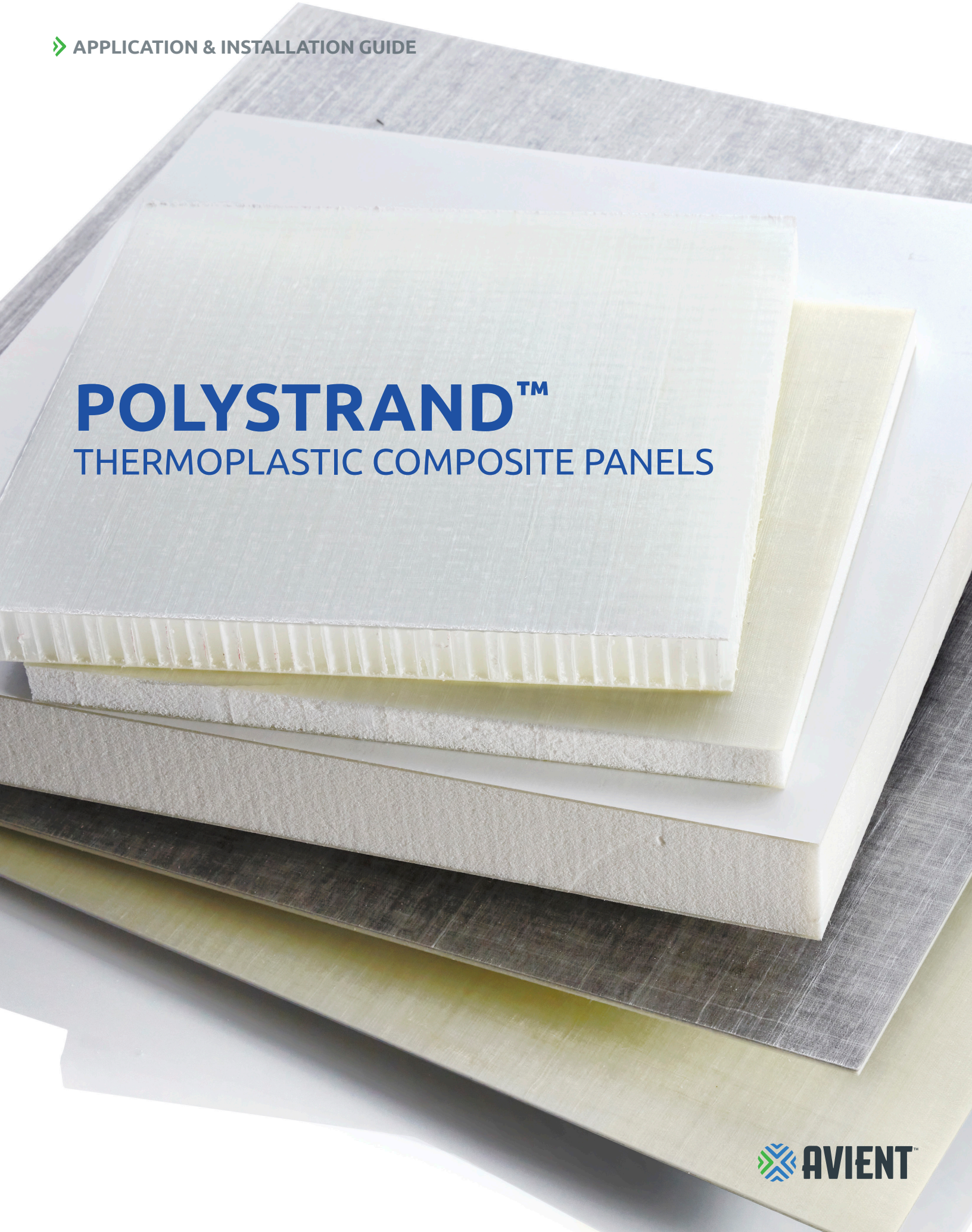
APPLICATION & INSTALLATION GUIDE

POLYSTRAND™

THERMOPLASTIC COMPOSITE PANELS



AVIENT™

PRODUCT DESCRIPTION

Polystrand™ Thermoplastic Composite Panels are engineered to provide **simplified installation, long-lasting components**, and **overall cost reduction**.

Hammerhead™ Composite Panels are made from continuous glass-fiber reinforced thermoplastic face sheets and polyester foam cores.

Honeycomb panels are made from polypropylene, making it easier to avoid compromising the core during thermal lamination.

PERFORMANCE ADVANTAGES

FEATURE	BENEFIT
Exceptional strength-to-weight ratio	Lightweight yet strong structural performance and increased payloads
Resistance to UV light, chemicals, moisture degradation and rot	Withstands harsh conditions
Tough and impact resistant	Durability and long product life
Dimensionally stable	Consistent performance in extreme temperature and humidity fluctuations
Strong adhesive properties	Easy bonding to various materials

MANUFACTURING ADVANTAGES

FEATURE	BENEFIT
Ready-to-install	Fewer parts & reduced scrap
Large format	Improved aesthetics with seamless designs
Made via continuous-fiber manufacturing process	Consistent quality in every panel

USES & APPLICATIONS

TRUCK & RV

- Ceilings
- Cabinetry
- Load floors
- Sidewalls
- Aerodynamic components

BUILDING & CONSTRUCTION

- Modular panels for temporary structures
- Garage & industrial doors
- Walls & flooring

RAIL

- Doors
- Flooring
- Interior panels

MARINE

- Stringers
- Bulkheads
- Ceilings & decking
- Doors & cabinetry

FOAM CORE PANELS

Core Density			5 lb/ft³			8 lb/ft³		
			80 kg/m³			130 kg/m³		
Panel Thickness			0.5 inch	0.75 inch	1.0 inch	0.5 inch	0.75 inch	1.0 inch
			13mm	19mm	25mm	13mm	19mm	25mm
Facesheet Configuration			5848 Quad-Ply			5848 Quad-Ply		
Property	**Test Method**	**Unit**						
Areal Weight	Calculated	lb/ft² kg/m²	0.83 4.05	0.93 4.54	1.04 5.08	0.96 4.69	1.13 5.52	1.31 6.40
Flexural Strength	ASTM D7249	psi MPa	104 0.72	112 0.77	102 0.70	168 1.16	171 1.18	172 1.19
Flexural Modulus	ASTM D7249	psi MPa	834,000 5,750	605,000 4,171	375,000 2,586	889,000 6,129	672,000 4,633	481,000 3,316
Flexural Rigidity	ASTM D7249	lb*in² kN*mm²	33,000 95,000	64,000 183,000	100,000 286,000	42,000 120,000	71,000 203,000	126,000 361,000

HONEYCOMB CORE PANELS

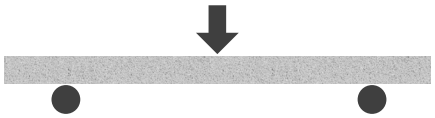
Core Density			5 lb/ft³			
			80 kg/m³			
Panel Thickness			0.5 inch		1.0 inch	
			13mm		25mm	
Facesheet Configuration			6536 X-Ply	6536 Tri-Ply	6536 X-Ply	6536 Tri-Ply
Property	**Test Method**	**Unit**				
Areal Weight	Calculated	lb/ft² kg/m²	0.49 2.39	0.63 3.08	0.63 3.08	0.8 3.91
Flexural Strength	ASTM D7249	psi MPa	33 0.23	82 0.57	46 0.32	97 0.67
Flexural Modulus	ASTM D7249	psi MPa	418,000 2,882	693,000 4,778	265,000 1,827	368,000 2,537
Flexural Rigidity	ASTM D7249	lb*in² kN*mm²	15,000 43,000	27,000 77,000	41,000 117,000	75,000 215,000

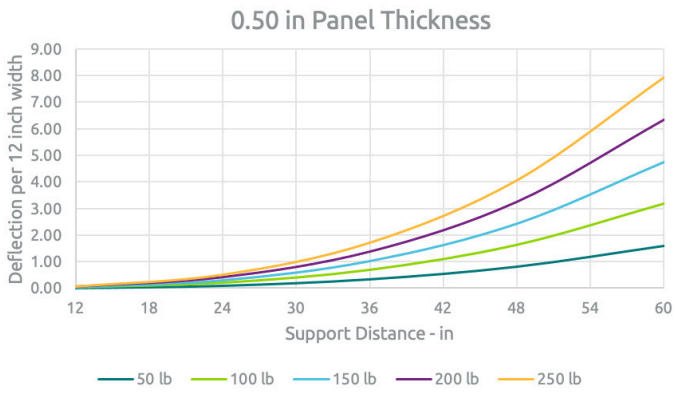
SUPPORT SPAN DEFLECTION

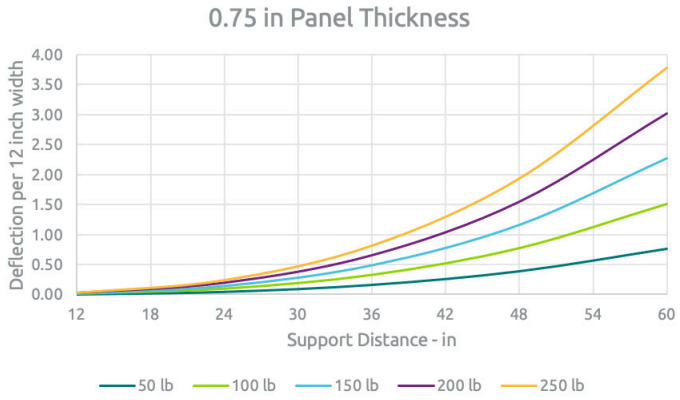
Meets performance required for marine applications

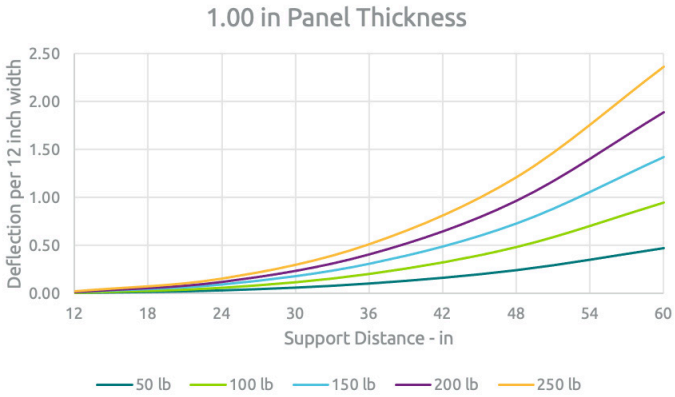
Predictive deflection in various load cases. Deflection is dependent on support span distance.

Simply Supported Beam Deflection
Hammerhead panel core density at various panel thicknesses



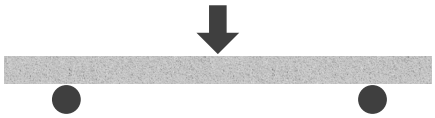


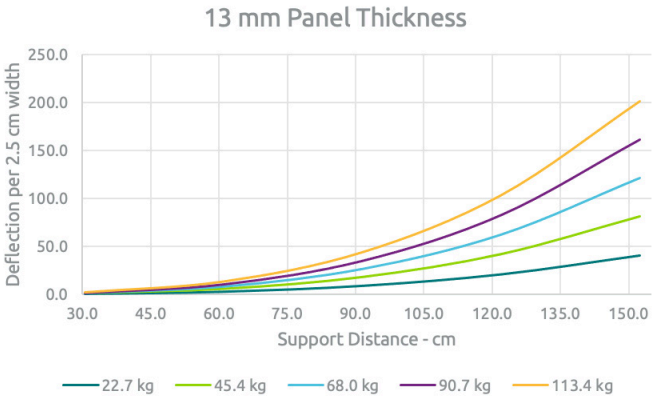


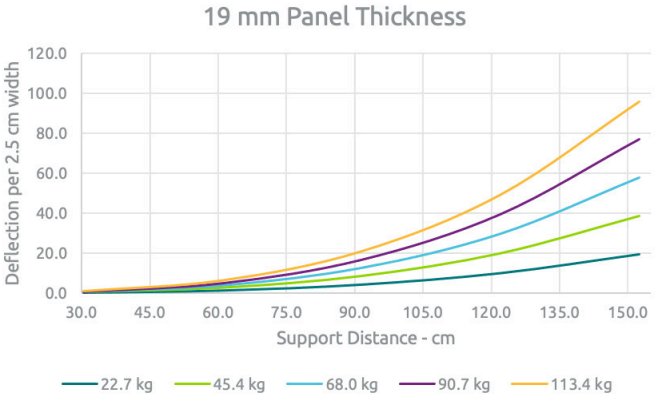


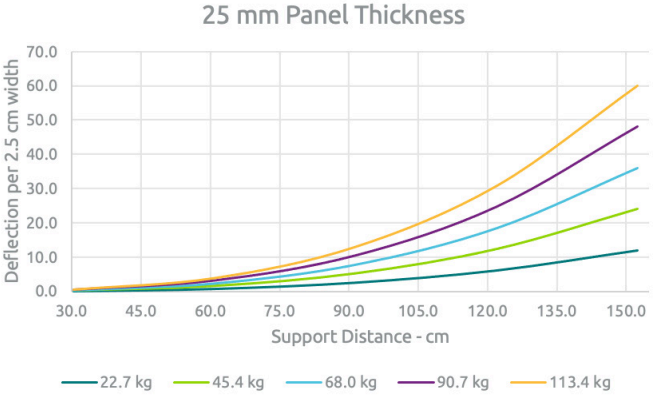
* To calculate deflection for different panel widths, use the following formula: Deflection = Chart value* [12 / panel width]. Example: Deflection for 24 inch panel = Chart value *[12 / 24]

Simply Supported Beam Deflection - Metric
115 kg/m³ core density at various panel thicknesses





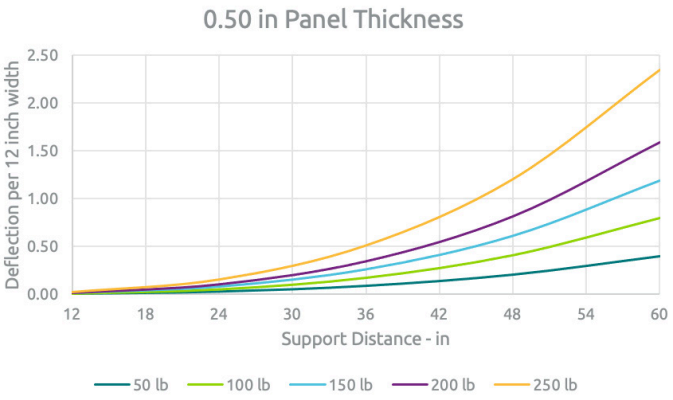


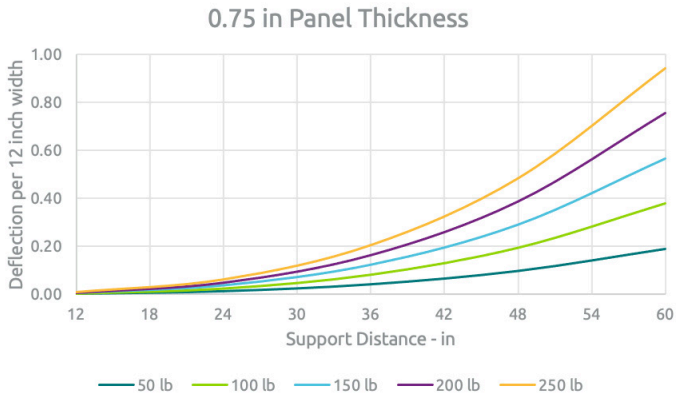


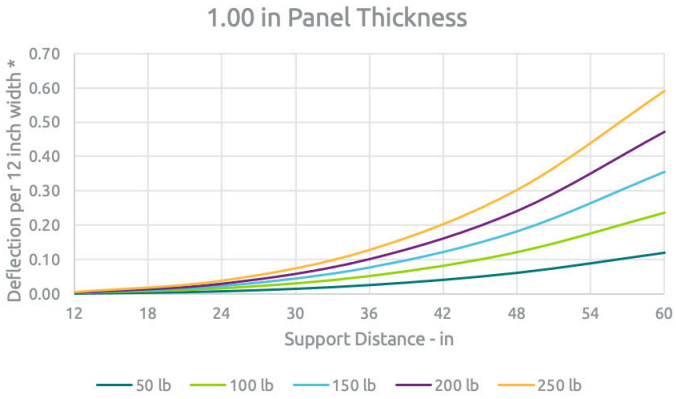
* To calculate deflection for different panel widths, use the following formula: Deflection = Chart value* [12 / panel width]. Example: Deflection for 24 inch panel = Chart value *[12 / 24]

SUPPORT SPAN DEFLECTION (continued)

Fixed End Beam Deflection
7 lb/ft³ core density at various panel thicknesses

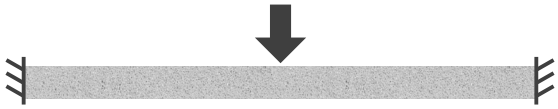


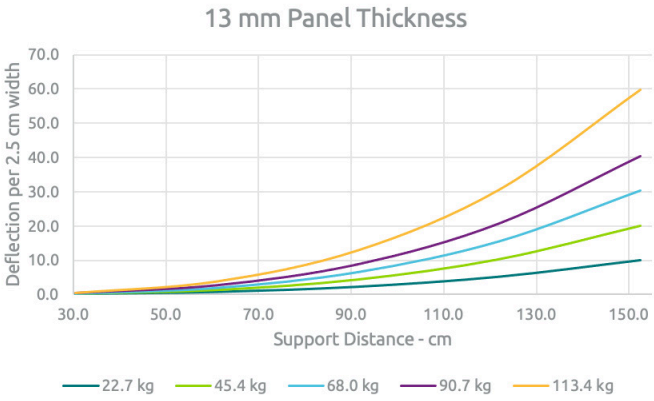


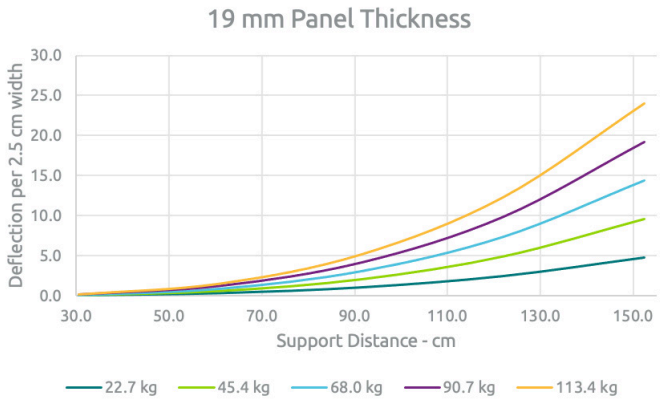


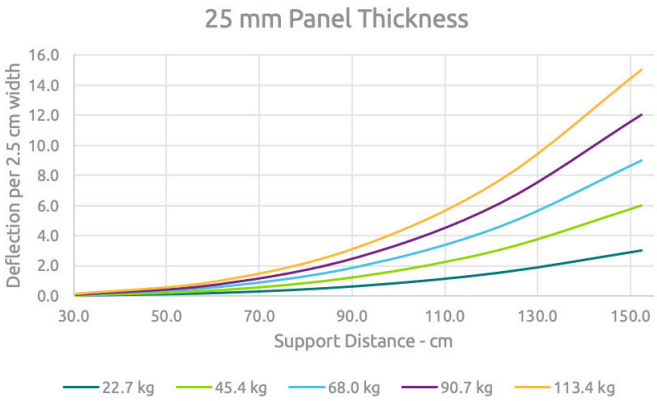
* To calculate deflection for different panel widths, use the following formula: Deflection = Chart value* [12 / panel width]. Example: Deflection for 24 inch panel = Chart value *[12 / 24]

Fixed End Beam Deflection - Metric
115 kg/m³ core density at various panel thicknesses



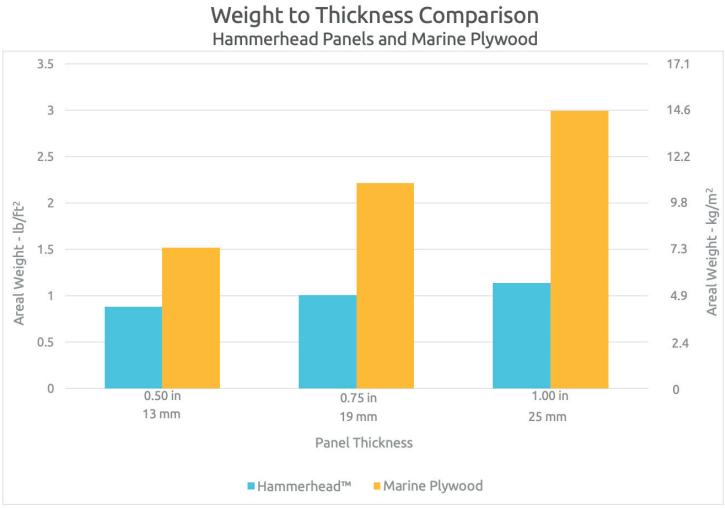


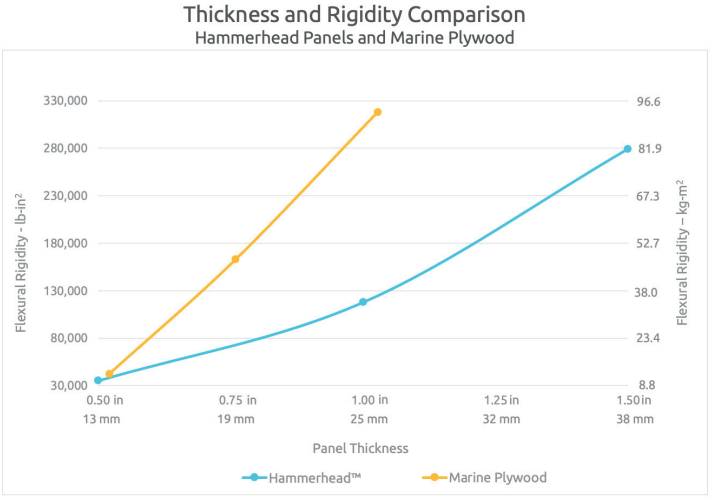


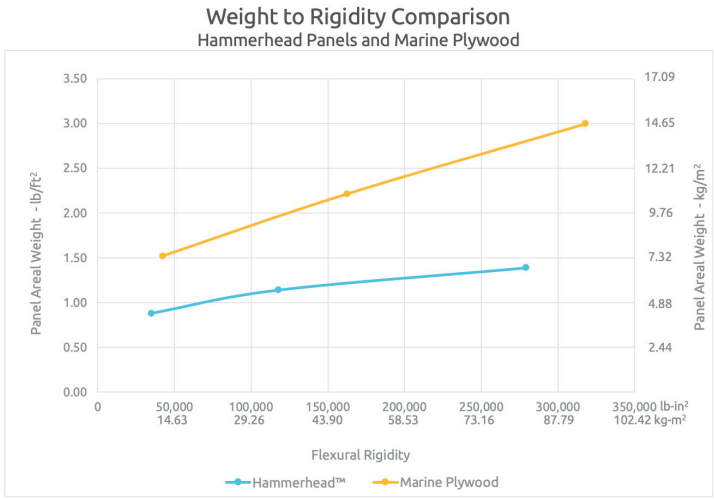


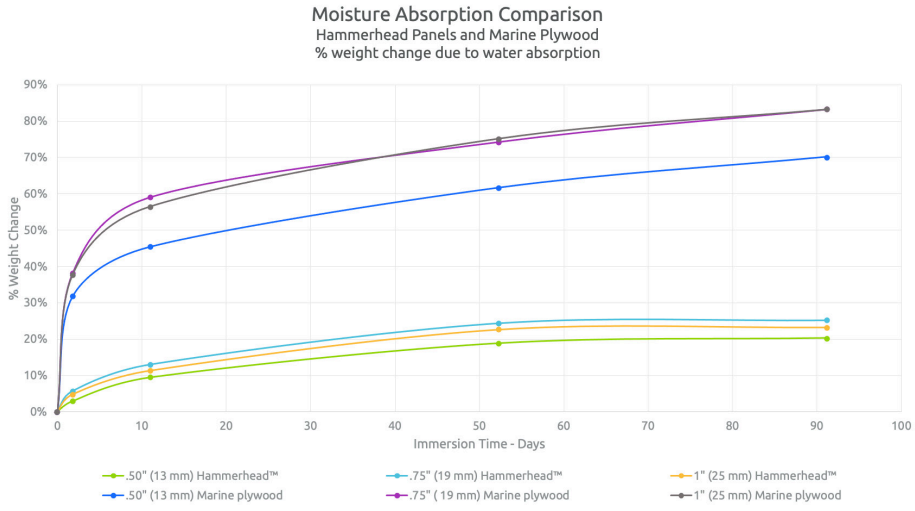
* To calculate deflection for different panel widths, use the following formula: Deflection = Chart value* [12 / panel width]. Example: Deflection for 24 inch panel = Chart value *[12 / 24]

Performance Comparison
Hammerhead Panels and Marine Plywood









INSTALLATION INSTRUCTIONS

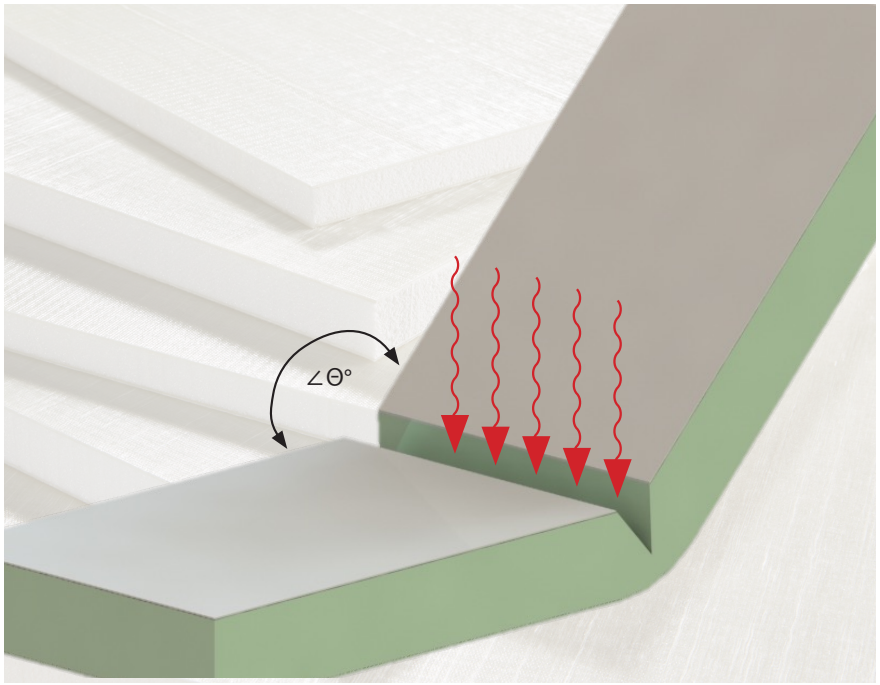
CUTTING & DRILLING

Recommended blade: Industrial fine cut-off saw blade, 10" x 80–94 teeth 38° alternate top bevel (ATB) grind with 5/8" bore, polytetrafluoroethylene (PTFE) coating, such as DIABLO® 10" x 80-teeth ultra finish saw blade for wood item #D1080X

Recommended router bits: Solid carbide single flute bit of O flute geometry, various diameters

PANEL SHAPING

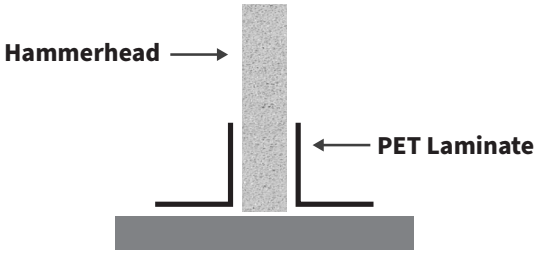
- Determine bend angle
- Cut relief
- Heat core to softening point
- Bend, hold, and cool
- Glue joint for added strength



FINISHING

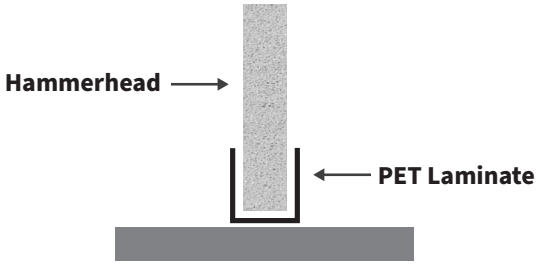
Gel coat finish is possible with minimal surface preparation.
Contact Avient for more information.

TAB TESTING OF VARIOUS INSTALLATION METHODS



L-Bracket Installation

BOTTOM PANEL	LEG LENGTH	BREAK STRENGTH
PET Skins with Plywood Core	1 in/25 mm 1.5 in/38 mm 2 in/51 mm	2400 lbs/1089 kg 2820 lbs/1279 kg 2748 lbs/1246 kg
Hammerhead with 5 lb/ft³ (80 kg/m³) Core Density	2 in 51 mm	665 lbs 302 kg
Hammerhead with 7 lb/ft³ (115 kg/m³) Core Density	2 in 51 mm	881 lbs 400 kg
Hammerhead with 8 lb/ft³ (135 kg/m³) Core Density	2 in 51 mm	1084 lbs 492 kg
Marine Plywood	2 in 51 mm	770 lbs 349 kg
Glass/Epoxy with Plywood Core	2 in 51 mm	1055 lbs 479 kg
Glass/Polyester with Balsa Core	2 in 51 mm	919 lbs 417 kg



U-Channel Installation

BOTTOM PANEL	LEG LENGTH	BREAK STRENGTH
PET Skins with Plywood Core	2 in 51 mm	2375 lbs 1077 kg
Marine Plywood	2 in 51 mm	770 lbs 349 kg
Glass/Polyester with Balsa Core	2 in 51 mm	797 lbs 362 kg

Mixed Conditions

	BOTTOM PANEL	LEG LENGTH	BREAK STRENGTH
GLASS/EPOXY TAB MATERIAL	Hammerhead with 5 lb/ft³ (80 kg/m³) Core Density	2 in 51 mm	420 lbs 191 kg
	Hammerhead with 7 lb/ft³ (115 kg/m³) Core Density	2 in 51 mm	370 lbs 168 kg
	Hammerhead with 8 lb/ft³ (135 kg/m³) Core Density	2 in 51 mm	332 lbs 151 kg
	Marine Plywood	2 in 51 mm	984 lbs 446 kg
	Glass/Polyester with Balsa Core	2 in 51 mm	1298 lbs 589 kg
NO TAB	Hammerhead with 5 lb/ft³ (80 kg/m³) Core Density - ITW Plexus MA420 Adhesive	NA	501 lbs 227 kg
	Hammerhead with 7 lb/ft³ (115 kg/m³) Core Density - ITW Plexus MA420 Adhesive	NA	839 lbs 381 kg
	Hammerhead with 8 lb/ft³ (135 kg/m³) Core Density - ITW Plexus MA420 Adhesive	NA	1156 lbs 524 kg
	Hammerhead with 8 lb/ft³ (135 kg/m³) Core Density - Crestomer 1152PA Adhesive	NA	1530 lbs 694 kg
	Hammerhead with 8 lb/in³ (135 kg/m³) Core Density - Crestomer M1-30 Adhesive	NA	1471 lbs 667 kg

ITW Plexus MA420 adhesive was used in all tab testing installations except where noted.

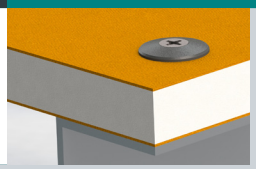
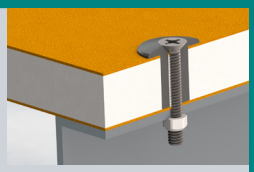
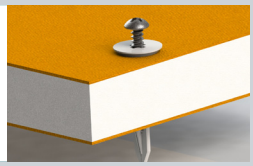
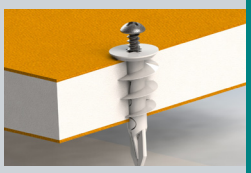
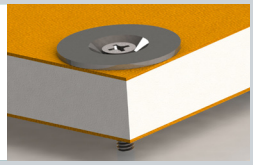
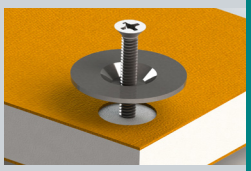
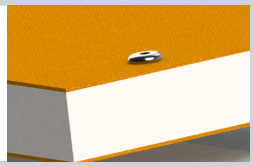
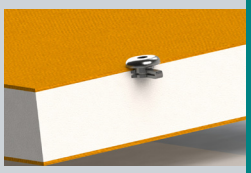
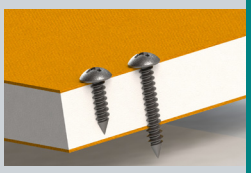
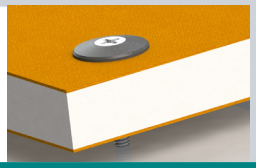
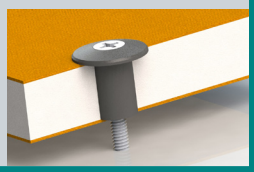
ADHESIVE SELECTION

ADHESIVE DESCRIPTION	ADHESIVE GRADE	MANUFACTURER	AVERAGE BOND STRENGTH	STANDARD DEVIATION	FAILURE MODE
BEST ADHESION					
2k Urethane	7542[1]	LORD	2281 psi 15.73 MPa	184 psi 1.27 MPa	Substrate Cohesive
2k Acrylic	SA1-705 GRY[1]	ACRALOCK	2211 psi 15.24 MPa	78 psi 0.54 MPa	Substrate
2k Acrylic	Plexus MA420	ITW	2171 psi 14.97 MPa	262 psi 1.81 MPa	Substrate
2k Acrylic	SA10-05 Blk[1]	ACRALOCK	2102 psi 14.49 MPa	138 psi 0.95 MPa	Substrate
2k Urethane	7545[1]	LORD	2047 psi 14.11 MPa	68 psi 0.47 MPa	Cohesive
2k Acrylic	SA1-705 GRY 1:1	ACRALOCK	1966 psi 13.56 MPa	68 psi 0.47 MPa	Substrate
2k Acrylic	Scotch-Weld 8010	3M	1907 psi 13.15 MPa	61 psi 0.42 MPa	Adhesive
Cyanoacrylate	Gorilla Glue	Gorilla Glue	1885 psi 13.00 MPa	432 psi 2.98 MPa	Cohesive
2k Acrylic	Crestabond PP-04	Scott Bader	1873 psi 12.91 MPa	281 psi 1.94 MPa	Substrate
2k Acrylic	SA10-05 Blk 10:1	ACRALOCK	1779 psi 12.27 MPa	127 psi 0.88 MPa	Cohesive
2k Urethane	7542[2]	LORD	1716 psi 11.83 MPa	190 psi 1.31 MPa	Cohesive Adhesive
2k Urethane	7545[2]	LORD	1535 psi 10.58 MPa	98 psi 0.68 MPa	Adhesive
2k Methacrylate	PolyFuse	Icon Containment	1610 psi 11.10 MPa	98 psi 0.68 MPa	Adhesive
INTERMEDIATE ADHESION					
2k Acrylic	FA10-05 Blk C010817	ACRALOCK	724 psi 4.99 MPa	58 psi 0.40 MPa	Cohesive
2k Acrylic	FA10-05 Blk[1]	ACRALOCK	722 psi 4.98 MPa	44 psi 0.30 MPa	Cohesive
2k Epoxy	Loctite Epoxy Instant Mix	Loctite	508 psi 3.50 MPa	81 psi 0.56 MPa	Adhesive
2k Epoxy	Gorilla Epoxy	Gorilla Glue	341 psi 2.35 MPa	198 psi 1.37 MPa	Adhesive
NOT RECOMMENDED					
2k Epoxy	Loctite Epoxy Marine	Loctite	0	0	No bond

Brand names of the adhesives are owned by the respective manufacturers.
Reference to them does not indicate any affiliation with or endorsement by them.

[1] surface sanded with 220 grit scuff prep [2] surface primed with 459T

FASTENER SELECTION

FASTENER TYPE	BENEFITS	CONSIDERATIONS	FOAM	HONEY COMB		
Through-bolting	Best mechanical locking system	Need back side access to panel	✓	✓		
Wide Grip (Bulb-Style) Rivet	Highest pullout strengths	Requires pilot hole	✓			
Cup Washer	Spreads compressive load	Requires relief hole; for substructure and hard point attachment	✓	✓		
Wide Grip (Bulb-Style) Rivet	Ease of use—no installation torque limitations	For lower load attachments	✓			
Sheet Metal or Wood Screw	Readily available, low cost	Penetrate both skins for improved pullout	✓			
Shoulder Washer	Limits compressive load	Requires relief hole; for substructure and hard point attachment	✓	✓		

For more information on installation, adhesives, and fasteners for specific applications, please contact Avient.

To learn more about our advanced composite solutions, contact Avient at 1.844.4AVIENT or visit www.avient.com.

AVIENT™