Weyerhaeuser DIAMOND DOWN PORE®

#0SB-4051 | SPECIFIER'S GUIDE

WEYERHAEUSER DIAMOND™ FLOOR PANELS

With Patented Down Pore® Self-Draining Technology

- Limited Lifetime Warranty Against Delamination
- 500-day No-Sand Guarantee
- Quick and Easy Installation
- Strong and Stable
- Self-Gapping
- Patented Down Pore Self-Draining Technology
- Fully Sanded Face For Uniform Thickness
- Easy-Fit Tongue-and-Groove
- Nailing Marks For Quick and Easy Installation

WEYERHAEUSER DIAMOND™ FLOOR PANELS ARE A BUILDER'S BEST FRIEND

LIFETIME LIMITED WARRANTY
GARANTÍA LIMITADA DE POR VIDA | GARANTIE À VIE LIMITÉE

500 DAY NO-SAND GUARANTEE
500 DÍAS SIN NECESIDAD DE LIJAR
500 JOURS SANS SABLAGE GARANTIE

No delamination.
No sanding.
We guarantee it.

A diamond is one of the hardest and most impervious materials on earth. And our Weyerhaeuser Diamond floor panel lives up to that reputation: it's strong, durable and forged using time and pressure.

Weyerhaeuser pioneered the manufacture of enhanced subfloor panels, and as technology progressed, our scientists kept pace to deliver a new benchmark in performance: a panel that is tough, highly resistant to weather, and engineered to save you time and money with our easy-fit tongue-and-groove edges.

Weyerhaeuser Diamond floor panels can help you build the best floors possible, in the toughest of conditions.

- Fully sanded face for uniform thickness
- Limited lifetime warranty against delamination and 500-day no sand guarantee
- Includes patented Down Pore® self-draining technology
- Tongue-and-groove profiles automatically gap panel edges to ⅛"
- Stamped with fastener markings for fast nailing
- Bundles delivered face-up for easy handling on the job site
- Proprietary edge seal provides superior edge swell resistance

WHY USE WEYERHAEUSER DIAMOND FLOOR PANELS?

Here's why—

- Self-gapping, tongue-and-groove edges
- Easy installation—panels go down flat and stay flat
- Consistent, reliable performance
- Use in conjunction with Trus Joist® TJI® joists for additional TJ-Pro™ Rating points.
- Limited lifetime warranty against delamination

Code Evaluations:
ICC-ES ESR-4133

The products in this guide are readily available through our nationwide network of distributors and dealers. For more information on other applications or other Weyerhaeuser products, contact your Weyerhaeuser representative.

SUSTAINABLE FORESTRY INITIATIVE
Certified Sourcing
www.sfiprogram.org
SFI-00008

A GOOD THING IS EVEN BETTER WITH DOWN PORE Self-Draining Technology

U.S. Patent: 8,333,044

Diamond floor panels include Down Pore technology, a patented, self-draining feature that allows rainwater to drain from the floor. If your site sees a hard rain after Diamond floor panels are installed, the water is channeled through the panel and off the joists below. No more sweeping off water, no more drilling holes in the floor to let it through, and less time spent waiting for flooring to dry before installing finish material.

DOWN PORE SELF-DRAINING TECHNOLOGY

Note: *When concrete topping is applied, Down Pore grooves do not need to be covered. However, if minor concrete seepage must be avoided, covering grooves with tape is recommended.*

Size and Availability

$^{23}/_{32}$" Diamond floor panels are available at select Weyerhaeuser Distribution Centers. Contact your Weyerhaeuser representative for availability in your area.

Product Specifications

Diamond floor panels are manufactured to meet the requirements of Voluntary Product Standard PS 2, which is recognized by the International Building Code (IBC) and the International Residential Code (IRC). They are also evaluated by ICC-ES for properties superior to those established under PS 2, and are Structural 1 Rated for 24" o.c., $^{23}/_{32}$" performance category panels.

Down Pore drainage grooves do not affect the use of Diamond floor panels in fire-rated assemblies.

Minimum quantities may be required for some orders.
Contact your Weyerhaeuser representative for information and availability.

DESIGN PROPERTIES

In most applications, Diamond™ floor panels will be specified based on the span rating of the panel. However, in some uses, engineers will require actual design values to support application-specific engineering calculations. The **Design Values** table below provides proprietary code-evaluated properties superior to PS 2.

The panel design values do not need to be adjusted for panel grade or construction. However, they must be adjusted for duration of load (DOL) and creep when appropriate, and may also require other adjustments that are not shown in this guide. Refer to the current *Manual for Engineered Wood Construction*, published by the American Wood Council (AWC), for applications with elevated moisture or temperatures, applications that require preservative or fire-retardant treatment, or for panels less than 24" in width.

Creep: Under constant load, the deflection of wood-based products generally increases over time—a phenomenon known as creep. In typical applications, with relatively low dead loads, it is not necessary to consider creep in the design process. However, when the potential for creep exists—specifically, when a permanent or constant load will stress the panels to one-half or more of their design strength capacity—an adjustment to the deflection calculations should be made. For Diamond floor panels in dry-use conditions, apply the creep adjustment factor (C_C = 0.50) to the panel stiffness.

Design Values for Diamond Floor Panels
(100% Load Duration)

	Span rating		=	24" o.c.–Structural 1	
	Performance Category		=	23/32"	
	Strength axis(1)		=	Primary	Secondary
Bending	Moment capacity (lb-in./ft of width)	F_bS	=	***1,360***	***790***
	Stiffness (lb-in.²/ft of width)	EI	=	***395,000***	***170,000***
Shear	Shear capacity in-the-plane (lb/ft of width)	$F_s(Ib/Q)$	=	***380***	***380***
	Rigidity through-the-thickness (lb/in. of panel depth)	G_vt_v	=	93,000	93,000
	Shear capacity through-the-thickness (lb/in. of shear-resisting panel length)	F_vt_v	=	215	215
Axial	Axial tension capacity (lb/ft of width)	F_tA	=	3,350	2,550
	Axial compression capacity (lb/ft of width)	F_cA	=	5,000	4,300
	Stiffness (lb/ft of width x10⁶)	EA	=	***6.5***	***4.6***

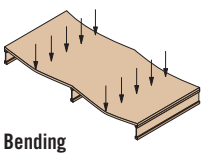
(1) The primary strength axis is the long direction of the panel unless otherwise noted.
Bold italic values are proprietary design values. Refer to ICC-ES ESR-4133

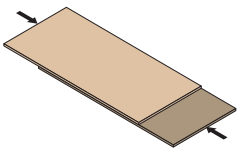
Nail or Screw Design Values

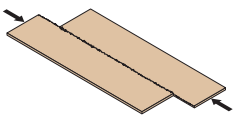
- Design values for nails or screws used with Diamond floor panels can be computed by engineers using the same NDS® procedures used for other structural wood products.
- **For withdrawal, use equivalent Specific Gravity (SG) as follows: smooth- or screw-shank nails = 0.45, ring-shank nails = 0.56, wood screws = 0.45.** Design values for nail or screw withdrawal resistance are shown in NDS Table 12.2B (screws) and Table 12.2C (nails). For ring-shank nails, refer to NDS®Section 12.2.3.2(a).
- **For lateral resistance, use equivalent Specific Gravity (SG) = 0.51.** Design values for nail or screw lateral resistance are found in NDS Tables 11L (screws) and 12N (nails).

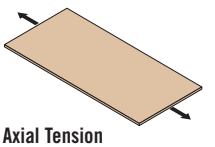
Table General Notes

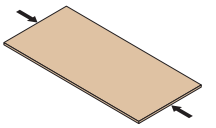
- Value must be adjusted for duration of load, creep, elevated moisture or temperature, or for panels less than 24" in width when appropriate. Refer to the current *Manual for Engineered Wood Construction*.
- Values do not need to be adjusted for panel grade or construction.


Bending


Shear-in-the-Plane
(Rolling or Interlaminar Shear)


Shear-through-the-Thickness


Axial Tension


Axial Compression

APPLICATION ADJUSTMENT FACTORS

Span Adjustments

	2-Span to 1-Span	3-Span to 1-Span
Deflection	0.42	0.53
Moment	1.00	0.80
Shear	1.25	1.20

- When adjusting uniform loads based on strength from the **Allowable Uniform Loads** table on page 4, use the span adjustment factor for moment.
- When adjusting uniform loads calculated from the equations on page 5, use the appropriate corresponding factor.

Duration of Load (C_D)
(Applies to strength capacities)

Permanent load (over 10 years)	0.90
Occupancy live load	1.00
2 months, as for snow	1.15
7 days	1.25
Wind or earthquake	1.60
Impact	2.00

Creep Adjustment Factor (C_C)
(For permanent loads)

Moisture Condition	OSB
Dry	0.50

- When a permanent or constant load will stress a panel to ½ or more of its design strength capacity, adjust the deflection calculation by applying the creep adjustment factor (C_c) to the panel stiffness (EI) found above.

SECTION PROPERTIES AND LOAD/SPAN TABLE

Panel Section Properties(1)

			23/32"
Approximate weight (psf)		=	2.6
Average Nominal thickness (in.)	t	=	0.73
Area (in.²/ft)	A	=	8.76
Moment of inertia (in.⁴/ft)	I	=	.389
Section modulus (in.³/ft)	S	=	1.066
Statical moment (in.³/ft)	Q	=	.799
Shear constant (in.²/ft)	Ib/Q	=	5.84

(1) Properties based on rectangular cross section of 1' width.

Geometric properties are calculated on a per-foot-of-panel width basis. These properties may be used to find design stresses when required. To do so, divide the design capacity by the applicable section property.

Diamond™ floor panels are intended for dry-use applications

Allowable Uniform Loads (PSF) for Diamond Floor Panels (100% Load Duration)

Span Rating	Performance Category	Load Calculation Based on(1)(2)	Span												
			Normal Orientation, Strength Axis Perpendicular to Supports										Strength Axis Parallel to Supports		
			12"	16"	19.2"	24"	30"	32"	36"	40"	48"	60"	12"	16"	24"
24" o.c.	23/32"	Deflection	1,718	646	354	171	84	68	60	43	28	14	740	278	94
		Strength	724	524	429	283	181	159	101	82	57	36	658	370	132

(1) Deflection calculation based on L/360 deflection limit. The allowable load for other deflection limits can be computed as follows:
- for L/240 limit, multiply by 1.5
- for L/180 limit, multiply by 2.0
- for L/480 limit, divide by 1.5

(2) Strength calculation based on the minimum of bending or shear.

General Notes

- Table is based on:
  - Uniform loads. See PS 2 and local building codes for concentrated load and other requirements.
  - Untreated Exposure 1-rated panel in dry conditions.
  - Typical sheathing applications such as floors, walls, and roofs.
  - 2x supports for span configurations less than 48" on-center. Support width effects have been considered.
  - 4x supports for span configurations equal to or greater than 48" on-center. Support width effects have been considered for shear and deflection calculations. Moment calculations do not consider support width effects.
- For **Strength Axis Perpendicular to Supports**:
  - 3-span condition is assumed for spans of 32" or less.
  - 2-span condition is assumed for spans greater than 32".
  - 1-span condition requires the use of the span adjustment factor on page 3.
- For **Strength Axis Parallel to Supports**:
  - 3-span condition is assumed for spans of 16" or less.
  - 2-span condition is assumed for spans of 24".
  - 1-span condition requires the use of the span adjustment factor on page 3.

A Note About Floor Performance

Floor panels are an important component in creating a floor that feels good to customers. The superior properties of Diamond floor panels can enhance floor performance when compared to an OSB floor of similar thickness. To meet higher customer expectations, floor performance can also be enhanced in other ways:

- Glue and nail flooring for improved connections to help resist vibrations, minimize nail pops, and transfer loads more evenly. Weyerhaeuser recommends using a subfloor adhesive that has been qualified as a Class ⅛ in., Type P/O subfloor adhesive in accordance with ASTM D3498-19.
- Use stiffer joists or a narrower joist spacing.

Choosing the optimal combination of these parameters can be difficult. To predict floor performance and evaluate the relationship between the cost and the "feel" of a floor, use Trus Joist® TJ-Pro™ Rating.

About TJ-Pro Rating

A poor performing floor can harm a builder's image, compromise build efficiency, and cost money. That's why we developed TJ-Pro Rating. For over 50 years builders have looked to the Trus Joist name for guidance on floor performance, and our decades of proven success with TJ-Pro Rating is one of the biggest reasons why.

How Does TJ-Pro Rating Work?

Point values up to 65 are assigned using complex algorithms based on field and laboratory research conducted on over 600 floor system assemblies. It also considers other key factors that affect floor performance, including:

- Basic stiffness (a combination of joist depths and span)
- Joist spacing and deck stiffness
- Wall support versus beam support, which tends to feel less stiff
- Composite action (careful nailing and adhesives can improve stiffness)
- Non-bearing partition walls, which can help dampen vibration
- Directly applied ceilings
- Use of bridging or blocking

Point ranges can then be regularly correlated to performance expectations for each type of customer.

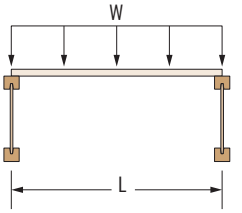
At a rating of 45 points, customer satisfaction is 84%. At 65 points, it's nearly 100%. For customized TJ-Pro Rating solutions, use ForteWEB™.

CALCULATING UNIFORM LOADS

One-Span Equations

Uniform load equations based on:

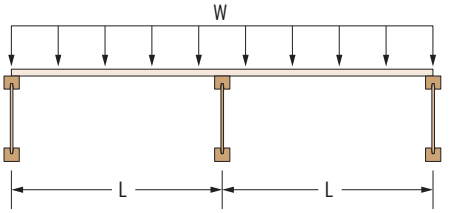
Moment Capacity	$W_M = \frac{96F_bS}{L_M^2}$
Shear Capacity	$W_V = \frac{24F_s(Ib/Q)}{L_V}$
Deflection	$W_\Delta = \frac{L_M 921.6\ EI}{L_\Delta^4 R}$



Two-Span Equations

Uniform load equations based on:

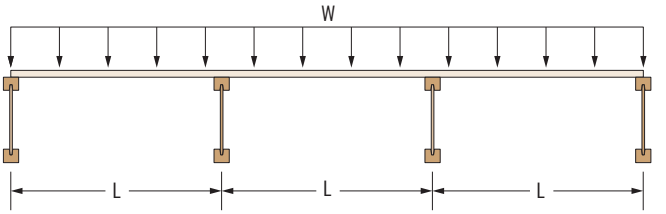
Moment Capacity	$W_M = \frac{96F_bS}{L_M^2}$
Shear Capacity	$W_V = \frac{19.2F_s(Ib/Q)}{L_V}$
Deflection	$W_\Delta = \frac{L_M 2220\ EI}{L_\Delta^4 R}$



Three-Span Equations

Uniform load equations based on:

Moment Capacity	$W_M = \frac{120F_bS}{L_M^2}$
Shear Capacity	$W_V = \frac{20F_s(Ib/Q)}{L_V}$
Deflection	$W_\Delta = \frac{L_M 1743\ EI}{L_\Delta^4 R}$



The equations above are based on one-way "beam" action. They are provided to help develop allowable uniform loads based on moment, shear, and deflection as applied to one-, two-, and three-span conditions. Loads derived from the equations provided are assumed to be applied over full-size panels in normal sheathing applications. The following definitions apply:

- Δ . . . . . deflection (in.)
- EI . . . . . design bending stiffness capacity (lb-in.^{2}/ft)
- F_bS . . . . . design moment capacity (lb-in./ft)
- $F_s(Ib/Q)$ . . . design shear capacity (lb/ft)
- L . . . . . span (in.)
- L_M . . . . . span, center-to-center of supports, used for moment calculation (in.)
- L_V . . . . . clear span, used for shear calculation (in.)
- L_Δ . . . . . clear span plus SW, used for deflection calculations (in.)
- R . . . . . denominator of chosen deflection limit. Example: deflection limit = L/360 then R = 360
- SW . . . . support width factor:
  - 0.25 for 2x nominal lumber
  - 0.625 for 4x nominal lumber
  - For additional information refer to the current *Panel Design Specification (APA D510)*
- W . . . . uniform load (psf)
- W_M . . . . uniform load based on moment capacity (psf)
- W_V . . . . uniform load based on shear capacity (psf)
- W_Δ . . . . uniform load based on deflection (psf)

Example Problem

Find the maximum allowable uniform load (psf) for 23⁄32" Diamond floor panels over 16" on-center joists.

Assumptions

- 24" o.c. span-rated flooring
  - Full 4'x8' panel
  - Strength axis perpendicular to joists
  - Use 3-span equations
- Joist Spacing = 16" o.c.
- Joist Width = 1.5"
- Deflection = L/360

Locate panel design values for moment, shear, and stiffness on page 3.

Moment capacity (primary) = F_bS = 1,360 lb-in./ft of width

Shear capacity (in-the-plane) = $F_s(Ib/Q)$ = 380 lb/ft of width

Stiffness = EI = 395,000 lb-in.^{2}/ft of width

1 Calculate Allowable Uniform Load Based on Moment Capacity

$W_M = 120F_bS/L_M^2$

Calculate appropriate span for moment (center-to-center), L_M = 16"

Using: F_bS = 1,360 lb-in./ft and L_M = 16"

$W_M = 120 \times 1{,}360/16^2$

W_M = 638 psf

2 Calculate Allowable Uniform Load Based on Shear Capacity

$W_V = 20F_S(Ib/Q)/L_V$

Calculate appropriate span for shear (clear span), L_V = 16"-1.5" = 14.5"

Using: $F_S(Ib/Q)$ = 380 lb and L_V = 14.5"

$W_V = 20 \times 380/14.5$

W_V = 524 psf

3 Calculate Allowable Uniform Load Based on Deflection

$W_\Delta = L_M\ 1743\ EI/L_\Delta^4 R$

SW = 0.25 (from above)

Calculate appropriate span for deflection (clear span + SW),

L_Δ = 14.5" + 0.25" = 14.75"

Using: L_M = 16", R = 360, and

EI = 395,000 lb-in^2/ft

$W_\Delta = (16 \times 1743 \times 395{,}000)/(14.75^4 \times 360)$

W_Δ = 646 psf

4 Compare Calculated Allowable Uniform Loads

Calculated allowable uniform loads based on strength:

W_M = 638 psf

W_V = 524 psf

W_V controls

Calculated allowable uniform load based on deflection:

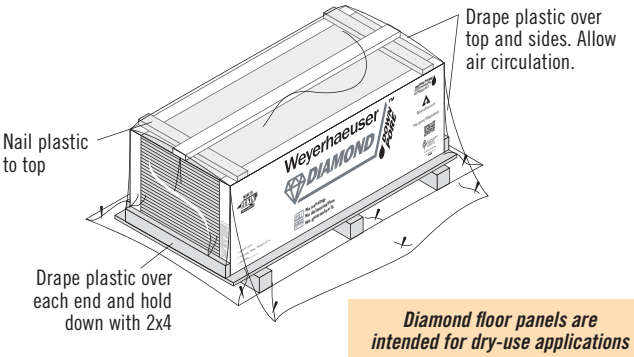
W_Δ = 646 psf

PRODUCT STORAGE AND HANDLING

Like any wood product, wood-based panels are at risk of fungal decay or rot if exposed to repeated wetting or high-moisture environments. Panels that are exposed to such conditions may deteriorate, lose strength, or support mold growth, so protection from these conditions must be provided.

Use a platform made from cull panels and scrap lumber supported by stickers that extend across the width of the stack, and keep panels at least 4" from the ground. Put one sticker in the center of the load and the others approximately 12" from each end. When covering the panels, drape plastic over the ends of the stack and secure it. Then drape plastic over the top and sides of the stack; stake it to the ground, pulling the ends away from the product to allow air circulation along the sides of the stack.

Handle Diamond™ floor panels in a flat orientation. Protect the edges and ends from damage, keep the load level, and lift the stack from the center.



Diamond floor panels are intended for dry-use applications

Exposure 1 Bond Classification

Diamond floor panels are manufactured to an Exposure 1 bond classification. Exposure 1 panels are suitable for uses where they are not permanently exposed to the weather; they are intended to resist the effects of moisture on structural performance due to construction delays or other conditions of similar severity.

WARNING: This product can expose you to chemicals including wood dust which are known to the State of California to cause cancer, and methanol, which are known to the State of California to cause birth defects or other reproductive harm. Drilling, sawing, sanding or machining wood products can expose you to wood dust. Avoid inhaling wood dust or use a dust mask or other safeguards for personal protection. For more information go to www.P65Warnings.ca.gov and www.P65Warnings.ca.gov/wood.

Safety data sheets for all Weyerhaeuser wood products can be found on our website at: **weyerhaeuser.com/sustainability/environment/product-stewardship/safety-data-sheets.**

PRODUCT WARRANTY


LIMITED WARRANTY
Weyerhaeuser Diamond™
OSB Single-Layer Floor Panels

*Visit **weyerhaeuser.com/woodproducts/warranty** for copies of this and other Weyerhaeuser product warranties.*

Contact your local representative or dealer at:

CONTACT US

1.888.453.8358 • weyerhaeuser.com/woodproducts/contact

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