

Deck Railing OPTIONS

Americans spent approximately \$713 million on new outdoor decks and porches in 1998 alone, topping all other

by Dave Holbrook

categories including new kitchens, roofing, and siding. While there is no way of knowing how much of that money was spent on railings, there's no question that railings add cost and complexity to a deck project. Pre-engineered railing systems and pre-assembled modules may take some of the head-scratching out of design issues as well as the pricing of materials and labor.

While wood has long ruled the roost in deck construction, its shortcomings are well known. A regular diet of scraping, sanding, and painting is required to keep a wooden railing looking spiffy. Maintenance-free materials and finishes save everybody work, from the installer to the homeowner. Finding a system that looks like wood is a priority for some homeowners, while others are concerned only with durability and convenience. Price also plays an important role; perhaps not surprisingly, the more it looks like "the real thing," the more it costs. In this article, we'll look at the features and assembly details of some of the new railing systems.

THERMAL INDUSTRIES

Maintenance-free materials and ready-to-assemble components simplify outdoor railing installations

PVC SYSTEMS

In spite of manufacturers' claims that vinyl provides the "classic look of wood" without the maintenance, smooth, glossy PVC (polyvinyl chloride) does little to impersonate the look and feel of the wood it replaces in a railing system, at least close up. From a distance, the illusion is more successful, because the component dimensions of vinyl railings mimic those of their wood counterparts, such as 4x4 newel posts and 2x2 or turned balusters. If the trend toward vinyl siding is any indication, many of your clients may care less about the "wood look" than about having a rail that requires no scraping, sanding, and repainting. What PVC lacks in strength and stiffness is compensated for with metal or wood inserts or an integral structural matrix.

BROCK DECK



The more than 1/8-inch-thick walls of Brock Deck's extruded newel post enable it to stand alone, secured on a proprietary steel deck post mount. The railing, available in five styles including square balusters or decorative spindles, is part of an entire deck system. As an option, you can have the entire deck and railing factory cut, shipped, and installed by a local distributor. The benefits are said to include a firm quote; tight, accurate assembly; no waste; and warranted

installation by others.

COLOR GUARD

With three railing styles to choose from, and a choice of a steel bracket or site-installed 4x4 newel support, Color Guard's system uses routed rail-to-post and baluster insert connections. Railings are secured with a capped retaining screw through the side of the post. The company boasts 13 years in the railing business, a "near perfect shipping performance," and wholesale distribution in 25 states.



COLOR GUARD FENCE

DREAM DECK

Dream Deck's PVC post sleeve is made to clad a pressure-treated 4x4. The aluminum-reinforced contoured railings insert through pre-cut openings in the post sleeve and are secured to a concealed bracket screwed to the site-rabbeted post core. The system is mostly self-explanatory, but there are certain techniques that have been worked out to



provide ease of assembly and eliminate "gotchas."

For example, if you're going to use the one-piece trim collar at the base of the post to conceal a sloppy cutout through the deck, don't forget to slide it over the post before you install the railing assembly, or you'll be starting over.

EVERNEW

At the heart of the EverNew post is a galvanized steel pipe, welded to a right-angle mounting flange. Blocking may have to be added to the deck frame at post locations lacking a usable corner. Spacers center the vinyl sleeve on the post support. Aluminum-reinforced railings install in pre-cut openings through the post sleeve, and are held captive between posts, which eliminates the need for mechanical fasteners.



CERTANTEED

GOSSEN

Gossen's cellular PVC balusters stand alone in the all-PVC field with the only non-tubular, solid-vinyl balusters, available in square and an honest-to-gosh lathe-turned profile. The vinyl railings are reinforced with Doug fir and interlocking



panels provide cover for on-site pressure-treated 4x4 newels. Although one of the principal selling points of PVC is that it "never needs painting," this manufacturer suggests their railing components may actually

require painting after a number of years, with acrylic latex- or alkyd-based paint. Check with individual manufacturers for their recommended painting procedure.

KODIAK

Galvanized steel reinforcement adds heft to Kodiak's railing. The tubular steel post mount has keyhole slots that drop in place over attachment bolts, making an easy and rugged installation. The heavy-duty vinyl post sleeve



DAYTON TECHNOLOGIES

snaps in place over the mount. The railing is a two-part, snap-together compound profile, with prepositioned picket pockets and a choice of baluster styles.

KROY

Kroy offers four tubular PVC baluster profiles, including octagonal, rectangular, square, and decorative turning. Aluminum reinforcement adds strength to



KROY



the railings, while steel beefs up the post sleeve. The company also makes a high-end FinylRail system on a custom basis. The contemporary round, steel-pipe-reinforced PVC railing can be formed to follow any bend or turn a deck or stair takes, and can be ordered in custom colors.

SHEERLINE

The 3 1/4-inch-wide aluminum-reinforced Sheerline 3250 PVC railing is rated to span 10 feet, post to post. The System 4500 railing can span 10 feet without any metal reinforcement, due to the wider, 4 1/2-inch structural cross section. Build your stairs to suit the system: Surface-mounted angle brackets define a standard 32.5-degree, 7:11 step incline. Step railings have elongated openings to receive balusters on the angle. Individual post panels interlock to wrap a 4x4 core.



L.B. PLASTICS

VINYLGARD

VinylGard's square galvanized steel post mounts inside a durable PVC sleeve, and pre-centered baluster spacing in the railings offer strong, simple assembly and installation. Railings contain steel reinforcement channels, enabling the system to span 8 feet between posts. Railings, with pre-spaced baluster pockets, insert into precut post openings, making a clean-looking assembly. A 45-degree connector-adapter is a slick way to navigate angled deck corners.



URETHANE FOAM

High-density molded urethane foam is arguably the material most like wood in look, feel, and workability. Unlike wood, urethane is stable, lightweight, and impervious to moisture. Urethane will break down under UV exposure — it's sold primed and must be kept painted. Paint may perform more reliably on urethane than on wood, because the foam isn't subject to thermal expansion or the variations in moisture content found in wood.

There is a broader selection of railing forms and styles available in urethane than in any material other than wood. Elegant curved balustrades are a specialty niche of urethane systems. Urethane component balustrades require the most skill of the builder; baluster layout, fitting, and railing assembly, whether level or sloped, must be done on the job. Pre-assembling railing sections in a shop setting can eliminate some of the hassles of field installation. Urethane systems are priced at the high end.



FYPON

FYPON

Fypon's stately posts, railing segments, and balusters are structurally reinforced with galvanized steel tubing or heavy-duty vinyl pipe. If the job calls for a truly classy or classic railing, molded urethane, with a vast selection of profiles to choose from, is a good place to start.

STYLE-MARK

It's easy to fool the eye with a Style-Mark railing, or "balustrade," in urethane terminology. The ability to replicate intricate detail gives urethane balustrades a look of classic authenticity.



STYLE MARK



OWENS CORNING

Style-Mark's PVC-reinforced urethane post installs on deck or slab by means of a steel flush base-mounting plate, solidly attached to framing or concrete. The plate holds a pair of full-height threaded rods, which are tightened at the top of the post.

WOOD-RESIN COMPOSITES

Composite lumber addresses the desire for a material that more closely resembles wood but without wood's natural defects and the need for incessant maintenance. Made from wood fiber and either virgin or recycled polymer resin, composite lumber can be worked much like solid wood. Wood-composite weathers to a uniform silver-gray color, but doesn't split, shrink, warp, absorb water, or decay like wood. Wood-composite can be extruded into tubular sections, giving it greater tensile strength than solid stock of the same material.

FIBERON

Fiberon system components are made of composite wood, extruded in tubular sections, and finished with an outer layer of solid-color PVC in four shades, pre-empting the paint option. The "sprayed-on" texture of the finish gives it an attractive painted, rather than plastic, look.

FIBER COMPOSITES





Fiberon railings ship in 4- and 6-foot pre-assembled sections, which automatically restricts the post spacing to a rated safe span.

The proprietary universal post mounting flange can be simply converted to bolt either inside a framing corner or on the straightaway.

SMARTDECK

The tubular configuration of SmartDeck's wood-poly extrusions makes it easy to add electrical features like newel-top lighting and base outlets, and the contoured surface of the

components give the system a distinctive, upscale look. Like other wood-poly composites, SmartDeck lumber can be painted after four to six months of outdoor exposure. Durawood railings, made of



solid HDPE (high-density polyethylene), may be substituted for the system's wood-poly railing to increase the distance between posts and completely eliminate the need to paint or stain.



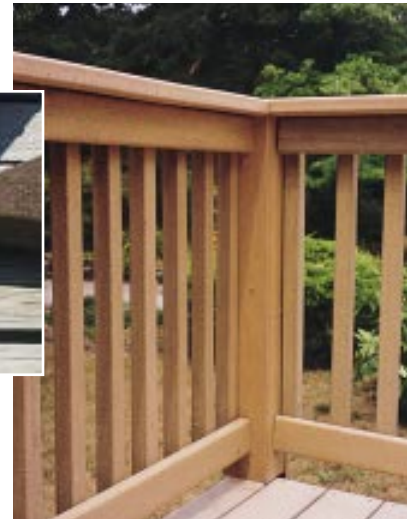
U.S. PLASTIC LUMBER

TREX

Perhaps the best-known composite lumber, Trex is available in decking, railing, post, and baluster profiles. A spokesperson for the company states that they prefer



their product to be viewed not as a "kit," but as a substitute for solid wood with most of wood's creative potential. Trex will weather to a natural silver-gray just like solid wood, but without the attendant splits, checks, and decay. Wood-polymer lumber can be painted or stained, best done after four to six months outdoors, when the surface has developed a little "tooth" from weathering.



TREX

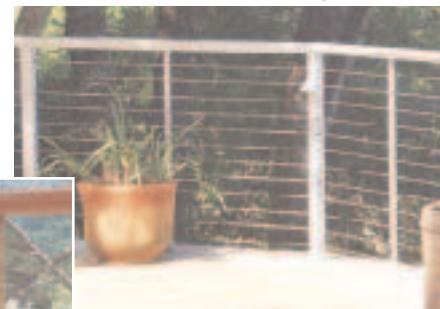
METAL RAILINGS

These railing systems take advantage of the high strength of aluminum or steel with component profiles that are much smaller than their wood and plastic counterparts. Metal railings may be appropriate when the view, and not the railing, is the desired focal point. Metal frames provide the strength and stiffness needed to replace ordinary balusters or pickets with clear-view tempered glass panels.

CABLERAIL

Homeowners pay top dollar for real estate with a view, so the last thing they want to do is block the scenery with a bulky railing. CableRail's high-strength $\frac{1}{8}$ -inch-diameter stainless steel cable, strung horizontally and tensioned between posts, calls little attention to itself, leaving the vista relatively unobstructed. Proprietary fittings at end posts have one-way "jaws" that grip the cable and provide adjustable tensioning. For safety, it's recommended that the cables be run no

FEENEY WIRE ROPE





more than 3 inches apart, and that vertical posts or spacers be provided every 3 feet. The system works with wood posts as well as square or round metal tubing.

As with any horizontally oriented railing system, codes may restrict or prohibit the use of horizontal railing members due to their ladder-like “climbability,” so check with your local building department first.

DEC-K-ING

DEC-K-ING's all-aluminum railing system, combined with their reinforced,



DEC-K-ING

welded-seam PVC roof membrane, offers a durable, attractive, and waterproof method to rehabilitate an older deck. Posts mount flush on the surface via an integral flange. The railing can be finished with aluminum pickets or tempered glass panels, using snap-in spacers between pickets or a fitted glass gasket. The aluminum railing sections can be cut to length using a carbide-tipped saw and joined using slide-on surface-mount couplings.

DECKORATORS

The unique, custom look of a DECKorators railing is a result of your wood-working and their solid 3/4-inch-diameter cylindrical aluminum balusters. The upper and lower railings are bored to receive the balusters, which are captured between them



DECKORATORS



without adhesives or fasteners. Balusters are the most labor-intensive part of a railing paint job, but these have a baked on maintenance-free finish with four color options. Available embellishments include decorative centerpieces and aluminum finials for the newel posts.

DURARAIL

Durarail's railing system accommodates glass, pickets, or even a combination, in a convertible aluminum frame. Tempered glass panels are usually ordered separately



DURADEK

from a local provider. A glass railing may eliminate the horizontal rail-climbing problem, but will require frequent cleaning to remain transparent.



FIBERGLASS

Pultruding refers to the manufacturing process of drawing glass fibers through polyester- or epoxy-resin and a heated mold to produce high-strength FRP (fiber reinforced plastic, or fiberglass) components. This method is used to make everything from fishing rods and sail masts to deck railings.

ARMOR-RAIL

Armor-Rail's FRP railing system takes advantage of the inherent strength of the material to produce smaller, thin-walled tubular sections with no need for additional reinforcement. A hollow, rectangular section of FRP with a 1/16-inch wall thickness safely spans 12 feet between posts, while providing all the stiffness necessary to meet code requirements, as well as the user's expectation of an unyielding barrier. The heavy-weight newel post friction-fits over a glass-filled-polycarbonate flush mount. Along with





their stock in trade post and picket design, the Armor-Rail system readily supports tempered glass panels.

E-Z DECK

E-Z Deck's unique FRP railing system lets the balusters fly solo, without newel posts.



PULTRONEX

Instead, balusters are captured in a routed perimeter shroud, and bolted into the rim joist at every second baluster. Although intended for use with the company's decking planks, the railing can be installed as an added barrier system on any deck.

OTHER PLASTICS

It's easier to stand out if you stand alone. A couple of manufacturers offer unique plastic formulations with outstanding performance characteristics.

With any plastic, it's recommended that you avoid dark colors in sunny locations, due to the material's tendency to fade under UV exposure. Dark colors also absorb, rather than reflect, the sun's infrared rays. Most plastics soften and expand when heated and may temporarily deform if the expanding plastic can't stretch out unrestricted.

AVCON

High-performance thermoplastic acrylonitrile styrene acrylate is used in Avcon's railing system. A monolithic, tubular system of consistent diameter, the contemporary-style railing can be formed into curved transitions, allowing it to "flow" from deck to step without terminations or sharp angles. The top guardrail is reinforced with a concealed steel insert for added stiffness. The acrylic compo-

sition qualifies the railing for use in demanding commercial, as well as residential, applications, and it can be tinted to nearly any



AVCON

color desired. Avcon's acrylic railing is produced on a custom basis in four standard colors, with special-order colors available.

CAREFREE

Carefree's HDPE deck railing is made of 90% recycled plastic milk and laundry detergent bottles, which, along with its splinter-free surface, makes this something of a "feel-good" product. The hefty, solid body extrusions can be cut and conventionally fastened like wood, preferably using stainless steel screws. Predrilling is unnecessary. The integral color eliminates painting; in fact, paint and most adhesives will not bond to HDPE. Maintenance is said to be limited to "soap and water."



PERMARAIL

The PermaRail system plays fast and loose with materials, defying easy categorization. Natural cedar forms the structural core of the expanded, or cellular, PVC railing. The square or decorative-turned "Perma Newel"



HB&G

has a full-length cedar core inside a cast polyurethane shell. The balusters are made of solid expanded PVC, available in square and turned profiles. Proprietary rail fasteners provide concealed connections.

Deck Railing Comparison

Manufacturer	Material	Cost PLF: 2 posts, 8-foot section, 36-inch rail	Colors	Paint Required	Rail Span (in feet)	Reinforcement
Armor-Rail	FRP	\$56	white, green, black, beige	no	12	integral
Avcon	Thermoplastic	n/a	black, white, brown, gray, special-order custom colors	no	no limit	steel
Brock Deck	PVC	\$18	tan, white, gray	no	6	steel
CableRail	Metal	\$10+/-	mill	N/A	3	none
Carefree	HDPE	\$20-\$25	tan, weathered wood, gray, brown, white	no	6	integral
Color Guard	PVC	\$11-\$23	white, tan, gray	no	8	steel
DEC-K-ING	Metal	\$17 - \$22.50	white	no	4 to 9	integral
DECKorators	Metal	\$6	black, white, pewter, green	no	n/a	n/a
Dream Deck	PVC	\$34	white	no	8	aluminum
Durarail	Metal	n/a	white	no	8	integral
EverNew	PVC	\$24 -\$40	gray, tan, white	no	8	aluminum
E-Z Deck	FRP	\$25	white, gray, tan	yes	n/a	integral
Fiberon	Wood-Resin	\$25	white	no	6	integral
Fypon	Polyurethane	\$163	primed	yes	8 to 10	steel/PVC
Gossen	PVC	\$28-\$30	white	no	8	wood
Kodiak	PVC	\$25-\$30	white, tan, gray, brown, green	no	8	alum/steel
Kroy	PVC	\$25 - \$70	white, gray, tan, special-order red, blue, green	no	8	alum/steel
PermaRail	PVC and Polyurethane	\$32	primed	yes	8 to 10	wood/steel
Sheerline	PVC	\$24.50	white, beige, gray	no	10	aluminum
SmartDeck	Wood-Resin	\$20-\$25	natural	no	4.5	integral
Style-Mark	Polyurethane	\$171	primed	yes	8	PVC
Trex	Wood-Resin	n/a	gray, "natural," brown	no	n/a	none
VinylGard	PVC	\$20	white, gray, tan	no	8	steel/aluminum

Railings and the Code

If ten people at a deck party lean against a section of railing and boogie to "Smoke on the Water," the railing must withstand those applied forces without failing. It is the railing as a system (and not the post alone) that is subjected to testing to ensure that it meets minimum code requirements for loading and impact. Basically, the top railing in a guardrail system must be able to resist a concentrated load of 200 pounds applied at any point along its length, and in any direction. In a separate test, the railing must survive a uniform load of 50 pounds per linear foot applied horizontally and concurrently with a uniform load of 100 pounds per linear foot applied vertically downward. Concentrated and uniform loads are not applied simultaneously. In addition, BOCA requires the entire railing system, including the spaces between railings, to resist an overall force of 25 psi applied laterally to the surface. Manufacturers limit the length of their railing

assemblies according to the particular material's capacity for loading (see "Deck Railing Comparison").

If you don't think tubular vinyl sections have the rigidity to withstand the lateral forces that a railing must to meet code, you're mostly correct. Manufacturers rely on wood, steel, or aluminum inserts to beef up the shell, which in turn protects the insert from rot or corrosion. Currently, no PVC railing manufacturer promotes a railing section longer than 10 feet.

According to ASTM testing, an FRP (fiber reinforced plastic) railing can be produced to match or surpass the longitudinal tensile strength of its aluminum counterpart; PVC trails the pack with less than 18 percent of the strength of either FRP or aluminum. Tensile strength in the transverse direction (across the railing section) fares a bit differently; FRP has one-third the tensile strength of aluminum, but more than 1.6 times that of PVC.



SOURCES OF SUPPLY

Avcon

800/242-8266
www.avconrail.com

Duradek (Durarail)

800/338-3568
www.duradek.com

Kroy Building Products

800/933-5769
www.kroybp.com

Shakespeare Composites & Electronics (Armor-Rail)

800/800-9008
www.shakespeare-ce.com

CertainTeed (EverNew)

800/333-0569
www.certainteed.com

Feeney Wire Rope (CableRail)

800/888-2418
www.cablerail.com

L.B. Plastics (Sheerline)

800/752-7739
www.lbplastics.com

Style-Mark

800/446-3040
www.style-mark.com

Color Guard Fence

800/832-8914
www.polyvinyl.com

Fiber Composites (Fiberon)

704/463-7120
www.bbslumber.com/fiberon.htm

Outdoor Technologies (VinylGard)

800/206-4946
www.heritage.com

Thermal Industries (Dream Deck)

800/245-1540
www.thermalindustries.com

Dayton Technologies (Kodiak)

800/432-9560
www.daytech.com

Fypon

800/537-5349
www.fypon.com

Pultronex (E-Z Deck)

800/990-3099
www.ezdeck.com

Trex

800/289-8739
www.trex.com

DEC-K-ING

800/804-6288
www.globaldecking.com

Gossen Corp.

800/558-8984

Royal Crown (Brock Deck)

800/365-3625
www.royalcrownltd.com

U.S. Plastic Lumber (Carefree, SmartDeck)

312/491-2500
www.carefree-products.com
www.smartdeck.com

DECKorators

888/662-3325
www.deckrail.com

HB&G (PermaRail)

800/264-4442
www.hbgcolumns.net