

## Gaps - Normal - Causes & Cures

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Seasonal gaps are a normal occurrence with wood floors. This is because wood is a hygroscopic material that absorbs and loses moisture in response to its environment. During warm, humid months, wood will gain moisture and swell. During cool, dry months, wood will lose moisture and shrink. This dimensional change is a normal function of wood that can result in seasonal gaps.

Typically, seasonal gaps will appear when wood shrinks (winter) and disappear when wood swells (summer). As long as these gaps return to normal, there is no need for concern or for repair. Gaps of this nature may be more noticeable with wood floors that utilize wider width boards. In addition, gaps may be more noticeable with square-edged floors than with bevel-edged floors, and with light-colored species as opposed to dark-colored species.

Gaps that do not appear and disappear seasonally are not considered normal. This type of gap has a variety of causes, including edge crush or compression set, hot spots in the subfloor, debris between the floor boards, improper nailing, cracked tongues, excessive moisture in the floor or subfloor, improper installation, foundation settlement, subfloor movement, improper subfloor materials, and improper adhesive use.

To repair this type of gap, the cause must be determined, eliminated, and humidity levels should return to normal living conditions. When the floor has stabilized, gaps up to 3/32" can be repaired using a compatible wood flooring filler. For gaps larger than 3/32", a sliver or Dutchman should be used to repair the gap.



Most seasonal gaps can be minimized by maintaining the structure within normal living conditions year-round. The best results will be achieved when the temperature is kept between 60-80 degrees Fahrenheit, and humidity is kept between 30-50%.

**More-detailed information about wood flooring gaps is available in the NWFA Wood Flooring Installation Guidelines and Methods publication, or at <http://member.nwfa.org/default.asp?page=InstallGuidelines>.**

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## Abnormal Gaps

**DEFINITION:** Gaps between boards in the installed floor that were not intentionally placed and remain with seasonal changes of high and low humidity.

### CAUSES:

- Flooring not installed tightly together to begin with.
- Debris between the boards during installation.
- Solid wood flooring installed at a higher moisture content a time of installation than the in-use conditions.
- Edge-crush/compression set from exposure to extreme moisture after the floor was installed.
- Distorted solid wood flooring from the manufacturing process (such as crook, pistol-grip, end joints out-of-square, variation in MC, etc.) that was installed in the floor.
- Changes in wood moisture content during the acclimation process as the flooring comes to equilibrium moisture content with the building, the wood may become distorted, which could result in gaps between boards.
- Solid wood flooring may exhibit End-shrinkage when moisture has been removed from the wood fibers through the end joints of individual planks, which may be caused by the following:
  - During the acclimation process, the packaging boxes are opened and exposed at the ends only, resulting in a reduction in moisture. (Not all of the material being conditioned to the environment at the same rate)
  - During storage or transportation the flooring becomes exposed to dry conditions, specifically affecting the outermost portion of palletized materials
- Substrate related causes:
  - Movement or deflection within the subflooring system.
  - Structural or foundation settlement.
  - Substrate not flat to within required tolerance (see NWFA Installation Guidelines for flatness requirements, unless otherwise specified by the flooring manufacturer).
  - Wood subflooring with excessive moisture during wood floor installation. Gaps will be most noticeable at approximate intervals coinciding with the subfloor joints. (see Panelization)
  - Hot spots in the subfloor, such as poorly insulated heating ducts, hot water plumbing lines, radiant heating systems, register openings and appliance motors.
  - Improper subflooring material for flooring being installed.
- For nail down floors:
  - Improper subflooring materials that will not hold the fastener.
  - Wrong fastener used per flooring manufacturer.
  - Improper fastener schedule or fasteners too close together resulting in cracked tongues.
  - Overdriven or underdriven flooring fasteners as a result of incorrect air compressor pressure settings.
- For glue down floors:
  - Early foot traffic before the adhesive has had time to set up during or following the installation.
  - Inadequate bond between the adhesive and the subfloor.
  - Improper use of straps or tape used during the installation.
  - Incorrect adhesive used for the flooring being installed.
  - Improper use of the adhesive.
    - Wrong trowel or spread rate as required by the adhesive manufacturer
    - Inadequate adhesive transfer as required by the adhesive manufacturer
    - Improper flash time allowing adhesive to skin over.
    - Not using a roller when recommended by the adhesive manufacturer
- For floating floors:
  - Failure to follow flooring manufacturer's installation instructions.



- Improper or missing adhesive used on tongue or groove of flooring.
- Improper adhesive application to tongue or groove.
- Loss of the adhesive bond between the tongue and groove.
- Broken or missing locking mechanism.
- Mechanical lock becomes disengaged (this is common on end joints with deflection due to a subfloor out of flat tolerances or improper underlayment material).
- Improper underlayment material used (per the flooring manufacturer) below the flooring.
- Inadequate expansion space may result in stresses in the entire flooring system resulting in gaps. This may also be caused by baseboards/trim being caulked to the installed flooring.
- Improperly installed or missing transitions at openings or vertical obstructions may result in stresses in the entire flooring system resulting in gaps.
- Improper spans/transitions as required by the flooring manufacturer.
- Heavy or permanently affixed (into the subfloor) objects restricting movement of the flooring system (such as kitchen island, appliances, electrical flooring outlets...)
- Moisture or environmentally related issues

#### CURES:

- Never attempt to repair a floor with moisture issues until all of the sources of moisture have been located and eliminated.
- Issues with the subfloor must be resolved; this is not typically the responsibility of the flooring contractor.
- Isolation repairs (such as wood filler, color matched putty or matching wood slivers) to address aesthetic concerns.
- For square edge material, replace the board(s) with matching material, then recoat or resand as necessary.
- For beveled edge flooring material, replace the board(s) with matching material. Additional steps may need to be accounted for when replicating bevels or edge profiles. Color matched putty may also be necessary and appropriate in some cases.
- In the case of widespread gaps throughout the floor, removal and replacement of affected areas may be necessary.
- Recoat or resand isolated areas or the entire floor as necessary.

### Seasonal/Normal Gaps

**DEFINITION:** Gaps that appear between individual boards, opening and closing with seasonal humidity changes. Wider boards can experience wider gaps. Gap size is directly related and proportional to the board width.

Normal gaps may also have been intentionally built into the installation as internal expansion space to accommodate for future seasonal changes.

#### CAUSES:

- Most normal gaps are caused by seasonal fluctuations in relative humidity. The floor expands with high humidity and contracts with periods of low humidity. This type of expansion and contraction is considered to be normal and expected with wood floors when exposed to seasonal variations.
- When wood flooring is installed during dry seasons where relative humidity is not maintained, it is normal to leave internal expansion spaces, or gaps, within the floor to accommodate for seasonal humidity changes.

#### CURES:

- Seasonal gaps can be minimized or completely eliminated by using the HVAC system to maintain relative humidity within the ranges suggested by the manufacturer or NWFA on a year-round basis. The use of humidifiers during the dry season and dehumidifiers during the humid season will help maintain constant wood moisture content resulting in reducing or eliminating gapping issues.

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