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When most people think about installing hardwood floors, they typically envision a hammer, nails, and a lot of backbreaking work. However, the reality is there are several options available for installing wood floors. Choosing the most appropriate method depends on the flooring type, whether the floor will be installed above or below grade, and the type of material employed for the subfloor.

Basically, there are three methods commonly used to install wood floors—nail-down, glue-down, and floating. This article explores the benefits and trade-offs of each method, examining when each strategy is most suitable for the task at hand.

**Nail-down**

Nailing down wood floors is the most common installation method. The process involves nailing or stapling the wood flooring material directly to a wood subfloor. Typically, it is installed by blind-nailing the material through the tongue of the floorboards into the wooden subfloor. This way, the nails are not visible after the flooring is installed.

In most cases, as the material fills the room, it will be necessary to face-nail the last few boards as the nail gun or staple gun cannot reach the tongue on the last few rows of flooring material. This installation method works for both solid and engineered wood flooring material, but only on wood subfloors.

When nailing down a wood floor, it is important to follow nailing schedules to ensure a quality installation. The National Wood Flooring Association (NWFA) Hardwood Flooring Installation Guidelines recommends that for blind-nailing 19-mm (¾-in.) solid strip tongue-and-groove flooring less than 76 mm (3 in.) wide, fasteners be spaced 152 to 203 mm (6 to 8 in.)
apart and 25 to 76 mm (1 to 3 in.) from the ends.

When face-nailing 19-mm solid strip tongue-and-groove flooring less than 76 mm wide, fasteners should be placed 254 to 305 mm (10 to 12 in.) apart. For 19-mm solid plank flooring greater than 76 mm wide, NWFA recommends blind-nailing fasteners every 152 to 203 mm apart and 25 to 76 mm from the ends.

When face-nailing 19-mm solid plank flooring greater than 76 mm wide, fasteners should be placed 254 to 305 mm apart. For engineered flooring, the NWFA's installation guidelines suggest manufacturer recommendations be followed. The typical suggestion, however, is engineered flooring being installed using cleats spaced every 102 to 152 mm (4 to 6 in.) apart and 25 to 51 mm (1 to 2 in.) from the end joints.

Engineered flooring being installed using staples should have them spaced every 76 to 102 mm apart and 25 to 51 mm from the end joints. Using fewer fasteners could result in cracks or squeaks in the floor, while using more could mean splitting the tongue, resulting in the flooring not adhering to the subfloor.

**Glue-down**

The glue-down installation method involves using adhesive to adhere the flooring material directly to the subfloor, or to a moisture barrier installed directly on the subfloor.

There are two types of wood flooring adhesives available on the market today—moisture-curing urethane and synthetic polymer adhesives. Since each one has different application and performance characteristics, one should research to find the product that will best fit the installation.

Some considerations that will have an impact on which adhesive one ultimately chooses for the installation include:

- ease of product use;
- product performance span; and
- any volatile organic compound (VOC) regulations that prevail in the area where the installation will take place.

Before beginning any glue-down floor installation, it is important to ensure the subfloor material is dry and flat. Since the boards are being adhered directly to the subfloor, it will take on its shape. Therefore, if there is a high spot on the subfloor, there will be a high spot in the flooring. High spots should be sanded down. Likewise, any low spots should be filled in with levelling compound to make them flat before installation begins. This preparation will help ensure long-term performance.

As a general rule, only as much adhesive as can effectively be worked within a period of 15 to 20 minutes should be put down. Any longer may cause the installation to fail as the bonding reaction could already have begun before the wood is installed over the adhesive.

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A glue-down installation being taught at a National Wood Flooring Association (NWFA) wood flooring installation school.

A nail-down installation featuring solid plank random-width distressed reclaimed white and red oak.

With many adhesives, the material must be down on the subfloor for a specified period of time before the wood is placed on it. This is called 'flash time,' and it is important to allow the proper duration to achieve optimal performance. Other adhesives do not require flash time and are called 'wet-lay' products. These adhesives require the wood be installed immediately after the adhesive is put down, so it is important to know and understand the flash time requirements for the product being used.

The properties of each adhesive type vary significantly among manufacturers, so one should always check the specific recommendations before installation begins. The wood flooring manufacturer's recommendation for the adhesive to be used to install the product, and the adhesive manufacturer's recommendation for the trowel, must always be followed. Using the wrong trowel can result in an improper spread rate and ultimately result in adhesion failure. Other factors, such as relative humidity (RH), could influence the bonding properties of the adhesive being used as well, so one should ensure the jobsite is at ideal conditions before beginning the installation.

No matter which type of adhesive is used, it is important to clean up stray adhesive from floorboards as the flooring is being installed. Allowing the adhesive to remain on the face of the flooring could result in unsightly cloudy or white spots when the adhesive dries. It is also very difficult to remove once it dries, and could cause a chemical reaction with the finish. Spills and drips must be cleaned as they occur.

Floating

The final wood flooring installation method is 'floating'—a process created by a wood flooring manufacturer in Sweden more than 60 years ago. Using this installation method, the flooring material is neither nailed nor glued to the subfloor, but floated above. The flooring material, usually engineered, is either glued or clipped to itself, both tongue to groove, and at end joints. This gives the floor stability without actually fastening it to the subfloor material beneath it. This installation is ideal over existing flooring material (e.g. vinyl, ceramic, or laminates), which can be difficult to remove.

Click installation systems are fairly new to the market and are another floating floor installation option. With these assemblies, the flooring does not require adhesives or clips to install the flooring. In some cases, the floorboards simply 'click' together (like Lego or other glueless fastening systems) and adhere to one another mechanically rather than chemically.

In other cases, the click systems include some sort of friction-induced chemical bonding process with adhesives applied by the manufacturer. When the tongue and groove and the end-joints are clicked together, the friction causes the adhesive to chemically react and form a chemical bond between boards. In either case, the click systems are floating floors as well; they adhere side-to-side and end-to-end without being fastened directly to the subfloor.

Before beginning a floating floor installation, it is important to ensure the
should be to see whether the jobsite conditions are acceptable for proper flooring installation to take place. Knowing what to look for before work begins can save the contractor big headaches, and increase profits, down the road.

First, it is important to understand installing wood flooring is often one of the last jobs to take place on any construction or remodeling project. In many cases, this means the flooring contractor may be pressured to get the floor installed quickly to make up for previously missed deadlines, without taking the necessary precautions and steps to ensure a quality installation. In the long run, it is in the contractor’s best interest to insist certain jobsite conditions be met ahead of the installation.

Before the wood flooring is delivered to the jobsite, the building should be completely enclosed. This means all doors and windows should be properly installed with working locks and latches. Having the construction site open to the outdoor elements could expose the wood flooring to excess moisture or humidity, which could potentially damage it and jeopardize a successful installation.

Final grading of the construction site should occur before the wood flooring is delivered to the jobsite as well. Any surface drainage on the construction site must direct water away from the building to minimize moisture issues that could impact the wood flooring. Additionally, all concrete, masonry, plastering, drywall, and other wet construction work should be completed and thoroughly dried before the wood is delivered. This includes any painting and texturing that will take place, both inside and outside the building. Exposing the wood floors to these kinds of elements could introduce excess moisture to the materials and potentially damage them.

Contractors should also ensure all basement and crawlspace areas are dry before the wood flooring is delivered, with proper vapour barriers and ventilation securely in place. In general, crawlspace should be at least 457 mm (18 in.) from the ground to the underside of the floor joists. Crawlspace vapour retarders should be a minimum of 0.152 mm (6-mil) black polyethylene. Perimeter venting should be equal to a minimum of 0.15 m² (1.5 sf) per 10 m² (100 sf) of the crawlspace, with vents properly positioned to foster adequate cross ventilation for the entire area.

Another important jobsite condition that must be met before flooring can be delivered to the building is for all the interior heating and cooling systems to be properly installed and working. These systems should be used to bring the building as close to normal living conditions as possible before the wood arrives. Additionally, the moisture content (MC) of the subfloor should be checked so it is acceptable for the geographic area, as this impacts the long-term performance of the wood flooring.

Once all these conditions are met, the wood flooring can be delivered to the jobsite. After the wood is delivered, it is important to allow enough time for the flooring to acclimate to the current jobsite conditions. The time required to accomplish this will vary depending on the type of wood flooring used, as well as the manufacturer’s specifications. It is important to perform a moisture test on all wood

subfloor material is dry and flat. As with the glue-down installation method, one needs to correct high and low spots before installation begins to ensure the long-term performance of the floor.

**Jobsite preparation**

No matter which installation method chosen, the same basic installation principles apply. Before work begins, the flooring contractor’s first priority

**Glue-down installation featuring solid American black walnut parquet in a French Versailles pattern.**

**Glue-down installation featuring solid hand-scraped hickory parquet in a custom basket weave pattern with faux alligator leather inserts.**
flooring, as well as the subfloor, before the installation process begins.

For solid strip flooring less than 76 mm (3 in.) wide, there should be no more than four per cent moisture content difference between properly acclimated wood flooring and the subfloor material. For solid flooring more than 76 mm wide, there should be no more than two per cent MC difference between properly acclimated wood flooring and the subfloor material.

If the wood flooring is not allowed enough time to acclimate to the jobsite, problems can occur, including:

- cupping;
- abnormal gaps appearing between floorboards;
- cracks developing on the face of the floorboards;
- splits that appear at the ends of floorboards;
- squeaks; and
- other noise-related issues.

Flooring contractors should remember no matter which installation method is used, wood flooring will reflect the shape of the subfloor, so the contractor must verify the subfloor is both solid and flat. This means any high or low spots should be corrected to flatten the floor as previously stated. It also means the contractor should ensure the subfloor is securely fastened to the flooring joists. This will prevent the floors from squeaking in the future.

Finally, flooring contractors should follow all manufacturer recommendations for installation, rack the wood in advance to avoid 'H-joints' and stair-stepping, and allow for enough expansion space for the product being installed to avoid buckling and other potential problems.

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