

Cold Weather Application



By Michael Gardner

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During the winter, every state in the continental U.S. and Canada will experience at least one night of below freezing temperature. Even warm-weather states like Florida encounter a few nights where temperatures become sufficiently low to create frost or to freeze external water sources.

Cold and damp weather conditions can have negative effects on freshly applied joint treatment and gypsum board, such as joint compound bond, delayed shrinkage, beading, nail popping, and board sag; all of which can affect the overall appearance of the system. Although extreme environmental conditions have little effect on the process of applying gypsum board, special procedures or precautions should be observed during the application and drying of joint treatments and adhesives. When weather conditions are cold and wet, the drying times of joint treatment materials are affected. Cold temperatures slow drying and increase the risk of freezing; wet weather also delays drying.

Joint treatment materials should not be applied when surfaces are cold or damp. The temperature of the building or the area where the joint treatment material is being applied should be maintained at no less than 50 degrees F (10 degrees C) for no less than 48 hours before and continuously thereafter, until applied materials are thoroughly dry. The same temperature criteria should be maintained if joint treatment materials are being used for laminating one layer of board to a monolithic surface or to another layer of board.

Cold and damp

The effect of cold and damp conditions on the drying time of joint compound under joint tape can readily be determined by examining the accompanying drying timetable. It is commonly acknowledged that hot, humid conditions—a temperature of 90 degrees F (32 degrees C) and a relative humidity of 90 percent, for example—will extend the drying

time of joint treatment materials; however, it is not as apparent that cold, dry conditions also impact the same process. As an example, the table shows an identical extended drying time of 34 hours for two completely different conditions: 40 degrees F (4 degrees C) with 20 percent relative humidity and 80 degrees F (27 degrees C) with 80 percent relative humidity; these are typical winter and summer working conditions for many parts of the U.S. and Canada.

It is imperative that each coat of joint compound be thoroughly dry prior to the application of subsequent finishing and texturing materials. Materials should be applied in accordance with the manufacturer's instructions. A heavy application of compound or texture that will lengthen the drying time should be avoided.

The use of temporary heat systems to artificially increase the temperature of a working area should be accomplished judiciously. When a temporary heat source is used, the temperature in the artificially heated area should not exceed 95 degrees F (35 degrees C). Heaters should not be allowed to blow directly on wall surfaces as excessive local heat can cause joint compound to dry too rapidly resulting in localized cracking and delamination. In addition, some temporary heaters introduce large amounts of water vapor into the air and can cause high humidity conditions if the work area is not properly ventilated. Humidity conditions should be monitored to determine the impact on overall drying time. Areas using temporary heat systems should be well ventilated to prevent the build-up of fumes. Caution should be exercised when relocating heaters or heat sources.

Water-based joint treatment materials, such as ready-mixed joint compounds, should be protected against freezing while in storage. Partially frozen joint compound can be used as a bedding and second coat material, after it is allowed to thaw naturally and if it is thoroughly mixed prior to use. Previously

DRYING TIME - JOINT COMPOUND UNDER TAPE1

Relative Humidity	Temperature, °F (°C)							
	32 (0)	40 (4)	50 (10)	60 (16)	70 (21)	80 (27)	90 (32)	100 (38)
98%	53D	38D	26D	18D	12D	9D	6D	4½D
97%	37D	26D	18D	12D	9D	6D	4½D	3½D
96%	28D	21D	14D	10D	7D	5D	3½D	2½D
95%	25D	17D	12D	8D	6D	4D	2½D	2D
94%	20D	14D	10D	7D	5D	3½D	2½D	41H
93%	18D	12½D	9D	6D	4D	2½D	2D	36H
92%	15D	11D	8D	5D	3½D	2½D	44H	32H
91%	14D	10D	7D	4½D	3½D	2½D	40H	29H
90%	13D	9D	6D	4½D	3D	49H	36H	26H
85%	10D	6D	4D	3D	2D	34H	25H	18H
80%	7D	4½D	3½D	2½D	38H	27H	19H	14H
70%	4½D	3½D	2½D	38H	26H	19H	14H	10H
60%	3½D	2½D	42H	29H	20H	14H	10H	8H
50%	3D	2D	36H	24H	17H	12H	9H	6H
40%	2½D	44H	29H	20H	14H	10H	7H	5H
30%	2½D	38H	26H	18H	12H	9H	6H	4½H
20%	2D	34H	23H	16H	11H	8H	5½H	4H
10%	42H	30H	21H	14H	10H	7H	5H	3½H
0 %	38H	28H	19H	13H	9H	6H	4½H	3H

1 For evaporation of 10 lbs (4.53 kg) of water per 250 ft (76200 mm) of tape, corresponding to 1/16" to 5/64" (1.6 to 2.0 mm) wet compound thickness under the tape. Thicker or thinner coats of compound will affect drying times in proportion to the wet compound thickness. These drying times apply when the exposed surface of the tape is bare or nearly bare, and when adequate ventilation is provided. A heavy coat of compound over the tape will lengthen the drying time.

frozen compound should never be used as a finish coat or topping material. Setting-type joint treatment materials provide an excellent alternative to canned or boxed joint compounds during cold weather as they can be stored in cold conditions and mixed at the job site. Water temperature should be closely monitored during the mixing process. Materials should not be mixed using extremely cold or partially frozen water.

Adhesion

Adhesives used for the application of gypsum board should be applied in accordance with manufacturers' instructions for temperature and climactic conditions. In general, adhesive application of interior gypsum board should be accomplished only when working area temperatures have been maintained at 50 degrees F (10 degrees C). Adhesives should be stored with conditions identical to those used with joint compounds as some adhesive materials can freeze. Previously frozen adhesive should be used only after discussion with the adhesive manufacturer.

Winter weather also introduces the possibility of snow, sleet, and rain storms. To prevent damage to gypsum board, it should be stored in a location where it is protected from moisture and properly supported above the ground. Board should not be enclosed in plastic shipping bags during storage. Plastic shipping bags are intended to provide protection during transit only and must be promptly removed upon arrival of the load. Failure to remove the shipping bag can increase the likelihood of developing conditions favorable to the growth of mold.

Care must also be exercised during cold weather installation of insulation to minimize the possibility of sag on interior ceilings and other horizontal soffit areas. When a polyethylene vapor retarder is installed on ceilings behind gypsum board, it is important to install batt or blanket ceiling insulation before the gypsum board is installed. When loose-fill insulation is used, the insulation should be installed immediately after the ceiling board is applied, but before the wall-board joints are taped or any other wet

finishing operation has begun on the ceiling or adjacent walls. Failure to follow these procedures creates a potential for moisture condensation on the backside of the gypsum board.

Preventive measures designed to compensate for or minimize the effects of weather extremes can avert a potential problem. Preventive measures amount to little more than the conscientious observance of some common sense practices. Special attention to maintaining recommended environmental conditions before, during, and after applications of gypsum board and joint treatment materials are important factors in minimizing the effects of extreme weather conditions. Extreme weather conditions are less forgiving when good practices are not followed. **W&C**

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