

ALSAN RS Jobsite Quality Control

General

ALSAN RS systems are relatively easy to install, but require monitoring of basic field conditions to assure successful application. All jobsites should be equipped with a means to monitor and record:

- Ambient air, substrate & resin temperatures
- Relatively humidity (RH) & dew point
- Moisture content of substrates
- Component adhesion

Substrate Conditions

ALSAN RS systems may be applied over a variety of substrates including but not limited to concrete, wood, metals, plastics, insulations, specialty roof board underlay, existing single-ply membranes, built-up roofing, and coatings. ALSAN RS systems, as with other liquid applied membranes and coatings, require a sound stable dry substrate to insure proper application, adhesion and performance. At the time of application, the substrate must be clean, dry, free of loose, spalled or weak material, oil, grease, contaminants, abrupt changes in level, waterproofing agents, curing compounds, and free of projections which could damage ALSAN RS components.

Before applying ALSAN RS components, the substrate must be evaluated to determine:

- Soundness & suitability as a substrate
- Required surface preparation
- Substrate moisture content

Once the substrate is evaluated and deemed suitable by the applicator, the ALSAN RS application may proceed.

ALSAN RS Recommended Guidelines

SOPREMA recommends substrates are prepared to provide maximum moisture content and ALSAN RS component adhesion with minimum bond strength as follows unless otherwise noted:

- 75% relative humidity
- 116 psi (0.8 N/mm²) for roofing or waterproofing applications
- 220 psi (1.5 N/mm²) on structural substrates traffic bearing waterproofing and surfacing applications

Determinations of moisture content and bond strength should be performed by the contractor prior to application of ALSAN RS components and periodically throughout the course of work at intervals as required assuring the specified adhesion and at minimum three (3) tests per 5000 ft² (465 m²). If substrate RH exceeds recommended levels, consult SOPREMA regarding use of an appropriate moisture mitigation primer where acceptable.

For roofing and waterproofing applications the minimum bond strength will vary and be limited by the substrate type or material used. At minimum ALSAN RS roofing and waterproofing systems should resist the design uplift pressures and/or dynamic loading required by the model building code for the structure and new waterproofing system.

Recovering Existing Membranes & Coatings

ALSAN RS roofing and waterproofing systems may be applied over acceptable existing single-ply membranes, built-up roofing and coatings as recovery applications. When recovering an existing membrane or coating, ALSAN RS systems are limited by the integrity and adhesion of the existing membrane or coating to the structural substrate. Therefore, in recovery applications any ALSAN RS warranty offered is limited to adhesion of ALSAN RS components to the properly prepared interface surface of the existing membrane or coating.

At a minimum the existing membrane or coating should be intact and bonded to the substrate with adequate adhesion to resist the design uplift pressures and/or dynamic loads required by the model building code for the structure, building components, cladding and new waterproofing system.

Field Adhesion Testing Methods

The applicator is responsible for selecting a suitable means for jobsite adhesion testing when evaluating substrate suitability. A variety of recognized methods can be used to determine bond strength to a substrate. Commonly used field techniques include peel strips for roofing or waterproofing applications or use of a portable pull-off adhesion tester for traffic bearing waterproofing and surfacing applications.

When determining substrate suitability, both bond strength and test failure mode should be considered. Typically interstitial failure within the membrane (cohesive) is preferred, while adhesive failure at the ALSAN RS component/substrate interface or failure of the substrate itself would indicate either issues with structural integrity or substrate preparation.

Pull Testing

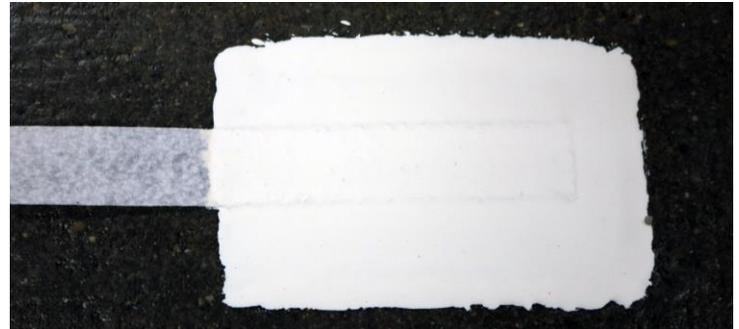
Where required, pull tests should be performed using a portable adhesion tester in accordance with ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers, which will provide reliable and quantitative results when evaluating ALSAN RS traffic bearing waterproofing and surfacing applications.

Pull testing typically requires a loading fixture; commonly called a dolly or stub must be affixed by an adhesive to the in-place cured ALSAN RS sample area. The ALSAN RS sample is cut directly around the dolly down to the substrate, then a uniform load is increasingly applied to the test surface using the portable pull-off adhesion tester until the dolly is pulled off. The force required to pull off the dolly or the force the dolly withstood, yields the tensile strength in pounds per square inch (psi) or mega Pascals (MPa). Failure (the fracture surface) will routinely occur along the weakest plane within the system comprised of the dolly, adhesive, coating system, or substrate.

Portable adhesion test equipment is available with mechanical (twist by hand), hydraulic (oil) or pneumatic (air) pressure apparatus, and is classified as being fixed or self-aligning depending upon their ability to ensure a vertical pull-off force. The best repeatability is obtained with self-aligning pull testers that ensure the pull-off force acts perpendicular to the surface being tested.

Peel Test

Peel testing may be used to qualitatively establish whether the adhesion of the ALSAN RS component to a substrate, coating or membrane (in multi-coat systems) is generally adequate. Peel testing is often used for ALSAN RS roofing and waterproofing applications, but may also be used for any non-traffic bearing ALSAN RS applications, where adequate adhesion normally results in a resin transfer (a residual layer of bonded ALSAN RS resin) onto the substrate.



Peel testing is typically performed in accordance with ASTM C794 as follows:

- Choose 3 or more areas, representative of each substrate.
- Clean, prepare and prime substrate as required.
- Cut 1 in (25 mm) wide x 12 in (300 mm) long strips of ALSAN RS Fleece reinforcing fabric.
- Apply ALSAN RS Fleece strips in the appropriate ALSAN RS resin to fully encapsulate an 8 to 9 in (200 to 225 mm) long section of the 12 in (300 mm) strip, leaving a 3 to 4 in (75 to 100mm) "dry tail" to remain uncoated.

- Allow the ALSAN RS component to fully cure. Samples may be peeled within 2-3 hours of cure. Certain substrates, i.e. thermoplastic membranes, may require additional cure time (3 to 7 days) to achieve optimum results.
- Grip the “dry tail” end of the ALSAN RS Fleece and pull 180 degrees, parallel with the surface.

For ALSAN RS systems, adequate resistance to peel adhesion is normally demonstrated by cohesive failure where most of the coating remains on the substrate. Any failure of the substrate should be evaluated to determine suitability and degree of surface preparation that may be needed.



Substrate Moisture Testing Methods

A variety of recognized methods can be used for substrate moisture testing. Common tests used to determine the presence of moisture include calcium chloride (CaCl) and plastic sheet, which measure surface moisture only and have proven unreliable when determining moisture conditions within a substrate. SOPREMA recommends using RH testing for all substrates, which provides accurate moisture measurements, especially in concrete and masonry.

Concrete & Masonry

SOPREMA recommends all concrete and masonry moisture testing be performed by relative humidity (RH) in accordance with ASTM F2170 or other means suitable to the project application.

ASTM F2170 provides a method with precise guidelines for using relative humidity (RH) testing when measuring moisture content in concrete slabs. ASTM F2170 should be reviewed for complete test requirements. A general guideline regardless of the RH test method includes:

- Confirm test equipment meets specifications and is correctly calibrated.

- Check job site conditions, assuring the slab and the ambient air above is at service conditions for a minimum of 48 hours before testing.
- Map out sensor count and location. F2170 requires three test holes for the first 1000 ft² (93 m²) and at least one additional hole for each additional 1000 ft² (93 m²). The total area of the slab and the number of test holes must be recorded.
- Determine the required depth of the test holes calculated based on slab thickness and number of drying sides. Typically this is 40% of the slabs depth when drying from one side; or 20% of the slabs depth drying from two sides.
- Drill and prepare the test holes, insert RH sensors, and sealed according to manufacturer's directions during equilibration.
- Equilibrate sensors for 72 hours before initial reading. ASTM F2170 requires each sensor to equilibrate at least 72 hours before a documentable reading is recorded.
- Take RH readings for each sensor following the 72 hour equilibration period.

Note: Accurate indication of internal substrate moisture conditions will determine the type of primer that may be required, impacting the application and long-term performance of ALSAN RS systems. Moisture does not evenly distribute through the slab during the drying process, but once the slab is sealed, any moisture remaining will eventually equilibrate through the slab. This is the moisture level that will remain in contact with any applied primers, membrane or finishes over time.

Other Substrates

For relatively dry substrates, surface moisture can quickly, easily and repeatedly be performed non-destructively using hand-held electronic moisture/RH meters. SOPREMA recommends the use of an electronic hand-held meter specifically designed for measuring moisture/RH utilizing a pin-less meter pad with a minimum $\frac{3}{4}$ in (19 mm) penetration in accordance with ASTM D7954 Standard Practice for Moisture Surveying of Roofing and Waterproofing Systems Using Non-Destructive Electrical Impedance Scanners.

The optimum instrument would measure moisture content, relative humidity, temperature and dew point in concrete and cementitious substrates.

Substrate Contaminant & Other Testing

Issues presented or demonstrated through failures in previously applied materials may dictate additional field and/or laboratory testing to confirm substrate suitability for ALSAN RS systems.

For substrates with unknown history, SOPREMA recommends testing for contaminants (i.e. hydrocarbons, other organic compounds, un-reacted water soluble silicates, chlorides, ASR, Sulfurous compounds, etc.) by means of Ion Chromatography and IR Spectroscopy. Projects with contaminated substrates may require pre-treatment, use of specialty primers or application of an appropriate separation screed to block capillary infiltration of oil and/or chemicals from the ground contamination, oil-contaminated slabs, high pH or other conditions.

Consult SOPREMA when suitability of any substrate may be in question and contact a suitable laboratory for testing as needed.