



**GILFORD-JOHNSON**  
FLOORING

1-866-940-5603  
tech@gilfordjohnson.com

## Flattening Wood Subfloors



The subfloor is the foundation for the wood floor. Whatever happens below, will undoubtedly affect what's on top. In other words, an improperly prepared or inadequate subfloor will adversely affect how the wood floor performs. Subfloor flatness is one of the many considerations that should be addressed before installation of any wood floor.

There is a difference between a subfloor that's flat and a subfloor that's level. You can have a flat floor where all points are in the same plane, but it's not level. Wood floors may be installed over subfloors that are out of level, such as a ramp, but should still fall within floor flatness tolerances. When nailing down a wood floor, the subfloor should be flat to within 1/4" in 10' or 3/16" in 6'. It is the responsibility of the flooring installer to assess and address substrate flatness before installation. Installation of a wood floor over the subfloor insinuates acceptance by the flooring installer.

You should inspect the subfloor carefully. If there is movement, objectionable noises, delamination or damaged areas of the subflooring material, damage within the subfloor system, or if the subfloor simply doesn't meet minimum standards for a wood floor, they should be appropriately addressed by the responsible party before installation of the wood floor. In new construction, the responsibility lies with the builder; in a remodel project, these repairs should be completed by a qualified professional. Use the pre-installation job site checklist available to members at [NWFA.org](http://NWFA.org) as a guide for assessing the job.



**GILFORD·JOHNSON**  
FLOORING

1-866-940-5603  
tech@gilfordjohnson.com

When installing over a wood subfloor, the flatness can affect how easily the wood floor can be installed, as well as the floor's long-term performance. Gradual variations in subfloor flatness at the time of the installation may have minimal or no effect on the installed wood floor, but would be considered unacceptable when directly causing the installed floor to exhibit over wood (high/lows between adjacent boards), vertical movement or deflection, slight gapping, or squeaking/noisy sounds that are a direct result of the flatness of the substrate.

Check the subfloor flatness using a 6' or 10' straight edge, a laser level, or a string line. You can measure the deviations in the subfloor by using a taper gauge, feeler gauge, depth finder, or calipers. From here, you should be able to mark out any discrepancies on the subfloor itself; giving a good indication of what alterations will be necessary.

With wood subfloors, your first plan of attack should always be to sand the high seams. It is good practice to sand all of the abutting seams on every job throughout the entire layout. Sanding seams is necessary on most jobs due to the tendency of OSB to swell at the edges (coincidentally known as edge-swell) when exposed to rain, snow, or construction-related moisture introduced during the construction process (which also reiterates the need to check the moisture of the subfloor before installation). It is easiest to sand the seams either using an edger or a buffer with coarse grit sandpaper. Use caution when sanding wood subfloors, as breathing these particles may cause allergic respiratory symptoms, mucosal and non-allergic respiratory symptoms, or even cancer. Proper use of a respirator minimizes the effects of these airborne particulates.

When there are low areas in the wood subfloor that need to be addressed, there are many methods used to get the substrate to within tolerance. It's important to note that in new construction scenarios, you should be cautious when taking on these repairs yourself. Outside of sanding seams, the builder should address any substrate issues before any floor covering coming to the job site.

In a remodel scenario (which is where this prep work is most common), removal of the subfloor to address the issue is often necessary. Before jumping into a repair of this magnitude, you should first determine whether the sagging/low areas are in any way structural. In some cases, a structural engineer may need to assess the situation to make this determination. Also note that in many jurisdictions, if you "cut" or "alter" the structure in any way, a building permit will be required. Altering the structure would include removal of the subflooring to access the joists in order to make necessary corrections.



**GILFORD·JOHNSON**  
FLOORING

1-866-940-5603  
tech@gilfordjohnson.com

The following are common methods for addressing the joists before reinstalling the subflooring material:

- Planing the existing floor joists, which includes removal of material to bring the elevations to within tolerance after the subfloor is replaced.
- Centering material to get the elevations within tolerance, which is the reinforcement of a joist by nailing, or attaching alongside the existing joist, another joist or reinforcing member.
- Replacement of the joists altogether, which requires removal and replacement of entire joists. Keep in mind, plumbing lines and electrical wiring/conduit are often run through/or alongside the joists, and will add to the difficulty of the replacement.

Be mindful that doing any of these repairs also opens the flooring contractor up to new potential liabilities due to the completion of work outside of the wood flooring profession, which may also require alternative/upgraded insurance policies, state licensing requirements, as well as further training or qualification of this skillset.

When doing minor overlay repairs to a low area within a subfloor, some of the more common methods are listed below:

- Shimming the subfloor is a common method to flatten to required tolerance. Shimming may consist of many variations in technique and a multitude of products to achieve the same goal.
  - Probably the most common method of shimming is using underlayment material to build slight elevation gains. In general, vapor retarding membranes such as #15 felt or asphalt saturated kraft paper are just shy of 1/64" thick.
- 3-tab roofing shingles may range from 1/16"-3/8" in thickness, or more, depending on the quality/style. The thinner, less-expensive shingles work best. Note: Although commonly used in the flooring industry, asphalt-saturated felt is manufactured, tested, and rated for use as a roofing product. Asphalt is known to the state of California to cause cancer and birth defects or other reproductive effects. Other state regulations may apply. Check individual state requirements for using asphalt indoors as an underlayment.
- Sheet vinyl products such as linoleum may range up to 1/8" in thickness. Many tear outs include removal of linoleum to be replaced with wood floors; this can be a great way to repurpose old material. Note: Linoleum installed in homes prior to 1986 may contain asbestos. To avoid exposing your customers, your employees,



**GILFORD·JOHNSON**  
FLOORING

1-866-940-5603  
tech@gilfordjohnson.com

and yourself to the dangers of asbestos, have the product tested and/or hire an asbestos abatement company to remove and dispose of the products. Strict removal and disposal laws have been put in place to protect workers and homeowners from the dangers of asbestos.

- Any time you use paper, roofing shingles, linoleum, or similar products to build up low spots in the subfloor, you reduce the fastener penetration into the wooden subfloor, which in turn increases the potential for squeaks, crackles, pops, or overall disengagement from the subfloor. Use of longer fasteners may assist in minimizing these risks, but will not alleviate the risk.
- Cedar shims can give elevation gain from 0 to 3/8" within a short 15" span. When elevation gain requires more, customized screeds planed to the necessary thickness work just as well.
  - How these shims are also adhered to the wood substrate below will dictate how well the wood floor performs over them. They are normally set in a bed of adhesive, which can allow for a nice solid platform for the flooring install.
- Plywood allows for a much better build-up with lower undulations in the subfloor. Plywood is available in many thicknesses (1/8", 1/4", 11/32", 15/32", 19/32", 23/32" and 1 1/8").
  - Build up from the lowest elevation, using the products that allow for enough incremental elevation gain to get to within flatness tolerance.
  - Using a good urethane adhesive along with screws will help minimize any potential for inadvertent noises such as squeaks or pops.
  - Any ridges at the panel edges should be sanded flat before installation of hardwood flooring, using an edger with coarse grit sandpaper.
- Many times a combination of all of these methods are necessary to get the floor flat to within tolerance.

Self-levelers are not normally approved or recommended for use over non-dimensionally stable subfloors such as OSB or plywood. And more importantly, you cannot nail through them. Check with your manufacturer for use and compatibility of these types of products over wood subfloors if you're considering a glue-down installation. Also remember that glue down over a wood subfloor is normally only recommended when no moisture issues exist and the space below the floor is climate controlled.

Although there is no standard on "how-to" flatten a subfloor, and no two subfloor jobs are the same, these general tips should give some general direction on which method best fits a given scenario. Many of these recommendations come from years of experience and from many of our members' suggestions. Throughout 2018, NWFA will be teaching



**GILFORD•JOHNSON**  
FLOORING

1-866-940-5603  
tech@gilfordjohnson.com

many of the subfloor preparation techniques and moisture testing for both wood and concrete subfloors. You can find a list of when and where these classes will be at [nwfa.org/education](http://nwfa.org/education).