



Technical Position

JOBSITE SYSTEM FAILURES INVOLVING PRESSURE SENSITIVE ADHESIVE MASKING TAPE OVER GYPSUM BOARD SUBSTRATES

Description of Problem: Pressure sensitive adhesive coated tape, such as common interior masking tape, is applied to decorated interior gypsum board substrates, and on occasion, when later removed surface damage/failure occurs within the paint/decorative finish and/or joint compound and/or gypsum board face paper.

What is happening?

In general, adhesives on masking tapes increase in adhesive strength while on a surface over time. Additionally, coatings/decorative finishes, joint compounds, and gypsum board face paper will independently possess various levels of cohesive and adhesive strengths. The overall system performance is influenced by how the individual material components are installed and matched with the other materials in the system.

When masking tapes are applied to the surface of a decorated gypsum board substrate, the adhesive strength of the masking tape can, under certain conditions, become stronger than the system adhesion properties at the surface and/or within the underlying layers of substrate materials. When this occurs, removal of the masking tape can damage the surface. This type of surface damage is generally recognized as a system failure, and not interpreted as a product defect of the masking tape, paint/decorative finish, or underlying substrate materials.

Qualitative test methods involving masking tape over gypsum board substrates

Test methods that include destructive procedures (such as cross-cutting through a paint film and using pressure sensitive adhesive tape) have been developed for use over certain surfaces, like metal substrates, to assess separation resistance. However, such methods are not to be regarded as a means of measuring adhesion. Currently, no drywall industry accepted test method or procedure exists (from a recognized, credible test methods organization such as ASTM, ISO, or similar) - whereby the use of pressure sensitive adhesive tape is employed as a means to qualitatively measure or assess the adhesion performance of a decorated gypsum board assembly, or any of the individual system components.

Note: Conducting such tests over decorated gypsum board surfaces leads to inconsistent, misinterpreted results and false conclusions. Because such tests are unreliable as an indicator of component and/or installed system performance, the Drywall Finishing Council membership asserts that adhesion judgments cannot be validated from information derived using such methods.

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Jobsite finishing - Selecting the right masking tape

Pressure sensitive adhesive masking tape is frequently used in the finishing and decorating process over gypsum board assemblies. It is important to point out that great results can be easily achieved when thoughtful consideration is given to the selection, installation, and removal of masking tape over a decorated gypsum board substrate.

Masking tape manufacturers offer a wide range of masking products for different surfaces. For example; 3M (web link below) has a comprehensive web page dedicated to assist users in selecting the correct, best performance masking tape for the job.

http://solutions.3m.com/wps/portal/3M/en_US/Scotch-BlueBrand/Scotch-Blue/Resources/Five/



Common causes

Most common causes associated with masking tape and system failures at the jobsite include;

- 1) Finishing and decorating under poor and/or changing environmental conditions.
- 2) Pressure sensitive adhesive masking tape being applied to dry, yet uncured paint surface.
- 3) Wrong type of pressure sensitive adhesive masking tape used.
- 4) Incorrect methods or techniques employed when removing masking tape.
- 5) Masking tape left on wall surface beyond time period recommended by tape manufacturer (tape adhesion to surface increases).
- 6) Wet builds of latex paint on a per coat basis were applied beyond manufacturer's recommendations (rewetting joint compound/substrate surface) and adversely affected system component performance.
- 7) The physical properties of the masking tape adhesive changes over time (from using old tape).

Tips for Prevention

Although it is unlikely one can prevent system failures from occurring 100% of the time, the following tips serve to assist in minimizing system failures involving masking tape;

- Properly store and install masking tape under good environmental conditions per manufacturer recommendations. Also see "Environmental Control" in Comments section.
- Refer to masking tape manufacturer for additional information when selecting masking tape.
- Do not use masking tape on a surface without testing a small area first.
- Avoid using masking tape that is over 24 months old from date of manufacture.
- When interior gypsum board, joint compound and/or decorative texture finishes are properly covered with an appropriate latex primer or flat latex paint the incidence of masking tape causing surface damage is reduced.
- Apply primer and topcoat paint on a per coat basis to the wet and dry film thickness recommended by the paint manufacturer.
- Avoid mixing additives into joint compound and/or paint products.
- Allow each application of joint compound and paint to fully dry before the next coat in the system is applied. Also see Joint Compound Drying in comments section.
- A fully "cured" paint film will have a higher resistance to being pulled off with masking tape than a paint that has dried less than 24-48 hours.
- Establish a visual job standard for appearance and durability. The constructed visual standard should be agreed to by the specifying entities and contracted workforce before any widespread work and/or production painting is conducted. Also see Job Standard in Comments section.



Helpful Tips

ABC's of HOW TO APPLY & REMOVE MASKING TAPE

Masking Tape	UV Resistant	General Purpose	High Adhesion	Low Adhesion
Blue Masking Tape	Yes	Yes	No	No
White Masking Tape	No	Yes	No	No
Yellow Masking Tape	No	Yes	No	No
Orange Masking Tape	No	Yes	No	No
Red Masking Tape	No	Yes	No	No
Green Masking Tape	No	Yes	No	No
Purple Masking Tape	No	Yes	No	No
Black Masking Tape	No	Yes	No	No
Clear Masking Tape	No	Yes	No	No
High Adhesion Masking Tape	No	No	Yes	No
Low Adhesion Masking Tape	No	No	No	Yes

Fig.1

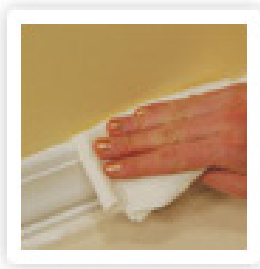


Fig. 2



Fig.3

- A) Use the correct masking tape for the job (see Fig.1). Select the painter's masking tape that best suits the project and surfaces. **Note:** Use a tape that is UV resistant and will not "bake" onto the interior surface if exposed to sunny conditions. Most "general purpose" masking tapes transfer adhesive into the surface when exposed to natural light.
- B) Clean the surface, and make sure it is dry and dust-free (see Fig.2). This will help the tape stick properly.
- C) Pull tape off the roll a few feet at a time (see Fig.3). Lay it onto surface depressions. Press down as you go. Avoid stretching the tape; this can cause it to lift up or break.



Fig. 4

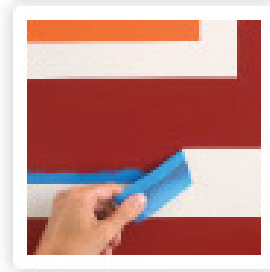


Fig. 5

- D) **LIGHTLY Secure Tape:** Secure the tape by applying light pressure (see Fig.4). Use a plastic credit card if you don't have a putty knife or similar.
- E) **REMOVAL – Speed and Angle:** Remove the tape at a 45-degree angle (see Fig.5), and at a moderate speed (about 1 linear inch per second). Just pull the tape back on itself. If adhesive sticks to the surface, try a 90-degree angle. If paint is pulling up with the tape, try scoring the edge of the tape with a razor blade before pulling further.



COMMENTS

Application. Industry experience demonstrates that an effective method for achieving a visually uniform surface for both the primer and topcoat is spray application immediately followed by back rolling or roller application using good roller techniques, such as finishing in one direction and using roller types and naps recommended by the paint manufacturer.

ASTM D-3359. This is an overly aggressive and destructive coatings test that is designed for use over metallic substrates. This test is inappropriate for use over interior gypsum board substrates, and as such, leads to erroneous results. The Drywall Finishing Council asserts that testing using such methods is invalid over gypsum board substrates, as the test method creates failures over non-metallic substrates, even when applied to sound interior gypsum board wall systems involving joint compound and paint.

Changing Job Conditions and Drying – As the job atmosphere becomes more humid and saturated with water during the joint treatment and/or painting operations drying time can increase. For example; at 55°F (with little ventilation), there can be as much as a 4X increase in drying time if room humidity elevates from 50% to 90%. Other atmospheric conditions at the jobsite can result in similar changes in drying times. Refer to Drywall Finishing Council document titled; “Joint Compound Drying Time”.

Environmental Conditions - Refer to Drywall Finishing Council recommendations in document titled, "Interior Job Condition Specifications for The Application of Drywall Joint Compounds, Drywall Textures, and Paint/Coatings".

Environmental Control – Temperature, humidity, and airflow should remain constant, and as close to occupancy conditions as possible. The potential for finishing and decorating problems are minimized when job environmental conditions match occupancy environmental conditions. Controlling and maintaining environmental conditions is key. Changes and/or fluctuations in temperature, humidity, and airflow can have a profound adverse effect. **Note:** Uncontrolled environmental conditions during finishing and decorating can have an adverse influence on system performance. It is known that poor and/or uncontrolled environmental conditions are detrimental to joint compound and paint/decorative systems.

Job Standard: A project standard of the approved wall and/or ceiling configurations should be established to provide a visual sample constructed, finished, and decorated in accordance with applicable project specifications set by the design and specifying / approving entities. Jobsite constructed standards of the selected coating system applied over the finished substrate should be evaluated for appearance and durability and agreed to by all parties prior to conducting any widespread finishing work and/or production painting.

Paint Selection. Manufacturers produce various paint grades and types. When the level of paint finish is selected, consult with the paint suppliers to determine the products that will produce the desired finish.

Tape Selection: It is important to use the appropriate masking tape. Refer to pressure sensitive adhesive masking tape manufacturer for recommendations.



RESOURCES

3M. Tape selection chart. www.solutions.3M.com

ASTM. C11 Standard Terminology Relating to Gypsum and Related Building Materials and Systems, American Society for Testing and Materials, West Conshohocken PA

ASTM. C840 Standard Specifications for Application and Finishing of Gypsum Board. American Society for Testing and Materials, West Conshohocken, PA

ASTM. D-3359 Standard Methods for Measuring Adhesion by Tape Test (*metallic surfaces*)

DWFC. Joint Compound Drying Time. Drywall Finishing Council, Incorporated. www.dwfc.org

DWFC. Interior Job Condition Specifications For The Application of Drywall Joint Compounds, Drywall Textures, and Paint/Coatings". Drywall Finishing Council, Incorporated. www.dwfc.org

DWFC. Method for Inspecting Joint Treated Gypsum Panel Surfaces, Drywall Finishing Council, Incorporated. www.dwfc.org

DWFC. Recommended Specification for Preparations of Gypsum Board Surfaces Prior To Texture Application, Drywall Finishing Council, Incorporated. www.dwfc.org

GA. GA-214, Recommended Levels of Gypsum Board Finish. Gypsum Association, 6525 Belcrest Road - Suite 480. Hyattsville, MD 20782 www.gypsum.org

FSCT; Coatings Encyclopedic Dictionary. Federation of Societies for Coatings Technology, Blue Bell, PA

ISO. 2409 Paints and Varnishes Cross-Cut Test, International Organization for Standardization. www.iso.org

ISO. 4624 Paints and Varnishes Pull-Off Test For Adhesion, International Organization for Standardization. www.iso.org

PDCA Glossary of Terms; Painting and Decorating Contractors of America.

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