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LATICRETE Substrate Preparation and Primer Guide for Self-Levelling Underlayments

TDS-1230

Substrate preparation is the most important factor for a successful LATICRETE self-levelling underlayment (SLU) and LATAPOXY Vapour Reduction Coating (VRC) installation. While it is not possible to cover all of the conditions that may exist on every project, this guide will cover substrate preparation and primer application for some of the more common conditions found on most projects.

The SLU installer is responsible for ensuring that the substrate is properly prepared and primed prior to installation. Any conditions discovered prior to or during preparation and installation must be brought to the attention of the project construction manager or builder immediately to remediate the condition and bring the affected areas into compliance. The project specifications should be consulted for any special substrate preparation or conditions that may apply.

Prior to an SLU installation, either the permanent building envelope or a temporary building enclosure must be in place to provide a suitable ambient temperature range, as well as protection from weather and direct sunlight. LATICRETE recommends that existing concrete slab core samples be analysed by an independent lab for contaminants, structural soundness and other deleterious compounds that may act as bond breakers.

LATICRETE Australia strongly recommends the use of installers who have demonstrated their commitment to their craft and taken the time to stay current with the latest materials and methods. Requiring references and a portfolio along with a tender or estimate is a good way to ensure the installer has successfully completed work of similar size, scope, and complexity.

I. SUBSTRATE TYPES/GENERAL REQUIREMENTS

The SLU installer should receive confirmation from the general builder that the floors are designed and built in accordance with local codes and industry standards; and are structurally sound and able to accommodate the type of finish flooring being installed under all live, dead, concentrated, and impact loads. Concrete slabs must have a minimum ICRI concrete surface profile (CSP) of 3. For more detailed ICRI CSP information refer to ICRI Guideline 310.2R-2013. Use of chemicals to remove contaminants or to create a surface profile is not recommended. Concrete must also have a minimum tensile strength of 0.7 MPa for a LATICRETE SLU installation and a minimum 1.4 MPa tensile strength for LATAPOXY VRC installation per ASTM C1583. Additionally, concrete slabs must readily absorb water, be clean, free of oil, wax, grease, sealers, curing compounds, asphalt, paint, de-icing agents, dust, dirt, loose surface material and any other contaminant that will act as a bond breaker.

New Concrete: New concrete slabs must be allowed to cure for a minimum of 28 days and have a minimum CSP of 3 prior to installing LATICRETE SLU products. Concrete cure/dry time will vary due to atmospheric conditions. Refer to the, Cement, Concrete & Aggregates Australia "Moisture in Concrete and Moisture-sensitive Finishes & Coating; the ACI 302.2R-06 "Guide for Concrete Slabs that Receive Moisture Sensitive Flooring" and; the ASTM F710 "Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring" for more detailed information. Use of curing compounds on new concrete slabs is not recommended. If a curing compound is used on new concrete, the curing compound (including "self-dissipating" curing compounds) must be removed by shot blasting, scarifying or other mechanical means to a minimum CSP of 3 per ICRI Guideline 310.2R-2013 then swept and vacuumed clean.

New concrete slabs that have been power troweled, burnished or over troweled must be shot blast, scarified or prepared by other mechanical means to a minimum CSP of 3 then swept and vacuumed clean.

Contaminated Concrete: All potential bond breaking contaminants must be removed to present with a clean, absorptive, structurally sound concrete surface by shot blasting, scarifying or other mechanical means to a minimum CSP of 3 then swept and vacuumed clean. Use of a sweeping compound is not recommended as they may contain oil which will act as a bond breaker. Use of chemicals to remove contaminants is not recommended. It is recommended that an independent lab be consulted to determine the full depth of the contamination. In some cases the more aggressive mechanical methods or combination of methods must be used to remove the full depth of contamination. Removal of contamination should always be followed by tensile strength testing per ASTM C1583. Concrete must have a minimum tensile strength of 0.7 MPa for LATICRETE SLU product installations and a minimum 1.4 MPa tensile strength for LATAPOXY VRC installations.

High-Suction Concrete: Highly porous or extremely dry concrete may require two coats of LATICRETE SLU Primer. Refer to Priming section for High-Suction priming instructions. Concrete slabs that are found to be brittle, weak, frozen or loose due to poor installation conditions, forced drying methods or any other cause must be repaired or replaced followed by tensile strength testing per ASTM C1583 prior to primer application.

Concrete must have a minimum tensile strength of 0.7 MPa for LATICRETE self-levelling product installations and a minimum 1.4 MPa tensile strength for LATAPOXY VRC installations.

Non-Suction Concrete: If water or primer beads up on surface and does not absorb into concrete (See Primer section for Water Drop Test), the surface may be contaminated or over-troweled and in need of further evaluation and preparation prior to application of LATICRETE SLU Primer. If the concrete has already been shot blast or scarified, the contaminant may have absorbed deep into the concrete or the slab may have become contaminated after shot blasting or scarification has taken place.

No matter the reason, do not continue with application of LATICRETE SLU Primer until the full depth of the issue has been remedied and the slab is absorptive. If contamination is suspected, see Contaminated Concrete section for further details.

II. CRITICAL PROJECT FACTORS

There are several critical job site factors and conditions that may exist on job sites. It is extremely important to evaluate and address each condition prior to application of LATICRETE SLU products.

Moisture: Concrete slabs must be tested and measure less than 95% relative humidity (RH) per ASTM F2170 prior to installation of LATICRETE SLU products. Do not install LATICRETE SLU products when there is standing water or visible moisture on the surface. It is important to note that concrete slabs may be dry enough to successfully install LATICRETE SLU products; however concrete slabs may not be dry enough to meet moisture conditions required for finish flooring.

Concrete slabs should also be tested for appropriate moisture conditions in accordance with the finish flooring manufacturer's specifications prior to installing LATICRETE SLU products. LATICRETE SLU Primer and SLU's are not moisture mitigation systems. If a moisture mitigation system is needed use a LATAPOXY VRC. Refer to the relevant data sheet for more detailed information about LATAPOXY Vapour Reduction Coatings. Refer to Cement, Concrete & Aggregates Australia "Moisture in Concrete and Moisture-sensitive Finishes & Coatings, ACI 302.2R-06 and ASTM F710 for more detailed information.

Expansion Joints, Control Joints, Movement Joints and Cracks: It is important to honour all types of moving joints and cracks in the substrate up through the underlayment and floor covering. Moving joints or cracks can transfer up through LATICRETE products and could cause cracks in the finish flooring. It is also important to evaluate areas around walls, columns, penetrations, and other building elements where movement may be anticipated.

Areas where movement is anticipated must be isolated from the self-levelling underlayment pours to allow for building movement against restraining surfaces. To help accommodate this type of movement, prior to application of LATICRETE SLU products, attach a temporary compressible isolation strip to the perimeter walls, columns, protrusions, etc. in order to isolate the LATICRETE SLU product from the restraining or moving surfaces. Compressible isolation strip can be fastened in place with staples, masking, duct, or carpet tape and can be removed after the LATICRETE SLU product has set firm.

Cracks, like joints, can transfer up through the underlayment and the finished flooring. All cracks should be evaluated and repaired if necessary prior to installation of LATICRETE SLU products. Good crack repair techniques depend on knowing the causes and selecting appropriate repair procedures that take these causes into account. Repairing a crack without addressing the cause may only be a temporary fix. Successful long-term repair procedures must address the causes of the cracks as well as the cracks themselves. Refer to Cement Concrete & Aggregates Australia - Concrete Pavement Maintenance/Repair; ACI 224.1R-07 for guidance on evaluation and repair of cracks in concrete. LATICRETE underlayment product application over active and/or structural cracks is not recommended. When installing a LATAPOXY VRC refer to the relevant data sheet for more detailed information on preparing cracks.

III. SUBSTRATE PREPARATION

To achieve an ICRI CSP of 3 or for removing bond breaking contaminants from concrete surfaces there are several methods that can be used. Some examples of mechanical cleaning are grinding, shot blasting, scarifying, needle scaling, high pressure water jetting, scabbling, and milling. While all these methods are effective for profiling the substrate surface, not all of them may be suitable for every project. Occupied space adjacent to, above or below the work space may prevent the use of some methods. The type and depth of surface preparation required may also prevent the use of some methods. Refer to ICRI Guideline 310.2R-2013 for more detailed information regarding suitable concrete surface profile methods.

Exterior Glue Plywood Substrate: The LATICRETE SLU installer should receive written confirmation from the builder that the wood substrate is stable and structurally sound enough to support total anticipated live, dead and impact loads. Wood substrate must be clean and free of any contaminants. Substrate can be sanded if necessary then swept, vacuumed and properly primed. See Priming section for detailed dilution and primer application. After primer application, fasten galvanized diamond metal lath over entire wood substrate using corrosion resistant fasteners every 15 cm overlapping lath seams by 2.5 cm.

Cutback Adhesives: Never install a LATAPOXY VRC over cutback adhesive or any other adhesive or residue. Mechanical removal of cutback adhesives can be hazardous as it may contain asbestos. Consult with adhesive manufacturer and proper governmental agencies regarding the proper removal of cutback adhesives containing asbestos. Refer to ASTM F710 and the Resilient Floor Covering Institute for recommended practices for removal of existing resilient floor coverings.

In order to achieve maximum bond possible between substrate and LATICRETE SLU's, best practice is to mechanically remove non-water soluble cutback adhesives that do not contain asbestos by shot blasting, grinding or other mechanical means down to clean, structurally sound concrete. However, in some cases LATICRETE SLU's can be installed over a thin, translucent residue of non-water soluble cutback adhesive. Non-water soluble adhesives that do not contain asbestos can be removed by razor scraping to a thin, translucent residue, then thoroughly swept and vacuumed. Once clean, conduct a series of tensile strength tests per ASTM C1583. Tensile strength test must be conducted in strict adherence to ASTM C1583 by qualified personnel using appropriate equipment with up-to-date calibration. If the tensile strength is 0.7 MPa or greater, the LATICRETE SLU may be installed. Prime using Non-Suction method in Primer section below. If the tensile strength is below 0.7 MPa or the adhesive is water soluble, the floor must be shot blast to a minimum ICRI CSP of 3 then swept and vacuumed clean.

All water-soluble adhesives, carpet adhesives or epoxy adhesives must be completely removed down to bare substrate prior to priming.

Moisture Mitigation Systems: When a moisture mitigation system is needed use a LATAPOXY Vapour Reduction Coating. See the relevant data sheet for more detailed installation information.

Once installed and allowed to cure in accordance with the installation instructions, the LATAPOXY VRC requires the use of a primer prior to installing a LATICRETE SLU. Refer to Priming section for more detailed priming instructions.

When walking on a LATAPOXY VRC prior to or after installation of primer, floors must be kept clean; therefore, shoes must be covered with clean, slip-on type booties (i.e. Tyvek®). The floor must not be opened to trade traffic prior to installation of LATICRETE SLU Primer. If floor becomes contaminated by trade traffic, construction dust, debris, flooded or any other bond inhibiting substance prior to LATICRETE SLU Primer installation, the contaminated primer and moisture mitigation system may need to be completely removed by shot blasting, scarification or other mechanical means and properly re-applied prior to LATICRETE self-levelling installation.

Non-Suction Substrates: Non-porous/non-suction substrates such as cement terrazzo, ceramic tile, quarry tile and VCT must be solid, well bonded, clean and free of any contaminants, glazes, wax, sealers and any other potentially bond inhibiting substance. Most non-suction surfaces must be mechanically abraded (LATAPOXY Vapour Reduction coating should not be abraded) and cleaned followed by tensile strength testing per ASTM C1583. A minimum of 0.7MPa tensile strength is required prior to installation of LATICRETE SLU's and 1.4 MPa for LATAPOXY VRC. Any areas that are loose, broken or do not meet a minimum tensile strength must be removed and repaired. Once repaired and clean, the surface must be properly primed prior to installing LATICRETE SLU products. Not all non-suction/nonporous floors are suitable substrates for LATICRETE SLU product installations. See PRIMING section for more detailed priming instructions.

IV. PRIMING

General Priming Information: All surfaces must be primed prior to the installation of LATICRETE self-levelling underlayments. LATICRETE SLU Primer is a concentrate and must be diluted with clean potable water prior to application. Dilution ratio and application methods vary depending on substrate. Always stir or shake LATICRETE SLU Primer concentrate prior to diluting. Mix primer with clean potable water according to the LATICRETE SLU Primer DILUTION / APPROXIMATE COVERAGE chart on the next page. Water must always be carefully measured in order to ensure proper dilution is achieved. Use a mixing paddle to thoroughly combine primer and water. LATICRETE SLU Primer can be broom, roller, mop, or spray applied. Substrate temperature must be a minimum 4°C during primer application and throughout drying time. Additionally, air temperature must be maintained between 10–32°C during primer application and throughout drying time. The primed surface must also be protected from weather, water and direct sunlight.

LATICRETE SLU Primer DILUTION / APPROXIMATE COVERAGE			WATER DROP TEST The water drop test described in this document is a subjective, qualitative test that may be conducted in order to help an experienced contractor form an opinion as to how a slab should be primed. However, this test may not be definitive. To help determine the appropriate primer dilution, properly prepare slab in accordance with this guide then apply several 18 - 25 mm size drops of water to properly prepared surface and observe. a) High-Suction = Water completely absorbs into surface within 15 seconds; surface may appear dark and wet with no visible water remaining on surface. b) Normal-Suction = Water absorbs or partially absorbs within 30 seconds but not less than 15 seconds; bead of water may slowly shrink as it absorbs while dark, wet spot on surface slowly expands. c) Non-Suction = Water beads up and does not absorb at all within 30 seconds; bead of water does not shrink or absorb, wet spot on surface does not expand.
SUITABLE SUBSTRATES	Primer to Water Ratio ¹	Approximate Coverage ²	
Normal Suction: Concrete	1:3	37 m ²	
High-Suction: Highly Porous Concrete / Cement Underlayments / Cement Mortar Beds	1st coat: 1:5 2nd coat: 1:3	19 m ²	
Exterior Glue Plywood	5:1	19 m ²	
Non-Suction: Ceramic, Stone, Quarry Tile / VCT, Sheet Vinyl / Cement Terrazzo	1:1 with slurry	26 m ²	
LATAPOXY Vapour Reduction Coating	1:1 with slurry	26 m ²	
1. Dilution Ratio = Primer: Water 2. Approximate coverage in square metres per 3.8 litres of concentrated Primer			

Normal Suction Concrete: Dilute LATICRETE SLU Primer 1:3 (1 part primer to 3 parts water). Apply a single coat of diluted Primer/water mix to the point of refusal so that the substrate is completely covered and small puddles form in low spots. While LATICRETE SLU Primer is still wet use a push broom to work primer into the substrate so that puddles are spread evenly over the surface, absorbed and a uniform film has been applied. Remove any remaining puddles by brooming and spreading over the surface. Then proceed below to the All Suitable Substrates and Protect Primer Application sections.

High-Suction Concrete: Apply two coats of LATICRETE SLU Primer, allowing adequate time to dry between coats. For the first coat, dilute LATICRETE SLU Primer 1:5 (1 part primer to 5 parts water). Apply first coat of diluted primer/water mix to the point of refusal so that the substrate is completely covered and small puddles form in low spots. While primer is still wet use a push broom to work primer into the substrate so that puddles are spread evenly over the surface, allowed to absorb and a uniform film remains on the surface. Remove any remaining puddles by brooming and spreading over the surface. Allow the primer to dry. The first coat is considered dry when a minimum of 3 hours dry time has elapsed, the primer turns from milky white to clear, is dry to the touch, and there is no release of primer from the substrate. First coat must not be opened to trade traffic prior to installation of second coat. If the primed floor becomes contaminated by trade traffic, construction dust, debris, or any other bond inhibiting substance, or is exposed to water/excessive moisture prior to second coat application, the contaminated first coat of primer must be completely removed by shot blasting, scarification or other mechanical means, properly re-primed and allowed to dry.

For the second coat, dilute LATICRETE SLU Primer 1:3 (1 part primer to 3 parts water). Apply second coat of diluted primer/water mix to the point of refusal so that the substrate is completely covered and small puddles form in low spots. While second coat of primer is still wet use a push broom to work primer into the substrate so that puddles are spread evenly over the surface and a uniform film has been applied. Then follow the All Suitable Substrates and Protect Primer Application sections.

Exterior Glue Plywood: Dilute LATICRETE SLU Primer 5:1 (5 parts primer to 1 part water). Using a sprayer or broom, apply a single coat of diluted primer/water mix so that the substrate is completely covered and a uniform film has been applied and follow the All Suitable Substrates section. Fasten galvanized diamond metal lath over entire exterior glue plywood substrate using corrosion resistant fasteners every 15 cm overlapping lath seams by 2.5 cm and follow the Protect Primer Application section.

Non-Suction Substrates: Non-Suction substrate primer dilution and application instructions are intended for ceramic tile, stone, quarry tile, VCT, sheet vinyl, and LATAPOXY VRC's that have been properly prepared in accordance with this guide and moisture mitigation manufacturer's instructions. Concrete slabs that are considered Non-Suction will require additional preparation prior to primer application. See Non-Suction Concrete in the Substrate Types/General Requirements section for more information.

Dilute LATICRETE SLU Primer 1:1 (1 part Primer to 1 part water). Apply a single coat of diluted primer/water mix to the point of refusal so that the substrate is completely and evenly covered. While primer is still wet and white, immediately lightly scatter LATICRETE self-levelling dry powder into the wet primer. Using a push broom, work the dry powder into the wet primer/water mixture forming a slurry. Continue to broom so that puddles are spread evenly over the surface and a uniform film has been applied. Then follow All Suitable Substrates and Protect Primer Application. For more information on this method contact the Technical Service Department.

LATAPOXY Vapour Reduction Coating: Ensure that LATAPOXY VRC has been installed according to installation instructions on the relevant data sheet. Apply LATICRETE SLU Primer in accordance with the Non-Suction Substrates Priming instructions.

LATICRETE Underlayments and other Cement Mortar Beds: Follow High-Suction priming instructions for priming on top of LATICRETE underlayments and cement mortar beds.

All Suitable Substrates: Remove any remaining puddles by brooming and spreading evenly over the surface. Allow the LATICRETE SLU Primer to completely dry for a minimum of 3 – 5 hours at 21°C and 50% Relative Humidity. LATICRETE SLU Primer coat is considered dry when a minimum of 3 hours dry time has elapsed, the primer turns from milky white to clear, is dry to the touch, and there is no release of primer from the substrate. Surface may feel slightly tacky. Drying time will vary depending on surface and ambient air conditions. Substrate temperature must be a minimum 4°C during primer application and throughout drying time. Additionally, air temperature must be maintained between 10–32°C during primer application and throughout drying time. Primer must also be protected from weather and direct sunlight. Temperatures below 21°C and/or relative humidity above 50% will increase drying time. Insufficient drying or poor film formation will result in pinholes and poor bond strength and may cause the LATICRETE SLU to debond. If primer dries within 30 minutes or if a 24 hour period is exceeded after primer application, the surface must be primed again.

Protect Primer Application: When walking over new primer application prior to installation of a LATICRETE SLU, shoes must be protected with clean, slip-on type booties (i.e. Tyvek). Primed floor must not be opened to trade traffic prior to installation of LATICRETE underlayments. If the primed floor becomes contaminated by trade traffic, construction dust, debris, or any other bond inhibiting substance, or is exposed to water/excessive moisture prior to second coat application, the contaminated first coat of primer must be completely removed by shot blasting, scarification or other mechanical means, properly re-primed and allowed to dry.

V. MOCK-UP

The purpose of a mock-up is to determine the acceptability to all parties of the performance, appearance, and applicability of all materials and methods planned to be used. It is always recommended that the underlayment installer and the flooring contractor test performance, suitability and compatibility of LATICRETE underlayments and finished floor system. On site mock-ups should be installed and tested for intended use and appearance. Always refer to finished floor manufacturer's recommendations regarding surface preparation, moisture requirements, installation instructions, restrictions and compatibility with underlayment. Mock-ups should be installed using all surface preparation and system components intended for use on the finished project including moisture mitigation (when applicable), primer, underlayment poured at the intended depth, finish flooring and any other applicable system components. When the finish flooring is unknown, the mock-ups should be conducted using just the LATICRETE underlayment to ensure compatibility with the substrate. When flooring is specified after the LATICRETE underlayment has already been installed, the flooring contractor should install finish flooring over a section of properly prepared LATICRETE underlayment and test in accordance with flooring manufacturer instructions. It is important to note that since many jobsites will exhibit several conditions that require different types of surface preparation, finish flooring and other unknown conditions, it may be necessary to conduct several mock-ups to test each condition separately.