

SECTION 23 83 16.13 - RADIANT HEATING HYDRONIC SUBFLOOR UNITS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Conductive aluminum overlay on subfloor plywood panels, grooved to accept polyethylene tubing for hydronic heating system.
 - 2. Polyethylene (PEX) tubing.
- B. Related Requirements:
 - 1. Coordination of system connection to hydronic heating system.
 - 2. Coordination of finish flooring installation requirements.

1.2 REFERENCES

- A. ICC-ES ESR 1421.
- B. Engineered Wood Association; Testing and Rating procedures for plywood sheathing.
- C. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- D. ASTM F876 - Standard Specification for Crosslinked Polyethylene (PEX) tubing.
- E. ASTM F1281 - Standard Specification for Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe.
- F. Applicable Plumbing Codes: Construction codes applicable to radiant heating systems.

[Edit selections below for project conditions]

- 1. UPC – Uniform Plumbing Code.
- 2. IBC – International Plumbing Code.
- 3. State and local plumbing codes.

1.3 SUBMITTALS

- A. Submit manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations
 - 2. Storage and handling requirements and recommendations
 - 3. Installation methods
- B. Submit manufacturer's layout drawings detailing the location, layout and pattern of panel and tubing installation.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: provide materials and installation patterns from manufacturer specializing in radiant subflooring. Approve radiant tubing, fasteners, and secondary materials to be installed in conjunction with the radiant subfloor system.
- B. Installer Qualifications
 - 1. Related plumbing connections required by the work listed in this section shall be performed by a contractor or subcontractor licensed or otherwise authorized to install radiant heating systems by Authorities Having Jurisdiction
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation, system coordination, fabrication, panel installation, and application of finish flooring.
 - 1. Indicate how finish flooring is applied.
 - 2. Rework mock-up to produce acceptable work.
 - 3. Mock-up may remain in place.

1.5 DELIVERY, STORAGE. AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Provide storage area to keep panels completely dry.

1.6 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results.
- B. Install panels only when environmental conditions comply with manufacturer's requirements.

1.7 WARRANTY

- A. Provide panel manufacturer's limited warranty.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Warmboard, Inc.
8035 Soquel Dr. Suite 41A,
Aptos CA 95003
877.338.5493
831.685.9276
831.685.9278 FAX
info@warmboard.com
www.warmboard.com

2.2 DESCRIPTION

- A. Warmboard plywood subfloor panels for installation on floor joists.
- B. PEX tubing installed in panels.

2.3 MATERIALS

- A. Radiant Subfloor Panels: Nominal 1-1/8-inch, (28mm) thick plywood subfloor with pre-routed channels for installation of radiant heat tubing.
 - 1. Panel Dimensions: 48x96 inches (1219mm x 2438mm).
 - 2. Panel Base: 1 3/32 inch (27.8mm) 7-layer Douglas Fir tongue-and-groove plywood; APA rated, Sturd-I-Floor.
 - 3. Conductive Aluminum Overlay: 0.025 inch (0.6mm) glare resistant light green aluminum sheet bonded to plywood and conforming to channels.
 - 4. Channel size: Nominal 21/32 inch (16.7mm) diameter.
 - 5. Channel spacing: 12 inches (305mm) o.c. parallel to panel's long dimension.
- B. Radiant Heat Tubing: Cross-linked Polyethylene (PEX) based tubing designed for transmission of hot water.
 - 1. Tubing size: ASTM F876 or F1281; 1/2-inch (13mm) inside diameter.
 - 2. Hydrostatic design and pressure ratings per Plastic Pipe Institute (PPI).
 - a. 200 F degrees F at 80 psi (93.3 C at 552 KPa).
 - b. 180 F degrees F at 100 psi (82.2 C at 689 KPa).
 - c. 73.4 F degrees F at 160 psi (23 C at 1103 KPa).
 - 3. Maximum Loop Length: 300 feet (91.44m).

- C. Vapor Retarder at concrete subfloor: 10-mil polyethylene sheet.

2.4 FASTENERS AND ADHESIVES

- A. Nails: 10penny, 3 inch (76mm) nails with twist, ring or otherwise deformed shank.
- B. Screws: Minimum 3-inch (76mm) long coarse thread deck or subfloor screws.
- C. Concrete Fasteners: 2-1/2 or 2-1/4 by 1/4 inch Tapcon concrete fasteners or Split Drive Anchors.
- D. Construction Adhesive: Elastomeric resin adhesive meeting or exceeding the requirements of ASTM D3498.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until floor joists and associated framing components are in place and inspected.
- B. Examine joist spacing and direction to ensure proper location and support of radiant subfloor panels. Ensure that floor joists are plumb, level and square, without warp, rake or skew and evenly spaced to ensure panel ends are supported properly. Correct any deficiencies prior to installation of the radiant subfloor.
- C. Unsupported or poorly supported panel ends not acceptable.
- D. Notify Architect of unsatisfactory conditions before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer and APA for achieving the best results for the substrate under the project conditions.
- C. Remove dust, debris and dirt from joist tops. Trim joist hangers and mounting hardware that may interfere with the installation.

3.3 VAPOR RETARDER INSTALLATION

- A. Install vapor retarder at concrete slab.
- B. Lap seams 24-inches (610mm).
- C. Patch tears and holes prior to panel installation.

3.4 PANEL INSTALLATION

- A. Install panels in accordance with manufacturer's current printed instructions.
- B. Locate panels as shown on reviewed shop drawings.
- C. Apply 1/4-inch wide beads of construction adhesive to the tops of the floor joists following the adhesive manufacturer's recommendations for use and open time. Apply two beads on joists where panels meet.
- D. Install panels perpendicular to floor joists. Provide 1/8-inch (3mm) space around panels for thermal and moisture expansion. Interface tongue ends with groove ends. Non-interlocked ends not acceptable.
- E. Fasten panels spacing 6-inches (152mm) on center into joists. Set fastener heads flush. Protruding fastener heads not acceptable.
- F. Concrete Substrate: Fasten panels with concrete fasteners. Minimum 21 fasteners per panels. Set fastener heads flush. Protruding fastener heads not acceptable.
- G. Where unusual architectural features require custom grooves to be created, follow the manufacturer's instructions on shaping and finishing grooves.

3.5 RADIANT TUBING INSTALLATION

- A. Do not install radiant tubing until the panels have been installed over the entire floor.
- B. Individual tubing runs shall not exceed 300 feet (91440mm).
- C. Install tubing approved by panel manufacturer.
- D. Carefully position and lock into place the tubing, avoiding sharp bends which may kink or otherwise damage tubing.
- E. Roll tubing into place using a weighted roller. Ensure that tubing is flush with top surface of subfloor.
- F. Repair and replace damaged tubing using tubing manufacturer's repair components.

3.6 PLUMBING CONNECTIONS

- A. Coordinate connection of hydronic tubing assembly to heating system. Ensure that manifold tubing matches panel tubing.
- B. Ensure that hydronic heating system is correctly connected.
- C. Observe pressure testing of complete hydronic system.
- D. Repair or replace damaged or leaking tubing.

3.7 FINISHED FLOORING APPLICATION

- A. Coordinate installation of finish flooring to prevent damage to tubing.
- B. Provide subfloor unit manufacturer's installation requirements for the finish flooring being installed to finish flooring installer.

3.8 PROTECTION

- A. Protect installed assembly until finished flooring installation is completed.

END OF SECTION

