

Warmboard-S[®] Radiant-Floor Heating Panels PR-V180
Warmboard, Inc. Revised February 19, 2016

Product: Warmboard-S[®] Radiant Floor Heating Panels
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1. Basis of the product report:
 - 2015 International Building Code (IBC): Sections 104.11 Alternative materials and 2303.1.5 Wood structural panels
 - 2012 and 2009 IBC: Sections 104.11 Alternative materials and 2303.1.4 Wood structural panels
 - 2015, 2012 and 2009 Residential Building Code (IRC): Sections R104.11 Alternative materials and R503.2 Wood structural panel sheathing
 - AWC SDPWS-2015 Special Design Provisions for Wind and Seismic
 - DOC PS 2-10 recognized by the 2015 IBC and IRC, and 2012 IBC and IRC
 - DOC PS 2-04 recognized by the 2009 IBC and IRC
 - CSA O325-07 Construction Sheathing recognized by the 2015 IRC, 2012 IRC, and 2009 IRC
 - APA Reports T2002Q-37 and T2010Q-03, and other qualification data
2. Product description:

Warmboard-S radiant-floor heating panels (abbreviated as “Warmboard-S panels” hereinafter) are manufactured from APA-Rated Sturd-I-Floor plywood that has been qualified under both DOC PS 2 and CSA O325. These base panels have a nominal thickness of 1-3/32 inches (27.8 mm) or greater, measure 4 feet by 8 feet (1219 mm by 2438 mm), and have tongue-and-grooved edges. One face of each base panel has channel grooves routed into the surface to accommodate radiant-floor tubing. Grooves are targeted to be 0.690 inch (17.5 mm) deep and 0.680 inch (17.2 mm) wide. Panels used in the field of the floor system contain straight grooves that are parallel to the strength axis of the panel and are spaced 12 inches (305 mm) apart starting at 6 inches (152 mm) from the panel edge (see Figure 1). End panels contain curved grooves to provide a continuous loop through the floor system. As shown in Figure 1, at nine inches (229 mm) from the panel edge, the cross-panel grooves are part of a “turnaround loop” which provides continuous water flow in polyethylene tubes through the floor system. Panels have an overlay of 0.025 inch (0.64 mm) thick aluminum bonded to the grooved surface, resulting in a nominal panel thickness of 1-1/8 inches (28.6 mm).
3. Design properties:

Warmboard-S panels are wood structural panels that meet the requirements of 2015 IBC Section 2303.1.5, 2012 and 2009 IBC Section 2303.1.4, and 2015, 2012, and 2009 IRC Section R503.2. In addition, Warmboard-S panels have been tested and meet all structural and bond performance requirements of DOC PS-2 and CSA O325. The panel single-floor span rating is 24 inches (610mm) on center, and is applicable to panels at least 24 inches (610 mm) wide. The allowable uniform total and live loads at the maximum span are 110 psf (5.3 kN/m²) and 100 psf (4.2 kN/m²), respectively. The span rating and allowable loads are based on Warmboard-S panels installed with the strength axis perpendicular to supports.

The allowable lateral shear capacities of Warmboard-S panels in diaphragm applications are shown in Table 1, which is in compliance with the 2015 and 2012 Special Design Provisions for Wind and Seismic, and Table 2306.2.1(1) of the 2009 IBC.

4. Product installation:
Warmboard-S panels shall be installed in accordance with recommendations provided by the manufacturer (www.warmboard.com/sites/default/files/downloads/Warmboard-S_InstallManual.pdf). The maximum span shall be in accordance with the Span Rating shown in the trademark.
5. Fire-resistant construction:
Wood structural panels that are not fire-treated have been shown to meet a Class III (or C) category for flame spread. Warmboard-S panels have not been tested for fire resistant construction and the evaluation of Warmboard-S panels for fire-rated assemblies is outside the scope of this report.
6. Limitations:
 - a) Warmboard-S panels shall be designed in accordance with the span rating and maximum loads specified in this report, and installed with the strength axis of the panel perpendicular to supports and with other recommendations provided by the manufacturer.
 - b) Warmboard-S panels are limited to dry service conditions where the average equilibrium moisture content of sawn lumber is less than 16 percent.
 - c) Warmboard-S panels are produced at METALfx, Willits, California under a quality assurance program audited by APA.
 - d) This report is subject to re-examination in one year.
7. Identification:
Warmboard-S panels described in this report are identified by a label bearing the manufacturer's name (Warmboard, Inc.) and/or trademark, the APA assigned plant number (487), the product thickness, the Span Rating, the Exposure Rating, the APA logo, the report number PR-V180, and a means of identifying the date of manufacture. A typical trademark for Warmboard-S panels is shown in Figure 2.

Table 1. Allowable Shear (Pounds Per Foot) for Horizontal Wood Structural Warmboard-S Panel Diaphragms Framed With Douglas-fir-Larch or Southern Pine for Wind^(a) or Seismic Loading^(b,c)

Panel Grade	Common Nail Size	Minimum Nail Penetration into Framing ^(e) (in.)	Minimum Nominal Panel Thickness ^(f) (in.)	Minimum Nominal Width of Framing Member (in.)	Blocked Diaphragms				Unblocked Diaphragms	
					Nail spacing (in.) at diaphragm boundaries (all cases), at continuous panel edges parallel to load (Cases 3 & 4), and at all panel edges (Cases 5 & 6) ^(d)				Nails Spaced 6 inches maximum at supported edges ^(d)	
					6	4	2-1/2 ^(e)	2 ^(e)	Case 1 (No unblocked edges or continuous joints parallel to load)	All other configurations (Cases 2, 3, 4, 5 & 6)
					Nail spacing (in.) at other panel edges (Cases 1, 2, 3, & 4) ^(e)					
					6	6	4	3		
Warmboard-S	10d	1-1/2	1-1/8	2	320	425	640	730	285	215
				3	360	480	720	820	320	240

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 lbf = 4.448 N.

- ^(a) For wind load applications, the values in the table above shall be permitted to be multiplied by 1.4.
- ^(b) For shear loads of normal or permanent load duration, as defined by the *National Design Specification for Wood Construction (NDS)*, the values in the table above shall be multiplied by 0.63 or 0.56, respectively.
- ^(c) For other wood framing species, the tabulated values shall be multiplied by the Specific Gravity Adjustment Factor = [1 - (0.5 - G)], where G = Specific Gravity of the framing lumber from the *NDS*. The Specific Gravity Adjustment Factor shall not be greater than 1.
- ^(d) Space nails maximum 12 inches o.c. along intermediate framing members (6 inches o.c. when supports are spaced 48 inches o.c. or greater).
- ^(e) Framing at adjoining panel edges shall be 3 inches nominal or wider, and nails shall be staggered at all panel edges where nails are spaced 2 inches or 2-1/2 inches on center, or where 10d (0.148 inch x 3 inches) nails having penetration of more than 1-1/2 inches into framing are spaced 3 inches or less on center.
- ^(f) The panel thickness at the point of nailing shall be no less than 19/32 inch.

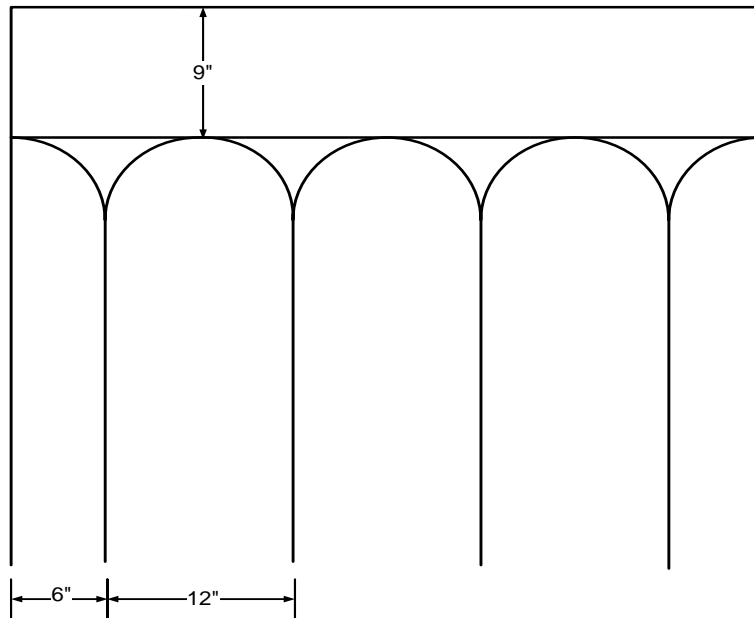


Figure 1. Grooving pattern for Warmboard-S panels with turnaround loop



Figure 2. Typical trademark for Warmboard-S panels

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