

Polyurethane Foam & Softer *Footfalls*

A blank slate like this one is perfect for the double-glue installation method for bonded polyurethane carpet cushion.



Photo courtesy API

The Double-Glue Method of Installing Carpet and Bonded Polyurethane Cushion

By Michael Norton

Bonded polyurethane foam, sometimes referred to as 'rebond,' is cut from a fused log or block of chopped pieces of recycled and/or manufactured polyurethane foam. The bonded polyurethane cushion used in commercial installations is specifically engineered for this purpose, and considered commercial-grade bonded polyurethane carpet cushion.



Photo courtesy API

Designed to provide the classic benefits of comfort and appearance retention, it is a thin, high-density, flat and resilient cushion. Its construction provides comfort without excessive thickness, and its memory promotes rapid recovery from depressions caused by heavy furnishings, making furniture arrangement simpler.

Polyurethane cushion under commercial carpet has many benefits over direct-glue. Cushion increases the life expectancy of carpet by up to 50 percent. Properly cushioned carpet subjected to walk tests, the Hexapod Drum Test, and Phillips Roller Chair test show outstanding bottom line results: markedly better appearance retention as well as greater comfort. It is also installer friendly, being clean, lightweight, and easy to cut to size.

A recent study by Intertek Testing Services (Cortland, New York) proves polyurethane carpet cushion helps absorb sound by as much as 50 percent, making the workplace that much quieter and more productive. Another study by Professional Testing (Dalton, Georgia) finds polyurethane cushion makes maintenance easier by improving soil removal while vacuuming by up to 40 percent or greater.

What follows is a description of the double-glue installation method for laying cushioned carpet in the commercial setting. The process involves adhering the polyurethane cushion to the floor, then the carpet on top. In both steps, the adhesives used are similar to the ones employed in typical direct-glue commercial carpet applications. The double-glue method allows for a choice of cushion and accommodates most flooring configurations—all while providing the sound absorption, ergonomic, and carpet life-extending benefits for which it was designed.

Many cushion manufacturers offer several products specifically designed for double-glue applications. Each has developed precise instructions to keep installations both practical and cost effective, and conformance with these directions is important for achieving long-term performance.

The double-glue method of carpet and cushion installation



Photo courtesy API

After the cushion has been installed, the carpet is cut 75 mm to 100 mm longer than the area measured. Carpet seams should be at a right angle to cushion seams, or offset at least 150 mm to either side. When gluing, the floor adhesive must be spread uniformly over the cushion, leaving ridges of sufficient height to achieve full and complete coverage of the cushion and carpet backing, including penetration into the backing's deepest recesses. To ensure the installation progresses properly, a small area should be selected to confirm the amount and placement of adhesive. Here, the carpet is lifted so the installer can verify adhesive transfer and coverage into the backstitch of carpet.

provides the specifier with a proven means of accessing the benefits of commercial carpet cushion. It is appropriate for most commercial applications, whereas other methods (like 'stretch-in'), are not viable over large areas typically found in the commercial setting. Additionally, the trend toward increased use of patterned carpet favors the double-glue approach when cushion is desired. When compared to attached cushion carpets, double-glue also offers these advantages:

- Less cushion waste
- Greater flexibility in cushion choice
- Improved sound absorption
- Easier handling (separate carpet and cushion mean lighter rolls to carry and position)

The double-glue method

Cushion choice

The starting point in commercial applications is choosing an appropriate commercial carpet cushion for the application at hand. Higher-traffic areas require more durable cushioning, and the double-glue method, in particular, is specifically designed for the job.

The following guidelines are based on the use of a typical commercial-grade bonded polyurethane carpet cushion with a

Additional information relevant to the installation of commercial carpet can be found in The Carpet and Rug Institute's (CRI's) 104-02, *Standard for Installation Specification of Commercial Carpet*. Note: not every carpet backing is suitable for a double-glue application. Confirm suitability with carpet manufacturer.

thickness of 6 mm (0.25 in.) maximum, and a density of 160 kg/m³ (10 pcf) minimum, with woven or non-woven scrim on both sides.

Pre-installation considerations

Whether a concrete slab is new or aged, the potential for performance problems exists when excess moisture or alkalinity is present. These conditions can degrade the adhesive over time. The slab should be inspected to determine whether moisture and alkalinity are within acceptable limits.

A calcium chloride moisture test kit (usually available from installation product suppliers) can produce reliable results, but scheduling is critical because the test requires 60 to 72 hours to conduct.

Generally, a moisture emission rate of 3 lb/1000 sf/24 h and a pH between five and nine are acceptable for most carpet installations. Beyond these limits, however, the risk of moisture- or alkaline-related problems increases. Should that be the case, corrective measures may be available. One should consult individual carpet and cushion manufacturers to determine acceptable limits for particular products, and proper corrective measures when necessary.

With the vast array of carpets, cushions, and adhesives available for commercial installations, one should confirm the products selected for the job at hand are approved by their respective manufacturers for the double-glue installation method.

Site conditions

The space in which the carpet is to be installed needs to have adequate temperature and humidity control for a good result. The temperature should be maintained between 18 to 35 C (65 and 95 F) starting 48 hours before installation and continuing at least 72 hours afterward. During this time, the relative humidity (RH) of the space should be maintained between 10 and 65 percent.

To achieve the best possible installation, The Carpet and Rug Institute's (CRI's) 104-02, *Standard for Installation Specification of Commercial Carpet*, suggests all materials be acclimated 48 hours prior to installation. When installing over concrete, the slab temperature should not be lower than 18 C (65 F). The finished installation should be maintained at a minimum 13 C (55 F) at all times.

Substrate preparation

The floor should be free of holes, loose tiles, or boards, so repairs should be made as necessary to provide a smooth surface for carpet and cushion installation.

When reviewing a project for possible bid, the carpet installation contractor will note the extent of resurfacing/leveling to be done.

The responsibility for completing the preparation (i.e. leveling and cleaning) should be defined by the architect/engineer (A/E) in writing. It could be performed by the flooring contractor or be let out to others.

As for certified installers, it is important that carpet installation be performed by professionals with specific training in commercial carpet installation. In this case, demonstration of additional skills for double-glue installation through training and field experience is needed. Many installers are certified by the International Certified Floorcovering Installers Association, are members of the Floor Covering Installation Contractors Association, or in the case of floor covering contractors, certified by the Floor Covering Installation Board.

The substrate should be dry and dust-free. Floors should be vacuumed, mopped when necessary, and otherwise thoroughly cleaned prior to the installation. Water should not be used excessively in the clean-up, though mopping with a slightly damp mop is useful for removing dust from the floor surface.

At this stage one can space and secure architectural tack strip to hold carpet edges in place (setting cove base on top of the carpet also secures edges).

Cushion layout

The cushion should be laid out in the longest lengths possible with seams running perpendicular to the carpet seams. Cushion seams should be kept at least 150 mm (6 in.) from carpet seams in instances where they cannot be laid out at right angles to one



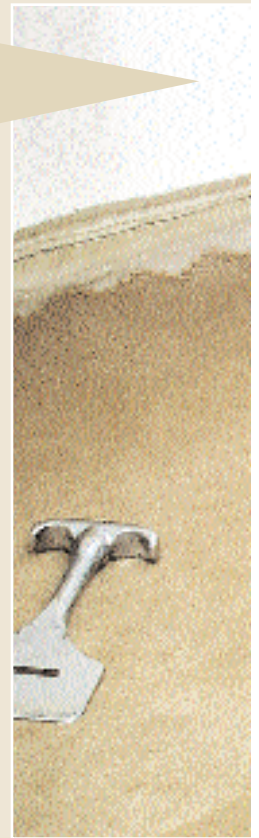
Did You Know?



In a one-year study, plastic building and construction materials saved 467.2 trillion Btu of energy over alternative construction materials. The energy saved by using plastic building and construction materials in one year is enough to meet the average household needs of 4.6 million American households. This is the equivalent of all the households in Nebraska, Utah, Nevada, Maine, Indiana, Hawaii, Montana, South Dakota, North Dakota, Arkansas, and Wyoming.

All carpet breadths are then aligned to the proper position and the seams trimmed before adhesive is applied. Once the adhesive has been spread for a given section, the carpet is laid into it according to the manufacturer's suggested open time to allow even distribution and penetration of all backing areas. Rolling should be performed with the lightest roller possible that achieves a satisfactory transfer of adhesive into the carpet backing. To ensure all the hard work pays off, traffic should be kept from the newly carpeted area for a minimum 24 to 48 hours after installation.

Photo courtesy API



another. The seams should be butted without compression, leaving no gaps. Any excess along the perimeter walls should be trimmed and tightly fitted.

Gluing the cushion to the floor

Once the entire cushion has been laid out, it is folded back to allow the adhesive (pressure-sensitive or premium multi-purpose) to be applied to the floor (no stapling). Special attention is directed to spreading the adhesive adjacent to the walls (cut-in) to prevent edge curling. The adhesive should be applied with a notched trowel (exact specs available from the adhesive manufacturer). Paint rollers can be inconsistent in applying the adhesive.

For bonding, the cushion should be laid onto the adhesive while it is still tacky/wet. (For pressure-sensitive adhesives, this point is often identified when the adhesive turns clear from its original opaque appearance.) The cushion is smoothed into the adhesive and worked toward the seams. It is trimmed in and any bubbles or wrinkles eliminated so the seams are tight (without overlapping).

In short, the installer should follow the adhesive manufacturer's recommended practices for installation.

Carpet layout

After the cushion has been secured, the carpet is cut to length and spread out. It should be cut 75 mm to 100 mm (3 in. to 4 in.) longer than the area measured. Where possible, allow for pattern repeat. Carpet seams should be at a right angle to cushion seams,

or offset at least 150 mm (6 in.) to either side. All carpet breadths are then aligned to the proper position and the seams trimmed.

Gluing carpet to cushion

The trowels again come out to secure the carpet to the cushion. (Again, trowel notch size and shape should be determined by the adhesive manufacturer.) The floor adhesive should be spread uniformly over the cushion, leaving ridges of sufficient height to achieve full and complete coverage of the cushion and carpet backing, including penetration into the backing's deepest recesses.

So the installation progresses properly, a small area should be selected to confirm the amount and placement of adhesive. Here, the carpet is lifted so the installer can verify adhesive transfer and coverage into the backstitch of carpet. Insufficient coverage is typically remedied by using a trowel with a larger notch size. Once the adhesive has been spread for a given section, the carpet is laid into it according to the manufacturer's suggested open time to allow even distribution and penetration of all backing areas.

Finally, a carpet roller is brought in and rolled in both directions to promote complete adhesion between the cushion and carpet. Rolling should be performed with the lightest roller possible that achieves a satisfactory transfer of adhesive into the carpet backing. Woven carpet should be rolled a second time (about three to 12 hours after initial rolling) so a strong bond is established.



Photo courtesy API

Due to dimensional instability, the double-glue method is typically not recommended for carpets with a unitary backing. For all the hard work to pay off, traffic should be kept from the newly carpeted area for a minimum 24 to 48 hours after installation. Otherwise, people walking over the carpet may create areas of inadequate adhesion between carpet and cushion, which may lead to future problems.

Spray adhesive system installation

A pressure-sensitive spray adhesive system is an acceptable method for gluing cushion to the substrate. To be successful, however, it should be executed by a spray-certified installation technician. Also, a firm cushion designed for the double-glue installation method should be specified. Similarly, it may be best to use a pressure-sensitive adhesive warranted by the manufacturer for use as a spray-applied adhesive for double-glue installations. Conformance to the required application rate and open time is critical.

The use of a spray system for gluing carpet to cushion is a very demanding operation. Consult the adhesive manufacturer for further information.

Other installation considerations

The first 30 days following installation are critical. During this time, the adhesive is undergoing the final cure required for long-term performance. The carpet should not be exposed to

water during this time, as it may very well prevent a proper cure and lead to future problems. When cleaning is required, it should be performed by a skilled professional (dry cleaning systems are preferred). Certain types of carpet backing and adhesives are incompatible, so follow manufacturer recommendations.

Adhesives

Trowel settings, open time, and other questions should be referred to the adhesive manufacturer.

Seaming

Depending on carpet manufacturer recommendations, seams may be hand sewn, butt-seamed and glued, or taped using a low-profile, non-silicone-treated hot melt tape specifically designed for double-glue installations. Prior to seaming, both trimmed edges of the carpet sections to be joined should be sealed with an appropriate seam adhesive. Latex seam sealer or thermoplastic adhesives are acceptable. Seam adhesive should be applied in a manner that encapsulates both primary and secondary backings.

Double-glue procedures for stairs

The carpet is pre-cut and dry fitted before installation commences. The tack strip is positioned on the tread and riser, then installed in the usual fashion. The specified cushion is then installed, extending completely over the bullnose, which is to be a radius of 19 mm (0.75 in.). After the cushion is adhered, the double-glue adhesive is applied over top, and the carpet laid.

Installing patterned carpet

All parties should discuss pattern configuration, the backing system, installation method, and expectations. Subsequent to the specification, the specifier, end user, and carpet installation contractor should all understand the manufacturer's tolerances for bow, skew, trueness of edge, and pattern repeat variation. When tolerances exceed the published specifications for these or other patterned carpet attributes, the manufacturer should be consulted before proceeding.

Conclusion

Commercial-grade bonded polyurethane carpet cushion offers many benefits, and when executed properly, the double-glue method makes cushion in commercial settings an attainable reality. The cushion improves carpet appearance retention, thereby reducing life-cycle cost, and improves workplace acoustics. Cushion also offers good ergonomics, a degree of thermal insulation, and is consistent with some recycling goals because it contains recycled polyurethane foam. ☉

About the Author

Michael (Mike) Norton is the president of Performance Consulting. The scope of his interests in technical support in the carpet and carpet cushion industry covers everything from issues identification, establishment, and oversight of research programs to results interpretation and communication. Prior to his current position, Mike was the global development manager for Dow's polyurethane carpet backing business, where he led the efforts for new product development and technical service.