Alternative Roofing Materials

by *JLC* Staff

Durability and fire resistance make plastic, metal, and fiber-cement good choices for residential roofs

These days, code officials, insurance companies, and homeowners are pressuring builders to find alternatives to conventional roofing products. In fire-prone areas, new codes prohibit wood roofing; in many cases, even fire-retardant-treated wood shakes and shingles are illegal. In regions susceptible to earthquakes, high wind, and hail, insurance companies are pushing builders to use roofing with better survivability. Finally, homeowners' associations are creating covenants that require alternatives to asphalt roofing, and individual owners are asking for roofing materials that are environmentally sensitive and have longer life expectancy.

Fortunately, manufacturers offer several alternative roofing materials that meet these demands, although each product must be evaluated in the context of the region and environment in which it is being applied. For instance, some materials will stand up to intense heat and UV radiation, but will fail when subjected to extreme freeze-thaw cycles.

These alternative roofing systems fall into three major categories: plastic composites, cementitious, and coated metal. The list of products included here is not comprehensive, but represents the variety of materials available.

Plastic Composites

Most plastic shakes and shingles are made from waste wood and recycled plastic from a variety of sources. Unlike wood, most plastic roofing installations can achieve a Class A fire rating, and are warranted for as long as 50 years against decay and mold or fungus growth. Formulations vary, but most products meet code requirements for temperature cycling, and resistance to freeze-thaw damage, wind uplift, and degradation from UV radiation. While some products must be applied by certified installers, most can be cut and fastened just like real wood. Material costs vary from $175 to about $350 per square, and installation costs are about the same as for wood shakes or shingles.

Imitation Shakes

The wood-plastic composite shingles called *Eco-Shakes* are made from recycled pallet wood and leftover plastic from vinyl hose, shower curtain, and bottle manufacturers. Eco-shakes come in 22-inch lengths and random widths of 5, 7, and 12 inches; premolded ridge caps are also available.

Both the shingles and the four available colors are solid throughout their thickness, so they look like conventional shakes. And like wood shakes, you can score them with a straight blade, snap them to size, and fasten them with nails or staples. Installation follows standard practice, except for an added step at the eaves, where side tabs on the undercourse shingles (made by cutting full-length shingles in half) are glued using RT600 construction adhesive provided by the manufacturer. Each shingle in the starter course is also glued to the undercourse. Eco-Shakes must be applied to a solid deck, however, so plywood may be an additional material and labor cost when the product is used to replace an existing shingle or shake roof on skip sheathing.

Contact: Re-New Wood, P.O.Box 1093, Wagoner, OK 74467; 800/420-7576.

Plastic Slate

If you want the look of slate without the weight, *Authentic Roof* plastic slates may be the answer. The wedge-shaped solid plastic slates are 1/4 inch thick at the butt, 12 inches wide, and 18 inches long, and can be installed at an exposure of 6 to 7 inches (special hip and ridge pieces are also available). The "shaled" edge, which is patterned after actual slate, makes the plastic roofing look like real stone. Made from 100% post-industrial waste, the slates weigh about the same as standard 20-year asphalt shingles.

Like wood shingles, you can score the plastic slates with a knife and snap them to size. The manufacturer is said to be working to improve the Class C fire rating; at present, however, Authentic Roof slates aren't suitable for areas where fire is a big concern.

Contact: Crowe Industries Ltd., 116 Burris St., Hamilton, ON L8M 2J5, Canada L8M 2J5; 905/529-6818.

Shake Panels

Another plastic roofing alternative is *Perfect Choice*, which is made from Noryl, a well-tested industrial material manufactured by GE Plastics. Each 21-inch-wide by 40-inch-long thermoformed panel is molded to look like a partial course of 13 individual hand-split shakes. The material can be cut with a circular saw using a diamond blade or by reversing a plywood paneling blade. Each panel is attached along the top edge with five nails, and interlocks along the sides with adjacent panels. Noryl trim pieces are also available, including caps, valleys, and hip starters.

When installed over 30-pound felt underlayment, Perfect Choice has a Class C fire rating; with the addition of a 90-pound sheet membrane over the felt, the system achieves a Class A fire rating. Installed only by company-certified installers, the in-place cost averages $425 per square.

Contact: American Sheet Extrusion Corp., 1618 Lynch Rd., Evansville, IN 47711; 800/347-3390.

Cementitious Roofing

Fiber-cement roofing shingles are made from Portland cement reinforced with cellulose fiber and molded to look like wood shingles, slate, and various tile shapes. Wood fibers have replaced the asbestos used to reinforce early fiber-cement materials, making today's products more environmentally acceptable. Because air-cured fiber-cement products are more vulnerable to freeze-thaw damage, some manufacturers use a steam-curing autoclave process, which increases strength and density while greatly reducing moisture absorption. Autoclaved roof tiles are a good choice for roofs in cold country, but the tiles are also more brittle than the air-cured variety and are more likely to break from seismic stresses or when walked on. Many manufacturers recommend air nailing or stapling to avoid breakage from errant hammer blows.

The strong suit of fiber-cement roofing tiles is their resistance to weathering, insects, fungus, and fire. Heavier tiles resist wind uplift to varying degrees; lighter tiles often need a hold-down clip to protect against uplift, although such clips can reduce breakage of any tile during earthquakes.

Expect installed cost to range from $350 to $650. Warranties vary from 25 to 60 years.

Slate Look-Alike

UltraSlate is a manufactured fiber-cement shingle with a direct-from-the-quarry appearance. The 1/4-inch-thick shingles measure 9 3/8x16 inches, and are installed with a 7-inch exposure. The high-pressure steam autoclave process used during manufacture preshrinks and compresses the material, increasing density and dimensional stability, and reducing water absorption and efflorescence. Five slate colors plus a ColorBlend series are available for field shingles as well as precut hip and ridge pieces. An UltraSlate roof weighs about 500 pounds per square. The company's line of fiber-cement roofing products includes *Hexagonal*, which creates a diamond-shaped pattern, as well as several styles that imitate wood-grain textures.

Contact: GAF Materials Corp., 1361 Alps Rd., Wayne, NJ 07470; 800/223-1948.

Cement Shakes

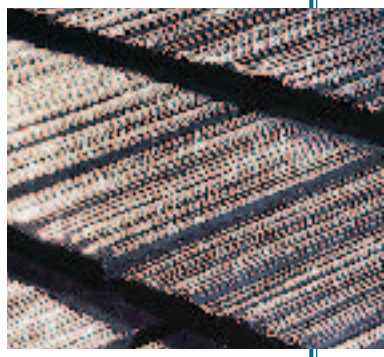
For clients who want the durability of cement but the look of wood, consider *Hardishakes*. Although freeze-thaw concerns make these roofing tiles more suitable for warm climates, the cement content ensures a Class A fire rating (depending on the underlayment used). The 1/4-inch-thick shakes come in 22-inch lengths and 6-, 8-, and 12-inch widths, and weigh about 400 pounds per square when installed with a 10-inch exposure.

Hardishakes are flexible enough to be walked on without breakage and don't need to be predrilled or punched. They can be scored with a carbide-tipped scoring tool and snapped, and can be nailed with a pneumatic nailer. Field tiles, starter sheets, and ridge caps are available in four colors and one color blend. A fiber-cement imitation slate tile called Hardislate is also available.

Contact: James Hardie Building Products, 26300 La Alameda, Suite 250, Mission Viejo, CA 92691; 800/426-4051.

Thick Butt Shakes

A fiber-cement shake called *Nature Guard* is 3/4-inch thick at the butt and comes in widths of 5, 7, and 12 inches. Available in standard lengths of 22 inches (starter pieces are 13 inches long), the composite shakes are designed to be applied with a 10-inch exposure and weigh 580 pounds per square. Installation is similar to that for wood shakes, including an interlayer of felt paper between courses. Nature Guard shakes can be nailed or stapled to solid or skip sheathing, or applied over existing roofing. The shakes, as well as preformed hip and ridge caps, are available in four colors.



Contact: Louisiana-Pacific, 5 Center Point Dr., Suite 500, Lake Oswego, OR 97035; 800/579-8401.

Oversize Slates

Another high-end fiber-cement shingle called *Eternit Slates* comes in two sizes: 12x24-inch English Slate, and 11x16-inch Continental Slate. The copper storm anchor required to protect against high-wind uplift is also said to inhibit moss growth. The non-autoclaved tiles are flexible enough to be scored and snapped, but are said to be strong enough to resist breakage from foot traffic. The slates are prepunched for nails, and the color is consistent through the core, so there's no need to touch up cut edges. Depending on size and exposure, the slates weigh between 384 and 467 pounds per square (see photo).

Contact: Eternit Inc., Burks Corp. Center, 210 Corporate Dr., Reading, PA 19605; 800/233-3155.

Corrugated Panels

Cembrit B7, a fiber-cement roofing panel, provides the look of traditional barrel tiles, but installation requires handling and fastening many fewer individual pieces. New to the U.S., Cembrit tiles have proved themselves in Denmark (where they are manufactured) and other European countries. The

pigmented layer of the 24x43-inch panels is sprayed on and compressed into the tile while the cement is still wet. After curing, an acrylic-based surface coat is added to provide extra protection against weathering.

Cembrit panels are prepunched to accept mounting nails or clips; corner miters required for drainage where tiles meet are also made at the factory. The corrugated panel roofing system comes with all necessary fasteners and accessories, including angled or conical hip, ridge, and rake tiles; eaves, valley, and top closures; low slope sealant; field- and ridge-vent tiles; and snow guards. At 350 pounds per square, the panels can be used in new construction or laid over existing asphalt shingles and still not exceed the average weight loading.

Contact: Northern Roof Tile Sales Co., 4408 Mile Strip Rd., Suite 266, Blasedell, NY 14219; 905/627-4035.

Score and Snap Shingles

A line of cementitious roofing products called *FireFree* is available in three styles — Quarry Slate, Rustic Shake, and Quantum Roof Panels — designed to replicate the appearance and hue of natural slate and genuine wood shakes and shingles. The lightweight material can be easily scored with a knife and snapped to size, and the color is continuous throughout. The FireFree line of roofing products is freeze-thaw resistant and Class A fire-rated.

Contact: FireFree, P.O. Box 1094, Sumas, WA 98295; 800/347-3373.

Metal Alternatives

Freeze-thaw resistance is a given with metal, but expansion and contraction, electrolysis, and color-fast coatings, as well as hail damage and noise, are all issues to consider when deciding to use metal roofing. Metal roofing is an especially attractive alternative because of its light weight, its fire resistance, and its ability in some cases to increase the shear value of the roof system. Most metal roof panels can be installed over existing roofing without any modification to the structure; some installations require the use of battens or sleepers. A variety of weather- and fade-resistant coatings are available, and most companies back their products with a 50-year warranty. Installed cost ranges from $350 to $500 per square.

Shear Steel

A steel panel called *California Classic* comes in 14-inch by 4-foot steel strips that lay up like asphalt roofing. This roofing system can be applied right over existing shingle or shake roofs, or onto a plywood substrate. In a typical reroof, 1x4s securely nailed along the length of the rafters are crisscrossed

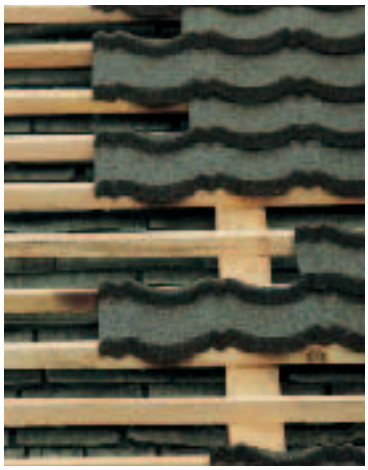
with horizontal 2x2s, with 1 1/2-inch foam insulation laid in the vertical bays. The steel panels are fastened through a raised rib with black phosphate nails. The upshot is an attractive, fireproof roof with an added R-10 insulation value; moreover, the sleepers and interlocking steel panels turn the entire roof into a shear panel. According to the manufacturer, 16 of 17 buildings reroofed with California Classic panels in a Northridge, Calif., housing tract survived the disastrous quake intact, while dozens of surrounding houses reroofed with clay tile collapsed.

The panels can be cut with tin snips or with a guillotine, and can be formed in a brake for custom flashing. The stone coating is made of ceramic granules in ten standard colors (custom color blends are also available). The company will also apply the stone coating to other roof components, including jacks, code caps over furnaces, tee tops, eyebrow vents, chimneys, flashing, and even the fascia.

Contact: American Roofing Industries, 2300 Wibar Ln., Antioch, CA 94509; 888/844-7663.

Wind-Resistant Panels

Decra, a stone-coated roofing material, is said to exhibit exceptional resistance to wind uplift. Unlike many roof panel products, which fail due to fastener pullout, Decra panels take



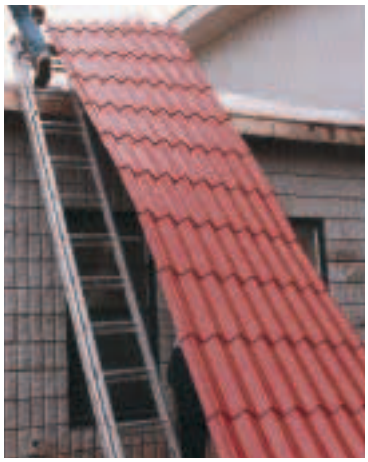
full advantage of the shear strength of the fasteners, which are driven horizontally into the upslope edge of 2x2 battens.

The interlocking, 26-gauge steel panels are available in two profiles, tile (49 1/2x14 1/2 inches) and shake (51x12 5/8 inches), and the stone-coating is available in a variety of colors. Decra panels are protected on both sides against UV radiation and corrosion with multiple layers of epoxy, aluminum-zinc, and acrylic coatings. The steel panels are designed to be installed over new construction or existing roofing.

Contact: Carter Holt Harvey Roofing, 827 Ave. H East, Suite 211, Arlington, TX 76011; 800/258-9740.

Custom Full-Length Panels

The vinyl-coated hot-dipped galvanized panels in the *Steel Tile Roofing System* are installed vertically from eaves to ridge. The panels are 41 1/4 inches wide in custom lengths of up to 40 feet. The roofing system weighs just one pound per foot, and can be applied over existing roofing or directly over framing without sheathing.



In addition to three industrial profiles, the roofing panels are manufactured in a Slate/Shake profile, and in two styles (Katech and Katech Elite) that resemble clay tiles. Three coating types are available in up to ten colors, as well as in aluminum and copper, and all necessary trim, flashing, and seals are included.

Contact: Steel Tile Co., Hwy. 400 & Industrial Park, RR 1, Thornton, ON L0L 2N0, Canada; 705/436-1723.

Aluminum Shakes

The recycled aluminum alloy used to manufacture *Rustic Shingles* provides the ultimate in corrosion resistance. Designed to look like wood shakes, the 12x24-inch interlocking panels come in eight colors and can be installed directly over existing roofing without the need for battens or sleepers. The nail-clip fastening system, which allows for expansion and contraction, is available in an extra-long version that can be used to attach Rustic Shingles directly to strapping or sheathing underlying a thick layer of wood shakes. According to the manufacturer, the lightweight panels are durable enough to resist hail damage and to be walked on during installation.

Contact: Classic Products, P.O. Box 701, Piqua, OH 45356; 800/543-8938.

Eaves-To-Ridge Panels

Another vertically applied panel called *Met-Tile* comes in 3-foot widths in lengths from 2 to 20 feet. The coated-steel panels are formed to look like Spanish tile and come with screws, closures, and all necessary accessories. Met-Tile can be installed over solid sheathing or over open steel or wood rafters. When applied directly over existing shingles, the panels achieve a Class B fire rating; a Class A rating is possible in new construction, depending on the underlayment.

Contact: Met-Tile, Inc., P.O. Box 4268, Ontario, CA 91761; 800/899-0311.

Diamond Pattern

A diamond-shaped flat metal tile called *Castletop* features an expanded polystyrene backing that adds insulation value and is said to protect the tile from foot traffic during installation. The 16x16-inch tiles interlace by means of a locking tab and are prepunched to accept mounting screws; interlocking upturned and downturned edges provide additional weather protection. Suitable for installation directly over existing roofing, the tiles are available in four versions: coated aluminum or steel, and natural-finish copper or zinc. Trim pieces for valleys, ridges, gables, and eaves can be factory formed to spec, and coil stock is available for custom flashing in the field.

Contact: ATAS International, 6612 Snowdrift Rd., Allentown, PA 18106; 610/395-8445.