



U.S. Plastic Lumber

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Technical Data

HDPE G/G Semi-Reinforced Lumber

DESCRIPTION

USPL's HDPE Semi-Reinforced products are made of high-density polyethylene (HDPE), fiberglass, UV-inhibited pigment systems, foaming compounds, and selected process additives.

The HDPE raw material is derived from post-consumer bottle waste, such as milk and detergent bottles. This material is cleaned in USPL's decontamination process to a high purity level, which removes contaminants such as food residue, paper, and adhesives. It is then compounded into a rigid board stock material, with the resulting finished product containing over 90% recycled plastic by weight.

Because HDPE products are made with a single, purified polymer, they are manufactured to exacting, reproducible specifications. They have exceptional resistance to corrosive substances, oil and fuels, insects, fungi, salt spray, and other environmental stresses. They do not absorb moisture; therefore, they will not rot, splinter, or crack.

HDPE products are manufactured in many dimensional lumber sizes, shapes, and colors. Planks, posts, rails, balusters, tongue and groove, groove and groove, and many specialty profiles are available. The products come in many wood tones and popular colors, including Sand, Weathered Wood, Light Gray, Cedar, Redwood, and White.

HDPE products have excellent weathering resistance; however, as with other polyolefins, it is possible that the material will fade slightly over the service life of the product. These products require no waterproofing, painting, staining, or similar maintenance when used in many exterior applications.

BASIC USES

HDPE products are used in many conventional wood lumber applications and are often the products of choice for exterior applications where weathering resistance and low maintenance are required.

Used in both residential and municipal applications, HDPE products are well suited for decking, porch flooring, docks, piers, furnishings, fencing, and lawn and garden items. HDPE products are cost-effective alternatives for ground contact and animal contact, wet, and environmentally harsh conditions.

Mechanical Properties @ 70°F	Test Method	Average Value
Density	ASTM D6111	.024 -.027 lbs / cu in*
Modulus of elasticity (@ 1% strain)	ASTM D6109	130,000 psi
Ultimate flexural stress (@ 3% strain)	ASTM D6109	2300 psi
Allowable flexural stress	ASTM D6109	1200 psi
Screw withdrawal, #10, 1 1/2"	ASTM D6117	90 lbs
Water absorption, 11 weeks	ASTM D570	Less than 0.1%
Coefficient of thermal expansion	ASTM D6341	.00003 in/in/°F

* Large cross sections may have higher density
 † Variations in color are inherent in the recycled nature of the products

LIMITATIONS

This type of product has less rigidity (modulus of elasticity) and greater elongation than wood lumber. Therefore, it is not recommended for use as a true structural member. Examples of applications that are inappropriate would be load-bearing walls, deck framing, and floor joists. It is recommended that an engineering study be performed prior to use of HDPE products if the application involves structural requirements. For commercial applications where the system design calls for concentrated loads, USPL's Structural Lumber (TriMax™) should be considered.

When utilizing HDPE products for decking or flooring, careful attention must be paid to joist spacing; joist spans will depend upon which HDPE deck board is installed. Multiple-span data at 120°F or less are presented here:

Allowable Live Load (psf), Multiple Spans, at 90°F				
Deflection Limit	12" Span	16" Span	19.2" Span	24" Span
HDPE 7% F 1X Decking Board (t=0.75"), E = 130,000 psi, Fbf = 1400 psi				
1/360	138	58	NR	NR
1/240	206	87	50	NR
HDPE 7% F 5/4 C-Decking Board (t=1.25"), E = 130,000 psi, Fbf = 1400 psi				
1/360	335	141	82	NR
1/240	502	212	123	63
HDPE 7% F 2X Decking Board (t=1.50"), E = 130,000 psi, Fbf = 1400 psi				
1/360	1101	464	269	138
1/240	1651	697	403	206

Notes: Table provides limiting uniform load in pounds per square foot (psf) based on the noted deflection criteria. Stress will not limit space and is provided for reference only. Table uses ASTM D6662-01 specification, Effective $E = E \times Ct$ where temperature factor Ct is 90 degrees F. Allowable stress $F_b = 0.3 F_{bu} \times Cd \times Ct / 1.5$. The duration factor, Cd , is 1.0. To apply long term creep factor of 1.5, multiply allowable live load by 0.67.
 NR - not recommended

INSTALLATION

HDPE products can be fabricated and installed with the same tools used to work wood lumber. The product will cut and drill very cleanly, as there is no grain to split or chip. It is not necessary to pre-drill the plastic lumber when fastening. Stainless steel or coated decking nails and screws are recommended for use with HDPE products. Screws offer the best form of attachment; however, nails and staples may also be utilized in some applications. See recommended fastener configurations and minimum screw sizes per the following tables:

Deck Board Member	Recommended Fastening System
2 x 6	Direct Screw
5/4, G&G/C-deck	Direct Screw, Groove & Groove
1 x 6	Direct Screw

Fastening System	Screw Type (All Stainless Steel or Coated Recommended)
Direct Screw Down	2 x 6: #10, 2 3/4" flat head, min.; G&G/C-deck, 5/4 x 6: #8, 2 1/2" flat head, min.
G&G or T&G	G&G: #7, 1 7/8" trim head into joist; T&G: #6 or #8, 2" deck screw, min.
EC-Clip for Stair Tread	Two 1 7/8" bugle head screws into joist and one 1" wood screw into bottom of overhang board

The use of full length boards is suggested to avoid unattractive butt-to-butt joints. If the deck is longer than the boards, feature strips may be used. Because of its recycled nature and the mechanical properties of plastic, both color variation and contraction are inherent in the product. For complete installation instructions, including HDPE railing, consult the full Carefree Xteriors® Installation Guide on www.usplasticlumber.com

Note: In direct sunlight, darker colors absorb more heat and may exaggerate expansion and contraction. It is recommended that lighter colors be used in these applications.

HDPE products offer multiple deck board attachment options to accommodate expansion and contraction concerns in different climatic conditions and to address specific installation parameters. These options include:

- Tongue & groove deck board attachment with toe screwing options.
 - Direct screw attachment with feature strip options.
 - Floating attachment with EC Clip options.
 - Floating attachment with groove & groove options.
- For comprehensive and up-to-date deck installation details, please visit www.usplasticlumber.com.

SIZES

HDPE products are manufactured in continuous extrusions and can be made to virtually any length. Popular dimensional lumber profiles are stocked in 12' and 16' lengths. Cross sections include:

Carefree 1 1/4" x 5 1/8" Groove & Groove
1x4 1x6 1x8 1x10 2x4 2x6
Custom Stair Tread

Other profiles may be available by contacting USPL customer service

WARRANTY

HDPE products come with a transferable 50-year limited warranty. The product is warranted against termites and fungal decay for a period of 50 years. The product is also warranted not to rot, split, splinter, or check for a period of 10 years. The material will be replaced if the product does not perform as stated. Contact USPL for specific limited warranty coverage.

MAINTENANCE

HDPE products are unaffected by most corrosive substances and will not absorb moisture. To maintain the original finish, clean the lumber with soap and water. No sealing or painting is required; as a general rule, paint will not adhere to HDPE products.

Graffiti can be cleaned from the plastic lumber with the use of a conventional all-purpose cleaner or petroleum-based cleaner.

If the skin or surface layer of an HDPE product becomes marred or blemished, it is possible to sand off the top skin. The surface can also be buffed to eliminate abrasions.

ADDITIONAL INFORMATION

HDPE products are impervious to paint and most adhesives; therefore, these materials are not recommended for use.

HDPE products have been tested by Underwriters Laboratories for use in outdoor applications. The product has a melt temperature of approximately 270°F and a flash point of approximately 620°F. It has a higher flashpoint than wood but exposed to a severe combustion source for a longer period than wood to ignite the product. Like wood, when exposed to a combustion source for a long enough period, it will burn. Should a flame occur, extinguishing media should be dry chemical, foam, carbon dioxide, or water spray; water should be applied from a fogging nozzle.

HDPE products have been tested under repeated hygrothermal conditions (freezing, thawing, and wet conditions), as established by the ASTM, and are proven to maintain their mechanical properties. HDPE products comply with the code requirements as outlined in ICC Legacy Evaluation Report 97-63.1. HDPE has also completed evaluation by HUD for decking and railing applications (see HUD MR #1306).

TECHNICAL SERVICE

Technical service is available from USPL at 888-733-2546, by fax at 312-491-2501, or visit our website at www.usplasticlumber.com



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