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Evolve® Deck Design and Installation Guide

The Product:

1) Composition

- Evolve® plastic lumber is a solid, non-hollow foamed recycled product made from Recycled High Density Polyethylene (ReHDPE) plastic. Common HDPE (recycling code # 2) products are gallon style milk, water and juice containers, as well as some detergent and shampoo bottles.
- Evolve plastic lumber is 100% plastic with no wood fillers to rot, peel, weather or blister, and generally contains over 90% recycled HDPE plastic material.

2) Color

- Evolve plastic lumber utilizes Ultra-Violet (UV) stabilized colorants added during the manufacturing process to ensure a long lasting, fade resistant product requiring no staining, painting or sealing of any kind. Even when cut, the exposed product is colored.
- Standard deck colors are Cedar, Dark Gray and Weather Wood. We also have special order colors available subject to an additional charge.

3) Texture

- Evolve plastic lumber is manufactured with a slight wood grain-like texture, creating an easy to clean surface that is no more slippery when wet than a painted or sealed wood deck.
- A natural film, which can't be seen or felt, is left on the surface of the material after manufacturing. Sunlight will normally "burn off" this film in a few weeks.
- A rougher, slip resistant (knurled) finish is available if required. Keep in mind that the coarser the surface finish, the more likely dirt will tend to collect on it.

4) Product Life

- Evolve plastic lumber is still going strong after over twenty years of accelerated weather testing. We haven't seen the total life span of the product to date. We do have product installed on boat docks since 1976 with no sign of degradation.

5) Maintenance

- Evolve plastic lumber is virtually maintenance free! No staining, painting or sealing is ever required!
- Washing with a garden hose or mop is about all that is needed under normal circumstances. For stubborn stains, a mixture of bleach and water (1 part bleach to 10 parts water) can be used without harming the product. After all, bleach and acids are normally sold in HDPE plastic bottles.

6) Tools

- Standard woodworking tools can be used. You may have to use a lower speed with your router or planer/jointer to prevent "gumming up" of the router bit or the planer/jointer knives. Carbide tipped bits and blades are recommended. Always use tools according to manufacturer's instructions, and wear protective clothing and safety glasses for your safety.

7) Weight

- The weight of this product is comparable to Oak lumber.

8) Sizes and Shapes available for decking

Flooring:	Standard =	3/4" x 6" T&G or 3/4" x 5 1/2" flat (typical 1x6)
	Special-Order =	3/4" x 3 1/2" Flat or T&G (typical 1x4), 1" x 5 1/2" (typical 5/4) or 1 1/2" x 5 1/2" Flat or T&G (typical 2x6)
Railing:	Standard =	1 1/2" x 3 1/2" flat (typical 2x4) or 1 1/2" x 3 1/2" Deluxe Handrail
Spindles:	Standard =	1 1/2" x 1 1/2" (typical 2x2)
	Special Order =	1 1/2" Round or Full 2" x 2"
Posts:	Standard =	3 1/2" x 3 1/2" (typical 4x4)
Fascia / Skirting:	Standard =	3/8" x 6" T&G or 1/2" x 8" or 5/8" x 12"
Other:	Contact your local dealer or view our profile listing on our web site for other sizes and profiles available.	



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Deck Design:

Virtually any deck design can be built using Evolve® plastic lumber, while keeping in mind the below guidelines:

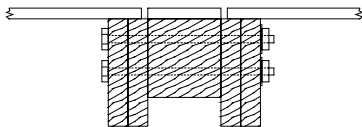
1) Board Length

- Evolve plastic lumber will expand and contract along its length, similar to vinyl siding, with temperature changes (see Expansion / Contraction chart on page 4). It is recommended that the deck boards should not exceed 16' in length.
- Apply deck boards across the shortest length of the deck whenever possible.
- Use of multiple deck levels to create transitional zones, or use of board patterns such as herringbone, checkerboard, angles, change of direction, etc. can all be used to increase the overall deck size while maintaining a minimum length on the deck boards.

Working with deck sections larger than 16'

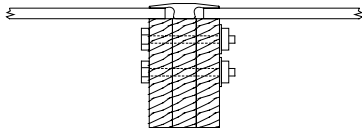
Installation of lengths longer than 16' should be avoided due to the expansion and contraction of Evolve® recycled plastic decking. This can be accomplished by using any of the following techniques.

Option 1 (for decking surface):



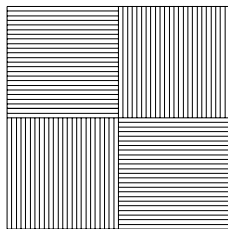
Use feature boards to break up the deck into “manageable” sections of shorter lengths. The structure must be modified to support the feature board while also supporting the ends of the deck boards running up to it. To do this, a wood 6x6 is installed directly below the feature board and two joists are installed on either side of the 6x6. These are all joined together using bolts with nuts and washers (see end-view illustration).

Option 2 (for decking surface):



Use T-Strip / Joint Covers to break deck up into “manageable” sections of shorter lengths. The structure must be modified to support the T-Strip while also supporting the ends of the deck boards running under it. To do this, a joist is installed directly below the feature board with a joist installed on either side of it. These are all joined together using bolts with nuts and washers (see end-view illustration). The decking boards can be installed first leaving an adequate gap between them to allow for the installation of the T-Strip.

Option 3 (for decking surface):



The layout of the deck can be designed in a way to break a very large (i.e. 24' x 24') deck into quadrants of alternating board directions (see top-view illustration).

Option 4 (for decking surface):

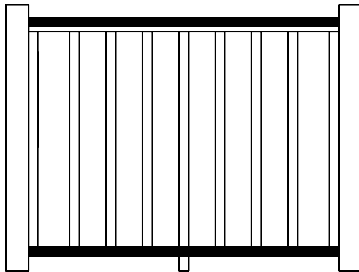
To avoid having to run joists in the long direction, over-length decks can be installed using wood 2x4 sleepers laying flat on 12” centers across 2x joists on 16” centers. This allows the frame of the deck to be installed as usual while working with the shortest length of the deck.

Evolve® Deck Design and Installation Guide

2) Joints

- Avoid butt joints whenever possible. If unavoidable, use either installation option 1 or 2 as illustrated on page 2.

3) Railing



- Railing should not exceed 48" between posts on all-plastic rails
- The bottom rail, when used, should be supported in the center to prevent sag.
- Contact your local dealer for various styles of railing available.
- Deluxe Rail with stainless steel channel should be used on rail sections that are 48" to 72" wide.
- Rail sections should be designed with spindles flush with each end of the rail with spindles evenly spaced between making sure distance between spindles conforms with local building codes.
- Rails sections are then mounted between the posts by screwing through the outside spindles into the posts. DO NOT toe nail rails into the posts. Screws will simply pull out when rails contract in cold temperatures.

4) Substructure

- Evolve plastic lumber is not suited for structural purposes. We recommend using a high quality kiln dried treated wood product, or galvanized steel, for your substructure to prevent warping and bowing.
- Wind bracing should be installed on a 45° angle to the joists, at 4' to 6' intervals, especially on larger decks. Traditional blocking methods may also be used.
- Joists shall be installed with spans according to the chart below.

Actual Evolve® Lumber Size (inches)	Maximum Allowable Span for 40 psf Uniform Load (inches)
3/4" x 5 1/2"	12
3/4" x 6" T&G	12
1 x 5 1/2"	16
1 1/2" x 3 1/2"	16
1 1/2" x 5 1/2"	23

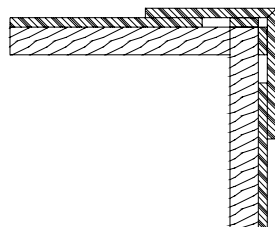
- The top surface of the joists must be flat to avoid the flooring taking on any peaks or valleys of the joists. Be sure all bowed joists are installed with the bow up if they must be used. Badly bowed joists should not be used. The joist system should be properly square.

5) Fascia / Skirting

- All exposed wood joists, and optionally the area between your deck and the ground, should be covered to complete the deck. 3/8" x 6" T&G, 1/2" x 8" or 5/8" x 12" Evolve boards are designed for this application.
- It is recommended that these boards be installed vertically or diagonally due to the effect of expansion and contraction. Horizontal installation is acceptable with the use of expansion gaps and caps covering the expansion areas. Contact your Evolve representative for more details.

Examples of expansion gaps and caps:

Corner =

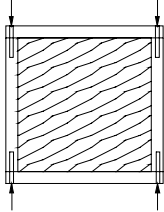


Straight =



Evolve® Deck Design and Installation Guide

5) Wrapping Wood Posts



Wood support posts can be wrapped with Evolve® materials. This will enhance the overall look of your deck as well as further reduce the maintenance your deck will require. Use either 1/2" or 5/8" thick materials wide enough to be ripped down to the widths necessary to cover the post (please notes on page 5 regarding rip cutting). Be sure to only fasten plastic to plastic and to leave a gap at the bottom to allow for movement. This gap can be covered with cutoff trim pieces. DO NOT fasten the material to the post (See end-view illustration), except at one point at the top to hold it in place. This will allow the expansion and contraction of the material.

Installation:

1) Posts

- Posts should be mounted before installation of the flooring. The posts should be thru-bolted to the joists using a minimum of two 1/2" carriage bolts with the nuts to the inside of the deck. This will allow the bolt heads to be easily covered later with a fascia board if bolted through the rim joist.
- **NOTE:** Be sure the rim joist is securely braced wherever a railing post is to be fastened to prevent movement of the post in the finished railing assembly.

2) Board clearances

- Ideally, Evolve® boards should be installed at the midrange of normal temperatures for the area at the time of installation (i.e.: approx. 60°F in northern climates).
- A space must be left next to building walls and around posts to allow for expansion and contraction of the Evolve plastic lumber. Generally, a 3/8" gap is sufficient, depending on the temperature of the boards at the time of installation and the length of boards being installed. Please refer to the expansion / contraction chart below to verify this. A trim board can be used, if desired, to cover the gap. Pre-cut post base trim pieces are available.

Expansion / Contraction Chart

Length of board	Movement over entire length per temperature change			
	40° F	60° F	80° F	100° F
96"	0.19"	0.29"	0.38"	0.48"
120"	0.24"	0.36"	0.48"	0.60"
12'	0.29"	0.43"	0.57"	0.72"
14'	0.33"	0.50"	0.67"	0.83"
16'	0.38"	0.58"	0.76"	0.95"
Coefficient of Linear Thermal Expansion = 4.965E-05 in./in./Δ°F				

- **NOTE:** When cutting notches into Evolve plastic lumber, drill or router a rounded corner in the cut out to prevent cracking at the corner, as you would with any other hard surface material. This can be accomplished by drilling a 1/2" hole at the corners of the notch and then cutting up to the drilled holes.

3) Board Edge Overhang

- **A 1" finished overhang of the deck boards beyond the rim joist is recommended.**
- **NOTE:** It is generally easier to allow additional overhang of every floorboard during installation, followed by trimming this overhang on a straight line when finished. A slight radius can be added to the trimmed floorboards' top edge with a router to create a more aesthetically pleasing effect.

4) Fastening

3/4" x 6" T&G floor boards

- Blind screw through the tongue into each joist with # 7 x 2 1/4" self-tapping stainless steel trim head screws. This results in a very clean and neat looking deck floor with no visible fasteners.
- **NOTE:** No pre-drilling is required with this installation method. A small amount of lubricant (soap or oil) applied to the screws may aid installation in some joist material, such as Douglas Fir.
- Firmly secure decking starting nearest to the house, working away from the house, down the entire length of the board.



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4) Fastening (Continued)

3/4" x 5 1/2" Flat floor boards

- Face screwing with two # 10 x 3" self-tapping stainless steel screws into each joist is recommended. Boards should be predrilled and slightly countersunk to have the cleanest looking installation. A small amount of lubricant (soap or oil) applied to the screws may aid installation in some joist material, such as Douglas Fir.
- **NOTE:** If you don't pre-drill, you may want to "tap down" the little mushrooms that may form when using self-tapping screws. This will hide part of the screw head for aesthetic purposes.
- Firmly secure decking starting nearest to the house, working away from the house, down the entire length of the board.

Notes:

Installer and/or purchaser should consult local building codes prior to the building process.

Evolve plastic lumber should be stored on a flat surface prior to installation, and boards should be carried on edge for better support.

Two cuts must be taken when rip cutting Evolve plastic lumber. This is due to the difference in density between the outer "skin" of the board and the board's center. For example, if a 3/4" X 5 1/2" board needs to be ripped to 3/4" x 4", 3/4" should be ripped from both sides. Contact your Evolve representative to answer any questions.

Information included in this guide is subject to change without notice.

The latest Evolve® Deck Design and Installation Guide is always available at www.renewplastics.com