



Protecting Tile Assemblies in Heavy Duty Service Conditions

Including Car Showrooms, Malls and Airports

Tile assemblies in locations that are subject to vehicular and heavy equipment traffic – such as shopping malls, airports and car dealership showrooms – require special considerations during the specification and construction phase of the project. From the heavy duty service requirement of the surface preparation materials to protecting the tile and grout from stains, each step of the installation and care process should be carefully considered when the products are selected.

*By Steve Taylor
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Technical White Paper

PROTECTING TILE ASSEMBLIES IN HEAVY DUTY SERVICE CONDITIONS



LevelQuik® RS cures fast and develops high early strength for walkability in only 4 hours, plus it is rated for Extra Heavy Duty service.



General Challenges

Dealerships and other retail sites as well as transport hubs are typically jobs with a highly compacted schedule. However, taking the time to prepare a mockup is particularly important when the tile will be set in challenging conditions that will be subjected to heavy wheeled traffic. Don't skip this critical step that could prevent costly problems after the tile assembly has been completed.

The concrete surface should be examined for any latencies such as curing compounds. Moisture vapor emission from the slab should be evaluated. If a concrete curing compound or excessive moisture vapor is present on a fast-track job, contact CUSTOM Technical Services for additional information on mitigation.

To help avoid the major issues common to these projects, CUSTOM recommends the following best practices to incorporate both speed and strength during the tile installation.

First of all, the choice and design of the tiles themselves must be considered. This selection will affect the durability and long-term appearance of the installation. Ensure that the tile meets criteria for the rigors of the jobsite conditions when tested per ASTM C627 (Robinson Test) as well as the required DCOF for slip resistance. Light colored, polished or unglazed, porous and textured tiles pose special grouting and care challenges that will be addressed below.

Heavy Duty Surface Preparation

Auto showrooms are rated "Heavy" in the Tile Council of North America (TCNA) Handbook Service Requirements Table, so these tile assemblies must be constructed to perform to this rating. If the subfloor needs to be leveled, specify **LevelQuik® RS Rapid setting Self-Leveling Underlayment**. LevelQuik RS cures fast and develops high early strength for walkability in only 4 hours, plus it is rated for Extra Heavy Duty service areas. Prior to application of the leveler, patch as needed with cement-based patching materials and prepare the concrete with LevelQuik Advanced Acrylic Primer.

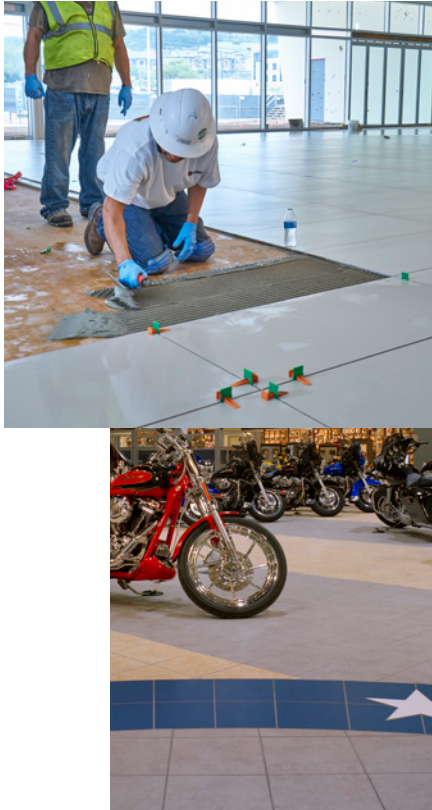
CUSTOM offers two crack isolation products that are appropriate for heavy duty service conditions.

- **RedGard® Waterproofing and Crack Prevention Membrane** is a quick drying, ready-to-use, liquid-applied elastomeric membrane. Each coat cures in as little as an hour.
- **Crack Buster® Pro Crack Prevention Mat Underlayment** is a self-bonding, fabric reinforced, asphaltic membrane. Crack Buster Pro can be used to bridge existing control and construction joints per TCNA F125 partial or full coverage treatment.

Both RedGard and CrackBuster Pro meet the performance requirements of ANSI A118.12, are rated Extra Heavy and isolate cracks from in-plane substrate movement up to 1/8" and 3/8" respectively. Before using Crack Buster Pro, prime the substrate with Peel & Stick Primer; once the mat is installed, you can begin tiling immediately.

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CUSTOM offers grouts meeting the needs of these demanding commercial projects.



Crack Prevention and Rapid Setting Mortars

The best choices for these heavy traffic projects are premium quality, high performance mortars meeting the rigorous bonding requirements of ANSI A118.15. Often, a rapid setting option is specified to help keep the schedule on track. In new construction without windows and/or HVAC, environmental factors such as humidity, wind and extreme temperatures will play an important part in cure rates that need to be taken into consideration.

- **MegaLite® Ultimate Crack Prevention Large Format Tile Mortar** offers the ultimate bond strength for the most demanding installation requirements along with the flexibility to withstand horizontal substrate movement. MegaLite is also available in a Rapid Setting formula to perform on these jobs regardless of time frame.
- **ProLite® Premium Large Format Tile Mortar** offers high bond strength in a lightweight formula with excellent handling characteristics and also comes in a Rapid Setting option.

Stain Resistant Grout

Grout on these types of projects must be color consistent, extremely hard in the joint and highly resistant to staining. CUSTOM offers grouts meeting the needs of these demanding commercial projects.

- **CEG-Lite™ 100% Solids Commercial Epoxy Grout** provides chemical and stain resistance with a fast cure time for a quick return to service. Its lightweight formula makes it easier to spread than typical epoxy grouts and CEG-Lite is water-cleanable during installation.
- **Prism® Color Consistent Grout** is a fast-setting, lightweight, cement-based grout that offers consistent color without mottling or shading, regardless of tile type, temperature or humidity. Prism meets ANSI A118.7, cures quickly and develops high early-strength for dense grout joints from 1/16" (1.6 mm) to 1/2" (13 mm).

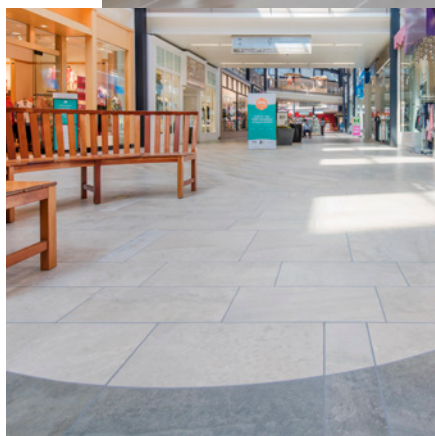
Protecting Tile and Grout

Tile assemblies in car dealerships, in particular, must be protected from tire dressing, motor oil and other petroleum products. Pre-sealing the tile is strongly recommended by tile manufacturers if the material will be exposed to this class of contaminants.

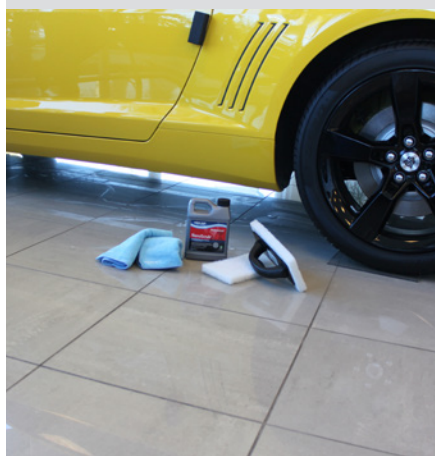
- Use of a grout release, such as **Aqua Mix® Grout Release**, is a must prior to grouting the unglazed, textured tiles commonly selected for these projects. This will make grouting quicker and easier to clean from the face of the tile and prevent grout staining of the tile.
- If a light-colored or porous material will be installed, use of a natural look, penetrating sealer, such as **Aqua Mix® Sealer's Choice® Gold**, should take the place of the Grout Release. This will improve the grouting process and protect the tile from staining after installation.
- On any projects subject to heavy foot traffic or vehicular traffic, CUSTOM recommends sealing cement-based grouts after curing. Sealer's Choice Gold is also an excellent choice to protect the grout.
- The tile and grout should be periodically tested for moisture penetration. If water does not bead on the surface, the tile should be resealed with the appropriate sealer.

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Unsightly marks left by tire dressings can be removed by an application of Aqua Mix NanoScrub®.



Movement Joints

Car showrooms, airport terminals and other sites with full glass exposure require more frequent and wider soft movement joints to accommodate thermal cycling as well as the heavy duty service conditions. As on an exterior project subject to direct sunlight, the movement joints should be spaced no more than 12-feet apart. Proper spacing of these movement joints, as well as placement at all perimeters per EJ171, is a requirement. All movement, cold and expansion joints in the concrete slab must be carried straight through the tile assembly and filled with the appropriate sealant.

- All movement joints should be filled with **CUSTOM 100% Silicone Sealant**, which remains permanently flexible and comes in colors to match all of our grouts.

Care and Maintenance

As we all know, cleaning programs by janitorial services are not always effective and can even damage the tile assembly. National Tile Contractors Association (NTCA) recommends the tile contractor provide a letter to the general contractor and project owner to inform them of the proper protection and cleaning measures for maintaining tile and grout. This documentation can help prolong the life of the installation.

- Once the tile has been set and grouted, no wheeled traffic should be driven over the assembly until it has cured for 28 days.
- If it is necessary to move heavy wheeled equipment or automobiles across a newly tiled area, make sure the minimum cure time has passed for the mortar used and use these precautions:
 - Any cars or heavy equipment like forklifts or cherry pickers should be driven over sheets of 3/4" plywood to better distribute the weight across the tile.
 - Do not turn the wheels of stationary vehicles that are sitting directly on the tile.
- Based on the materials installed and the jobsite conditions, suggest a daily program of neutral, non-acidic, cleaning products from Aqua Mix that will not damage the tile or grout.
- When deep cleaning is needed, Aqua Mix concentrated, high alkaline formulas are ideal for high traffic commercial applications.
- Unsightly marks left by tire dressings can be removed by an application of **Aqua Mix NanoScrub®**.
 - For recommendations on removing other common stains, see the Care and Maintenance Technical Bulletins on the CUSTOM website.

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Green Building

The Emerald System™ is CUSTOM's complete system of environmentally responsible products. It expands our Build Green® program by addressing some key issues related to the practice of green building. The above named mortars and grouts - MegaLite, ProLite, CEG-Lite and Prism - are all part of the Emerald System of products that contribute points towards LEED certification as well as the purchase of carbon offset credits for the project. Low VOC, water-based Aqua Mix formulas also meet many stringent environmental standards.

When it comes to the dynamic weight bearing, thermal cycling and high stain risks encountered in heavy duty installations, an ounce of planning is worth a lot more than a pound of tile repair. The high performance surface preparation, tile setting and grout products mentioned in this paper are all eligible for up to a lifetime warranty when properly installed with a qualifying system of CUSTOM products. Call CUSTOM and install the most challenging tile projects with confidence.



About the Author

Steve Taylor is Director of Architecture and Technical Marketing for Custom Building Products and has more than 30 years of experience developing products for the construction industry.

Steve is a member of the Tile Council of North America (TCNA) and Materials & Methods Standards Association (MMSA). In these roles, he helps to determine proper tile installation methods and standards. This includes simplifying the tile installation process to save tile professionals time and money.

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