



Warmboard-S[®] Radiant-Floor Heating Panels
Warmboard, Inc.

PR-V180
Revised February 19, 2023

Product: Warmboard-S[®] Radiant Floor Heating Panels
Warmboard, Inc., 8035 Soquel Dr., Aptos, CA 95003
(831) 685-9276
www.warmboard.com

1. Basis of the product report:

- 2021, 2018, and 2015 International Building Code (IBC): Sections 104.11 Alternative materials and 2303.1.5 Wood structural panels
- 2021, 2018, and 2015 Residential Building Code (IRC): Sections R104.11 Alternative materials and R503.2 Wood structural panel sheathing
- 2021, 2015, and 2008 AWC SDPWS, Special Design Provisions for Wind and Seismic
- DOC PS 2-18 and PS 2-10 recognized in the 2021 IBC and IRC, and 2018 and 2015 IBC and IRC, respectively
- CSA O325-16 and O325-07 recognized in the 2021 IRC, and 2018 and 2015 IRC, respectively
- 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 2021, 2018, and 2015 IBC Section 2303.1.5, and 2021, 2018, and 2015 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 2021, 2015, and 2008 Special Design Provisions for Wind and Seismic.

4. Product installation:
Warmboard-S panels shall be installed in accordance with recommendations provided by the manufacturer (<https://www.warmboard.com/resources/technical-documents/>). 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%.
 - 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.

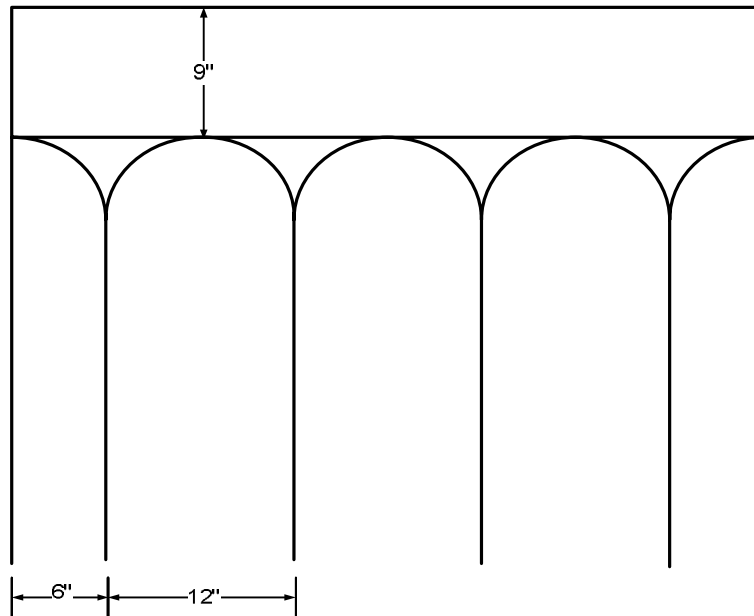


Figure 1. Grooving pattern for Warmboard-S panels with turnaround loop

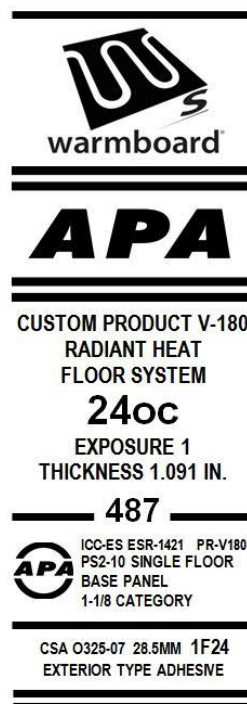


Figure 2. Typical trademark for Warmboard-S panels

APA – The Engineered Wood Association is an approved national standards developer accredited by American National Standards Institute (ANSI). APA publishes ANSI standards and Voluntary Product Standards for wood structural panels and engineered wood products. APA is an accredited certification body under ISO/IEC 17065 by Standards Council of Canada (SCC), an accredited inspection agency under ISO/IEC 17020 by International Code Council (ICC) International Accreditation Service (IAS), and an accredited testing organization under ISO/IEC 17025 by IAS. APA is also an approved Product Certification Agency, Testing Laboratory, Quality Assurance Entity, Validation Entity, and Product Evaluation Entity by the State of Florida, and an approved testing laboratory by City of Los Angeles.

**APA – THE ENGINEERED WOOD ASSOCIATION
HEADQUARTERS**

7011 So. 19th St. ▪ Tacoma, Washington 98466
Phone: (253) 565-6600 ▪ Fax: (253) 565-7265 ▪ Internet Address: www.apawood.org

PRODUCT SUPPORT HELP DESK
(253) 620-7400 ▪ *E-mail Address:* help@apawood.org

DISCLAIMER

APA Product Report® is a trademark of *APA – The Engineered Wood Association*, Tacoma, Washington. The information contained herein is based on the product evaluation in accordance with the references noted in this report. Neither APA, nor its members make any warranty, expressed or implied, or assume any legal liability or responsibility for the use, application of, and/or reference to opinions, findings, conclusions, or recommendations included in this report. Consult your local jurisdiction or design professional to assure compliance with code, construction, and performance requirements. Because APA has no control over quality of workmanship or the conditions under which engineered wood products are used, it cannot accept responsibility for product performance or designs as actually constructed.