

## TRIMAX® Structural Lumber

### DESCRIPTION

TRIMAX® Structural Lumber is a high-performance construction material consisting of a patented formula of recycled plastic, fiberglass, and select additives. The plastic raw material utilized in Structural Lumber is derived from post-consumer bottle waste such as milk and detergent bottles. The material is compounded into a consistent mixture of fiberglass and plastic that give it the structural properties in the table below.

Structural Lumber is a cost-effective and high-performance timber product for marine construction and commercial applications. It has exceptional resistance to marine borers, salt spray, termites, corrosive substances, oil and fuels, fungi, and other environmental stresses. It does not absorb moisture; therefore, it will not rot, splinter or crack.

Structural Lumber products are manufactured in many dimensional lumber and timber sizes, particularly in large cross sections. Deck and dock planks, sheet piling, wale timbers, camels, fenders, and piles are all available from TRIMAX® Structural Lumber. The product comes in almost any transportable length and is standard in Black. It can be special ordered in colors to complement HDPE.

Structural Lumber has excellent weathering resistance; however, as with many other polyolefins, the material will fade over the service life of the product. The product requires no waterproofing, painting, staining, or similar maintenance when used in many exterior applications.

### BASIC USES

Structural Lumber products are used in a variety of commercial and marine applications and are often the product of choice for exterior applications where resistance to salt and fresh water, marine borers, and other environmentally harsh conditions is required. Due to the unique composition of TRIMAX® Structural Lumber, the product can be used for a number of structural members in commercial and shoreline timberwork. It is well suited for:

- ⇒ Dock and deck planks
- ⇒ Sheet piling
- ⇒ Pilings
- ⇒ Channel markers
- ⇒ Wale Timbers
- ⇒ Camels
- ⇒ Fenders
- ⇒ Posts, beams, and joists

### Structural Properties

| Mechanical Properties @ 70°F       | Test Method   | Average Value |
|------------------------------------|---------------|---------------|
| Density, lbs / cu. In.             | ASTM D6111-09 | 0.034         |
| Water Absorption                   | ASTM D570-98  | < 0.1         |
| Modulus of Rupture (MOR)           | ASTM D6109-05 | 4,134 psi     |
| Modulus of Elasticity (MOE)        | ASTM D6109-05 | 329,787 psi   |
| Secant MOE @ 1% Strain             | ASTM D6109-05 | 288,751 psi   |
| Compression Parallel to Grain      | ASTM D198-05  | 3,716 psi     |
| Compression Perpendicular to Grain | ASTM D143-94  | 2,516 psi     |
| Shear Strength                     | ASTM D143-94  | 1,828 psi     |
| Tensile Strength                   | ASTM D198-05  | 3,076 psi     |
| Durometer Hardness                 | ASTM D2240-05 | 68.2          |
| Abrasion Resistance                | ASTM D4060-10 | 42 mg         |
| Chemical Resistance                | ASTM D543-06  | 5%            |
| Tensile Properties                 | ASTM D638-10  | 3660 psi      |
| Coefficient of Friction (Dry)      | ASTM D2047    | 0.95          |
| Coefficient of Thermal Expansion   | ASTM D6341-98 | 0.000021      |
| Screw Withdrawal                   | ASTM D1761-06 | 938 lbf/in    |
| Flame spread                       | ASTM E84      | Class C       |

- 1 1/2" x 5 1/2" TRIMAX® profile used in testing data at various lengths required by the test method noted
- Lower density may occur in larger cross sections
- The above testing was performed by an independent 3<sup>rd</sup> party testing agency in January 2012

### LIMITATIONS

This type of plastic lumber product has a significantly higher modulus of elasticity (MOE) than conventional forms of plastic lumber. It is important to evaluate the suitability of this product for specific uses. It is recommended that an engineering study be performed prior to use of Structural Lumber products for structural applications. Building code regulations vary by region, so all users should consult local building and safety codes prior to installation for specific requirements.

### INSTALLATION

Structural Lumber 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, or knots to bind tools and bend fasteners. It is reinforced with glass fibers, and precautions should be taken when fabricating this product. Maintain adequate ventilation when generating fabrication dust, and personal respiratory protection such as dust masks should be employed during fabrication, as well as safety glasses or goggles.

Pilings and sheet piling products, can be driven with pile-driving equipment such as vibratory hammers, land-based or barge-mounted drop hammers, or waterjets. For sheet piling installations, backfill soils should always be analyzed to determine that the proper amount of force would be exerted on the sheet piling system. For shoreline timberwork applications, Structural Lumber is used with conventional hardware such as stainless or galvanized bolts, tie rods, nuts, washers, and anchor systems.

When using Structural Lumber for decking, joist spacing should be in accordance with the span tables. Multiple-span data at 120°F or less are presented here:

| Structural Allowable Live Load (psf), Multiple Span, at 120°F or less |           |           |          |
|---|-----------|-----------|----------|
| Deflection Limit  | 12" Span  | 16" Span  | 24" Span |
| Structural 2X Decking Board (t = 1.50")                               |           |           |          |
| L/360'  | 2198 PSF  | 927 PSF   | 275 PSF  |
| L/240'  | 3000* PSF | 1391 PSF  | 412 PSF  |
| L/180'  | 3000* PSF | 1618* PSF | 550 PSF  |

\*Load limited by allowable stress of 1000 psi.

Note: Table provides limiting uniform load present on three spans in pounds per square foot (psf) based on noted deflection criteria.

Recommended standard is to limit live load deflection for floors to L/360' and to limit total deflection (dead + live load) to L/240'. Designers may choose less restrictive or more restrictive criteria for a given application. Except for very unusual and heavy loading, deflection criteria will control allowable plank span.

Deflection determination is based on a modulus of elasticity equal to 325,000 psi at 70° Fahrenheit.

Multiple span data assumes uniform load is present on three spans (deflection =  $.0069wL^4/EI$ ). This formulation is consistent with and slightly more conservative than the plank span data promulgated by the Western Woods Product Association and others. Multiple span values are applicable to planks continuous over at least two spans.

#### SIZES

Popular dimensional lumber sizes are typically stocked up to 24' lengths. Larger timbers, particularly for marine construction, are manufactured to order in virtually any transportable length. Cross sections include:

| Nominal Size (Inches)   | Actual Size (Inches)       |
|-------------------------|----------------------------|
| 2 x 4 Board             | 1 ~ 1/2" x 3 ~ 1/2"        |
| 2 x 6 Board             | 1 ~ 1/2" x 5 ~ 1/2"        |
| 2 x 7 Board             | 1 ~ 1/2" x 6 ~ 1/2"        |
| 2 x 8 Board             | 1 ~ 1/2" x 7 ~ 1/2"        |
| 2 x 8 Actual Board      | 2" x 8"                    |
| 2 x 10 Board            | 1 ~ 1/2" x 9 ~ 1/2"        |
| 2 x 12 Board            | 1 ~ 1/2" x 11 ~ 1/2"       |
| 3 x 10 Board            | 2 ~ 1/2" x 9 ~ 1/4"        |
| 3 x 4 Board             | 2 ~ 1/2" x 3 ~ 1/2"        |
| 3 x 8 Board             | 2 ~ 1/2" x 7 ~ 1/2"        |
| 4 x 4 Board             | 3 ~ 1/2" x 3 ~ 1/2"        |
| 4 x 6 Board             | 3 ~ 1/2" x 5 ~ 1/2"        |
| 2 x 10 Board with T & G | 1 ~ 1/2" x 8 ~ 3/4" w/ T&G |
| 3 x 10 Board with T & G | 2 ~ 1/2" x 8 ~ 3/4" w/ T&G |
| 6 x 6 Board             | 5 ~ 1/2" x 5 ~ 1/2"        |

#### WARRANTY

Each user of Structural Lumber products is solely responsible for determining the suitability, safety, and effectiveness of any application or use of the product. Structural Lumber products come with a limited 25 year warranty. The product is warranted against termites, decay, mold or facial fractures. Contact Trimax Building Products for specific limited warranty coverage.

#### MAINTENANCE

Structural Lumber 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 well to these 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 plastic lumber becomes marred or blemished, it is possible to sand off the top skin. The surface can also be buffed to eliminate abrasions.

#### ADDITIONAL INFORMATION

Structural Lumber has a melt temperature of approximately 270°F and a flash-point of approximately 620°F. It has a higher flashpoint than wood, and it must be exposed to a severe combustion source for a longer period than wood to ignite the product. But 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.

Trimax Structural Lumber 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. Trimax® Structural Lumber has been submitted to and is under evaluation by International Code Council (ICC).