LONSEAL®

Interior Flooring Manual

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About This Manual

Audience and Qualifications

Audience

Information in this manual is intended for use by commercial flooring contractors and specifiers.

Flooring Contractor Qualifications

The awarded contractor must be an established firm with experience in the installation of the specified product, and have complete access to Lonseal's technical information and all other related or required documents. The flooring contractor must have completed at least three projects of similar scope, material, and complexity.

Installer Qualifications

Lonseal flooring must be installed by someone determined by the contractor to be an experienced installer, who has specialized in the installation of work similar to that required for the project. Installation procedures must be in strict accordance with Lonseal's published technical information and should not begin until the work of all other trades has been completed. Refer to *Installer Responsibility* on page 12.

Document References

All documents referenced in this manual will be per their most current revision at the time of installation. Please refer to *www.lonseal.com* for the most current technical documentation. For all other documents, please refer to the referenced websites throughout this manual for the most current revisions.

Safety Warnings

Safety on the project site is critical. Read and obey all health and safety warnings on **Safety Data Sheets** (SDS) and labels.

Chemical-Related Emergencies

For 24/7 guidance, call INFOTRAC Poison Control Hotline: Emergencies 800-535-5053

Cautions Regarding Complete Floor Covering Removal

When removing any type of floor covering, ensure that all applicable local, state, and federal regulations are observed. Those who undertake removal must be familiar with the most current revision of the RFCI – Recommended Work Practices for Removal of Resilient Floor Coverings, and are properly trained and licensed as required. This document is available at *www.rfci.com*.

Disclaimers

To preserve the warranty and deliver the best possible installation, follow the instructions in this manual and all related technical information. Please review the warranty in full, and pay special attention to all disclaimers and notes throughout this manual, and all other technical information.

Questions about what is contained within Lonseal's technical documentation or any discrepancies discovered within them, excluding those specifically addressed as intentional, should be brought to the attention of Lonseal's Technical Department prior to specifying or installing Lonseal products, in order to receive clarification or proper direction. Contact information may be found under *Technical Support* on page 17.

Lonseal is not responsible for residential installations of its products, or any other types of installation outside of those covered by Lonseal's technical documentation. Lonseal flooring products and sundries are commercial grade products intended for commercial use only.

About Lonseal Products

Flooring Description and Features

Lonseal flooring is available in a wide variety of colors and textures, for use in multiple commercial and specialty type applications. Complete product specifications may be found at *www.lonseal.com*.

Composition and Construction

The wear layers of Lonseal flooring are formulated to provide maximum resistance to foot traffic and easy maintenance. Select products are available with a factory-applied urethane finish.

All Lonseal flooring is a vinyl sheet good created through a calendering process, allowing for enhanced dimensional stability. The components used in construction allow for more pliable material, resulting in flooring that is easier to work with when installing, and improved comfort underfoot.

Most flooring roll sizes are 6 ft. (1.8 m) wide by 60 ft. (18.3 m) long with a total thickness ranging from 0.080 – 0.217 in. (2.0 – 5.5 mm), with some versions available in 8 ft. (2.4 m) widths.

All sizes and measurements for Lonseal products are nominal. Some variations may exist between the actual product and what is shown in published or printed documentation and labels.

Quality Control

All Lonseal products are closely inspected for conformity throughout the manufacturing process to ensure they meet rigorous production standards.

Color Shading

Because a certain degree of color variation can occur as a result of the manufacturing process, all rolls of Lonseal flooring must be installed sequentially by roll number, and all cuts must be installed in the order of their removal from the roll. DO NOT reverse the sheets when installing Lonseal flooring. Lonseal is not responsible when shading issues arise due to improper installation.

Variations in color can exist between dye lots. It is recommended that the same dye lot be used within the same space whenever possible.

Some products have an inherent feature where the color tone will change depending on the viewing angle and lighting conditions. This may result in a contrast between adjacent sheets, even if installed as required. Products with a pearlescent or metallic appearance are examples of those exhibiting this feature.

Flooring Samples

Product samples are cut from actual Lonseal flooring and are intended to show typical pattern and color. Slight variations in color can occur between dye lots. When exact color matching is required, it is recommended that color matches be made from samples cut from the actual material that has been reserved for the project or stock on hand at Lonseal.

> **Disclaimer:** Lonseal is not responsible for replacement when the color selection, based on a random sample, fails to exactly match the flooring received for installation. Refer to *Installer Responsibility* on page 12.

Design Applications and Considerations

Custom Cutting

Lonseal's extensive palette of colors, patterns, and embossing provide a variety of design options. For small patterns, or elements like leaves or geometric shapes, templates made of hardboard or metal enable consistent replication. For larger patterns involving intersecting colors, the installer can use tempered wire to replicate graceful, swooping curves and arcs. Lonseal flooring is supple enough to be cut freehand, but may be patterned as determined by the installer's skill and the complexity of the project. Additionally, CNC or water jet cutting may be used as an alternative.

Disclaimer: Sheet vinyl is subject to a greater degree of dimensional change than vinyl plank or tile. Lonseal accepts no responsibility for dimensional changes to its flooring that is cut into shapes, not properly acclimated, or cut outside recommended environmental conditions. The amount of change will depend on the environment in which the flooring is cut versus the environment in which it is installed. Keeping the material acclimated in similar, if not the same, environments can help reduce or eliminate this natural occurrence, as can cutting the material slightly larger than needed, and trimming to the correct size just prior to installation.

Furniture

Furniture should be equipped with proper non-rubber, non-staining glides, protectors, or wheels that are intended for use with resilient flooring and avoid concentrating weight loads. Their surface contact area must be 1 1/2 in. (3.8 cm) diameter minimum, or approximately 1 3/4 in^2 (11.3 cm^2). Use glides, protectors, or wheels that properly distribute the load over the surface of the flooring. Excessive point loading can cause adhesive displacement or permanent damage to the flooring.

Disclaimer: Lonseal is not responsible for damage resulting from the use of improperly designed, inadequate, or inappropriate floor protection devices, rolling-type casters, or wheels. Any warranty for these products rests with the appliance, equipment, or furniture manufacturer. Always confirm with the manufacturer that the rolling-type casters or wheels used on their appliances, equipment, or furniture are suitable for use with resilient flooring to avoid causing permanent damage.

Custom Flooring

Lonseal has the ability to create custom sheet vinyl flooring, from modified colors of existing products to entirely new products. Limitations will apply to what is possible with a sheet vinyl product, and minimum order quantities may be required. Please contact your Lonseal sales representative for more information.

SUNDRIES

The following Lonseal branded sundries have been specifically chosen to be used with Lonseal flooring based on optimal performance. Refer to the individual product's technical data sheet (TDS) for more information.

- #400 Contact Adhesive
- #650 Two-Component, Solvent Free Epoxy Adhesive
- #813 Sheet Vinyl Adhesive
- Double Face Tape (DFT)
- Lonsealer
- Welding Thread

Lonseal does carry additional, specialized sundries, and more details about them will be noted in the appropriate **Installation Guides** shown on page 14.

A list of non-Lonseal branded sundries that have been tested and approved for use with Lonseal flooring by their manufacturers may be obtained by contacting Lonseal's Technical Department. Contact information is noted at the end of this document.

Disclaimer: Use of sundries not specifically recommended by Lonseal or approved for use by the product manufacturer may result in installation failure or damage to the flooring, jeopardizing appearance or performance. The suitability for use and warranty for non-Lonseal branded products will be the sole responsibility of the installer or product manufacturer.

ACCLIMATION, HANDLING, AND STORAGE

ACCLIMATION

The storage and installation areas of the products listed in this manual are to be maintained between 65 – 85 °F (18.3 – 29.4 °C) for 48 hours before, during, and 48 hours after installation.

HANDLING AND STORAGE

Proper storage is necessary to ensure the best performance and appearance from Lonseal products. The storage area must be indoors, clean, dry, temperature controlled, and out of direct sunlight.

Remove all rolls of flooring from the shipping pallet immediately and store standing on end. Rolls left on the pallet will develop indentations, which may be permanent if left too long. Rolls stored horizontally may also develop an oblong shape, causing evenly spaced humps in the flooring, which can take considerable time to relax and lay flat. These humps may become permanent if the rolls are left on their side for too long.

If transporting rolls of flooring from one location to another, and they are to be secured to a pallet or otherwise, avoid placing any straps in direct contact with the rolls or packaging. If straps are overtightened, they may leave indentations that could take a considerable amount of time to recover, or may even become permanent.

On the project site, wrap opened rolls tightly, face out, to avoid material distortion, and store standing on end.

Pre-Installation

Site and Substrate Conditions

Site Conditions

The site must be dry and should not have been flooded or exposed to excessive moisture for a minimum of two weeks prior to installation. The installation location must have a fully functioning, permanent HVAC, which must maintain the work area and substrate temperatures between 65 – 85 °F (18.3 – 29.4 °C) for 48 hours before, during, and 48 hours after installation. Relative humidity level extremes should also be avoided because of their influence on proper drying and curing of substrate preparation materials and adhesives. General recommended humidity control level is between 35 – 55%.

While not recommended, use of a system other than a permanent HVAC must still provide proper control of both temperature and humidity to the recommended levels for the specified time duration.

Do not use temporary gas-fired space heaters to warm the installation area. These heaters can create emissions that contaminate the substrate and raise the relative humidity level, and carbon dioxide from the exhaust can create a condition called carbonation on the surface of concrete, requiring it to be mechanically cleaned.

Portable, electric space heaters or cooling fans are not recommended for use in conditioning the installation area. Both types of equipment are not able to consistently maintain the environmental conditions needed for proper installation. Additionally, they can create concentrated areas of hot or cold, dry air that will impact the curing of substrate preparation materials, and can result in inconsistent open and curing time of adhesives.

Subfloor and Substrate Contamination

Take precautions to ensure that the subfloor or substrate is not contaminated. Contamination can include, but is not limited to, applications of curing compounds, dyes, inks, paints, sealers, or sweeping with oil-based products. All surface contaminants must be removed and abated prior to installing the flooring. If contaminants are present, they must be mechanically removed per ASTM F710 or ASTM F1482.

Substrate Repair

All existing substrates must be sufficiently repaired prior to installation, resulting in a substrate that can be considered in "as new" condition. This may include, but is not limited to, the following steps to ensure this condition is met:

- Fill and make smooth any abandoned pipe or conduit holes in slabs using fast setting Portland cement.
- Holes in plywood panels require that both the affected areas of the underlayment and subfloor be sawn out and replaced with new material.
- Repaired substrates must be blocked, fastened, sanded, and smoothed, as needed, to restore the structure and floor components to "as new" condition.
- Fill or level minor surface cracks, grooves, and other irregularities using an approved patching compound. Refer to *Patching Compounds* on page 9.

Concrete Slabs

All concrete slabs, whether existing or new, must conform to the requirements of ASTM F710, including moisture testing and preparation, prior to installation of the flooring. Slabs containing lightweight aggregate, excess water, or concrete on metal decking may require longer drying time than on-grade slabs.

Minimum Smoothness (F_F/F_L)

Concrete slabs must conform to the requirements of ACI 302 and be within the tolerances of ACI 117. ACI 117 specifies that overall conformance to design grade must be within 3/4 in. (19.1 mm) of design elevation. Prior to installation, the installer must obtain either a report from the project general contractor stating that the substrate has been tested in accordance with ASTM E1155, or must test and verify the condition themselves.

Moisture and Alkalinity Testing

Lonseal requires that moisture and alkalinity testing be performed and documented by an accredited engineering firm, laboratory, or person prior to the installation date so that corrective measures may be performed as necessary. The flooring contractor is to ensure testing has been completed prior to initiating installation. If necessary, a certified concrete slab moisture testing technician (CCSMTT) may be located at *www.icri.org*.

In all forms of concrete, moisture drive can carry alkaline salts to the surface which can chemically react with the adhesive, eventually destroying the bond. The presence of alkaline concentrations can indicate elevated moisture vapor emission.

Regardless of age or grade level, testing for moisture and alkalinity must be conducted in strict accordance to the following three, required tests:

- **ASTM F1869:** calcium chloride test
- **ASTM F2170:** relative humidity test
- **ASTM F3441:** alkalinity test

Be aware that testing per the above standards applies to a single concrete slab. For installations that will occur across multiple slabs, each must be tested separately. All three tests are required in order to provide the flooring contractor with the most data possible, so that fully informed decisions may be made.

When performing ASTM F3441, only results from an electronic pH meter will be accepted by Lonseal. The use of pH test paper is not acceptable, as the possibility for improper evaluation exists, whether from the variations in paper by the manufacturer or between different manufacturers, or human error in determining the results.

All testing must be fully documented and include all the information required per each test method. All equipment used for testing must be properly calibrated prior to testing, and evidence of calibration must be documented along with the test conditions and results.

The required results for each test will vary by Lonseal adhesive. Refer to each adhesive's TDS for these requirements. If results exceed these limits, a moisture mitigation system (MMS) must be used to avoid installation failure. If necessary, please contact Lonseal's Technical Department for additional guidance.

Disclaimer: Test results can only indicate the slab condition at the time of testing. Moisture vapor emissions are subject to seasonal fluctuations and site conditions, and any subsequent damages are beyond the control of Lonseal. Installation of the flooring constitutes acceptance of the slab and acknowledgement by the general contractor, flooring contractor, architect, design team, or building owner that the slab or substrate meets all Lonseal requirements and recommendations for site conditions. Reports that are completed by an unaccredited or uncertified source, contain insufficient documentation, or performed incorrectly will not be considered by Lonseal.

Vapor Retarders

Vapor retarders must always be used beneath new on- or below-grade concrete slabs per ASTM E1745. For existing on- or below-grade slabs, the presence of a vapor retarder must be verified. If none is present, a moisture mitigation system (MMS) must be applied.

Moisture Mitigation Systems

If a moisture mitigation system (MMS) is to be applied, the slab's moisture test results should be utilized to determine which MMS is most suitable. This may be done by contacting the MMS manufacturer for their recommendations. When contacting the manufacturer, they should also be informed whether a vapor retarder is present or not, and confirm the compatibility of their product with Lonseal adhesives and any substrate preparation materials used. Refer to *Patching Compounds* on page 9. All installed MMS must meet the requirements of ASTM F3010 or ASTM F3513.

Disclaimer: The installer is responsible for confirming compatibility of all components in a flooring system. The use of a bond test can help assure the installer of compatibility between the flooring system components and the MMS. Refer to *Bond Tests* on page 10.

Expansion Joints and Control Joints

Expansion joints are gaps between adjacent slabs, and allow independent movement of each slab. Do not install any flooring over expansion joints. Make sure the flooring stops short of the expansion joint, and install a suitable transition cap or threshold. This product should be designed to permit slab movement, while preserving the quality of the installation and preventing damage to the flooring. Application of a 3 in. (7.6 cm) band of #650 epoxy adhesive beneath the flooring adjacent to the expansion joint is required to minimize dimensional changes of the flooring and moisture intrusion.

Control joints are designed to control cracking during slab movement. Following the manufacturer's directions, open, clean, and fill chase cuts, control joints, and saw cuts with an approved patching compound. Refer to *Patching Compounds* on page 9.

Disclaimer: Lonseal is not liable for damage resulting from telegraphing of any substrate disfigurement or hazard due to installations over control joints, cracks, or expansion joints.

Permanent HVAC

Using the permanent HVAC system, ensure the slab is conditioned to a temperature between 65 – 85 °F (18.3 – 29.4 °C) for 48 hours before, during, and 48 hours after installation.

Old Adhesive Residue

Different kinds of adhesives can react adversely to each other. This can result in chemical reactions that cause adhesive emulsification, bond failure, indentations, or staining of the flooring.

The slab must be thoroughly cleaned to remove all contaminants and adhesive residues through mechanical methods only.

Note: Read warnings regarding removal of old cutback adhesives as published in the most current revision of RFCI – Recommended Work Practices for Removal of Resilient Floor Coverings. This document is available at *www.rfci.com*.

Substrates and Preparation

All substrates and preparations must be per ASTM F2678. If a subfloor or substrate is not noted, then it is not recommended for use with Lonseal flooring. Installation over these unapproved subfloors or substrates could cause installation issues or failures, and are not covered under any Lonseal warranty.

Wood Subfloors

Structural Requirements

The system must be composed of double-layer construction, and must be smooth, sound, and made of solid, exterior grade plywood with a minimum overall thickness of 7/8 in. (22.2 mm). All panels used must meet the criteria set forth by APA – The Engineered Wood Association. Refer to the most current APA Document E30 for additional information on selection, placement, and installation. A list of manufacturers who provide plywood panels meeting the requirements noted in this manual may be found at *www.apawood.org*.

All subfloor panels (bottom layer) must be 5/8 in. (15.9 mm) thick minimum, and classified as APA Panel Subflooring. Panel thickness must increase for joist spacing over 16 in. (40.6 cm) on center to minimize deflection.

Underlayment panels (top layer) must be 1/4 in. (6.4 mm) thick minimum and meet the requirements noted in *Underlayment Panel Selection* on page 7.

Other requirements are as follows:

- Provide a minimum of 18 in. (45.7 cm) well-ventilated air space, measured from the bottom of the floor joists to the top of grade.
- Provide a 0.004 in. (4 mil or 0.1 mm) polyethylene membrane on grade, with a 6 in. (15.2 cm) overlap at the seams, as a ground moisture barrier where necessary.
- Provide insulation as required by code.

Underlayment Panel Selection

Lonseal flooring must only be installed over plywood underlayment panels. Plywood panel selection, conditioning, installation, and preparation must conform to ASTM F1482 and APA Document E30. Installations over any other type of underlayment panel, including, but not limited to, Luan, OSB, fiber-cement panels, gypsum fiber panels, particleboard, hardboard, waferboard, MDF, or HDF, can result in installation or performance issues and will not be supported or warranted by Lonseal.

- Do not attempt to install flooring on plywood panels that are wet, not properly acclimated, pressure-treated, or fire-retardant treated.
- Do not install flooring on underlayment panels that are fastened or adhered directly to concrete.

Underlayment Panel Fasteners

Use exterior rated staples or ring shank fasteners, such as annular-grooved or screw shank nails. Avoid resin coated nails and staples, as these items can move within the panel, resulting in nail pops and squeaks. Make sure the fastener length does not exceed the combined thickness of the underlayment and subfloor panels. Use the correct fastening schedule as detailed in the ICC-ES ESR-1539, available at *www.isanta.org*.

Screws are recommended only on panels 3/8 in. (9.5 mm) and thicker. They should be exterior rated, properly spaced, countersunk, and filled with an approved patching compound. Refer to *Patching Compounds* on page 9.

Note: Never use cartridge-type construction adhesives as a replacement for fasteners when installing underlayment panels. Fumes from some construction-type adhesives can cause discoloration and damage the flooring.

Concrete Subfloors

All concrete subfloors must meet the requirements of ASTM F710 and have a minimum density of 100 lbs./ft^3 (1602 kg/m^3) and minimum compressive strength of 3500 psi (24.1 MPa). Refer to *Concrete Slabs* on page 4 for additional information.

Steel-troweled Concrete

If the concrete has a dense steel-troweled surface, it should be mechanically abraded, by diamond grinding or shot blasting, to provide a surface optimized for adhesion.

Cracks and Joints

Repair all cracks in new and old concrete. Control joints or large dormant cracks, such as those typically found due to settling, must be cleaned out, opened up with a crack chaser where necessary, and patched with an approved patching compound. Refer to *Patching Compounds* on page 9. If a crack is too large for patching or extends entirely through the concrete slab, it should be repaired using epoxy injection or another suitable method as recommended by ICRI.

Gypsum Concrete Underlayments

All gypsum concrete underlayments must meet the requirements of ASTM F2419 and have a minimum density of 105 lbs./ft^3 (1460 kg/m^3). The minimum compressive strength must be 2000 psi (13.8 MPa) over wood subfloors or 3000 psi (20.7 MPa) over concrete subfloors. Minimum thickness must be 3/4 in. (19.1 mm) over wood subfloors or 1/2 in. (12.7 mm) over concrete subfloors. Due to the porosity of this type of underlayment, consult the manufacturer to determine if a primer is necessary, prior to application of a patching compound or adhesive.

Note: Use of a gypsum concrete underlayment will require written approval from Lonseal's Technical Department prior to installation for warranty terms to apply. When contacting Lonseal, the product being used must be submitted for review.

Lightweight Cellular Concrete Underlayments

All lightweight cellular concrete underlayments must meet the requirements of ASTM F2471 and have a minimum density of 110 lbs./ft^3 (1682 kg/m^3). The minimum compressive strength must be 2000 psi (13.8 MPa) over wood subfloors or 3000 psi (20.7 MPa) over concrete subfloors. The minimum thickness must be 1 1/2 in. (3.8 cm). Due to the porosity of this type of underlayment, consult the manufacturer to determine if a primer is necessary, prior to application of a patching compound or adhesive.

Note: Use of a lightweight cellular concrete underlayment will require written approval from the Lonseal's Technical Department prior to installation for warranty terms to apply. When contacting Lonseal, the product being used must be submitted for review.

Stripwood Floors

If the stripwood is 3 in. (7.6 cm) or less in width, and is tongue-and-groove with a smooth surface, use an approved underlayment panel with a minimum thickness of 1/4 in. (6.4 mm).

If the stripwood is wider than 3 in. (7.6 cm), not tongue-and-groove, or with a rough surface, use an approved underlayment panel with a minimum thickness of 1/2 in. (12.7 mm).

Refer to *Underlayment Panel Selection* on page 7 for additional information.

Radiant Heated Flooring Systems

If the flooring will be installed over a radiant heated system, the maximum substrate temperature must be 85 °F (29.4 °C). Ensure the system is functioning properly prior to installation of the flooring, and be aware of "hot spots", as these can cause issues during or after installation.

The two most common systems are in-slab and matting.

For the in-slab type, surface preparation and installation will be treated the same as installing over a concrete slab. Ensuring this type of system works properly is especially critical as repairs may need to be invasive, requiring concrete removal and replacement. Leaking pipes from hydronic systems will also impact concrete moisture content. Refer to *Concrete Slabs* on page 4 for additional information.

For the mat type, surface preparation and installation must be coordinated with the manufacturer of the mat and Lonseal. Please contact Lonseal's Technical Department for installations where this type of system will be used prior to installation.

> **Note:** Constant, direct exposure to temperatures greater than 85 °F (29.4 °C) can result in discoloration of the flooring or adhesive failure. Do not operate the radiant heated system until all adhesives have fully cured.

Fiberglass and Metal

Ensure either type of substrate is sound, dry, and free of contaminants and debris, including, but not limited to: curing compounds, dirt, dust, grease, loose paint, sealers, wax, and other foreign matter such as rust or oxidation. Additionally for metal, apply denatured alcohol to a clean cloth and wipe the surface to remove any additional contaminants. Always use caution when working with denatured alcohol.

Lightly abrade the surface with 60 grit sandpaper, then brush or vacuum, prior to applying the adhesive.

> **Note:** Do not use acrylic- or latex-based adhesives over either of these substrates.

Floating Floors

Select Lonseal flooring may be installed over a floating floor system, such as GCP Applied Technologies KOVARA™ or Mondo Everlay® Protection. Follow the floating floor system manufacturer's installation instructions for use with sheet vinyl flooring. Additional installation requirements may be required by Lonseal, depending on the product used and installation location.

> **Note:** Installation over a floating floor system will require written approval from the Lonseal's Technical Department prior to installation for warranty terms to apply. When contacting Lonseal, the product being used must be submitted for review.

Raised Panel Systems

Select Lonseal flooring may be installed over a raised panel system. The flooring may be installed on individual panels, or in full sheets, depending on the type of system and end user requirements.

> **Note:** Installation over a raised panel system will require written approval from the Lonseal's Technical Department prior to installation for warranty terms to apply. When contacting Lonseal, the product being used must be submitted for review.

Existing Floor Coverings

To achieve an optimal installation, Lonseal recommends complete removal of any existing floor covering and adhesive residue prior to installation.

Disclaimer: There is an increased likelihood of indentation when installing over an existing floor covering, especially from commercial fixtures, hospital beds, and equipment. Telegraphing of existing floor coverings through the surface of the new flooring is possible over time and should be expected.

Should Lonseal flooring still be chosen for installation over an existing floor covering, the following requirements must be met:

- The existing floor covering must be a single layer of non-foam backed, resilient flooring that is fully and securely bonded (not perimeter bonded) to an approved, "as new" substrate (refer to *Substrate Repair* on page 4).
- The existing floor covering must be prepared sufficiently to provide a smooth surface for installation.
- The existing floor covering must be compatible with the adhesive being used for the new installation.
- If the subfloor is concrete, it must still be tested for moisture and alkalinity (refer to *Concrete Slabs* on page 4).
- The installation must meet all other criteria noted throughout this manual.

Compatible, existing floor coverings can include: ceramic tile, epoxy paint, linoleum, marble, sheet vinyl, SVP (LVP), SVT (LVT), terrazzo, urethane coating, or VCT. Incompatible floor coverings include, but are not limited to, rubber or asphalt surfaces.

An existing floor covering should always be considered a non-porous surface, unless a self-leveling underlayment with a minimum thickness of 1/4 in. (6.4 mm) is used. Refer to *Self-Leveling Underlayment* on page 10.

Disclaimer: Lonseal makes no guarantee of the compatibility between Lonseal flooring and the existing floor covering. It is up to the installer to confirm compatibility. It is highly recommended that the manufacturer of the patching compound or self-leveling underlayment be contacted for their recommendations, and to perform a bond test (refer to *Bond Tests* on page 10). The following information is provided as the best possible suggestion to prepare an existing floor covering to receive Lonseal flooring.

Existing Resilient/Adhered/Tile Floor Covering Preparation:

- Repair or replace damaged or missing tiles, and eliminate gapped seams.
- Completely remove dirt, coatings, or other surface treatments.
- Sand (non-asbestos) flooring to remove all traces of wax or contaminants, to knock down rough edges, and to provide a suitably abraded surface for optimal bond.
- Smooth and fill any surface imperfections with an approved patching compound or self-leveling underlayment. Always check with the underlayment manufacturer to confirm which product is most suitable for this type of installation, and confirm the use and type of primer. Refer to *Patching Compounds* on page 9.

Existing Fluid-Applied Coating Preparation:

- Ensure the coating is well bonded, and remove loose and scaly areas.
- Abrade with 60 grit sandpaper.
- Smooth and fill any surface imperfections with an approved patching compound or self-leveling underlayment. Always check with the underlayment manufacturer to confirm which product is most suitable for this type of installation, and confirm the use and type of primer. Refer to *Patching Compounds* on page 9.

Existing Marble/Terrazzo Preparation:

- Sand or grind the surface to ensure complete removal of any sealers or coatings, and to provide a suitably abraded surface for optimal bond.
- Smooth and fill any surface imperfections with an approved patching compound or self-leveling underlayment. Always check with the underlayment manufacturer to confirm which product is most suitable for this type of installation, and confirm the use and type of primer. Refer to *Patching Compounds* on page 9.

PATCHING COMPOUNDS

Portland cement-based products may be used for smoothing and filling indentations, holes, and minor cracks on commercial projects and for all applications over concrete or wood subfloors. These products must have a minimum cured compression strength of 3000 psi (20.7 MPa) per ASTM C109/C109M.

Note: Gypsum-based patching compounds are not recommended and must not be used when installing Lonseal flooring.

Why Patches Fail and How to Prevent It

When a patching compound is force dried, improperly mixed, or mixed with too much water, the patch is prevented from reaching full cure strength. Loss of strength can cause indentations when exposed to heavy point or rolling loads. Typical reasons for problems associated with floor patching compounds include:

- Using substandard products.
- Over-watering or using additives not called for by the manufacturer of the patch. This weakens the patch and causes loss of "internal cohesion" and shear resistance, ultimately reducing cured compressive strength.
- Force drying, which stops the hydration process needed to develop full cure strength.
- Using a patching compound that is incompatible with the substrate.

Note: Priming the subfloor makes application of properly mixed patching and smoothing products easier and increases their performance. Check with the patch manufacturer for primer recommendations.

Self-Leveling Underlayment

Self-leveling underlayments are an alternative to traditional hand troweled smoothing that can save time and money. Once poured or pumped into place, these products seek their own level to provide a flat, smooth surface. Self-leveling underlayments may be applied over virtually any dry, cured, clean, solid, and properly prepared substrate. Use primer as directed by the underlayment manufacturer. All self-leveling underlayments used with Lonseal flooring must be Portland cement-based and cure to 4100 psi (28.3 MPa) or greater at 28 days.

Note: Always check with the underlayment manufacturer for suitability of use in your application, including moisture-related issues.

Bond Tests

Lonseal always recommends that a bond test be performed, regardless of substrate or underlayment. A bond test will help the installer to test the overall bond and compatibility of the flooring system, which includes the primer (if used), patching compound or self-leveler, and adhesive. The bond test should be performed at various locations throughout the installation area by adhering 2 ft. x 2 ft. (0.6 m x 0.6 m) minimum pieces of flooring following the installation instructions detailed in this manual. Allow a full 72 hours for the adhesive to cure. Removal of the flooring should be difficult, and there should be some form of cohesive failure between various components of the flooring system. If failure occurs solely at one level of the installation, there may be an issue and the manufacturers of the products involved should be consulted. Additional guidance for performing bond tests may be found in ASTM F3311.

Other benefits to a bond test are:

- While applying the adhesive, the installer can get a feel for the appropriate open and working times for the installation area. This is especially useful when installing in an area where a system other than a permanent HVAC is being used to control the temperature and humidity.
- Allows the installer to verify the suitability of the adhesive for use with the substrate, as well as determining the appropriate trowel size and spread rate, when dealing with a porous or non-porous surface.
- When an end-user will subject the flooring to heavy rolling loads (e.g. money carts, freight dollies, clothing racks, tool chests, pallet jacks, hospital beds, etc.) they have the opportunity to repeatedly roll these loads over the adhered flooring, to determine if the system may be deemed fit for the application. Using a larger piece of flooring than noted above for this type of situation is recommended.

Note: For small scale or specialty projects, the test size may need to be adjusted, but should still be sufficient to ensure compatibility can be tested.

Mock-Ups

Prior to installing Lonseal flooring, mock-ups may be used for approval by the end user or specifier. A mock-up must show the actual product as it will ultimately look installed and should present every finish detail, such as:

- Heat or chemically welded seams
- Flash coving, including inside and outside corners, complete with cove stick and cap
- Surface finish treatment, whether standard acrylic, aftermarket urethane, or factory-applied urethane finishes
- Game lines or insets

Installation

Lonseal flooring must be installed in strict accordance with the requirements and recommendations noted throughout this manual and any other technical information related to the installation, including **Technical Data Sheets** (TDS) and **Installation Guides** (IG). Always ensure the most current revision of the document is being used. This includes printed labels and documentation included with adhesives and sundries, as revisions may have been made since their last printing. For these products, their TDS will supersede the information on the label or insert when it differs. All related products not branded by Lonseal must be installed per those manufacturers' current instructions. Failure to do so may result in a failure of the flooring system to perform as intended.

Installer Responsibility

Although Lonseal products are closely inspected prior to shipping, if a problem becomes evident that cannot reasonably be worked around during the course of installation, STOP the installation and notify your supplier or Lonseal sales representative immediately.

The installer must verify that all products are correct for the project, and ensure that the pattern, color, style, and lot numbers match those called for in the finish schedule as specified for the project. The installer must also verify that the site conditions will permit installation per Lonseal's requirements.

Before beginning the project, the installer should become familiar with all technical documents related to the installation, including Lonseal's documents (manual, installation guides, TDS, SDS, bulletins, etc.) and documents from the manufacturers of all other products used for the installation. Further, the installer should become familiar with the tools and products to be used (adhesives, heat guns and nozzles, patching compounds, self-leveling underlayments, trowels, etc.). It is critical that all instructions for these products be thoroughly reviewed, noting all cautions, disclaimers, and warnings.

> **Disclaimer:** Installation of any Lonseal products constitutes acceptance of those products and all site-related conditions by the installer. If any issues arise from improper use or installation of Lonseal products, the installer bears sole responsibility for the installation, which may no longer be covered under any Lonseal warranty. This includes, but is not limited to, use of installation products or methods not suitable for sheet vinyl or contrary to Lonseal's technical documentation, installation on unapproved subfloors or substrates, or installation of products with readily apparent or known issues.

Prior to Installation

Store all products in the installation area for a minimum of 48 hours prior to installation, with the flooring being kept in its packaging and standing on end. Storage and acclimation temperature must be between 65 – 85 °C (18.3 – 29.4 °C), with the relative humidity between 35 – 55%. The installation area must have an operating, permanent HVAC, or a system which provides proper control of both the temperature and humidity. The optimal acclimation environment will be the same as the one the flooring will occupy after installation is complete.

> **Note:** If the flooring is not allowed to acclimate properly, expansion or contraction of the flooring may occur during or after installation. This can lead to issues like buckling, edge curl, gapping at the perimeter, or seam separation.

After acclimation, unroll and allow the flooring to lay flat. This process may take multiple hours, depending on previous storage temperature, acclimation temperature, and how tightly wound the material was on the roll. Allow extra length when cutting, as shrinkage may occur if temperatures are unstable from acclimation to installation.

> **Disclaimer:** Sheet vinyl is subject to a greater degree of dimensional change than vinyl plank or tile. Lonseal accepts no responsibility for dimensional changes to its flooring that is cut into shapes, not properly acclimated, or cut outside recommended environmental conditions. The amount of change will depend on the environment in which the flooring is cut versus the environment in which it is installed. Keeping the material acclimated in similar, if not the same, environments can help reduce or eliminate this natural occurrence, as can cutting the material slightly larger than needed, and trimming to the correct size just prior to installation.

Laying Out

Only some Lonseal flooring has a contrasting thread woven into the scrim backing cloth approximately 8 – 10 in. (20.3 – 25.4 cm) from the edge to help indicate roll direction. When removing flooring without this thread from the roll, always mark the back to note the roll direction with a pencil. DO NOT use marker, as the dye or ink can bleed to the surface of the flooring and cause permanent discoloration. When removing cuts, it is also important to indicate the order each cut was removed from the roll on the back of the flooring.

The flooring must be installed sequentially by roll number and all cuts must be installed in the order they are removed from the roll and in the same direction. Proper indication made on the back of the flooring will help ensure that material moved during or after layout does not get mixed up prior to installation. DO NOT reverse the sheets when installing the flooring.

Disclaimer: Lonseal is not responsible when shading issues arise due to improper installation. Variations in color can exist between dye lots, and it is recommended that the same dye lot be used within the same space.

Lay out the flooring so that seams are kept out of high traffic locations whenever possible. Avoid placing seams at pivot points, if known. Mark the locations of the seams on the substrate using a pencil or chalk line only. DO NOT use marker, paint, or any other surface contaminant on the substrate as it can leech into the backing layer of the flooring, and then bleed through to the surface causing permanent discoloration.

Avoid the use of cross- or head-seams, if possible. These types of seams will require an installer sufficiently skilled at heat or chemically welding them to ensure they are structurally sound and aesthetically pleasing. If these seams are not welded correctly, it will create a weak point in the installation and separation or moisture intrusion could occur.

Patterned Flooring

It is recommended to match the pattern at the center of the installation or focal point and work the pattern out from that location.

When working with embossed patterns, they will not typically side-match along the entire length of the seam. Match the pattern as closely as possible at the center of the installation or focal point of the seam. It is inherent to these products that the pattern will deviate as it moves away from this location. Seams should appear balanced throughout the length, and not allow the pattern to taper off into the seam.

For wood grain patterned products, refer to the **Wood Grain Patterns Installation Guide** for more information.

Installing

For all adhesives and other sundries, refer to the corresponding **Technical Data Sheet** (TDS) for complete installation information and guidelines. The information below is for a typical flooring installation. Since installation areas are not always simple, please contact Lonseal's Technical Department for guidance if a unique situation is encountered.

1. Make relief cuts as necessary to fit the floor to the installation area.
2. If required, apply Lonseal DFT at seam locations.
3. For simple rooms or installations, select the sheet nearest the wall or perimeter and tube (gently fold the flooring over itself lengthwise) towards the center of the room. Take care, and keep the radius large when tubing the material. Failure to do so could result in damage to the flooring, and visual imperfections may appear on the surface.
4. Spread the appropriate adhesive over the substrate, and after sufficient open time, roll the flooring into the adhesive.
5. After anchoring the first section down, tube the other half of the sheet, and the adjacent sheet, if present. Spread the adhesive over the substrate and seam location, including any DFT (with the liner still in place). After sufficient open time, roll the flooring into the adhesive, removing the DFT liner beforehand.
6. Continue until the entire area is fully adhered.
7. Trim seams if necessary, and roll the flooring securely into the adhesive or DFT with a hand roller.
8. Heat or chemical weld the seams. Do not heat weld seams less than 24 hours after installation, unless DFT was used. Heat welds should always be glazed, except when using RapidThread. Refer to the **Welding Thread TDS** and **Welding Thread List Technical Bulletin** to determine if the welding thread being used is RapidThread.

Note: For larger areas, it may be beneficial to start towards the middle of the installation, and carefully tube two sheets open at the seam. Then continue to install in both directions away from the anchor point. The installer should make this determination based on experience and site conditions.

End Curl

End curl can occur if the flooring is not allowed to fully acclimate or lay flat prior to installation, or it may be the result of the material being tightly wound on the core, most noticeable at the core end of the roll. End curl is normal and may be addressed during installation. One or more of the recommendations below may be used to address end curl.

- The flooring may be softened with a heat gun on a low enough temperature to avoid damaging the flooring, but warm enough to make it more pliable. If possible, the roll's cardboard core may then be used to reverse roll the material (face in) for a foot or two. Avoid rolling the material up into a tighter roll than the core's diameter to prevent any unintentional damage. For high gloss flooring (products will typically have UV in their name), do not use the core and only gently work out the end curl manually.
- If using the #813 adhesive, use a 1/4 in. (6.4 mm) nap roller as detailed in the TDS to apply the adhesive to both the back of the flooring and the substrate. This will provide a much higher tack than normal, and it should be sufficient to overcome most curling.
- For all adhesives, weigh down the affected area by placing a piece of smooth, clean plywood over it and then adding additional weight, just enough to apply even pressure to the area. Leave the plywood and weight in place until the adhesive has fully cured.

Seaming to Other Flooring Types

Lonseal flooring can usually be chemically or heat welded to most other sheet vinyl flooring of similar thickness using Lonsealer or welding thread. However, where this is not possible, apply a 3 in. (7.6 cm) band of #650 epoxy adhesive beneath the Lonseal flooring at the transition, and consider installing a transition strip to further protect the seam.

> **Note:** It is recommended to test the planned seaming method on scrap material of Lonseal flooring and the other sheet vinyl flooring prior to installation. If a strong bond is not possible, use of the #650 as noted above is highly recommended to minimize the chance of seam separation.

Installation Guides

Lonseal flooring may be installed in a variety of settings, from healthcare and gymnasiums to aircraft and boats. Special installation instructions for these types of applications may be obtained at *www.lonseal.com*, and are meant to be supplemental to this manual. Below is a list of the **Installation Guides** (IG) currently available:

- **Aircraft:** for use with all aircraft installations (airplanes, helicopters, etc.)
  - This guide may contain additional or differing installation requirements from this manual. This is intentional, and this guide will supersede the requirements in this manual where it differs.
  - The use of Lontape is covered by this guide, and is suitable for installations where permanent floor installations are needed or allowed.
- **Elevator:** for use with all installations in passenger elevators
  - This guide may contain additional or differing installation requirements from this manual. This is intentional, and this guide will supersede the requirements in this manual where it differs.
  - Freight elevators may not be suitable for resilient flooring, due to the type of traffic and loads to which the flooring will be subjected.
- **Exhibits & Show Floors:** for use with temporary or short-term installations
  - This guide may contain additional or differing installation requirements from this manual. This is intentional, and this guide will supersede the requirements in this manual where it differs.
  - The use of Show Tape for temporary installations is covered by this guide. Please be aware that temporary installations using Show Tape will have modified limited warranty terms.
- **Fitness Flooring:** for use with Lonseal's fitness flooring (Loncourt I, Loncourt UV, Lonwood Performa, and Lonwood with Foam)
  - This guide also includes the application requirements for game line paints and installation in areas with retractable bleachers.
  - Hot yoga studio installations should use the appropriate guide noted on page 15.
- **Fixtures:** for use with all cabinet, counter, display, or fixture installations
  - This guide may contain additional or differing installation requirements from this manual. This is intentional, and this guide will supersede the requirements in this manual where it differs.
- **Flash Coving:** for use when flash coving Lonseal flooring
  - While this is not a comprehensive guide for flash coving installations, it will provide minimum requirements and recommendations.

- **Hot Yoga:** for use when installing in hot yoga studios
  - Studios must not exceed 105 °F (40.6 °C) ambient air temperature or 85 °F (29.4 °C) substrate temperature.
  - When using Lonseal's fitness flooring or Lonsafe for this type of installation, this guide should be used instead of the **Fitness Flooring** or **Lonsafe Installation Guides**.
- **Lonmat:** for use with all Lonmat installations in marine or naval vessels
  - This guide may contain additional or differing installation requirements from this manual. This is intentional, and this guide will supersede the requirements in this manual where it differs.
- **Lonsafe:** for use when installing Lonseal flooring with the Lonsafe underlayment
  - Hot yoga studio installations should use the appropriate guide noted above.
  - Foam-back products and fitness flooring are not intended for use with Lonsafe.
- **Marine:** for use with all marine installations (excludes Lonmat, which should use the guide noted above)
  - This guide may contain additional or differing installation requirements from this manual. This is intentional, and this guide will supersede the requirements in this manual where it differs.
  - The use of Lontape as an alternative to the #400 or #650 adhesives is covered by this guide.
- **Patient Rooms:** for use in all healthcare patient room installations, where patient beds are expected
  - This guide should also be used for other locations where heavy static or dynamic rolling loads may exist.
- **Stairs:** for use with all interior stair installations
  - This guide may contain additional or differing installation requirements from this manual. This is intentional, and this guide will supersede the requirements in this manual where it differs.
- **Vehicle:** for use with all ground vehicle installations
  - This guide may contain additional or differing installation requirements from this manual. This is intentional, and this guide will supersede the requirements in this manual where it differs.
  - The use of Lontape as an alternative to the #400 or #650 adhesives is covered by this guide.
- **Wood Grain Patterns:** for use with all wood grain patterned products
  - This guide provides pattern repeat and additional information.

After Installation

Initial Maintenance

No less than 48 hours after installation, initial maintenance must be performed. Refer to the corresponding **Maintenance Guides** (MG) available at *www.lonseal.com*. There are three guides available, one for each type of surface option available from Lonseal.

- **High Gloss**
  - For use with the high gloss, factory-applied urethane finish (products will typically have UV in their name)
- **Topseal**
  - For use with the matte, factory-applied urethane finish
- **Unfinished Flooring**
  - For use with all floors without a factory-applied finish

Protecting the Floor

To reduce the chance of product damage or conflict with activities by other trades, Lonseal flooring should be the last finish material installed. Other trades must remain out of the work area and off the floor until the flooring contractor advises it is safe to enter or at least 72 hours after installation. Where trade work must take place on or around Lonseal flooring after installation, provide adequate protective covering using 1/4 in. (6.4 mm) thick minimum plywood panels in order to protect the flooring from damage caused by ladders, scaffolding, or construction traffic.

Use of products such as cover guard®, Ram Board®, or similar may be suitable for light traffic or work only, as recommended by the manufacturer. These products are not a substitute for plywood when high point loads from ladders, scaffolding, or laden construction carts will be used on the installed flooring, as they may not fully distribute the load enough to avoid indentation or adhesive displacement.

Note: Kraft paper with certain dyes can cause permanent staining on the surface of the flooring.

Disclaimer: Lonseal accepts no responsibility for damage caused to the flooring or installation by work performed on or around the installation area. Sole responsibility for properly protecting the floor after it is installed belongs to the flooring or general contractor, including any products used to protect the flooring or installation.

Contacting Lonseal

Placing Orders

Please fax your completed purchase order to Customer Service at 888-LONSEAL (888.566.7985) or send by email to *orders@lonseal.com*. Lonseal is unable to take orders over the phone.

Requesting Samples

Please call 800.832.7111 or visit our website at *www.lonseal.com*.

General Information

928 East 238th Street
Carson, California 90745

Toll Free (USA Only): 800.832.7111
Phone: 310.830.7111
Fax: 310.830.9986
E-mail: *orders@lonseal.com*

Technical Support

There are many non-standard applications or installations that require prior approval of Lonseal's Technical Department in order for warranty terms to apply. Please contact the Technical Department for assistance using the following methods:

EMAIL *technical@lonseal.com*
Please include the words, "TECH SUPPORT" in all caps in the subject line of your email.

ONLINE Contact us via the website at *www.lonseal.com*.
Click on Contact Us. Please include "TECH SUPPORT" in all caps at the start of the Comments/Questions field.

FAX 310.830.9986
Please include "TECH SUPPORT" in all caps in the subject line.