

# IN PURSUIT OF THE PERFECTLY FINISHED GYPSUM BOARD WALL



## *A Guide to Potential Problems —and Solutions—in Decorating Drywall*

By Robert H. Negri

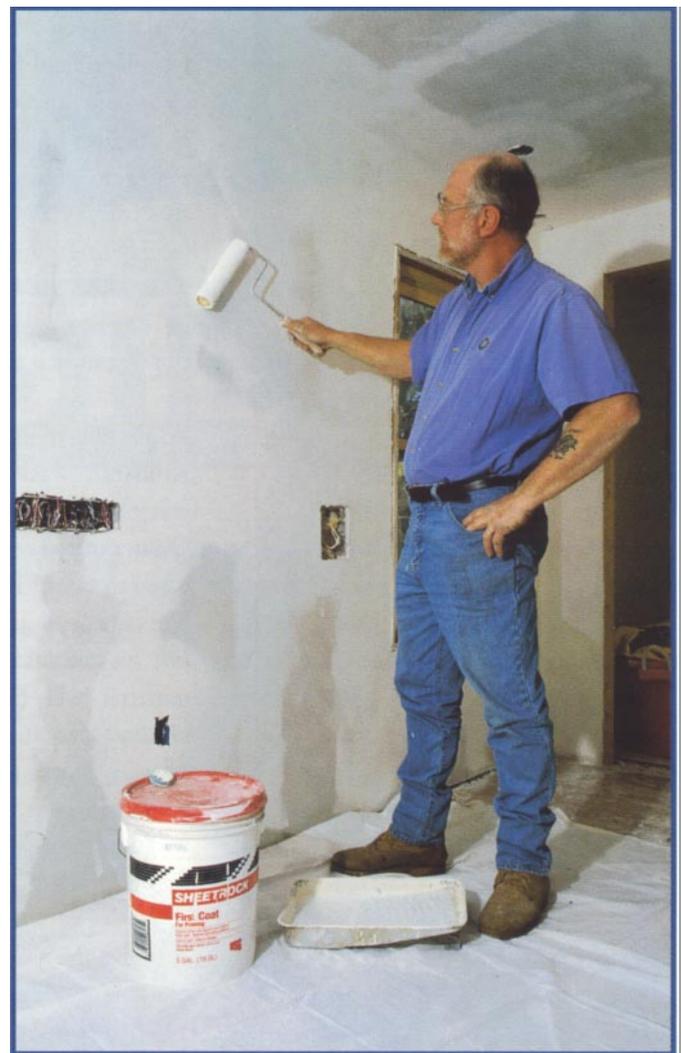
One of the most frustrating problems encountered in new construction by the interior finishing trade is the discovery that those newly decorated “smooth” gypsum board walls aren’t quite as smooth . . . or as uniform . . . or as perfect as they first appeared to be.

Decorating nonuniformity on drywall surfaces is a frustrating problem, and it often has little or nothing to do with the application of the finish itself. The problem more often stems from deficiencies in wall construction and surface preparation.

Gypsum board is not a particularly difficult surface to finish, provided that you are aware of the proper application procedures, select the right materials and take the time and effort to do the job well. The intent of this article is to provide an overview of the types of problems most frequently encountered in finishing gypsum board walls and to provide some basic guidelines for prevention. To accomplish this, we will review not only the results of extensive testing and research on the subject as conducted by the USG Corporation Research Center, but we will also review “real life” experiences and perceptions from several interior finishing and drywall contractors interviewed for this article.

### *Four Problem Sources*

As the world’s leading producer of gypsum board and joint treatment products, United States Gypsum Company is quite familiar with drywall finishing techniques. Through our research, we have identified four primary sources of nonuni-



**Application of a high-quality primer equalizes the surface differences between gypsum board and joint compound.**

formity: texture variation, porosity variation, deformation and color variation. These are the root causes of the most common drywall decorating problems, including “joint banding,” “telegraphing,” “flashing,” “ridging” and “photographing.”

Solving these problems requires a synergistic approach to the finishing process, in which the interior finishing contractor must select the right combination of materials while employing the correct application techniques and job practices.

### *Texture Variation*

Variation in texture between drywall face paper and joint compound is perhaps the most common cause of nonuniformity. It results in “joint banding” (or “photographing”), a problem that is especially noticeable under critical lighting conditions or when semi-gloss paints are used. The problem can be accentuated through improper or sloppy sanding techniques.

Rick Miller, of Drywall Resources, Inc., Kirkland, Wash., notes one potential cause of texture-related problems. “Many of today’s ‘muds’ are softer and easier to sand,” he says. “The workmen like it because it’s easier to work with, but we’ve noticed that, at times, the material will build up beneath the sanding pad in the wall surface and actually scratch itself to the point where it leaves very fine scratches that fill up with dust and are hard to notice until they’re primed.”

Sanding the finished joint compound with 100 grit or coarser sandpaper and/or employing excessive “body” sanding (as opposed to lighter, less abrasive “surface” sanding) can create

disruptive patterns similar to those described by Miller.

A related problem that can cause texture nonuniformity is fiber raising. This occurs when the drywall face paper is accidentally roughened during sanding of the joint compound. The result is a disruptive transition from the smooth joint compound to the roughened, raised fibers of the paper located adjacent to the treated joint area. This finishing problem is especially apparent when eggshell or semi-gloss paints are used, and will be magnified further if the paint system is spray applied and not backrolled.

To minimize texture variations, use 150 grit or finer sandpaper, or “wet” sand the joints. You can also equalize texture by applying a primer recommended by the drywall manufacturer or by skim coating the entire surface with joint compound.

Bill Chandler of Modern Decorating, Inc., Richmond, Va., goes with the first approach. His primer of choice is SHEETROCK First Coat, a flat latex paint prime coat from United States Gypsum Company formulated to equalize the texture and porosity differences between joint compound and drywall. “We’ve discovered, over the years, that the sealers on the market really don’t take care of the differences,” Chandler says. “Particularly with eggshell and semi-gloss finishes, the drywall joints seem to telegraph through the sealers, especially when they’re subject to high light reflectance. Only by using SHEETROCK First Coat are we able to eliminate those differences.”

Miller agrees. “We had a home on a waterfront setting that had 30-foot-high walls in one room, with lots of

windows picking up a tremendous amount of light. To ensure the highest quality finished look possible, we skim-coated that area. But on other walls in the home, we used [the USG] primer. In the end, there were no detectable differences between the walls we skimmed out and the First Coat walls. It was very impressive—the primer gave us virtually the same results as skim coating.”

Miller typically spray applies the equalizing primer. “After application, we inspect our work with the owner, do our touch-up with tinted mud, sand the tinted mud areas so they’re feathered out and reapply the primer by roller over those areas. Then we sand the walls completely. Finally, we clean up and turn the job over to the painter.”

## *Porosity Variation*

Next to texture variation, the most preventable and most common cause of nonuniformity results from porosity variations between joint compound and drywall. If the composite surface is left untreated, the finish paint will be absorbed into the treated joints and gypsum panel paper at different rates. This results in a classic case of “joint banding” or “photographing,” as the joint becomes graphically visible through the decorative finish.

The joint can appear lighter or darker than the surrounding gypsum panel field areas, depending on whether the treated joint is more or less porous than the drywall face paper.

When the joint compound is more porous, a condition known as “white banding” occurs, and the joint area will take on a lighter sheen than the surrounding gypsum panels. White band-

ing is generally accentuated by hot, dry weather conditions and when damp or wet gypsum panels are used.

Conversely when the gypsum panel surface is more porous than the joint compound, “dark banding” occurs. Paint applied over this type of surface will be absorbed at a greater rate over the face paper, making the joint appear darker. Extended, slow drying conditions or painting over wet joint compound are the most common causes of this condition.

Both these conditions can be prevented by first making sure the entire surface—treated joints and drywall panels—are thoroughly dry prior to finishing. Be sure to let each layer of joint compound dry completely before applying the subsequent coat. Also, be sure to apply a preparatory (prime) first coat, as recommended by the drywall manufacturer. Sealers, which seal the entire surface and therefore equalize moisture porosity rates, are best for correcting porosity-related problems, but typically do not correct texture variations of the substrate. Primers, on the other hand, generally help correct texture differences, but do not equalize porosity. Another option is to skim coat the entire wall surface using joint compound. If a skim coat is applied, the use of a sealer prior to painting is recommended for optimal results.

“Customers never understand why they see the seams in the drywall when it has two or three coats of paint,” noted Don Steadman, owner of All-Tech Decorating Co., Chicago Ridge, Ill. “With new drywall, it’s really hard to disguise that problem, especially when you’re using eggshell or semi-gloss finish coats, Normal PVA-type primers won’t hide it entirely, Skim

coating is an option, but it gets expensive. The only solution we've found is to use an equalizing primer, such as the U.S. Gypsum product. It really evens out the sheen differences"

Pat Giordano of American Painting & Refinishing, Montrose, N.Y., puts it another way: "Applying a primer to equalize both the porosity and texture differences is the logical completion of a drywall installation. That's how we think of it."

## *Color Variation*

Even a smooth, flat surface void of deformations can appear nonuniform due to color variation over the decorat-

ed surface. Color variation has several causes, among them translucency, a condition that occurs when a continuous dried film of solid color paint has the appearance of being partially transparent. This accentuates the underlying color contrast between the treated joints and the field area of the gypsum panels.

Foreign material deposits and migratory stains also can cause color variation. Deposits from biological growths such as mildew and mold can appear gray, red, green or black in color. These are generally confined to areas that have been exposed to moisture. Deposits from chemical reactions can appear pink, gray or black in color. These

deposits are the result of a chemical reaction between the painted surface and airborne chemical gases.

The most common of this relatively uncommon phenomenon is called hydrogen sulfide staining. Sulfides can originate from many common sources, including automobile exhaust fumes and high sulfur coal-burning power plants. "Pink" sulfide staining occurs when moderate levels of sulfide acid fumes in the air react with calcium carbonate (a raw material used in the formulation of most paint coatings) to produce calcium sulfide (which has a pink-red color). "Black" sulfide staining occurs when sulfides react with heavy metals such as lead or mercury.

This type of staining is commonly associated with lead-based paints or paints that use a mercury complex fungicide.

To minimize most color variations, apply a preparatory first coat over the composite substrate prior to applying the decorative finish. The general guideline for the total paint system (prime and finish) build should be a minimum of 5 mils dry film thickness, or approximately 10 to 15 mils wet film thickness.

Although it is difficult to specify the thickness build of a protective coating by the number of coats, at least two coats (prime and finish) should be applied to achieve a minimum paint system build of 5 mils DFT. Most, if not all, paint

manufacturers recommend a prime coat and two finish coats of paint.

## *Deformation*

There are several types of deformation that can prevent a wall surface from being flat, in effect ending your quest for uniformity before it begins.

One is paper swelling. When the paper facing of the gypsum panels gets wet, it swells and will not always shrink back to its original size. The result is surface undulation in the finished wall.

Another common cause of deformation is inadequate or improper joint finishing. The overzealous application of joint compound can result in raised

areas on your finished walls that can create shadows. Not enough compound and you have depressed areas that can be visible as very subtle divots in the finished wall.

To minimize substrate deformation, the use of quality framing and cladding materials and proper practices should be employed. Correct any framing

irregularities prior to installing the cladding, and remember that all cladding should be fitted and installed using the correct attachment system recommended by the manufacturer. In lieu of manufacturers instructions, you can refer to Recommended Specification: Levels of Gypsum Board Finish (Publication GA-214-96), available from both the Association of the Wall

and Ceiling Industries—International and the Gypsum Association.

### *Prevention Is Best “Cure”*

Whether nonuniformity is caused by texture variation, porosity variation, color variation or deformation—or by a combination—the best “cure” is prevention. Prevention, in this case, essentially

means proper wall and surface preparation. As noted previously, most drywall decorating problems are not directly related to the finish application, but rather stem from problems inherent in wall construction or surface preparation.

Undulations due to improper framing or fastening must be corrected before the finish coat is applied. Joint compound must be applied and sanded properly. Remember though, that even a perfectly treated joint may still cause decorating problems due to the texture and porosity differences between the joint treatment and the gypsum panel face paper. To correct this, application of a skim coat or an equalizing prime coat is essential. Finally, paint selection also plays a role. Semi-gloss or eggshell finishes will tele-

graph nonuniformity problems more readily than standard flat latexes, especially under critical lighting conditions.

Only by being aware and by controlling all these factors can the contractor truly have a chance to achieve the "perfect" finished gypsum board wall surface. □

#### **About the Author**

Robert Negri is a member of technical staff in the Interiors Finishing Systems Laboratory at the USG Corporation Research Center, Libenysville, Ill. He has more than 15 years of formulatory experience in joint treatment, paint and texture coatings applications. He holds two U.S. patents and is a member of the Chicago Chapter of the Federation of Societies for Coatings Technology.