



*Engineered Flooring*  
INSTALLATION GUIDE

**APPALACHIAN**

APPALACHIAN FLOORING

It is important to read the Installation Guides, Maintenance Guide and the Limited Warranty document prior to the installation of your Appalachian Flooring product. **Installation that does not respect the instructions and procedures may void your warranty.**

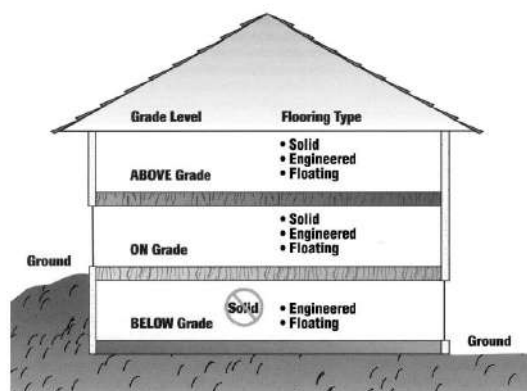
For questions concerning the installation process, please contact your authorized Appalachian Flooring retailer or [info@appalachianflooring.com](mailto:info@appalachianflooring.com).

*Our installation instructions take precedence over NWFA installation guidelines. However in situations not specifically covered by our installation guide NWFA guidelines are recommended.*

## About your Appalachian Flooring engineered hardwood product

Engineered floors are specially designed to suit all situations, including basements, floors with radiant heating systems or direct installation on a concrete subfloor. Engineered floors comprise a solid hardwood surface with a Baltic Birch plywood core. Sanding and finishing of engineered products are performed at the factory, under ideal conditions, in accordance with the same quality and precision requirements that have made Appalachian Flooring’s solid hardwood boards a synonym of excellence. The installation method for engineered flooring is nailed, stapled, or glued.

Appalachian engineered flooring may be installed on grade, above grade as well as below grade where conditions meet the requirements outlined in this guide and in the Appalachian Flooring Warranty.



### Recommended Use

Ground Floor:	Yes
Second Floor:	Yes
Basement:	Yes

Figure from NWFA Installation guidelines

**For Materials and Tools Required: See Annex one.**

## Owner and installer responsibility

Prior to laying the floor, the contractor/installer and/or the owner must make sure that the installation site and subfloor comply with the conditions specified in this document. The installer and the buyer have the responsibility to inspect the wood boards prior to their installation. Appalachian Flooring products meet stringent quality standards and comply with the standards in force in the wood flooring industry. These allow a rate of imperfection not exceeding 5% of the quantity of the purchased boards. This rate includes both the natural imperfections of the wood, manufacturing defects and selection of the grade.

**If the installer doubts the grade selection, the manufacturing or finishing quality and cannot place the board in a less conspicuous place, nor eliminate imperfection, he/she should not install it and contact their retailer. Once the board is installed, it shall be considered as having been accepted by the installer and the owner, even if the latter is absent at the time of installation.**

According to the site and the type of installation, control of the hardwood boards should provide 3 to 5% additional covering to compensate for the loss caused by the cuts. Appalachian Flooring will only replace products with a defect rate exceeding the acceptable 5% rate (excluding the 3 to 5% cutting loss). Appalachian Flooring cannot be held liable for improper installation of its products or poor judgment by the installer.

## Warranty

For more information about our warranty, consult our Limited Warranty in the documents section of our website.

## Prior to Installation

- Ensure that the customer approves the consistency of the species, color, grade, size, and quality of the product, as well as the intended layout.
- Ensure that the space has a relative humidity within the warranty range of 35-55% and the temperature between 60-80F (16-27C) for 14 days prior to installation, as well as during and after installation.
- **Acclimate flooring for 48 hours prior to installation.** Never store flooring in an unsuitable location, such as a shed, unheated garage, or basement.
  - **It is important to note that an acceptable humidity variation between your subfloor and wood flooring is 3 percent.**
- Be sure to plan the layout for the best visual appearance of the finished wood floor.
- If installing on a subfloor over joists, verify joist orientation prior to beginning. Flooring should be laid perpendicular to the floor joists for greater stability.
- Basements and crawls spaces must be well ventilated. Crawl space should have 1.5% of open venting per 1,000 s/f (92.90 sq. meters) of floor area. Vents must be properly located to foster cross ventilation. *For more information on basements and crawl spaces, see Annex two.*
- Insulate overheating and un-insulated heat ducts to prevent hot spots.
- Ensure that any drainage is directed away from the building.
- Inspect all door casings and wall moldings. Where necessary, use a jamb saw laid on an upside down piece of flooring to cut the door casings to allow the wood flooring to slide beneath them.
- Use a utility knife to scribe along the top edge of the base moldings before removing to prevent tearing paint or drywall.
- Remove all existing base molding.
- Remove the waste material and sweep away all debris.

## Important Notes about Installation

- Never rip-off the box ends to prevent exposure to moisture.
- Do not cut short boards to finish a row. The leftover materials will be used for future starter boards. Short lengths cannot be used and will become waste.
- Ensure that staple plate is clean and free from nicks.
- Follow the maintenance guide provided by your stapler/nailer manufacture.
- When stapler/nailer is not used, never place directly on the hardwood floor.
- Check air pressure: different subfloors and engineered flooring require different pressures.
- We recommend you keep extra boards on hand in case you need to repair or replace boards in the future.

## Important Notes about Engineered Flooring 7" planks

- A bead of polyurethane adhesive should be applied in a 3" serpentine pattern to the back of the board and adhered directly to the subfloor if nailed down.

## **Engineered Installation Guide**

### **Subfloor Preparation**

#### **Wood Subfloors**

1. The floor must be level. Level is within 3/16" in 10' (5 mm in 3 m) and/or 1/8" in 6' (3mm in 2m).
2. Ensure that no creaking, loose edges, sags etc. exist. Repair them as Necessary before starting installation.
3. Sand subfloor joints.
4. The panels can be laid diagonally or perpendicularly with the joists, with an expansion space of 1/8" between panels.
5. Fasten panels down at least every 6" and glue them to the joists.
6. Walk across the floor to check for squeaks and add additional screws if necessary.
7. Ensure that there are no protruding fasteners.
8. OSB and plywood must be APA (or equivalent) rated and maintained in a controlled environment OSB is more likely to yield noisy floors.
9. Wood subfloors should not exceed 12% and there should result in less than a 4% humidity difference between the flooring and the wood subflooring material. If the subfloor has excessive moisture content, postpone installation, find the moisture source and correct by raising the heat and increasing ventilation until proper conditions are met.
10. Apply a suitable moisture retardant or use an underlayment that also acts as a vapor retardant.
11. It is important that the subfloor moisture is correct or the flooring is at risk for cupping. Cupping is not a manufacturing defect.
12. Make sure the subfloor is free of debris before beginning installation.

On truss/joist spacing	Size and fastening method	MINIMUM REQUIREMENT
16" o/c or less	4' x 8' sheets glued and screwed.	<ol style="list-style-type: none"> <li>5/8" APA CDX exposure 1 plywood subfloor panels</li> <li>23/32" OSB APA exposure 1 subfloor panels</li> </ol>
16", up to 19.2" o/c	4' x 8' sheets glued and screwed.	<ol style="list-style-type: none"> <li>3/4" APA CDX exposure 1 plywood subfloor panels</li> <li>23/32" OSB APA exposure 1 subfloor panels</li> </ol>
More than 19.2" o/c up to a maximum of 24"	4' X 8' sheets, glued and screwed	<ol style="list-style-type: none"> <li>7/8" T&amp;G APA CDX exposure 1 Plywood subfloor panels</li> <li>1" OSB APA Exposure 1 subfloor panels</li> <li>Double layer subfloor: <ul style="list-style-type: none"> <li>1<sup>st</sup> layer 3/4" APA CDX exposure 1 plywood or APA OSB laid perpendicular to the joists.</li> <li>Second layer laid on a diagonal or perpendicular to the first layer 1/2" CDX exposure 1 plywood. Glued and screwed in a 6" grid pattern.</li> </ul> </li> </ol>

## Concrete

### **Moisture testing**

Before testing a concrete slab for moisture, it should be cured for a minimum of 30 days and 60 days is preferable. Moisture testing must be done and results recorded prior to flooring installation. Always verify compatibility of moisture barrier and adhesive systems with adhesive manufacturer.

Results indicate:

**0-3 lb: dry**

**3-7 lb: moisture barrier required**

**7+ lb: too wet installation cannot occur**

### **Test 1**

CALCIUM CHLORIDE TEST \* One test per 1,000 s/f for 24 hours. Minimum two tests per jobsite. Always follow test manufacturer recommendations.

### **Test 2**

RH probe such as the Wagner Rapid RH. Please follow all manufacturer instructions.

### **Debris and Cleanliness**

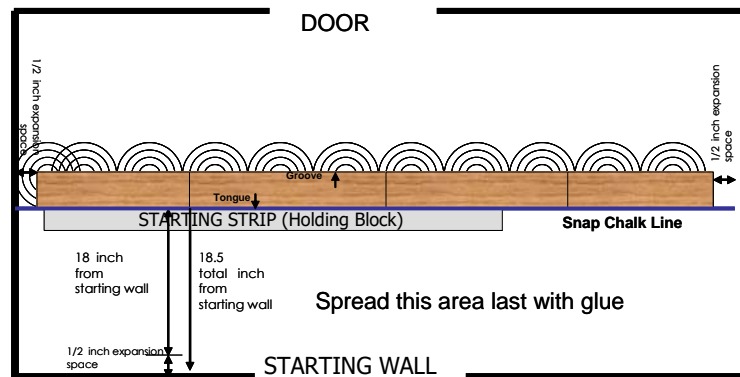
- Concrete must be free of contamination from materials such as paint, oil, wax, grease curing compounds etc. as these can result in unsatisfactory bonding of the adhesive.
- To remove the contaminants ensure that a solvent bases stripper is not used as this will affect the bond of the adhesive.
- Loose flaky concrete to be sanded with open 20 grit sandpaper.
- Prior to installation sweep or vacuum.

## Level

The floor must be level. Level is within 3/16" in 10' (5mm in 3m) and/or 1/8" in 6' (3mm in 2m).

1. High spots must be grinded level.
2. For low spots they need to be filled with Portland based leveling compound PSI 3000+.
3. Concrete sub floors must be smooth and free of structural defects.
4. Do not install over concrete that has a compressive strength less than 2500 psi

## Glue Down Installation



### Be aware of flash and open times for the adhesive.

Flash time is the waiting time between application of the adhesive and the installation of the wood floor. Open time is the maximum amount of time recommended for the adhesive to be exposed to the air before the installation of the wood. Open time typically range from 75 to 180 minutes depending on the substrate and conditions. It is important to clean glue off the surface of the flooring promptly before it dries. Each adhesive manufacturer can supply an appropriate adhesive remover. Always test these in an inconspicuous area first.

Flooring straps may be necessary to assemble and hold rows together during installation.



## Step One Starting Line

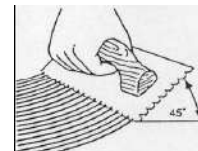
1. The floor must be level. Level is within 3/16" in 10` (5mm in 3m) and/or 1/8" in 6" (3mm in 2m).
2. Insure that the shear strength of the glue does not exceed the strength of the concrete. Lightweight concrete (less than 3000 psi) will not be strong enough for a glue down application.
3. Place a mark approximately 18" from the corners of the starting walls add the width of flooring + 1/2" to allow for expansion and the tongue. Strike a chalk line through these two points the length of the room to the end lines.
4. Measure the distance between the starting line and the wall the full length of the starting wall. If the wall is badly out of line (crooked) it may be necessary to rip boards to follow the irregularity in the wall.
5. Using no adhesive install a strip on the inside edge (closest to the wall) of the chalk line. This row may be of any straight wood material. Make certain each strip is in **perfect alignment** with the starting line. When satisfied, attach the board to the sub-floor using finish nails or concrete nails. This strip row is to minimize movement of the flooring during installation and will be removed once the floor is complete

## Step Two Spread the Adhesive

Recommended Adhesives
Bostik Greenforce <a href="http://www.bostik.com">www.bostik.com</a>
Mapei Ultrabond 980 <a href="http://www.mapei.com">www.mapei.com</a>
Sika Bond T-55 <a href="http://www.sika.ca">www.sika.ca</a>

*Read the label on the adhesive container.*

Using the trowel recommended by the adhesive supplier spread an area that can be covered with wood within the starting time of the adhesive (as noted on pail), An average spread is an area 14-25" deep and the length of the room. For Optimum adhesive application work trowel in circular motion at 45 degree angle.





### Step Three Install the Strip

1. Install the first board making certain that the Tongue side is tight against the strip. Insert the end of the next board into the adjoining tongue or groove and force the board tightly against the sacrificial board and the end of the adjoining first board. After three or more boards have been installed in the first row installation of the second row can begin.
2. Select a board for the second row that will allow at least 6" of difference between it and the length of the board in the first row. Continue installing in this manner until three or more boards have been installed. Continue adding rows, extending each as necessary until all the adhesive has been covered.
3. Avoid close alignment of joints in all rows throughout the installation, always attempting to get the maximum spacing available with a minimum of 6". Avoid alignment of joints in opposite rows, which may create an "H" pattern in the floor.
4. Once the first section has been completed inspect it closely, tightening all end and side gaps as necessary.
5. Clean all adhesive from the surface immediately. DO NOT wait to clean the surface until completion of the job, as the adhesive may not be removable. If necessary, use flooring straps to hold the joints tightly together until the adhesive cures. Do not use masking tape.
6. 3M blue painter's tape can be used to hold the rows together until the adhesive cures.
7. Measure the final row. Rip the boards (parallel cut) to fit the final wall allowing for 1/2" expansion. Use blue painter's tape to hold the final row in place.
8. Remove the strip row being careful to not damage the adjoining boards. Apply adhesive to the back of each board and gently press in place. Pull the boards tightly to the previously installed row and hold in place with blue painter's tape.

## Step Four Completion

1. Remove all tape from the floor starting from the area in which the wood was first applied. Inspect for gaps, chips and adhesive residue while removing the tape. Remove all adhesive residues, touch up chipped areas and fill with the appropriate filler as necessary. Use colored latex filler for factory finished flooring.
2. Install/reinstall all moldings.
3. Vacuum floor thoroughly. Use Appalachian Flooring multi-surface floor cleaner. **Never use a wet mop or spray cleaner directly on the floor.**
4. Follow adhesive manufacturer's instructions, however, generally, the floor can have light foot traffic after the adhesive has cured for 18-24 hours. You can move furniture by lifting it into place after 24 hours. Save a few boards in case board replacements are necessary.

## Nail or Staple Installation

### NOTES

Check stapler/nailer prior to starting installation as the installer will be responsible for damage caused by the machine. Never place the machine directly on the hardwood as it may dent or scratch the flooring. Check the plate on the machine before and during installation and replace it if damaged in order to avoid scratches. Ensure that the base sits flat on the floor and the top of the tongue. Verify that proper hose and air compressor for the model is used. When using a pneumatic gun, set and check air pressure regularly ensuring the nail/staple enters at a 45 degree angle and that the nail or staple is flush with the tongue of the flooring because if not properly set it can cause dimples or break the tongues.

**Do not use another piece of wood to tap wood into place as it can cause damage to the finish, use a rubber tapping block instead.**

### NOTES for Engineered 7" planks

A bead of polyurethane adhesive should be applied in a 3" serpentine pattern to the back of the boards and adhered directly to the subfloor if nailed down.

<b>WOOD FLOORING TYPE</b>	<b>FASTENER TO BE USED</b>	<b>FASTENER SPACING</b>
11.4mm-14.9mm thickness	1 1/4"-1 1/2" 18 gauge cleats	Blind fastener spacing every 4" apart along length of the strips, minimum two fasteners per piece. Fasteners 2" from each board end.

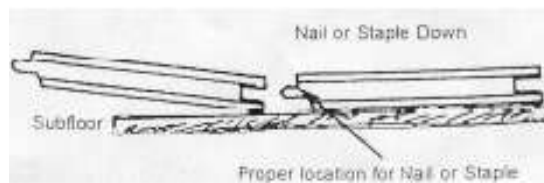
18.4mm thickness	1 ½" -2" 18 gauge cleats	Blind fastener spacing every 4" apart along length of the strips, minimum two fasteners per piece. Fasteners 2" from each board end.
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## FASTENER SCHEDULE

### Step One Working Line

1. Place a mark approximately 18" from the corners of the walls at a distance equivalent to the width of flooring + 1/2" to allow for expansion. Strike a chalk line through these two points the length of the room to the end walls on top of the underlayment. This line is the STARTING LINE.
2. Measure the distance between the starting line and the wall the full length of the starting wall. If the wall is badly out of line (crooked) it may be necessary to rip boards to follow the irregularity in the wall.
3. The floor must be level. Level is within 3/16" in 10'.
4. Use a vapor retarder (0.7 to 1 perm) over wood sub-floors.

### Step Two Board Installation



1. Install the first board making certain that the Tongue side aligns with the Starting Mark with the groove facing the wall. It is very important to start straight and square.
2. Place a serpentine bead of polyurethane adhesive on the back of the boards installed using the finish nailer for greater holding power. These boards must be installed directly on the subfloor.
3. Using 6d finish nails and a pneumatic finish nailer, nail the first board every 4" approximately ½" from the groove edge parallel to the starting wall. Nail the edge not the ends. Maintain ½" expansion space at all times. Ensure that nail head are close to the wall so they are hidden by the baseboards and quarter round.

4. Working from several cartons “rack” an area of the floor by loosely laying materials side by side in a pleasing pattern avoiding close joints.
5. “Blind” nail every 4” within the tongue side nail pocket at a 45° angle. Use 1¼”- 1½” fasteners, minimum 2 per piece and within 2” of each end.
6. Insert the end of the next board into the adjoining tongue or groove and force the butt ends tightly together. Fasten as above until all boards in the row are complete.
7. Cut to length a board that fits at the end of each row always allowing for 5/8” **expansion space at the wall.**
8. Continue adding rows in this manner, blind nailing the tongue side only until enough rows have been installed to make room for the “blind” fastening machine. Avoid close alignment of joints in all rows throughout the installation, always attempting to get the maximum spacing available with a minimum of 6”. Avoid alignment of joints in opposite rows, which may create an “H” pattern in the floor.
9. Install the area using cut pieces from the end as starter boards for the next rows to reduce waste. Continue in this manner until the entire floor that can be installed with the “blind” nailing machine is complete.
10. Using 6d finish nails or a pneumatic finish nailer blind nail and face nail the final rows. A recommended urethane adhesive can also be used to install the final rows and will provide additional holding power.
11. Measure the final row. Rip the boards (parallel cut) to fit the final wall allowing for ½” expansion.

### **Step Three** **Completing the Job**

1. Inspect for gaps, chips and adhesive residue while removing the tape. Touch up chipped areas and fill with the appropriate filler as necessary. Use colored latex filler.
2. Install/reinstall all moldings and clean the floor with the appropriate cleaner. Use only Appalachian Flooring multi-surface cleaner to clean the floors

### **Radiant Heated Subfloors**

#### **NOTES**

- Prior to any installation the slab must be cured naturally.

- It should be cured for a minimum of 30 days and 60 days is preferable. Moisture testing must be done and results recorded prior to flooring installation.
- Always check for subfloor moisture prior to installing.
- Make sure all testing of system functions has been completed and you are approved to start installation
- Insure that the shear strength of the glue does not exceed the strength of the adhesive. Light weight concrete (less than 3000 psi) will not be strong enough for a glue down application.
- **Only engineered maple, red oak, white oak and walnut floors are approved for use over radiant heated floors.**
- Solid flooring is not approved for use over radiant heated floors.

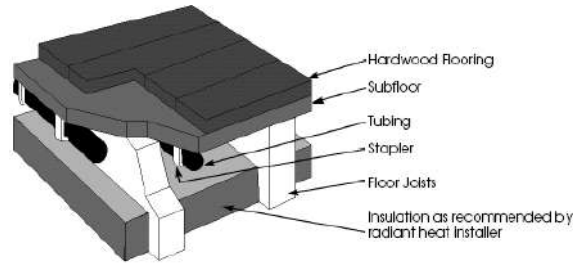
### Rules to follow:

1. Low Temperature - Keep the subfloor temperature as low as practical while still heating the space.
2. Even Heat - Spread the heat in the subfloor as evenly as possible.
3. Acclimate - Make sure the subfloor and the wood flooring are normalized or acclimated to the finished room before the wood is installed.

While normal household temperatures do not harm the wood, they do affect its moisture content. As the temperature goes up, the moisture content generally goes down. Heating the wood too much will cause it to shrink and gaps will occur between the boards. This is why a humidifier will be necessary in the room.

### Systems above Radiant Heat

1. Plywood with vapor barrier is recommended for all applications glue and cleat over radiant heat.
2. If directly over concrete it is possible to glue down using an appropriate adhesive
3. Direct nail to subfloor with floor joists. The plywood is screwed and glued into place on the floor joist which the radiant heating system is installed. The vapor barrier is between the floor and the subfloor.



**WITH RADIANT HEATING IT IS EXTREMELY IMPORTANT THAT THE RELATIVE HUMIDITY STAYS BETWEEN 45-55%, NEVER GOES BELOW 35% AND THAT THE SUBFLOOR TEMPERATURE DOES NOT EXCEED 81F (27C). TYPICALLY A HUMIDIFIER AND DEHUMIDIFIER WILL BE NEEDED.**

**IN ADDITION TO THESE POINTS PLEASE READ THE INSTALLATION PROCEDURES FOR THE TYPE OF INSTALLATION YOU PLAN TO DO OVER THE RADIANT HEAT.**

### Glue Down



Follow appropriate glue down guidelines as outlined in this guide as well as those from the adhesive manufacturer and the NWFA.

- Do not glue down any flooring directly to the exposed radiant heat piping.
- Do not directly glue down any wood flooring over brittle or light weight concrete
- Make sure you use an adhesive that is rated for use over radiant heat systems.

### Nailing

Please follow NWFA guidelines.

The essential requirement in proper applications of wood flooring over radiant heated systems is to avoid penetration of the heating element. Be sure nails are not so long as to penetrate heating elements.

### Starting the Radiant Heating System

The heating system should be run at 2/3 of maximum output for a minimum of 2 weeks before hardwood installation to allow any remaining moisture to evaporate.

- Four days prior to installation, during installation and 48 hours after installation, the heating system needs to be reduced to approximately 64F (18C).
- 2 days after installation gradually and for the next week raise the temperature to desired level (1C increase every 24H).
- The surface temperature of the subfloor should never exceed 81F (27C)
- Most radiant heat systems do not have a humidification system. However, the relative humidity MUST BE MAINTAINED AT 35-55%. Add humidification to maintain this level and to ensure that the warranty conditions are met.
- Expect some seasonal shrinkage during the heating season.



## Repairs

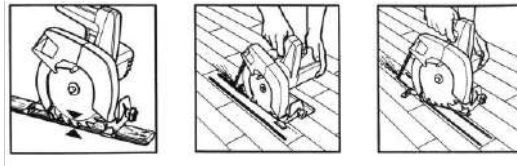
Wood is a natural product. If repairs are needed during and after installation, it is normal. Using a touch up marker, wax filler, or putty filler to fix imperfections in the flooring is standard practice. In addition, for the larger repairs, a board replacement is a normal procedure during and after installation.

### Board Replacement

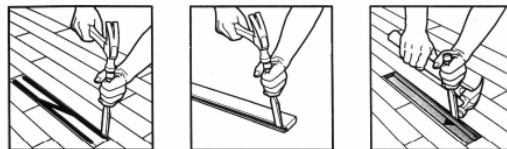
#### Step One: Board replacement selection

Individual wood flooring boards can be replaced in solid and engineered prefinished flooring products without affecting adjoining boards. Prefinished boards should be selected for gloss and color match as well as to resemble the grain pattern and look of the original board.

#### Step two: Removing damaged boards

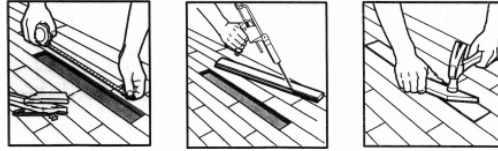


- Make sure you have a replacement board. Set a circular saw to the depth of the thickness of the board to be removed.
- Make one cut inset 1/2" from groove side running from end to end on the board to be removed.
- Make a second cut inset 1/2" from tongue side running from end to end on the board to be removed.
- Make a third cut across the center of the board at a 30-45 degree angle from first long cut to second long cut.



- With a chisel cut completely through both ends at cut lines and lift out center of the board. The groove side piece can now be easily removed.
- Carefully remove nails or staples and side tongue piece. Avoid damage to adjoining boards.

### Step three: Board replacement



- Clean all debris and old adhesive from the work area.
- Repair subfloor if necessary. Measure the opening and cut replacement board to size.
- Measure the opening and cut replacement board to size. Carefully test the new board against the opening for precise fit.
- From the back side of the replacement board, chisel off or cut lower half of its groove side and end match so that it will fit over the tongue of the adjoining boards in the replacement area.
- Carefully dry fit the replacement board. When well situated, coat tongue and groove with glue. If available, use a polyurethane adhesive suitable for hardwood flooring to coat the back of the board to avoid the use of nails (described below) in the repair. If glue is used, board must be placed in contact with the subfloor or glue compatible membrane.
- Insert tongue, then drive it into place, using a wood block and mallet. If adhesive has not been used to secure the board (as described above) to the subfloor drill pilot holes for nails at each end of board and along sides of long boards. Make holes smaller than the size of the cement coated nails.
- A fifty-pound weight should be placed on top of the clean board for 24h post replacement.
- Sink nail heads with a nail set. Use color putty to fill holes and joints.

## Annex one – Materials and Tools Required for Installation

Install	GLUE DOWN	NAIL OR STAPLE	
	x		Flooring straps
	x	x	Hammer or rubber mallet
	x	x	Measuring Tape
	x	x	Utility knife
	x	x	Tapping block
	x	x	Chalk line
	x	x	Straight Edge
	x	x	Carpenter square
	x	x	Pencil
	x	x	Moisture meter
	x	x	Pry bar
			Pull bar
		x	Drill
	x	x	Hand saw, table saw, circular saw or band saw
	x	x	Jamb saw
		x	Air compressor and hose
		x	Recommended flooring stapler/nailer
	As needed		100-150lbs (45-69kg) roller
	x		Scraper
	As needed		Leveling compound
	As needed		Leveling bar
<b>Tools</b>	x	x	Level
			2" concrete nails and 1"x3"x8" lathe for first row holding back
	x	x	Wood filler
	x		3m blue tape
	x		Recommended adhesives
	x		Recommended trowel
			Premium wood glue (PVA carpenters glue)
		x	1 1/2"-2" fasteners
	As needed	As needed	Moldings, reducers, stair nosing
	x		#20 grit sandpaper
		x	Pneumatic finish nailer 1 1/4"- 1 1/2" fasteners or 6D nails
	As needed		Acoustic underlayment pad
		x	Vapor retarder / barrier
	x	x	Broom or vacuum
	x	x	Appalachian multi-surface floor cleaner
	x	x	Towel for cleaning tools
	x	x	Recommended adhesive remover
	x	x	Safety glasses
	x	x	Dust mask