



# **Junckers** – A Natural Feeling

## **Our Radiant Heat Guide**

# Junckers Clip System & Radiant Heat

For over 70 years Junckers has been producing hardwood floors of exceptional beauty and quality. Junckers, Europe's largest producer of pre-finished solid hardwood flooring is recognized worldwide as a leader and innovator in hardwood installation over radiant heat systems. The unique nature of Junckers Clip Installation System and our solid hardwood flooring products makes this system a natural choice.

Developed by Junckers over 30 years ago, the clip installation method enables Junckers solid hardwood floors to be installed in a way that is truly revolutionary. With over one billion square feet installed all over the world, above, on, and below grade, the Junckers Clip System is the only floating installation method that allows solid hardwood flooring to be installed directly over any dry, level subfloor, including concrete. The Junckers Clip System is particularly suited for use over radiant heat systems as it allows the floor to come in close proximity to the heat source, thus allowing for efficient transfer of heat. The Clip System also allows the floor to move freely and in a uniform manner. This benefit assists in eliminating some of the traditional problems associated with hardwood flooring over radiant heat.

**The benefits of a Junckers floating floor over a radiant heat system include:**

- Eliminates the need for a plywood subfloor over concrete, thereby allowing for more efficient heat transmission. Problems associated with the use of plywood can include delamination and loss of bond.
- Junckers Poly-Felt underlayment acts as a moisture barrier against vapor emissions and is a non-organic material, allowing for a healthy indoor environment.
- As no nailing is required, the Junckers Clip System eliminates the possibility of punctures to the tubing.
- As the floor is not glued directly to the concrete, the Junckers Clip System eliminates the potential loss of adhesive bond between the flooring and subfloor. In addition, the use of a Junckers solid hardwood floor eliminates the worry of delamination, associated with engineered flooring.
- Junckers solid hardwood floors may be sanded and recoated many times and maintain their natural beauty for a lifetime. See Junckers Lifetime Warranty & Maintenance Guide for additional information.

Most Junckers floors are available with our unique Ship's Decking option, which consists of a pre-applied neoprene strip on each board. This feature demonstrates a beautiful designer look that assists in making the normal seasonal changes in the floor less noticeable.

**Radiant Heat Systems:** In-floor heating systems should be water-based, low temperature, and must not generate surface temperatures in excess of 85°F. Electrical radiant heat systems are not recommended. Diligently follow all radiant heat manufacturers installation specifications.

## FAQ's

**Q. At what point during construction should a Junckers floor be installed?**

**A.** Hardwood flooring should be the last item installed in the home. The lightweight concrete should be fully dry. All doors and windows should be installed and weather tight before installation. Kitchen cabinets should be installed prior to the hardwood floors. Environmental conditions should match living conditions as closely as possible with a relative humidity range of between 35–65% depending on local climatic conditions.

**Q. How long before installation of Junckers should the radiant system be turned on?**

**A.** Prior to the installation of your solid hardwood flooring, the heating system should operate for at least 2–3 weeks with the thermostat set at 70°F and then at 85°F for 2–3 days. During this period the home should be ventilated briefly each day to prevent a build-up of moisture that may occur during the drying process of the lightweight concrete.

**Q. What is the maximum surface temperature?**

**A.** 85°F.

**Q. What should the moisture content of the lightweight concrete be before installation?**

**A.** Moisture content of the lightweight concrete must not exceed 1.5%, as determined by a Tramex concrete moisture meter.

**Q. Do the boards move or change size? If so, why?**

**A.** Wood is a natural living material and as such will react to changes in its environment. Wood flooring will contract when exposed to low humidity levels, and conversely, will expand when exposed to elevated humidity levels. The relative humidity in your home will fluctuate with changes in the weather brought about by normal seasonal cycles. In general, the cooler winter temperatures bring lower levels of humidity and the warmer summer temperatures bring higher levels. Heating and air conditioning may also have the same effect. As your floor will expand and contract primarily in the width, periods of lower humidity will cause a loss of moisture in the wood and may result in slight gaps between the boards. This is perfectly normal and once the humidity level rises, the wood will once again regain its moisture and the gaps will close.

**Q. If solid wood moves...?**

**A.** A commonly held belief is that engineered products do not move. However, they are fabricated from wood and have a tendency to expand and contract at the ends versus the sides. In addition, the cross plys found in engineered floors have a tendency to be effected by radiant heat and can fail. Face veneer products are prone to surface splits and cracks, whereas the ability of a Junckers clip floor to "float" and expand and contract in a uniform manner gives greater, long-term performance.

**Q. Can the movement of wood flooring be controlled?**

**A.** By adding humidifiers to the home, relative humidity can be maintained and seasonal changes minimized. In areas of the country that have very warm and humid summers, these humidity spikes within the home can be remedied or prevented by running the air conditioning.

**Q. What about acclimation of the wood?**

**A.** In general, acclimation is not necessary with Junckers floors when installed to Junckers specifications in most regions of the country, with few exceptions. If your home is located in a very arid area that may experience periods of humidity as low as 10% during the year, then you should acclimate your Junckers floor. To successfully acclimate, all boards must be removed from the packaging and placed "cross stacked" into the area where the floor will be installed. The period of acclimation will vary, however, as the days go by there are tests that you can perform to see if the floor is fully acclimated. During acclimation moisture is being removed from the boards, and as a result, the boards will contract in the width. Measure the width (face) of the board, if you get a reading below 128.8 mm, your floor is ready to be installed. You may also use a moisture meter to measure the moisture content of the boards. A reading of 6% or lower will also mean that your floor is fully acclimated.

**Q. What would be considered a low humidity climate?**

**A.** Junckers divides the country into four humidity zones. Only zone one (see Junckers Installation & Repair Instructions) requires that the material be acclimated to the home. This zone falls in desert and high altitude areas with very dry conditions and low relative humidity conditions that fluctuate between 10–30%.

**Q. Will area rugs, furniture, and bookcases interfere with the transmission of heat or the movement of the flooring?**

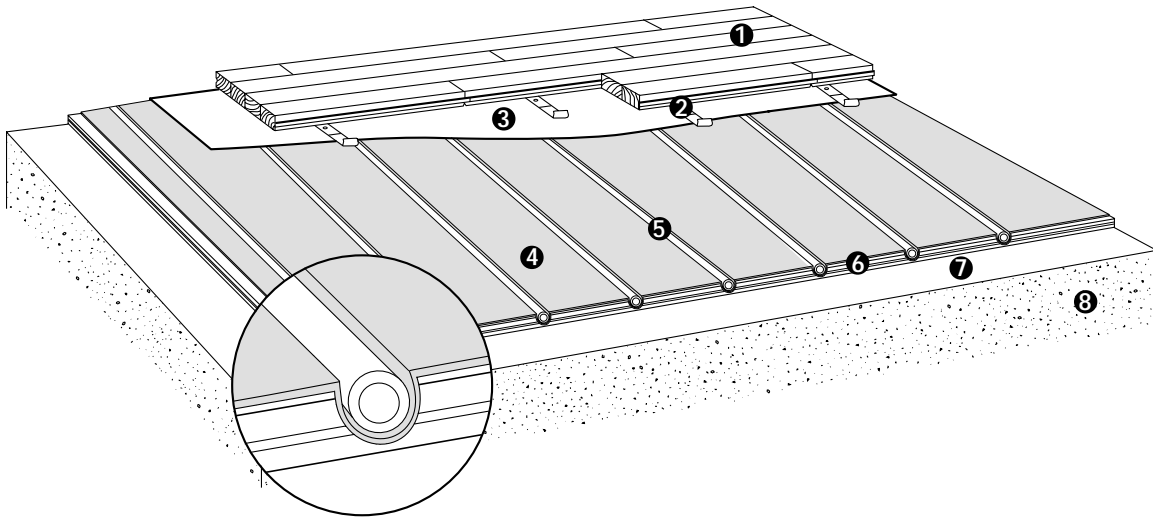
**A.** Areas covered by these items may retain some heat, and therefore may cause a slight change in heat transmission. Please note that these areas may also show slight gaps between the boards.

**Q. Should the radiant heat be turned on prior to the weather becoming very cold?**

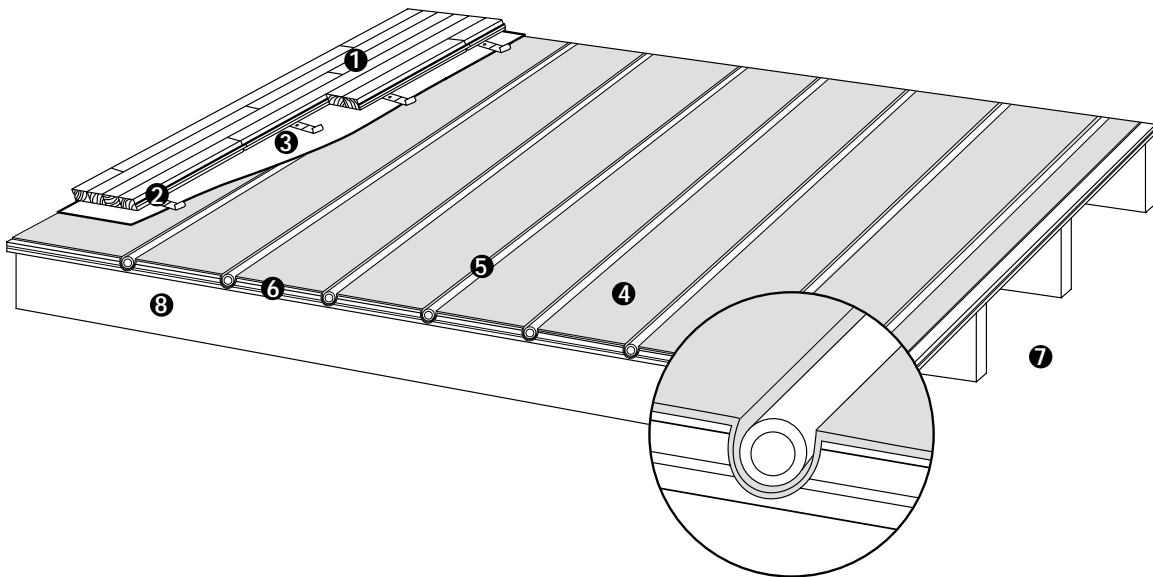
**A.** Radiant heat should be turned on at low power in the Fall and gradually increased as the weather gets colder. This allows for a gradual change in the indoor environment.

# Clip System on Heat-Distribution Plates

## Channel Plywood Boards with Heat-Distribution Plates over Concrete



## Channel Plywood Boards with Heat-Distribution Plates over Joists



The illustrations in this guide show four of the many types of radiant heat systems available. To achieve the best possible outcome when installing Junckers solid hardwood floors with radiant heat systems, several factors must be considered. The surface temperature of the hardwood flooring can not exceed 85°F. If the radiant heat system is integrated into a suspended wooden subfloor (without the use of lightweight concrete) it must include the use of aluminum heat-distribution plates where the heating tubes are covered by or partially encapsulated (as shown above) by the plates. Heat-distribution plates must evenly disperse heat from tubing without creating hot spots or wide temperature fluctuations under the hardwood floor.

This guide establishes the general conditions of use for Junckers solid hardwood flooring in homes using radiant heat systems. They apply to all Junckers products and require the use of the Junckers Clip Installation System.

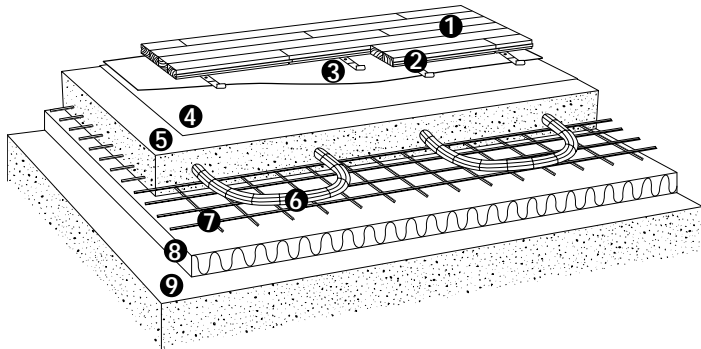
### Components

- ❶ Junckers Flooring: two-strip and wide board products  
7/8" (22 mm) boards with/without Ship's Decking  
3/4" (20.5 mm) boards with/without Ship's Decking  
9/16" (14 mm) boards with/without Ship's Decking
- ❷ Installation Clips
- ❸ Poly-Felt Underlayment
- ❹ Aluminum Heat-Distribution Plates
- ❺ Heating Tube
- ❻ Plywood Channel Board
- ❼ Moisture Barrier (required over soil in crawl space)
- ❽ Concrete Subfloor or Joists

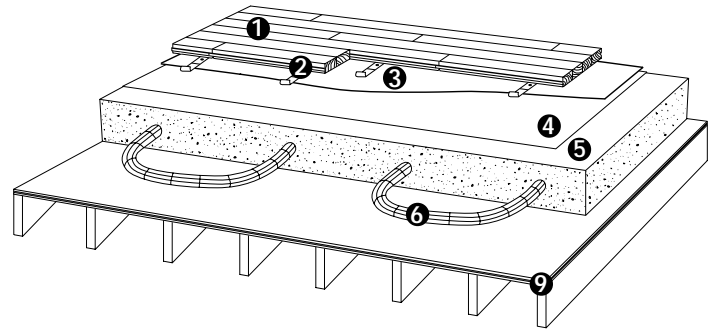
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# Clip System on Lightweight Concrete

Clip System on Lightweight Concrete with Cast-In Heating Tubes



Clip System on Lightweight Concrete with Cast-In Heating Tubes over Wooden Subfloor and Joists



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## Components

- ❶ Junckers Flooring: two-strip and wide board products  
7/8" (22 mm) boards with/without Ship's Decking  
3/4" (20.5 mm) boards with/without Ship's Decking  
9/16" (14 mm) boards with/without Ship's Decking
- ❷ Installation Clips
- ❸ Poly-Felt Underlayment

- ❹ 6 mil. Plastic
- ❺ Lightweight Concrete
- ❻ Heating Tube
- ❼ Reinforcement Wire
- ❽ Insulation
- ❾ Concrete Deck or Wooden Subfloor over Joists

## Technical Information

**Thermal Conductivity**                      K [BTU.in./h.ft<sup>2</sup>.°F]  
Beech, Oak, Ash, Jatoba and Merbau, approx. 1.18

**Intermediate Layer:**  
Junckers Poly-Felt

**Thermal Resistance/Insulation**                      R – [ft<sup>2</sup>.h.°F/BTU]  
Junckers Flooring  
7/8" (22 mm) boards                                      0.738  
3/4" (20.5 mm) board                                    0.681  
9/16" (14 mm) board                                    0.454

## Terminology

**Intermediate Layer:** In systems with heat-distribution plates Poly-Felt is used to act as a vapor barrier and as an intermediate layer. This helps to minimize noise from possible movement between floorboards and heat-distribution plates.

**Flatness of Subfloor:** As in all Junckers installations, the subfloor must be flat with a maximum of 3/16" variance in a 10-foot radius.

**Bearing Strength:** The load bearing strength of the floor structure must be capable of supporting the actual load.

**Maximum output (BTU/h/ft<sup>2</sup>):** The maximum amount of energy in BTU's per square foot, which radiates from the surface of the floor.

**Maximum Surface Temperature 85°F, Hardwood Flooring:** The maximum permitted temperature on the surface of the hardwood flooring.

**Flow Temperature (°F):** The temperature of the water flowing from the boiler to the heating circuit under the floor. The flow temperature required to give a floorboard surface temperature of 85°F depends on the type of floor heating system, the floor structure and the floor covering. The flow temperature will normally be in a range between 95°F–113°F.

**Thermal Conductivity – K [BTU.in./h/ft<sup>2</sup>.°F]:** Expresses the ability of the material to conduct heat.

**Thermal Resistance – R [FT.h.°F/BTU]:** The thermal resistance of a material is calculated on the basis of the thickness of the material divided by its thermal conductivity.