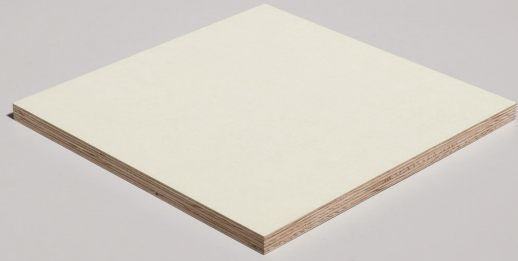




HIGHWAY HDO® Sign Board



- Reflective film and paint ready
- Minimal wood grain & no patch show through
- Enhanced panel stability using "Swan Peel™" Technology
- Waterproof bond for exceptional weatherability
- High face/edge screwholding
- NAUF - meets CARB requirements

Swanson Group® provides the highest proven performance in panel solutions. Customers recognize our exceptional history of performance, exhibited in our panel solutions, including the first high gloss UV coated MDO panel in North America.

We are now enhancing our capability to provide superior panel performance. "Swan Peel™" Technology provides a smoother surface: less grain show through, and improved glue and overlay bond. "Swan Peel™" Technology reduces thickness variability: resulting in an enhanced balanced construction, tighter core lines, and dimensional stability.

Swanson is manufacturing overlay panels in a new state-of-the-art facility - the most technologically advanced operation in North America.

Product Description:

Highway HDO® is a premium, high durability, long lasting HDO plywood. It is prepped for reflective film or paint for Federal & State highway, state, county, municipal and commercial signage.

Panel Construction/Moisture Resistance:

Highway HDO® is constructed of premium, high density overlaid hardwood faced plywood with Douglas Fir inner plys. It is manufactured with a two-step® layup using our Swan Peel™ Technology, has a waterproof glue bond and meets APA PS 1-22. All Swanson products are made in the USA.

Working Faces/Treatment:

- Highway HDO® is available with two working faces only.
- Working faces are available in natural (buff) and black colors.
 - Natural HDO is ready for paint or film. For best results, see finishing instructions.
 - Black HDO requires chemical prep before finishing. Contact Swanson Group® for instructions.

Working Edges/Treatment:

- Edges are factory sawn without edge treatment.
- For interior applications requiring edge banding, do not edge seal, otherwise, seal all edges using clear or pigmented polyurethane or penetrating epoxy sealer.

Applications:

- Exterior signage with reflective films or paint.
- Pallets, bins, totes, crates & reels and tank stock.
- Pattern & die stock; Marine components; Military tables & cases.
- Slides, chutes, decks & conveyor plates.
- Industrial doors, ducts, hoods & barricades.

Thicknesses & Sizes: Highway HDO® is available in 1/2", 5/8", & 3/4" thickness. Standard panel sizes are 4' X 8' and 10' only.

Sign Board:

- Highway HDO® - Premium sign panel, prepped for reflective film.
- SignReady UV™ - Prefinished, high gloss, paint/vinyl letter ready, 5-yr. limited warranty.
- Prefinished UV™ - Prefinished, satin gloss, paint/vinyl letter ready, 2-yr. limited warranty.
- Signal® MDO - Two-step®, hardwood faced, tightly laid core, ideal for cutout letters.
- Pre-Primed MDO - Exclusive, primed overlay, Two-step®.
- Crezon Two-Step® MDO - Premium paint grade.
- Guardian® One-Step MDO - Standard paint grade.

Technical Data Applicable Standards

All panels are manufactured by Swanson Group® per product standard PS1-22. This standard is available at www.apawood.org.

Physical Properties	1/2"	5/8" to 3/4"
Modulus of Rupture ^{2,3}	6,900 psi	6,800 psi
Modulus of Elasticity ^{2,3}	846,890 psi	892,720 psi
Lineal Expansion ^{2,3}	.045%	.056%
Thickness Swell	3.4%	3.4%
Water Absorption (24-Hours)	6.0%	6.0%
Internal Bond ²	173 psi	185 psi
Shelf Stiffness EI ASTM D-3043 C	68,280 lb-in ² /ft ⁶	602,180 lb-in ² /ft ⁶
Shelf Bending FbS ASTM D-3043 C	1,625 lb-in/ft ⁶	6,420 lb-in/ft ⁶
Face Screw Holding ²	414 lbs.	432 lbs.
Edge Screw Holding ²	Not Applicable	418 lbs.
Moisture Content ² ASTM D-1037	6-9%	6-9%
Specific Gravity ² ASTM D-1037	.572	.592
Density ² ASTM D-1037	35.6 lbs./ft. ³	36.9 lbs./ft. ³
Flame Spread ASTM E-84	76 - 200 ⁵	76 - 200 ⁵
Smoke Developed ASTM E-84	25 - 270 ⁵	25 - 270 ⁵
Flame/Smoke Spread Rating E-84	Class C	
Formaldehyde Level E-1333	<0.01 parts/million	

Panel Tolerances ²	3/4"
Thickness Tolerance	+/- 1/32" (.031")
Length & Width Tolerance	+0, -1/16" (.062")
Squareness	1/16" (.062")
Straightness	1/16" (.062")

¹5-panel average. Product averages vary for individual thicknesses, consult sales or technical staff for exact properties.²

All tolerances and specifications apply at the time of manufacture.

²ANSI 208.1 test result.

³Calculations based on test averages of along and across grain.

⁴Shelving physical properties based on engineering calculations.

⁵Flame and smoke spread properties based on engineering calculations.

⁶Shelving stiffness/bending properties are based on a limited 5-panel average.

Note: All tolerances and specifications apply at the time of manufacture.

Note: Product averages vary for individual thicknesses. Consult sales or technical offices for exact properties.

Limitations: Do not exceed shelving span table design limitations. Black Highway® must be chemically prepped before paint/film is applied.

Product Grade: Standard product is shipped on grade only. Special product is shipped allowing up to 10% total Good One Side (G1S) and/or Shop, identified & priced separately. Shipments of G1S and shop may be available.

Weatherability:

Highway HDO®					
EMMAQUA® Outdoor Accelerated Weathering Test Simulates 3.4 years in Florida and 2.9 years in Arizona					
Test	CHALK UNWSH	COLOR CHNGE UNWSH	CRACK UNWSH	BLIST UNWSH	CHECK UNWSH
ASTM #	D 4214-97	D1729-96 (2003)	D661-93 (2000)	D 714-02	D660-93 (2000)
Coating Applied	NONE	NONE	NONE	NONE	NONE

*Equatorial Mount with Mirrors for Acceleration with Water.
 CHALK UNWSH = Chalking, unwashed area: ASTM D4214-97 - Test methods for evaluation degree of chalking of exterior paint films (Method A/Cloth Method).
 COLOR CHNGE UNWSH = Visual color, unwashed area: ASTM D1729-96 (2003) - Practice for visual appraisal of color and color difference of diffusely-illuminated opaque materials.
 CRACK UNWSH = Cracking, unwashed area: ASTM D661-93 (2000) - Method for evaluating degree of cracking of exterior paints.
 BLIST UNWSH = Blistering, unwashed area: ASTM D714-02 - Method for evaluating degree of blistering paints.
 CHECK UNWSH = Check, unwashed area: ASTM D660-93 (2000) - Method for evaluating degree of checking of exterior paints.

Standard Packaging:

Thickness	Highway HDO® Average Weight* lbs./Panel	Pieces per Unit
1/2"	52.0	66
5/8"	64.0	50
3/4"	76.0	44

*Average product weights may vary +/- 10%

Highway HDO® Finishing Instructions

Ensure surface is clean and free of debris.

Black HDO: Requires chemical prep. Contact Swanson Group® for instructions.

General: When fast-drying primers are desired, oil/alkyd types are recommended. Interior grade paints, water base vinyl-acrylic, solvent based alkyd flat or alkyd solid color stains are not recommended.

1. **Coating System:** Use a high quality exterior industrial enamel:

- Water Based: All-Acrylic semi-gloss or gloss enamel system or:
- Solvent Based: Industrial semi-gloss or gloss enamel system.
- Sign Chromatic Based: Semi-gloss or gloss system.

Application: Follow overcoat recommendations. Use good painting practices. Perform a tape pull test (ASTM D3359) before lettering.

2. **Prime Coat:** For good performance, 2 coats of primer should yield about 1 mil dry film thickness. Latex primers are recommended. Follow the spreading rate recommended by the manufacturer.

3. **Top Coat:** Once properly primed, panels must be top-coated with 2 coats of a variety of finishes, including solvent-thinned and water-thinned paints and enamels. Both primer and topcoat should be obtained from the same manufacturer to ensure compatibility. Follow manufacturer's application instructions. Do not apply automotive primers and enamels, lacquer undercoats and topcoats directly to overlaid plywood.

4. **Edge Coating:** For interior applications requiring edge banding, do not edge seal, otherwise, seal all edges using clear or pigmented polyurethane or penetrating epoxy sealer.

Suitability for Use and Warranty: Nothing herein constitutes a warranty express or implied, including any warranty of merchantability or fitness for use, nor is protection from any law or patent to be inferred. The exclusive remedy for all claims is replacement of materials.

Warehouse Storage and Handling

- Store in a dry, clean, well-ventilated area indoors
- Avoid temperatures and moisture extremes. Allow panels to equalize for 72 hours or more before use
- Pieces must not be stored in contact with the ground
- Limit the stacking height to four or five units. Separate units with clean, dry spacers of uniform thickness, aligned carefully. Use three spacers for panels 8' long, four or five spacers for longer panels.

Environmental Impact

- Swanson Group® uses process by-products to produce energy
- Swanson products are renewable, biodegradable and recyclable

Warnings: This product will generate wood dust from sawing, sanding, or shaping. Safety data sheets are available on Swanson's website at www.swansongroup.biz and upon request.

Structural panels (PS-1) are exempt from California Air Resources Board regulations, however, this product is below CARB limits for all uses.

Find out more at www.swansongroup.biz

Highway HDO® Shelving Load Span Table:

Table 1 - Face Grain Across Supports - Multiple Spans ¹ Panel v276						
Span ¹	1/2"		5/8"		3/4"	
	ℓ/240	ℓ/180	ℓ/240	ℓ/180	ℓ/240	ℓ/180
4"	1,899	1,899	2,340	2,340	2,870	2,870
8"	730	730	900	900	1,104	1,104
12"	414	414	557	557	683	683
16"	233	233	367	367	495	495
19.2"	155	162	255	255	405	405
24"	80	104	163	163	307	307
30"	41	54	85	104	170	196
32"	33	44	70	92	141	173
36"	23	31	49	66	100	133
40"		22	36	48	73	98
48"			24	32	49	65
60"					24	32

Table 2 - Face Grain Parallel to Supports - Multiple Spans ¹ Panel v276						
Span ¹	1/2"		5/8"		3/4"	
	ℓ/240	ℓ/180	ℓ/240	ℓ/180	ℓ/240	ℓ/180
4"	1,457	1,457	1,811	1,811	2,208	2,208
8"	560	560	696	696	849	849
12"	307	307	431	431	526	526
16"	173	173	289	289	381	381
19.2"	111	120	201	201	312	312
24"	55	74	128	128	230	230
30"	28	27	82	82	129	147
32"	23	30	71	72	106	129
36"		21	50	57	74	99
40"			36	46	54	72
48"			24	32	35	47

Table 3 - Face Grain Across Supports - Single Spans ² Panel v276						
Span ²	1/2"		5/8"		3/4"	
	ℓ/240	ℓ/180	ℓ/240	ℓ/180	ℓ/240	ℓ/180
4"	2,374	2,374	2,926	2,926	3,588	3,588
8"	913	913	1,125	1,125	1,380	1,380
12"	307	410	609	652	854	854
16"	125	167	257	343	507	619
19.2"	71	94	147	197	296	394
24"	35	47	74	99	151	202
30"		23	37	50	77	102
32"			31	41	63	84
36"			21	28	44	59
40"				20	32	42
48"					21	28

Table 4 - Face Grain Parallel to Supports - Single Spans ² Panel v276						
Span ²	1/2"		5/8"		3/4"	
	ℓ/240	ℓ/180	ℓ/240	ℓ/180	ℓ/240	ℓ/180
4"	1,822	1,822	2,263	2,263	2,760	2,760
8"	690	690	870	870	1,062	1,062
12"	221	295	514	514	657	657
16"	87	116	270	289	395	476
19.2"	48	64	152	201	224	299
24"	24	32	75	100	112	149
30"			37	50	56	74
32"			30	41	46	61
36"			21	28	32	42
40"				20	23	30

Maximum allowable loads are psf. Uniform loading is assumed. Loads are for dry conditions. For wet conditions, reduce loads approximately 25%. Inquire for precise data. Basic allowable stresses (bending F_b and shear F_s) increase 15% for shelving use per the APA experience factor. Pallet design normally is based on higher allowable loads than given. NOTES: ¹Spans are center-to-center of supports. ²Span is out-to-out of supports. Allow for 1-1/2" supports on each end.



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