

Substrate Prep for General Adhesive Applications

The jobsite must be completely closed-in and conditioned with permanent HVAC in operation before beginning the installation process or before any substrate testing or preparations are performed. The jobsite, along with the floor covering materials and adhesive, must be acclimated to a temperature between 65°F and 85°F and air humidity from 40% to 65% for at least 48 hours before, during, and continuously after the testing, preparations, and final installation.

The substrate must be inspected to ensure that it is completely free of dust and dirt, paint, markings, oil, curing or release agents, sealers or existing adhesives, or anything that would interfere with the adhesive making a good bond directly to the substrate or stain or discolor the floorcovering. Remember, the adhesive bonds to the material it touches. If it is applied over old adhesive residue or coatings that are soft, brittle, or not otherwise physically sound or well bonded to the substrate, the entire installation is compromised. Such residues, if not removed, become the substrate onto which the new floor covering will be adhered. High traffic areas are commonly seen to be the first areas to show delamination over substrates not properly prepared. All substrate preparations must conform to appropriate ASTM F710 and CRI 104 guidelines.

Follow the floor covering manufacturer's guidelines for installing over existing resilient flooring. Adhesives and subsequent floor covering should not be installed over any substrate where silicate compounds have been applied or entrained, or where chemical or solvent cleaners or adhesive removers have been used. The surface temperature of radiant-heated floors should not exceed 85°F. Jobsite conditions should be recorded before conducting moisture testing and prior to installation. This can be achieved by using a standard thermometer, infrared pyrometer, and hydrometer to measure ambient temperature, slab temperature, and ambient Relative Humidity. Dew point, as it relates to interior moisture condensation, is an important factor for ensuring that proper conditions exist before and during substrate testing, preparations, and floor covering installations. The interior air temperature and Relative Humidity must be maintained between 65-85° F and 40-65% RH, and the substrate temperature should be at least 5 degrees F. higher than the Dew Point. Monitoring the substrate temperature, indoor temperature and ambient RH, and utilizing fans and/or dehumidifiers as needed will help correct or prevent existing or possible Dew Point conditions until the installation is complete.

Moisture and pH testing must always be performed on concrete substrates on every grade level. Moisture testing is specified to be done using the latest versions of the following methods:

- ASTM F2170, in-situ relative humidity test to measure the internal humidity in the concrete.
- ASTM F2659, substrate surface moisture using an electronic impedance moisture meter.

Testing for concrete substrate moisture is required to be performed per the latest edition of ASTM F2170.

Impedance meter testing (refer to ASTM F2659) is highly recommended due to issues related to topical moisture from Dew Point conditions. Substrate surfaces should not read over 4% on the impedance meter for any adhesive application. In the event of an installation claim that may be moisture related, impedance meter testing on the substrate will be performed. Substrate surface moisture readings found to be above the 4% acceptable range may void the warranty.

Concrete Substrate Testing Procedures:

1. Moisture test site(s) selection: Using an impedance and/or electrical resistance meter, first measure potential problem areas (trench lines, exterior walls, room dividers, surface discoloration, etc.). The first priority is given to those area(s) that measure higher moisture levels, until the appropriate number and properly spaced test sites are chosen.
2. Once the areas are chosen, ASTM F2170 is used to obtain a reasonably accurate profile of the existing conditions.
3. The relative humidity testing (F2170) and impedance meter test (F2659) should be used together in order to form a more complete view as to the moisture content and slab condition.

Acceptable concrete slab moisture and pH readings are established for each adhesive product and application. While moisture test results are a good indication of the condition of the slab at the time of testing, it is not going to indicate moisture changes from below the slab that may be due to seasonal changes. This can only be done with a proper vapor retarder membrane installed by the building contractor (in accordance with ASTM E1745), and by making certain there are no run off problems around the building. Flooring installations on below-grade substrates have inherent risks that require strict adherence to specific guidelines addressed by the floorcovering and adhesive manufacturers.

Any cracks, holes or other substrate irregularities should be repaired using a good Portland cement based product in strict compliance with the manufacturer's guidelines. Gypsum based patches should be completely dry and primed with a latex primer. Concrete substrates should be smooth and flat within the tolerances as described in current ASTM F710 Paragraph 4.6, per ACI 117R, or as measured by the method described in ASTM E1155, or any industry recognized method as specified by the floor covering manufacturer.

Excessively hard or smooth concrete surfaces may need to be abraded to achieve porosity. A mechanically prepared surface can be accomplished in the following ways; abrasive (sand) blasting, grinding, sanding and shot blasting. The concrete surface profile (CSP) must be between 1-3 to ensure a proper bond.

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(Continued)

ASTM F3191-16; concrete substrates may be tested for porosity by placing 0.05mL bead of water on the surface to observe absorption (see Fig 1). If the water is not absorbed within one minute, the floor should be considered non-porous. Non-porous concrete surfaces are generally rendered porous by mechanically abrading, sanding or bead-blasting the surface of the concrete.



Fig 1

Porosity of the substrate affects adhesive open time and eventual drying time. Adhesives generally dry quicker over porous substrates, whereas adhesives applied over non-porous substrates can take much longer to dry. Non-permeable floor covering should never be installed over wet adhesive on a non-porous substrate.

After any substrate preparations, a bond test should be conducted before beginning the installation. It is up to the end user to ensure proper adhesive coverage is applied that is appropriate for the floor covering and jobsite conditions. A bond test is a mock-up installation done prior to the general installation of the floor covering to indicate whether the adhesive will bond satisfactorily to the substrate and floor covering. Bond testing will aid in identifying both the working characteristics of the adhesive, such as the appropriate open and working time for the site conditions, and also any potential bonding problems to the substrate or floor covering. Select an approximately 2-foot square area in a typical location on the substrate and put down the adhesive and subsequent floor covering using the exact techniques that will be used for the installation. After 24 hours, observe the mock-up installation to see if any obvious problems may exist. The floor covering should be tightly bonded to the substrate, and remaining dimensionally positioned in the manner in which it was installed. If necessary, the slab would need to be mechanically profiled (bead blasting recommended) to an untreated depth, until a successful bond test can be achieved.

SUBSTRATE/INSTALLATION PREPARATIONS CHECKLIST

✓	SUBSTRATE(S)	PREPARATION/TEST	REFERENCE/METHOD	DESCRIPTION/SPECIFICATION
	ALL	SITE CONDITIONS	ACCLIMATED INTERIOR	HVAC IN OPERATION
		TEMPERATURE	CRI 104, ASTM F710	INTERIOR 65-85° F
		SITE RELATIVE HUMIDITY, RH	CRI 104, ASTM F710	INTERIOR 40-60% RH
	ALL	SUBSTRATE PREPARATIONS	CLEAN, FLAT, DRY	NO SOLVENTS, MECHANICAL CLEAN ONLY
		SUBSTRATE PREPARATION	CRI 104, ASTM F710	REPAIR, PATCH, SKIM COAT
		TEST SUBSTRATE TEMP	INFRARED PYROMETER	>5° F HIGHER THAN DEW POINT
		TEST SUBSTRATE MOISTURE	ASTM F2659	LOCATE HIGH MOISTURE AREAS
	EXISTING VCT	STRIP, SAND	REMOVE FINISHES	CLEAN, NON-CUSHIONED, ONE LAYER
	CERAMIC	FILL GROUTLINES	APPLY EMBOSSEING LEVELER	CLEAN, EVEN SURFACE SCREED
	TERRAZZO	PROPERLY PREPARED	SCARIFY/SAND SURFACE	PREPARE BONDING SURFACE
	GYPSUM	TEST DRYNESS, PRIME	ASTM F2419	APPLY PRIMER PRIOR TO ADHESIVES
	PLYWOOD	SMOOTH, FLAT	APA APPROVED	MEET CONSTRUCTION STANDARDS
	RADIANT-HEATED	OFF DURING INSTALL	CRI 104, ASTM F710	85° F MAX SURFACE TEMP THEREAFTER
	CONCRETE	SLAB MOISTURE RH	ASTM F2170	% <i>IN-SITU</i> RH
		SUBSTRATE SURFACE MOISTURE	ASTM F2659	IMPEDANCE METER, 4% MAX
		TEST SUBSTRATE POROSITY	ASTM F3191-16; 0.05mL WATER BEAD	<1 MIN. ABSORPTION RATE
		TEST pH	LITMUS STRIPS, pH METER	(8.0 -10.0 NORMAL)
	ALL	PRE-INSTALL BOND TEST	MOCK-UP	2 FT ² AREA
	ALL	FOLLOW INSTALLATION PLAN	FLOORPLANS, SCALE DRAWINGS	PER DESIGN

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*ALWAYS FOLLOW THE FLOOR COVERING MANUFACTURER'S GUIDELINES FOR APPROVED SUBSTRATE SELECTION AND PREPARATIONS