
Glass Reinforced Gypsum:

When Manufacturers Differ, Who's Right? What's Right? It's Up to You!

By Wally Wilson

Editor's Note: The following article is the second in a series examining Glass Reinforced Gypsum (GRG). The first article appeared in last month's issue. Reader response is welcome.

Experience is a hard teacher; it gives the test first, the lesson later. And this statement applies to manufacturers as well as installers of Glass Reinforced Gypsum materials.

As has been pointed out in other articles on this subject, there are differences between the Glass Reinforced Gypsum systems being offered on the market that far exceed the differences between the various gypsum wall boards and metal studs. This does not mean that there are not differences in board and studs, but, by comparison, Glass Reinforced Gypsum materials vary by a far greater degree.

In looking at differences between manufacturer's systems, you must decide whether that difference is important to you or not. That is what counts here.

Let's look at spray layup versus hand layup, for example. The different methods create definite product differences. What are they and what do they mean to you?

Our company uses spray layup and we will tell you that it's better. Another company uses hand layup and will tell you the same thing. Who's right? You have to decide.

What do you have to base your decision on?

1. The common plaster used for Glass Reinforced Gypsum products is high density alpha gypsum combined with a prescribed amount of water.

2. This plaster and water is then reinforced with "E" glass fiber strands, 5% to 6% by weight.

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Now, if the product is manufactured by either spray layup or hand layup and the thickness is the same, is there a difference?

Let's look a little further.

1. In spray layup the plaster is sprayed into a mold and simultaneously chopped glass fibers are "blown" into the plaster to form the Glass Reinforced Gypsum.

2. In hand layup the plaster is "brushed" or "rubbed" in a continuous filament glass fiber veil which is 10, 20, or 30 mils thick and is in layers. It is layed up in three, four or five layers to form the specified thickness. Spray layup creates a multi-directional orientation of

the glass reinforcement (fibers are reinforcing in all directions), while with hand layup the material is a laminate and the glass placement is layered with no glass reinforcement connecting the layers.

Furthermore, not all high strength high density alpha gypsum plasters are the same. The processes of manufacture can be varied by the plaster manufacturer to change the properties of the gypsum. These differences can be in density, flexural or tensile strengths. Two bags of plaster laying side by side from different manufacturers or even the same manufacturer are not necessarily the same.

Different glass reinforced placement and different plasters do make a difference in the strengths and properties of GRG. How can you prove this to yourself? Take a piece of spray layup and a similar piece of hand layup and break them in your hand. Observe the breaks, and the difficulty of doing so. Take two parts of each layup method of similar size and configuration and drop an 8-lb. "ladies shot-put" from three feet onto the same area on each part and observe the difference.

What does this mean to you? Material with higher physical strength means:

1. Your customers are getting a better material.

2. When your workers can handle the material, you can expect less

breakage and damage on site.

3. Your costs should be lower and your headaches fewer.

Another consideration is wood/metal reinforcing in parts along edges and attaching locations. There are two schools of thought on this subject as well, and it appears that the spray layup manufacturers generally do not promote wood/metal reinforcing while some hand layup people do.

Why is this and what does it mean to you?

Edges and Reinforcement

Regarding edges and reinforcement, spray layup manufacturers will thicken an edge or turn a flange to provide for attachment locations basically because it is far easier to run the gun and chopper in an area on a part longer (making it thicker) than it is to insert a piece of wood or metal. The spray layup process allows the plaster/glass reinforcement ratio to be 5% to 6% for the entire edge profile, whether it is 3/16", 5/8" or some other thickness. To achieve thicknesses with hand layup, additional strips of glass must be cut and applied with plaster to develop the thickness and maintain the plaster /glass reinforcement ratio so critical to material strength in Glass Reinforced Gypsum. If the thickness is attained with just plaster or the plaster/glass reinforcement ratio is less than 5% to 6%, then the strength is not there.

Plaster does not inherently stick to wood or metal. Even if perforated, the metal severely reduces the bond between plaster to plaster adhesion. When you have an edge on a part that is a total 1/2" thick and it is comprised of a strip of 1/8" plywood sandwiched between 2 layers of 3/16" of Glass Reinforced Gypsum, the composite is weaker than 1/2" of solid Glass Reinforced Gypsum layed up with 5% to 6% glass reinforcement. This is also true of a piece of flat sheet metal layed into the edge, since a full 1/2" of Glass reinforced Gypsum is stronger than two 1/4" layers with no bond between the two layers, and

the flat metal adds no strength.

What does this mean to you?

1. Metal and/or plywood molded into the edge of a part will make it difficult to screw the part to steel framing because a screw, driven through wood or metal, into metal will "back" the material away from the framing until the screw spins out in the part edge and is able to "self tap" into the framing.

2. A stronger edge would allow for fewer fasteners and certainly a

higher degree of safety from job failure.

Surface Quality

Surface quality is highly important to you as well. Whether you have to do any work on the surface or not can greatly affect your cost. As you receive it, the surface of GRG should be ready for primer except at locations where you are going to apply joint compound and tape. This means that defects occurring during manufacture such as

pinholes, voids, or nicks that can be seen from arms length should be repaired before shipment to you. For a 24" diameter column cover as installed and treated with joint compound, the joint compound should equal 22% of the total surface. If a part has been repaired in the shop to fix a few pinholes or other blemishes or nicks, the percentage of total surface that is joint compound is not increased significantly and you should get a surface that is primer ready as you receive it, which is what you want.

What does this mean to you?

If material is delivered to you not primer ready, you will have to make it so at extra cost to you.

Joining of GRG Parts

The joining of GRG parts to one

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another is an important concern. Since this material is usually designed as a free standing unit (for example, column covers attached to structures top and bottom or a cove attached to framing at the top and bottom edge), the joints between the parts making up a unit or run are generally unbacked. To prevent a joint that is unbacked from cracking, a return flange on the edge of the part (1-1/2" at 90 degrees to the part surface) which provides two surfaces to be glued (with drywall or construction adhesive) and then embedding paper drywall tape with joint compound over the joint provides a system that is proven to be crack free. Others have tried "ship lap" joints and/or joints without provision for "taping" in the past and have gone away from those systems.

The joining of parts is critical to

the success of the installation. You know what cracks are like to repair either before or after the job has been painted. You essentially have to start all over again.

Conclusion

The subjects presented up to now in this article have been important items for you to consider when evaluating competitive Glass Reinforced Gypsum systems.

The article has also been self serving, since we believe our way is the best way. As well, to be sure, our competition believes theirs is best.

We have some rationale, test data, and experience that makes us think we are right, but are we?

What needs to be done in this industry is not to force every manufacturer to conform to another's system, but to develop standard tests for important properties such as impact resistance, edge strengths, screw holding capacity, joint strengths, humidified deflections, fire, hygrometric expansion and contraction, embed strengths, surface quality, and flexural strengths. Perhaps then from these standardized procedures, we can develop minimum performance standards that the material and systems must meet.

The establishment of standard test methods is a project being undertaken by the CISCA Glass Reinforced Gypsum Committee. This committee's birth was caused by interest and pressure from contractors using and installing Glass Reinforced Gypsum materials. These contractors and their organization have spent money in an effort to bring the Glass Reinforced Gypsum industry to some sort of common ground. AWCI has been involved at each of the meetings and has shown a vital interest. The leadership of these two contractor associations need some methodology to enable their contractor members to operate and to successfully and predictably make a profit from the furnishing and installing of Glass Reinforced Gypsum.

The Glass Reinforced Gypsum

Committee made its first presentation to ASTM's C-11 Committee last November. ASTM C-11 meets every six months. The process of establishing comprehensive standards, while under way, will require time. Committee C-11 has formed a Task Group on GRG, chaired by AWCI's Technical Director, Bob Wessel, and a product standard is being developed.

The CISCA Glass Reinforced Gypsum Committee has published a guide to Glass Reinforced Gypsum which is available from both CISCA and AWCI, and CISCA has a production guide section. These activities form a starting place from which we can work.

It is our objective to make our materials and this industry as problem free as possible. If we join together to do this it will be much quicker and easier. All the manufacturers of Glass Reinforced Gypsum should belong to the committee—our customers want to know who's right and what's right. It's up to us.

About the Author

Wally Wilson started in the dry-wall construction business in 1953 at the age of 15, by scraping floors and sanding part time in the summer and mixing powdered mud before school in the winter for Cather & Sons Drywall in Lincoln, Nebraska. He continued to work as a hanger and finisher during the summers and part time through college at the University of Nebraska. He was a field sales rep for U.S. Gypsum for six years before going to work for Eliason & Knuth Drywall in Omaha as an estimator, where he became vice president in charge of estimating in 1974. He started Plastrglas as a subsidiary of E&K in 1978 and purchased Plastrglas, Inc., from them in 1984. Wally likes drywall people because they are willing and capable of developing new ways to make a larger dollar segment of the construction business for themselves.