

 Armor™	
	TECHNICAL INFORMATION

CES-366
11/25 SUPERSEDES 10/12

INSTALLATION SPECIFICATION CONDUCTIVE TILE AND BRICK FLOORING

1. SCOPE

- 1.1 This specification a conductive direct bond corrosion-resistant tile or brick flooring system. With a conductive system, the brick or tile flooring functions not only as a mechanical and thermal barrier but also as a conductor of static electrical charges that may build up because of surface movement across the floor. The grout or mortar and the tile bed functions both as a component of the corrosion and wear resistant surface, as well as a means of transferring charges to the conductive tape system under the tile. The underlying tape embedded into the primer serves to dissipate static charges to ground.
- 1.2 Additional applicable specifications shall include all specifications referenced on individual data sheets as well as Corrosion Engineering Specifications CES-309 and CES-311. In case of conflict in specifications, consult with manufacturer for clarification.

2. CONCRETE SUBSTRATE

- 2.1 Prior to commencement of any work, the flooring contractor shall thoroughly examine all floor surfaces, and report any conditions which will adversely affect proper floor installation. These conditions may include the presence of birdbaths, irregular slopes and flatness, cracks or chips, and degraded expansion or control joints amongst others. Commencement of work shall be deemed as acceptance of floor finish slope and condition. If there are any disputes, these should be resolved before commencement of work as a tile floor will follow the elevations of the underlying concrete.
- 2.2 Acid proof floors should be designed to drain completely. To do this, a fall of up to 1/4" (6 mm) to the foot may be considered in the design. However, this amount of slope is very evident when walking across the slope. A 1/8" (3 mm) to the foot slope will still drain if all tile and joints are smoothly laid. A lesser slope should be reviewed with the contractor.
- 2.3 Prepare the concrete surface in accordance with industry practice as outlined in NACE No. 6/SSPC-SP 13. Criteria for acceptance shall be as noted in section 6, Acceptance Criteria. If moisture testing is not performed in accordance with NACE No. 6/SSPC-SP 13 section 5, then standard industry practice is to allow a 28-day cure on concrete surfaces receiving membranes, epoxy setting beds or monolithic toppings. Consult Armor or review with the installation contractor and the general contractor to resolve. If circumstances are such that the above acceptance criteria cannot be met, work should be halted until resolved. Exact surface preparation method shall be determined by installation contractor based on his experience, personal preferences, equipment, access, job-specific needs and circumstances.

3. MATERIALS

- 3.1 Pavers and/or tile are available in a variety of sizes and surface textures, and thicknesses depending on the manufacturer. Most tile or brick masonry units can be used with a conductive flooring system as the conductivity is related to the grout. Consult Armor or the installation contractor for full details.

The tile surface must be pre-waxed with a suitable wax suitable to prevent adhesion of grout to the tile

CES-366 SPECIFICATION FOR INSTALLATION OF CONDUCTIVE TILE/BRICK FLOORING
10/12 SUPERSEDES 06/12
PAGE 2 OF 4

surface and to facilitate cleanup of grout from the tile face upon completion of the tile work. Wax should not carry onto the edge, side or bottom of the tile.

All cuts shall be made with a masonry saw and cuts allowed to dry before use. Slivers of a size typically on the order of 1" or less, whether along the tile length or width shall not be used for both aesthetic and functional reasons. Such slivers are not only unsightly but also can be problematic, especially in critical areas such as along an expansion joint or a transition to an adjoining surface or room where there is an expectation of heavy traffic. If for example, there is an 8.5" (216 mm) gap to fill to complete the floor, it would not be desirable to place an 8" (203 mm) full tile plus a 1/2" (13 mm) sliver part tile. The contractor may choose to use a 5" (1 mm) and 3.5" (87 mm) piece instead, alternating their positions to break bond in the adjoining row to achieve the best aesthetic while maintaining the layout. Consult with the contractor about his plan to address this detail. An experienced contractor can often foresee the need to make minor joint width adjustments as work proceeds to avoid this issue, and this section is noted only as a cautionary point.

- 3.2 The setting bed material shall be The setting bed material shall be Thinset™ Novolac Adhesive Carbon Grade, data sheet CE-164, a 100% reactive conductive epoxy adhesive composed of an epoxy resin, chemically curing hardener and conductive filler.
- 3.3 The chemically-resistant conductive grout shall be Furalac™ Red Panel Grout, data sheet CE-130. If 3.0 mm joints are to be used with the bricklayers installation method, consult Armor Furalac Green Panel Mortar data sheet CE-128.
- 3.4 Alternate Grout: The chemically-resistant grout shall be Pennchem CIP Tile Grout, data sheet CE-160. Pennchem CIP Tile Grout shall be installed by the tile setters method of installation only.
- 3.5 Consult with installation contractor or Armor if unsure which grout or mortar to use.
- 3.6 Conductive tape shall be 3M 1181 self-adhesive copper foil tape. Tape width shall be 1" (25 mm). Copper tape is installed onto tack-free primer or direct to the concrete (if primer is not used) and tied to ground points located at minimum spacing of 2 points per room, or 1 point per 1,000 sf (90 sm) whichever is lesser. Tape shall be laid on a 39" (1 meter) squared pattern, with tape running in both directions.
- 3.4 Expansion joints are required to accommodate mechanical or thermal stresses in tile flooring. Expansion joints are placed over existing joints in the underlying concrete. Flexjoint U500 Joint Sealant (CE-134), a two component polyurea joint filler shall be used in traffic bearing areas. Consult joint detail drawings CED-607 or CED-1020 for a typical detail.

4. CONDITIONING OF MATERIALS AND JOBSITE

- 4.1 All tile work with chemically curing setting beds and grouts should be performed under cover from the elements, and at a minimum temperature of 50°F (10°C) and a maximum of 90°F (32°C) unless specific arrangements for exceptions are made. The temperature limitations apply not only to the air, but to the substrate the masonry will be in contact with as well as the materials themselves. In addition, the air temperature must be maintained from start of job until cure is initiated at 5°F (3°C) or more above the moisture dew point.

All materials including the tile must be kept dry and within this temperature range for not less than 48 hours prior to use to allow sufficient time to acclimate. All work shall be kept dry until the mortar has reached the point of cure designated by the manufacturer. The bedding and grouting materials and chemically setting compounds that are temperature dependent and work best within a temperature range of 70°F-75°F (21°C-24°C). Higher temperatures will reduce work life and set time, and lower temperatures will increase it.

- 4.2 The user should be conscious of temperature changes and erratic cures that can result from high winds (chilling or heating, and rapid drying), by direct sunlight during summer months, particularly in hot climates, and changes in temperature for daytime to nighttime. Provide appropriate job protection.

5. APPLICATION OF MATERIALS

- 5.1 If surface-damp concrete is a concern, it may first be conditioned by applying Penntrowel™ Epoxy Primer (CE-139) or Novocoat™ SC100 Primer. Thinset Adhesive should be placed after primer has dried to touch, but no longer than 48 hours after primer has been installed.
- 5.2 Installation steps shall be as outlined below. In all cases, refer to additional specifications associated with specific material data sheets.
- 1: Primer installation, if required.
 - 2: Lay tape onto floor, attach to ground.
 - 3: Test and verify the system conductivity.
 - 4: Install tile or pavers with setting bed.
 - 5: Install grout or mortar.
 - 6: Clean residual grout off face of tile before turnover of area to owner.
- 5.3 Flush full side joints and intimate contact between adhesive and mortar are critical to performance of the entire system. If joints cannot be assured to be full and flush using the tile setters method of installation, consideration should be given to installing the tile by hand buttering the side joints.

6. CONDUCTIVITY CHECK

- 6.1 Resistance should be checked before the tape system is buried. Check the conductivity of the tape grid point-to-point and to ground to make sure the circuit is functioning prior to installing the tile/brick. Only proceed with ceramic system installation after conductivity is verified.
- 6.2 Resistance readings should be under 1,000,000 ohms +/-500,000 ohms using ANSI/ESD STM7.1 when measured. Selection of footwear for use on the floor is critical to keep voltage potentials on persons walking on the floor under the required limits for the application. Measure in accordance with ANSI/ESD STM97.2. Any specific additional system performance requirements should be evaluated on a case-by-case basis depending on requirements of the installation.
- 6.3 Performance of the installed lining will vary depending on several factors. The understood purpose of the system is to dissipate static charges that may build up because of objects or personnel moving across the floor. The concept is the system transfers these static charges via the carbon filled conductive side jointing and the conductive bed to the tape and then to ground. The type and conductivity of the moving item (steel wheels vs plastic wheels for example) and the type of footwear the employee is wearing (plastic soled shoes vs leather for example) can affect the amount of charge built up. Additionally, the ability of the moving object to contact the grout joint is critical. If the joints are not full and flush but rather are recessed below the tile surface, the charge may not be able to be dissipated. Cleanliness of the floor can also be a factor as dirt or contaminants may impede the system's ability to conduct.
- 6.4 A mockup or test panel of the specified system and an agreed testing methodology considering the variables outlined above shall be considered to verify the expected performance of the installed system before proceeding. Allow sufficient lead time and budget for a site-specific test area and sign-off panel if it is deemed a project-specific requirement.

7. CLEANUP

- 7.1 Consult specific product data sheets for suggested tool cleaning recommendations.

8. SAFETY PRECAUTIONS DISCLAIMER CONTACT INFORMATION

- 8.1 Consult current Safety Data Sheets before commencement of work.
- 8.2 Mixes and applications of this product present a number of hazards. Read and follow the hazard information, precautions and first aid directions on the individual product labels and safety data sheets before using. While all statements, technical information, and recommendations contained herein are based on information our company believes to be reliable, nothing contained herein shall constitute any warranty, express or implied, with respect to the products and/or services described herein and any such warranties are expressly disclaimed. We recommend that the prospective purchaser or user independently determine the suitability of our product(s) for their intended use. No statement, information or recommendation with respect to our products, whether contained herein or otherwise communicated, shall be legally binding upon us unless expressly set forth in a written agreement between us and the purchaser/user. For all Terms and Conditions of Sale see armor-inc.com.
- 7.3 Please contact Armor for further information at +1-877-98ARMOR (982-7667) or customerservice@armor-inc.com.

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