



Logs End Installation and Maintenance Information

General Installation Instructions for all products

Ensure the site environmental conditions are suitable for installation and take record. This includes: Relative Humidity, Subfloor or Concrete Moisture Reading, condition of product to be laid, sources of water or humidity extremes. Do not continue, if any of the conditions in these directions and warranties are not met and/or according to the NWFA instructions.

Ensure all other trade activities are completed as they impact the quality of the installed flooring. Wood flooring is one of the last products to be installed at a construction site. Window, door, dry walling and painting and HVAC activation (on for >7 days) must be completed and dry before installation begins. This is to avoid humidity extremes and damages that void the warranty.

Acclimatize the product according to the product directions.

Ensure the subfloor is perfectly level (1/8" per 8'). Level high spots and fill low spots as required. Ensure the subfloor is firmly anchored ensuring no movement, flex or squeaking.

Ensure the subfloor is less than 12% MC and record readings, subfloor must be within 4% of the actual floor being installed.

Thoroughly sweep and vacuum the area the flooring is to be installed.

Prepare installation along longest straightest wall first using long pieces for starting row and across (perpendicular to) floor joist.

Open and select products from multiple boxes to ensure an appropriate mix of lengths, wood character and colour.

Inspect each piece before installation. Do not install any defective piece or piece that has a colour, character or grain etc. that may not suit the look of the floor and may be displeasing to the consumer. These pieces can be cut and used for starters, installed in a less conspicuous location (E.g. Closet, under Cabinets etc.) or discarded. If you choose not to install these pieces please note that they are not covered by Logs End Inc.'s warranty.

Preparation of Plywood & Concrete Subfloor

Logs End Inc. recommends that all Logs End flooring be installed with a minimum of 5/8" (15.8750 mm) A.P.A. approved, C.S.P/D.F.P. stamped plywood, or 3/4" O.S.B. Underlay grade PS2-92 rated, or concrete slab. The use of particleboard as a subfloor will automatically void the warranty. Consult a Logs End representative for recommendations on your specific subfloor application. Any failure of Logs End Inc. relating to improper

subfloors, or subfloor preparation is not the responsibility of Logs End Inc., and will not be covered under warranty. Sweep and vacuum subfloor. Ensure that old carpets, oils, foreign particles, protruding nails, carpet glues, etc., are removed prior to installation. For wood subfloors, make sure they are level, clean, dry and securely fastened. Repair and/or replace any section that is rotted or damaged. Always follow local building codes.

Do not install Logs End solid flooring over concrete unless an acceptable plywood subfloor and vapour barrier is firmly anchored over sleepers and a dehumidifier is in place to continuously remove excess humidity from the room.

Moisture Content Acceptable subfloors & ground levels installations for Logs End Product

| Solid | Plywood, OSB | At or above ground level only | Nail |
|------------|--------------------------|---------------------------------|---------------------|
| Engineered | Plywood, OSB or Concrete | At, above or below ground level | Nail, glue or float |

Plywood: The maximum moisture content (MC) for plywood should never exceed 12%

Concrete: The maximum moisture content for concrete should never exceed 12%

The difference between the flooring and the subfloor should never exceed 4%.

Tools & Accessories – For Nail & Glue Installations

Table saw, miter saw, measuring tape, nail set, hammer, tapping block, nail gun (manual or pneumatic), square, chalk line, putty fill, broom and dustpan.

Tools & Accessories – Nail Down

15 lb felt or equivalent, nail gun or staple gun (manual or pneumatic), square, chalk line, putty fill, broom and dustpan.

Tools & Accessories – Glue Down

Trowel, cleaning solvent and moisture cured glue.

NOTE: It is extremely important that you use the proper trowel to ensure maximum coverage and produce a good bond between subfloor and flooring. You may also require a 100-150 pound roller.

Installation – Expansion Gap allowances

| |
|--|
| <p>Solid 3/4" : Leave 3/4" around entire room Engineered 5/8": Engineered 3/4"</p> |
|--|

(Chart #1)

Material Acclimatization

Open boxes fully (never just the ends) and allow the wood to acclimatize to the ambient temperature of the room.

Unfinished Solid & Pre-oiled Solid: Must be given 7-10 days at approx. 23° C (72°F) and a relative humidity of 40% before installation.

Pre-finished Solid: Must be given 2-3 days at approx. 23° C (72°F) and a relative humidity of 40% before installation.

Engineered: Must be given 48-72 hours at approx. 23° C (72°F) and a relative humidity of 40% before installation.

When relative humidity is too high or too low (above 50% and below 40% RH), acclimatizing may not be suitable. Always consult your hardwood flooring representative or installer for their recommendations. Expansion and contraction caused by acclimatizing is not covered under this warranty.

Hardwood flooring should be one of the last items installed when renovating your home. For new construction, the heating system must be operating for at least one week (7 days) at normal residential temperatures (approx. 70°F/22°C) prior to installation.

Additional Allowance Recommendations

This will cover waste, defects or personal preference of boards. It is the installer's and owner's responsibility that all pieces be inspected, and graded prior to installation. If any piece does not meet installer/owner's personal standard, do not install these pieces. If you choose not to install pieces because of appearance, length of piece, or your personal visual standards, this will not be considered part of the 5% defect allowance. It is also recommended to have additional materials kept in case of future repairs.

7%-10% waste recommended.

(Chart #2)

Important Notes

FOR ALL INSTALLATIONS – ALWAYS WORK FROM 5-6 DIFFERENT BOXES AT ONE TIME

The installer is the final grader. Installer/homeowner will take full responsibility for all flooring that is installed, even if the primary owner of the residence is absent at the time of installation. If you are unsure of any requirements, please consult a Logs End representative prior to installation. Although Logs End Inc. takes every precaution to ensure that our flooring is graded and shipped to industry standards, we suggest you inspect each piece of Vintage Flooring before installation. Boards that you may not like the look of, or contain a mark that you think will affect the look of the floor should be used as cut pieces for your start/end pieces. You may also use these pieces in less conspicuous areas such as in closets or under couches and sofas etc.

Nailed Down Application

Step #1 – Mark your starting line using a chalk line, draw a guide line out from the starting wall by measuring out the width of one board plus a 3/4" allowance for expansion gap. This line is where your first strip of flooring is going, and also allows for the expansion gap. It is very important for the starting line to be straight and square.

Step #2 – Install the strips.

Face nail or glue using a moisture cured adhesive (best practice) on the first row of strips with the grooved side facing the wall; put the nails as close to the wall as possible. This way, the quarter round will cover the nail heads. You may have to face nail for the first few rows before there is enough room to use the nail/staple gun. It must be nailed/stapled down or glued by hand rather than with the hardwood floor-nailing machine because of the vertical wall obstruction. When clearance allows, start using the hardwood floor nail/staple gun. Nails/staples should be spaced a minimum 2"-3"

(57 – 76 mm) from both ends of the boards, and for all other nails/staples. Measure and cut the strip to the required length to finish the first row. The remaining section should be used to start the second row, in order to minimize cut waste. The strip selection for completing the first row must be long enough to yield a remaining section of adequate length. Leave the required expansion gap between the wall and the end of each strip in each row. The subsequent rows must be installed in the same manner. Don't be afraid to waste a few strips in order to adjust and test the nailing machine. See Hardwood Floor Nailing Tips. When you reach the last few rows, you may not be able to complete these rows with the nail/staple gun, due to vertical obstructions. Toe nail, face nail, or glue the last remaining rows.

NOTE: You may have to rip the last strips along the wall in order for them to fit properly. Don't forget to leave the minimum space for expansion.

Step #3 – Finally

Install the transition pieces, baseboards and/or quarter round mouldings. Following the initial installation, vacuum thoroughly and clean the floor. For detailed installation guidelines for your specific installation contact a Logs End representative.

Installing over a crawl space: You may install over a crawl space providing care has been taken to cover all areas of exposed earth with a 6mm C.G.S.B polyethylene. You must also ensure that sufficient cross ventilation exists so that no moisture will accumulate and be absorbed in the wood flooring. Follow local building codes.

Wood Displacement (Dimples on Surface)

Hardwood flooring, dense smooth woods in particular, may show dimpling on the surface from the displacement of wood by the fastener. Logs End flooring should not dimple providing installation is adhered to. Therefore, dimpling is not covered under Logs End Inc.'s warranty. It is the responsibility of the installer to monitor and take immediate action if dimpling occurs. (i.e. adjusting air pressure, using smaller cleats, adjust/repair nail driver pin, adjust nailer shoe angle etc).

Nailing Pattern/Schedule

Ends of the boards: 2"-3"
Along the board: 6"-8"

(Chart #3)

Hardwood Floor Tips

Here are a few tips to make your job easier, should you decide to use a hardwood floor nailer or staple gun.

1. Prevent any scratches and indentations on the surface of the board by keeping the nailer plate (base) clean, free from nicks and scratches at all times. Also by putting down the nailer/stapler on the plywood or on a piece of cardboard, not directly on the floor.
2. Make sure the nailer/stapler base is squared and sits well on the edge of the strip to ensure the nails/staples are secured into the nailing channel at the proper angle to prevent dimpling and damaging the edges of the strips.

3. Verify regularly the hardwood floor nailer/stapler is in working condition to prevent damages to the strips.
4. Start the second row and subsequent rows with a strip of at least 6" (150mm) longer or shorter than the strip used in the previous row. This will eliminate unsightly step effects. The remainder of the floor should follow this rule to ensure an aesthetically pleasing floor.

*Pneumatic nailer. Air pressure should be adjusted adequately for each species of hardwood floor being installed and checked regularly (always try it before using) so that the cleats are seated properly in the nailing channel to avoid dimpling. *Great attention to detail during fabrication on the part of the Logs End flooring team ensures exceptional QUALITY in the finished product. Longevity of hardwood floors is directly related to proper installation and lifetime commitment to appropriate care and maintenance.

Glue Down Installation Instructions

Step #1 – Mark your starting line. Logs End recommends that your flooring be installed parallel to the longest, straightest wall in the room. Start by measuring out from the wall 10 boards wide. Example: for 3/4" solid flooring, $10 \times 3.25 = 32.50$ *, plus the expansion gap of 3/4" which totals 33.25" from the wall. See Chart # 1 for expansion gap widths for all products. Using a chalk line draw a guideline parallel to the wall based on the above measurements. This will eliminate any ripping of material at the end of the job for the last row. Using the straightest pieces of 1" x 2" x 8' length of wood and 2-inch concrete nails or screws, fasten the strips to the concrete. Your first row of the starter boards will butt against this, so make sure that the strips are in line with the chalk line because this will determine how straight your floor will be.

Note: If you are cutting a piece that has not been set aside for cutting, make sure it is long enough to yield your next row's starting piece. Leave the expansion gap (See Chart #1) between the wall and the end of each strip in each row.

Step #2 – Spread the adhesive

NOTE: Logs End only recommends installations when a moisture-cured polymer glue is used. Follow directions of glue manufacturer. Do not use latex/water based glues. Apply the recommended adhesive with a trowel according to the manufacturer's installation instructions (found on adhesive pail) for the specific adhesive that is being used.

SPECIAL NOTE: Open time and installation on adhesives vary from manufacturer to manufacturer so read instructions carefully before starting. Open time can also be affected greatly depending on the temperature and humidity. See Chart #4 for Adhesive recommendations).

Step #3 – Install the strips

You should inspect each piece of Logs End flooring before installation. Boards that you may not like the look of, or with a flaw that you think will affect the look of the floor, should be used as the cut pieces for your start and/or end pieces. You may also choose to put these pieces in less conspicuous areas such as closets or under couches etc. Start your first piece with the tongue facing the area that will be completed last. Line up the tongue of the

boards against the holding strip, and then press the board into the adhesive. Working from the left to right, lay the next board and continue working towards to right, until you reach the wall and require a cut piece. Choose one of the pieces set aside for cutting and cut the desired length. NOTE: If you are cutting a piece that has not been set aside for cutting, make sure it is long enough to yield your next row's starting piece. Leave the expansion gap between the wall and the end of each strip in each row. Start the second row with a strip of at least 6" (150mm) longer or shorter than the strip used in the first row. This will eliminate unsightly step effects. The remainder of the floor should follow this rule to ensure an aesthetically clean looking floor. Minimize adhesive from getting into the tongue or groove; otherwise, the strips of the flooring may not fit tightly. If adhesive gets on the finished side of the strips, clean immediately with appropriate cleaning products – see adhesive manufacturer's recommendations.

Flooring may require slight tapping in order to ensure a tight fit. You may use 3M's blue tape (if required), to hold pieces together until glue bond has developed. If a roller is required to obtain maximum adhesion, wrap a foam sheet around it to minimize any damage to the surface of the floor. When you get to the end of the wall, you may require a pry bar to get the pieces tight. Use shims where required until the glue has dried.

Step #4 – Installation of Accessories & Cleaning

After the floor has dried, you may install the baseboards and quarter rounds. Make sure that the nails penetrate the wall and not the floor. NOTE: Always keep leftover pieces for future use. Flooring may become damaged and require replacing several pieces. It's a good idea to have the same production dates put aside. Use a vacuum to pick up any dust and loose fibers.

Moisture Cured Adhesive Recommendations

For all glue down installations, AF2130 or equivalent Urethane based or polymer adhesives are acceptable. Logs End does not warranty the adhesive, check manufacturer's warranty information.

(Chart #4)

3-Year Commercial Warranty

Logs End Product: Subject to the Warranty Exclusions set out in the Warranty guide for each of the product lines. Logs End Inc. warrants to the original purchaser that the finish wear layer of the 3/4" solid hardwood flooring, 5/8" engineered hardwood flooring and the 3/4" engineered hardwood flooring in the original manufactured/purchased condition will not wear through or peel from the wood for a period of three (3) years from the date of purchase, when used and installed under commercial traffic conditions such as, but not limited, living or residence areas, education or religious buildings, corporate or business offices and selected retail stores and spaces (or any non-food service stores) located away from outdoor main entryways or street, therefore excluding any heavy commercial use.

Finish Warranty excludes any indentations, scratches or surface damage caused by lack of proper maintenance, misuse, negligence, accidents, spiked-heeled shoes, water, wet mopping, erosion, pebbles, sand, other abrasives, insufficient prevention and/or protection. The surface wear must be readily visible and cover at least fifteen percent (15%) of the surface area. Gloss reduction is not considered surface wear.

Regular maintenance as specified by Logs End Inc. must be followed in order to validate this Warranty. The sole remedy pursuant to this warranty is available to the original purchaser only and shall be limited to the repair, refinishing, refinished or replaced after a reasonable number of attempts, Logs End Inc. will, upon request, refund the original purchase price of the defective floor on a pro rata basis. Any attempt to repair, refinish or replace the defective product prior to inspection by Logs End Inc. will invalidate this warranty.

Humidity Control (Gapping, Cupping and Splits)

Relative humidity is the ratio of the actual amount of water vapour contained in the air at a given temperature to the maximum amount of water vapour that the air at a given temperature can hold, expressed as a percent. In other words, relative humidity is the absolute humidity divided by the absolute humidity at saturation of air at the same temperature.

Wood is hygroscopic material. Always containing water, it constantly exchanges water vapour with the air, picking it up when atmospheric relative humidity is high, and giving it off when relative humidity is low. Since wood swells as it absorbs water, and shrinks as it releases water, both its moisture content and its dimensions are controlled by the relative humidity of the surrounding air. Wood moisture content is equal to the weight of water contained in the wood divided by the oven dry weight of the wood, expressed as a percent.

Inside homes however, where the relative humidity (RH) of outdoor air drawn inside is drastically altered by heating it and cooling it without humidification or dehumidification. Wide seasonal swings in relative humidity in wood moisture content and dimension changes occur. Since warm air can hold more water vapor than cold air, the relative humidity of air with a certain absolute humidity can be changed by simply changing its temperature. If in winter, for example, outside air is 20°F (-6°C) and 65% RH is drawn inside and warmed to 70°F (20°C) without humidification, its relative humidity drops to about 10%. In summer, outside air at 70°F (20°C) and 60% RH that flows into a basement at 60°F (15°C) will end up at 82% RH. In order to minimize this movement, the relative humidity must be maintained according to product specifications, anything higher and the flooring will start to cup, anything lower and the floor will start to gap and may check and split in winter months.

Special note for engineered products

Although these products are significantly more stable than solid wood, they can still react to changes in relative humidity at extremes according to the season. Minor cupping, crowning, face distortions, etc., is considered normal when near the limits of the stability warranty and is not covered by this warranty. Raising or lowering your humidity level towards the middle of the warranty range will resolve this issue.

Logs End Inc.'s engineered flooring will perform extremely well with high humidity. However, if the humidity drops below warranted levels the face lamella will start to contract. The construction of these products is such that the core material will minimize the face lamella's contraction. If the humidity drops below warranted levels the core will continue to do its job and minimize contraction again. However, there comes a point where the face lamella is under so much stress, and the core is not allowing the face to move (minimize cupping) that the face lamella

has no other choice but to relieve its pressure by stress cracking. Stress cracking is NOT covered under this warranty.

The Logs End mill stores solid wood flooring in a humidity controlled environment. It is important to check and document both the ambient humidity and the moisture of the subfloors in the rooms before installation. Humidity outside the allowed range or subfloors more than 2% difference in moisture on 3/4" and wider floors (4% difference on 3" and narrower) will cause the floors to expand/shrink and cup. Wet subfloors and high humidity environments can cause gapping and create splits as the wood dries and returns to a normal humidity level. Un-insulated heat ducts or radiant heat also cause extreme drying leading to gapping and splitting. Gapping, Cupping and splits resulting from moisture & humidity excesses are not covered under Logs End's warranty. Generally, wood flooring should not be installed over crawl spaces. If necessary, ensure the crawl space has a 6 mil CGSB polyethylene over all exposed earth and that sufficient cross ventilation exists in order that no moisture accumulation occurs. Follow local building codes.

Moisture content (%) at various relative humidity values

| (°C) | (°F) | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% |
|------|-------|-----|-----|-----|-----|-----|-----|-----|------|------|
| 4.4 | (40) | 4.6 | 5.5 | 6.3 | 7.1 | 7.9 | 8.7 | 9.5 | 10.4 | 11.3 |
| 10.0 | (50) | 4.6 | 5.5 | 6.3 | 7.1 | 7.9 | 8.7 | 9.5 | 10.3 | 11.2 |
| 15.6 | (60) | 4.6 | 5.4 | 6.2 | 7.0 | 7.8 | 8.6 | 9.4 | 10.2 | 11.1 |
| 21.1 | (70) | 4.5 | 5.4 | 6.2 | 6.9 | 7.7 | 8.5 | 9.2 | 10.1 | 11.0 |
| 26.7 | (80) | 4.4 | 5.3 | 6.1 | 6.8 | 7.6 | 8.3 | 9.1 | 9.9 | 10.8 |
| 32.2 | (90) | 4.3 | 5.1 | 5.9 | 6.7 | 7.4 | 8.1 | 8.9 | 9.7 | 10.5 |
| 37.8 | (100) | 4.2 | 5.0 | 5.8 | 6.5 | 7.2 | 7.9 | 8.7 | 9.5 | 10.3 |

Warranty Exclusions

The following are excluded from all Logs End warranties

- Any damage or failures, but not limited, to the following are not covered by Logs End's warranty:
 - The finish wear surface must be easily noticeable and cover at least 15% of the total floor area for a claim to be considered.
 - Damage or structure failure relating to installation and interior conditions that do not comply with Logs End's installation requirements.
 - Damage due to improper care or failure to comply with Logs End's maintenance and care instructions.
 - Structural defects natural in the wood where the finish cracks, contains voids, or colour variation that appear on the surface of a knot, check, split, hole or similar naturally occurring wood character in the grade.
 - Natural expansion, contraction and tensions caused by woods reaction to humidity variations.
 - Wood displacement due to nailing, stapling or installation (i.e. Dimpling & Nail pops).
 - Gloss changes due to wear or use, including variation in replacement boards.
 - Damage due to water spills, steaming, excessive cleaner, wet mopping, moisture, sink/dishwasher/pet bowl/planter spills that will cause distortion of the wood and blistering and peeling of the finish.
 - Dents, scratches, high heel marks, pet damage, chemical & adhesive damage. Use of tape except 3M blue tape.

Natural discolouration of the finish, aging, fading or darkening of the wood and excessive exposure to sunlight, including uneven colouration under rugs & furniture.

Natural colour and character marks in the wood as allowed in the grade (Samples do not show all possible character marks allowed in the entire floor).

Environment extremes of heat, dryness or humidity that exceed the product specified humidity range.

Construction, damage, in particular on textured surfaces, can contaminate the naturally occurring or intended undulations in the surfaces (i.e. drywall dust).

In all cases, any warranty, remedy, or repair must first be approved by Logs End Inc.

Action taken prior to Logs End's approval will void the warranty claim.

The corrective action to remedy any warranty issue is the exclusive right of Logs End Inc.

This warranty only applies to defects in excess of the 7%-10% on boards.

Logs End Inc.'s liability under this warranty is limited to the replacement or repair, of any portion of the floor, solely at Logs End's discretion, and only up to the total purchase price of the floor (excluding installation). Logs End will not be liable for other costs, including labour, installation, moving, or accommodation costs.

The warranty is only the original purchaser and cannot be transferred.

Any defect or warranty claim must be submitted in writing to Logs End Inc. within 6 months of the occurrence of the issue giving rise to the claim.

Filing a Claim

To file a claim, contact a Logs End representative. They will assess and complete a claim form if warranted, that will require the details of original purchase, payment confirmation, installation, environmental conditions and details of the issue.

Logs End Inc. at its discretion reserves the right to: be provided detailed pictures of the floor, access for inspection, and/or removal of samples for analysis.