

# **S E C T I O N   I I I**

## **SPECIAL INSTALLATION REQUIREMENTS**

<b>Chapter 7</b>	<b>Wood Joists - Deflection Factor</b>	<b>Page 1</b>
<b>Chapter 8</b>	<b>Radiant Heat Installation</b>	<b>Page 3</b>
<b>Chapter 9</b>	<b>Sound Control Products</b>	<b>Page 11</b>
<b>Chapter 10</b>	<b>Trims &amp; Thresholds</b>	<b>Page 13</b>

# SECTION III

## SPECIAL INSTALLATION REQUIREMENTS

### CHAPTER 7

#### WOOD JOISTS - DEFLECTION FACTOR

Wood Joists include joists, I joists and dimensional sawn lumber

With current construction specifications, NWFA, in conjunction with the American Plywood Association, have determined the following underlayment requirement based on spacing of supports.

3/4" CDX Plywood and 23/32" OSB can be used singly up to 19.2" o.c. spacing. 7/8" CDX Plywood or OSB can be used singly up to 24" o.c. spacing. Here are the APA recommendations with which NWFA concurs. Refer to Table 1.

With 3/4" CDX Plywood or 23/32" OSB, if the truss system is more than 19.2" o.c., you must overlay with 1/2" CDX Plywood cross directed or brace between joists with 2X4 or wider boards every 24".

With 5/8" CDX Plywood underlayment, if the truss system is more than 16" o.c., you must overlay with 1/2" CDX Plywood cross-directed or brace between joists with 2X4 or wider boards every 16".

TABLE 1 Subfloors and Spacing of Floor Framing for Hardwood Flooring

Minimum Thickness	Code Plus Maximum Spacing
5/8" Plywood	16" o.c.
3/4" Plywood	19.2" o.c.
23/32" OSB	19.2" o.c.
7/8" Plywood	24" o.c.

## Chapter 7, Wood Joist - Deflection Factor

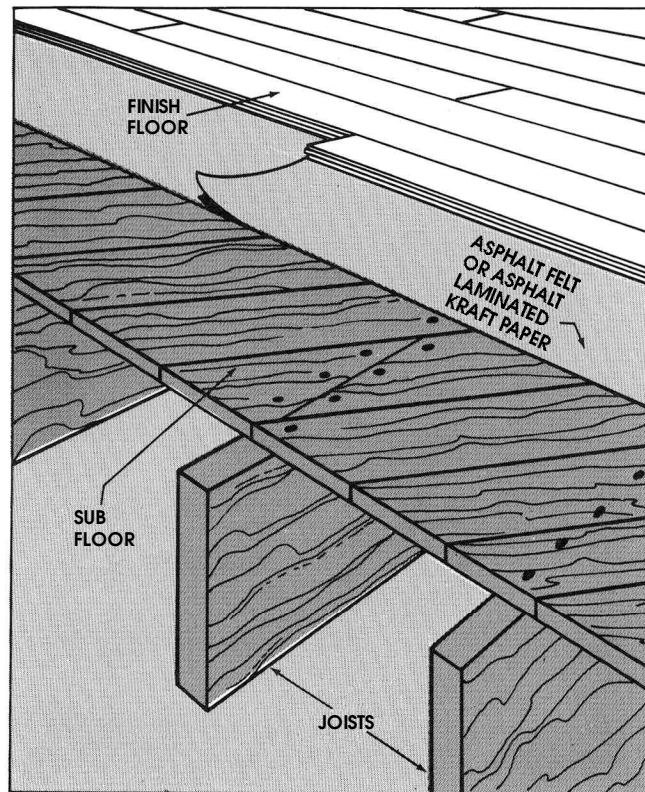
### DEFLECTION IN RESIDENTIAL FLOORS

For long-span residential floors framed with sawn joists, wood I-joists or trusses a simple deflection design rule of thumb is proposed that in most cases should yield a floor with satisfactory performance from a vibration standpoint. The proposed rule of thumb<sup>1</sup> limits deflection under live load to  $L/360$  for members spanning up to 15 feet and to  $L/480$  for members spanning 15 to 30 feet. Both equations equal a deflection of approximately 1/2-inch.

The reference on the subject of residential floor vibration is "Minimum Property Standards for One and Two Living Units" which defines the minimum construction standards that must be met in order to qualify for a FHA mortgage.

Design deflection of structural members when subjected to total loads of live loads specified herein plus actual dead loads shall not exceed the following:

Floor joists, beams and girders, and ridge beams supporting roof joists,  $L/360$  of the clear span of the member up to 15 feet. Over 15 feet, deflection shall not exceed 1/2 inch.



(Illustration courtesy of NOFMA)

figure 1-1

<sup>1</sup> "A Proposed Rule of Thumb for Controlling Annoying Vibrations in Residential Floors" by Frank E. Woeste, Ph.D., P.E., Virginia Tech.

# SECTION III

## SPECIAL INSTALLATION REQUIREMENTS

### CHAPTER 8

#### RADIANT HEAT INSTALLATIONS

With radiant heat, the heat source is directly beneath the flooring, so the flooring may dry out faster than a similar floor in a home with a conventional heating system. Wood flooring can be installed over radiant heat as long as you understand radiant heat and how it can impact wood flooring, what precautions to take, and what type of wood flooring to use.

Types of wood flooring that are best suited for radiant heat subfloor are products that possess improved dimensional stability such as:

Engineered Wood Flooring - is more dimensionally stable than solid wood flooring.

Certain Species are known for their inherent dimensional stability such as American cherry, American walnut, teak and others. Other species such as maple and Brazilian cherry are less stable.

Quartersawn and Rift Sawn Wood Flooring - is more dimensionally stable in width than plain sawn wood flooring.

Narrow boards are more dimensionally stable than wider boards. Solid plank wood flooring 4 inches and wider is not recommended over radiant heat.

#### GENERAL RADIANT HEAT INSTALLATION GUIDELINES

To minimize the effect that rapid changes in temperature will have on the moisture content of the wood floor, it is recommended that an outside thermostat be installed. If one is not present, suggest to your customer that this should be considered. Unlike conventional heating systems whereby when it becomes cold, the heat is switched on, the radiant systems work most effectively and with less trauma to the wood floor if the heating process is gradual, based on small increment-increases in relation to the outside temperature.

Subfloors should have proper moisture tests according to Moisture Test Procedure in Section V, AA and AB. Refer to Section V, AD and AE.

## Chapter 8, Radiant Heat Installation

The essential requirement in proper applications of wood flooring over radiant heated systems is to avoid penetration of the heating element. Radiant heated subfloor systems can be concrete, wood or a combination of both. The type of subfloor as described in the previous chapters determines subfloor preparation.

If the subfloor is concrete and it has cured, turn the heat on, regardless of season, and leave it on for at least 5-6 days before installation of the wood flooring to drive out residual moisture. Some installation systems, particularly glue down applications, require the heat to be reduced or even turned off before installation of the flooring begins.

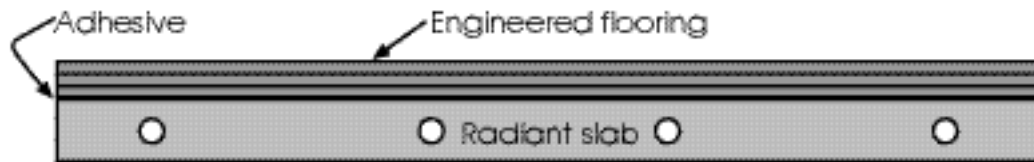
With water heated radiant systems a pressure test must be performed by a qualified plumber or the system installer prior to beginning the installation of the wood flooring. The following installation and subfloors systems can be used successfully over radiant heat:

1. Glue down, engineered or solid parquet
2. Direct nail, solid wood or engineered wood flooring to wood subfloor
3. Solid T & G floor direct nail to sleepers
4. Single layer of plywood on sleepers
5. Double plywood floating subfloor
6. Floating engineered
7. Loose lay single layer of cdx plywood cut in 16" planks staggered, with 1/8" gap between laid perpendicular to wood direction.

NOTE: Follow manufacturers' printed installation instructions.

## Chapter 8, Radiant Heat Installation

### GLUE DOWN ENGINEERED OR SOLID PARQUET



Install over approved subfloor - refer to Section II, Engineered Floor or Section II, Solid Parquet Floor.

Can be glued direct to approved subfloor. Always check for subfloor moisture. See Appendix AA.

The heating system has to be turned off before installation.

Use adhesive approved by the manufacturer.

Maximum surface temperature - 85 degrees F (29.44 degrees C).

Expect some heating season shrinkage.

NOTE: Follow manufacturers' printed installation instructions.

## Chapter 8, Radiant Heat Installation

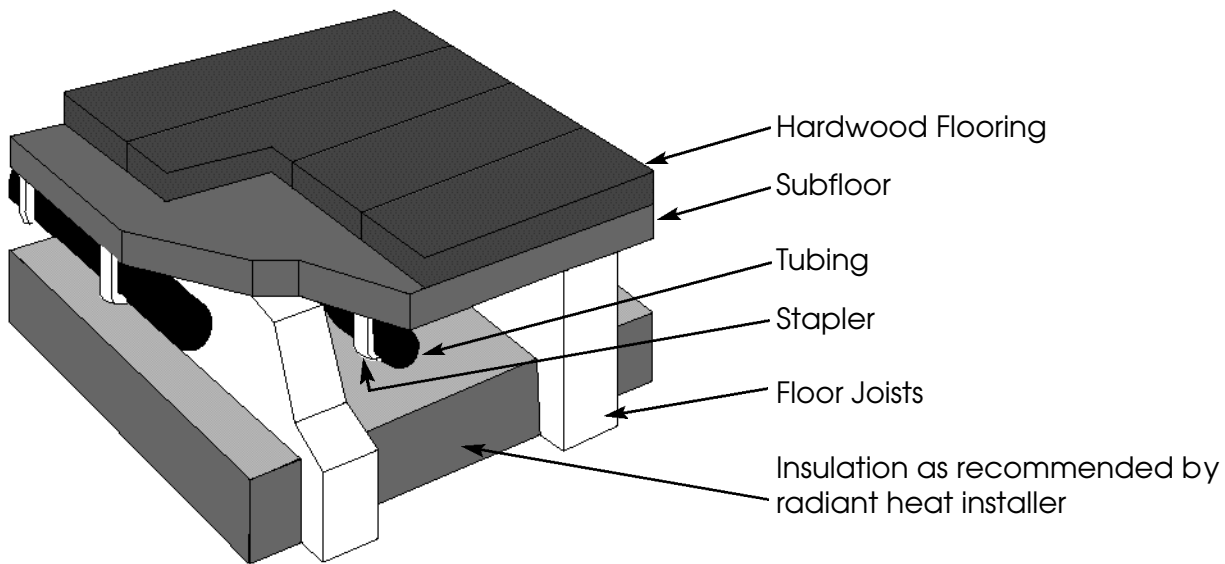
### DIRECT NAIL, SOLID WOOD OR ENGINEERED TO WOOD SUBFLOOR

Must have an NWFA approved subfloor for wood flooring. (Refer to Section II, CHAPTER 4-6.

Always check for subfloor moisture. See Appendix AB.

Solid wood must be properly acclimated to normal living conditions.

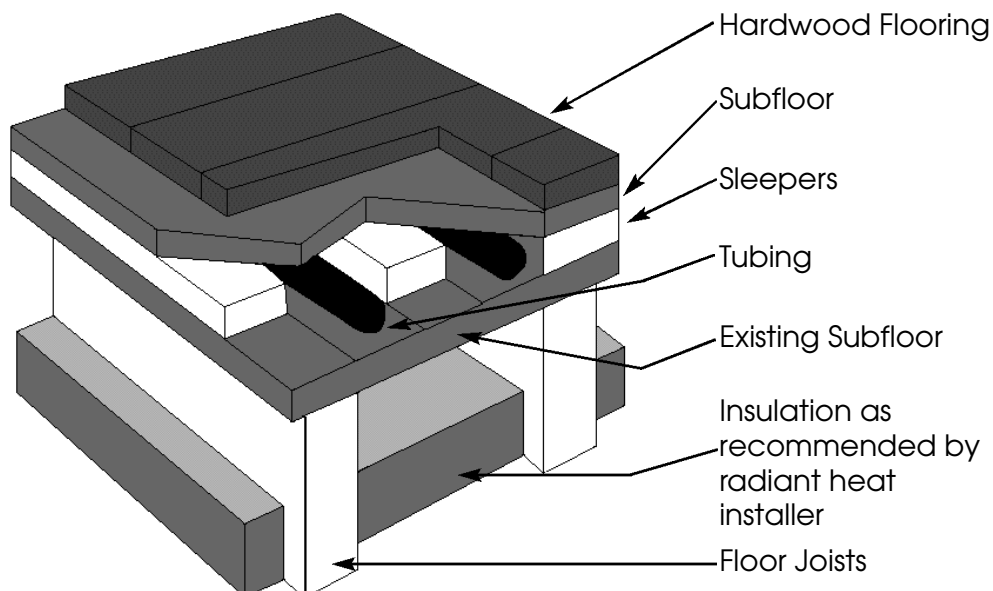
Be sure nails are not so long as to penetrate heating elements.



All other installation procedures are the same as outlined in Section II, Chapter 4-6.

Maximum surface temperature - 85 degrees F (29.44 degrees C).

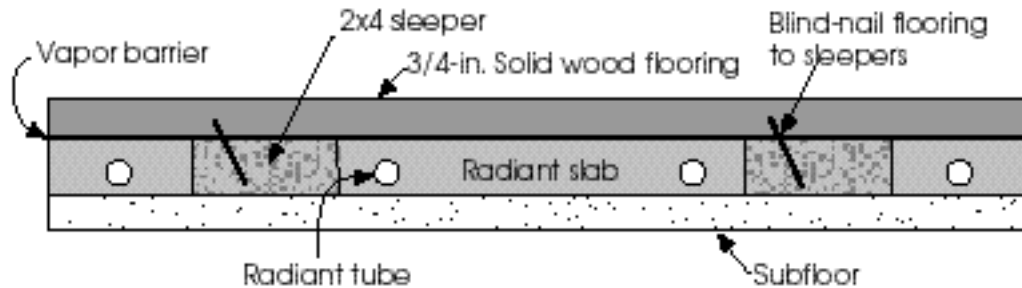
Expect some heating season shrinkage.



NOTE: Follow manufacturers' printed installation instructions.

## Chapter 8, Radiant Heat Installation

### SOLID T & G FLOOR DIRECT TO SLEEPER



Must follow the installation guidelines for installation over screed systems as outlined in Section II, Chapter 5-6.

If over suspended subfloor, a vapor retarder may not be necessary.

The use of solid plank 4 inches and wider is not recommended over radiant heated systems.

Solid wood must be properly acclimated.

Cannot use shorts.

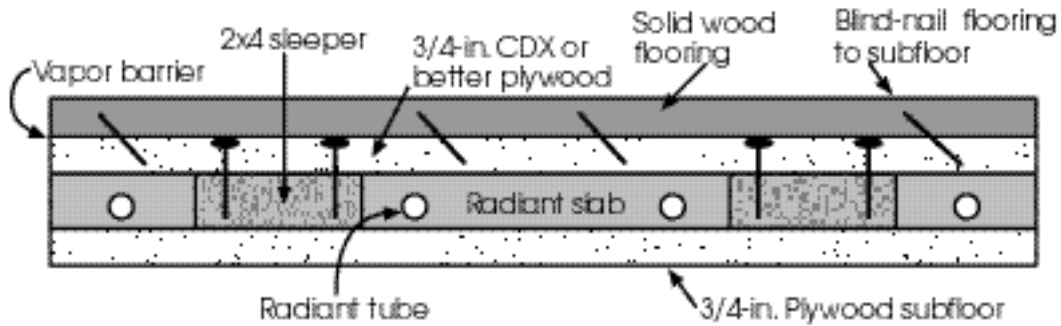
Maximum surface temperature - 85 degrees F (29.44 degrees C).

Expect some heating season shrinkage.

NOTE: Follow manufacturers' printed installation instructions.

## Chapter 8, Radiant Heat Installation

### SINGLE LAYER OF PLYWOOD ON SLEEPER



Must follow the installation guidelines for installation of plywood on sleepers systems as outlined in Section II, Chapter 5-6.

If over suspended subfloor, a vapor retarder may not be necessary.

The use of solid plank 4 inches and wider is not recommended over radiant heated systems.

Solid wood must be properly acclimated.

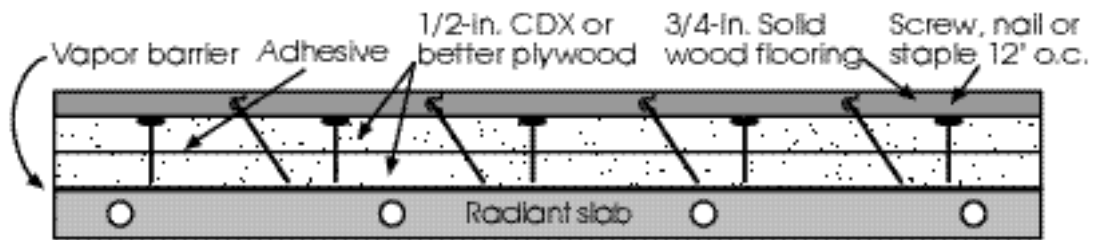
Maximum surface temperature - 85 degrees F (29.44 degrees C).

Expect some heating season shrinkage.

NOTE: Follow manufacturers' printed installation instructions.

## Chapter 8, Radiant Heat Installation

### DOUBLE PLYWOOD



Must follow the installation guidelines for installation of floated subfloor as outlined in Section II, Chapter 3-6.

The use of solid plank 4 inches and wider is not recommended over radiant heated systems.

Solid wood must be properly acclimated.

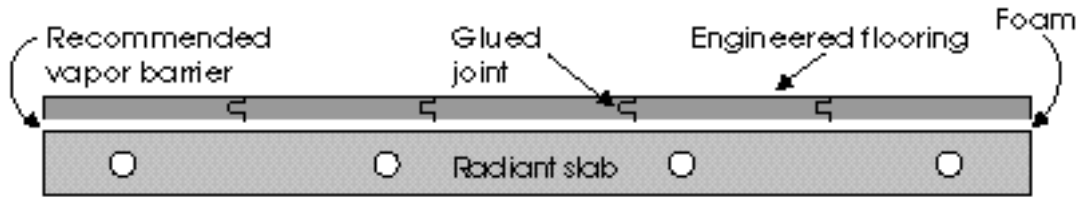
Maximum surface temperature - 85 degrees F (29.44 degrees C).

Expect some heating season shrinkage.

NOTE: Follow manufacturers' printed installation instructions.

## Chapter 8, Radiant Heat Installation

### FLOATING ENGINEERED



Install over approved subfloor. Refer to section II Engineered-Unfinished/Prefinished/Impregnated. Always check for subfloor moisture. See section AA.

A 6 mil or better polyethylene vapor barrier should be installed over concrete subfloors.

A recommended foam or resilient underlayment must be installed prior to application of the wood flooring.

Use an adhesive approved by the manufacturer for side and/or end joints.

Maximum surface temperature-85 degrees F (29.44 degrees C).

NOTE: Follow manufacturers' printed installation instructions.

# **SECTION III**

## **SPECIAL INSTALLATION REQUIREMENTS**

### **CHAPTER 9**

#### **SOUND CONTROL PRODUCTS**

The UBC Uniform Building Code and the BOCA National Building Code both have requirements regarding sound control for multi-family dwellings. Areas of the country which do not follow either of these code standards may have local building code regulations with their own sound control requirements.

The BOCA National Building Code, 1996 has the following section for sound control: "1214.2 Air-borne noise: Walls, partitions and floor/ceiling assemblies separating dwelling units from each other or from public or service areas shall have a sound transmission class (STC) of not less than 45 for air-borne noise when tested in accordance with ASTM E90 listed in Chapter 35. This requirement shall not apply to dwelling unit entrance doors; however, such doors shall be tight fitting to the frame and sill. 1214.3 Structure borne sound: Floor/ceiling assemblies between dwelling units or between a dwelling unit and a public or service area within the structure shall have an impact insulation class (IIC) rating of not less than 45 when tested in accordance with ASTM E492 listed in Chapter 35."

Condominium associations may have a set of protective covenants with even more stringent regulations than the Uniform or National Building Code.

Sound rating values measure the amount of sound that is transmitted from room to room. The values are determined by the reduction of noise as attributed to the barrier elements.

Sound striking a wall or ceiling surface is transmitted through the air in the wall or ceiling cavity. It then strikes the opposite surface, causing it to vibrate and transmit the sound into the adjoining room. Sound is also transmitted through any openings into the room, such as air ducts, electrical outlets, window openings, and doors. This is air-borne sound transmission.

Sound Transmission Class (STC) measures the reduction of air-borne noise within a room such as music from a stereo.

Impact Insulation Class (IIC) measures the transmission of noise caused by impact to the floor.

The control of sound is achieved by separating the wood floor system from the building

## Chapter 9, Sound Control Products

with the use of Sound Control materials.

### Sound control materials:

6mm or thicker acoustical cork material applied to subfloor or underlayment with an adhesive approved by the manufacturer.

Sound deadening boards applied with an adhesive approved by the manufacturer.

1/16" to 1/4" closed cell foam, loose laid under an NWFA recommended floating subfloor system.

Sound Control Matting, loose laid under an NWFA recommended floating subfloor system.

Acoustical backed wood flooring.

NOTE: Always follow the wood flooring manufacturers recommended procedure.

NOTE1: Consult the manufacturer of the sound control material desired to determine the method of construction to meet minimum sound rating values of the project.

CAUTION: To maintain the integrity of sound control, do not use nails so that they penetrate the sound control material. If you use nails, the impact will travel through the nail to the surface below negating the effectiveness of the sound control system. The flooring must not contact walls, posts or other fixtures that may transmit noise to the rest or to another part of the building or surface.

# SECTION III

## SPECIAL INSTALLATION REQUIREMENTS

### CHAPTER 10

#### TRIMS & THRESHOLDS

##### MOLDINGS USED WITH HARDWOOD FLOORS



Baseboard

Wood floors require expansion space at the wall and all vertical obstructions. Moldings are used to cover the expansion area, to hide cut ends, to adjust height differences or transitions between floors and to aesthetically finish the area. Profiles are many and vary through the industry. Here are some examples of standard profiles.

BASEBOARD — from 3/8" and thicker, from 1 1/2" to 4+" high; used to protect the wall and cover expansion space.



Baseshoe

BASESHOE — from 3/8" to 5/8" thick, from 1/2" to 1" high; used instead of baseboard or with baseboard to complete expansion coverage; flexible enough to conform to irregular surfaces.



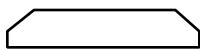
Quarter Round

QUARTER ROUND — one quarter of a full round; from 1/2" to 1"; used as an alternative to shoe in some areas.



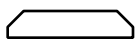
Reducer

REDUCER — from 5/16" to 3/4" thick, 1" to 3"+ wide; used to make transition in thickness from wood floor down to thinner surface (or carpet or vice versa), generally through door openings. Also used to cover expansion space around vertical surfaces such as fireplace hearths when mounted directly to surface of flooring.



Threshold/Saddle

THRESHOLD/SADDLE — from 5/16" to 3/4" thick, many widths; used to make the transition at doorways, between interior rooms and to the outside. Can be custom milled to any size.



Baby Threshold

BABY THRESHOLD — Often variable - used to cover expansion space in perimeter areas where vertical molding cannot be used. Example: Stone, brick wall and hearths as well as floor to ceiling glass and sliding doors. May also be used at existing door thresholds.

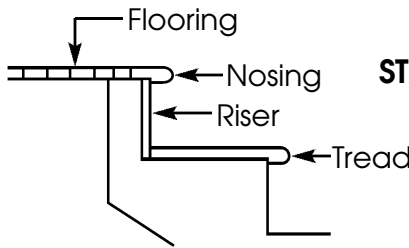
## Chapter 10, Trims & Thresholds



T-Moldings

T-MOLDINGS — 5/8" thick by 2" wide, beveled down on both sides with a T-configuration; used for transition from one hard surface floor to another.

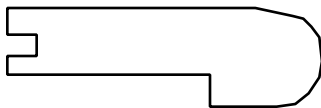
CUSTOM MOLDINGS — Specialty moldings created for unusual circumstances. May be manufactured to job site requirements to complement the wood floor and allow for proper transition and coverage of expansion space.



### STAIRS/STEPS

STAIR RISER — 3/4" thick, various heights and lengths, used to create the vertical "rise" in the step.

STAIR TREAD — 3/4" to 1 1/16" thick, various widths and lengths, the actual step surface.



T-Moldings

NOSING — also called stair nosing, bull nose, stairwell trim, landing tread. Thickness same as flooring. Used to create finished edge on top step, around stairwell, sunken living room, etc.