond strength. Check manufacturers' specifications for details.

These admixtures can be used in mortars for all types of glass block structures, but are especially needed for exterior walls and shower stalls exposed to moisture. Contractors and block manufacturers say the water repellent is necessary because glass block structures lack weep holes or cavities that allow moisture to run out. ■

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