Roofs Feature Engineering Plastics

GE Plastics’ “Living Environment” spurs three new roofing systems

In conjunction with the opening of GE Plastics’ Living Environments concept house, Nailite and Masonite are displaying new roof coverings using engineering plastics.

Both companies’ products are showcased on the house: Nailite roofing on the back of the house, and Masonite on the front and ridge cap. A third company, Carlisle, is working with GE Plastics on the design of another plastic panelized roofing system, a prototype of which is displayed inside the house.

Early in the Living Environments program, GE Plastics identified roofing as one of the largest potential applications for engineering plastics — 12 billion square feet of residential roofing is installed annually.

Roofing panels from Miami-based Nailite International, molded of Noryl® resin, replace traditional cedar shakes and shingles. The resin provides excellent flame retardancy and weatherability and is being tested for UL 790 Class C flame listing. Wood shakes and shingles are not listed. In Los Angeles, a ban on wood shakes and shingles is being considered because of fire issues. Consequently, Nailite plans to market the panels in California first, where the need for highly aesthetic, flame-retardant roofing is increasing.

Noryl resins hydrolytic stability reduces the risk of rotting, warping, or splitting. It also prevents the growth of fungus and spores that can cause decay in wood roofing. The panels are installed with nails and can be custom colored. On the Living Environments house, the Nailite panels are gray to match the Masonite panels on the front half.

The 21-inch by 48-inch Nailite panels underwent the Xenon Arc accelerated weatherability test—2,000 hours of exposure to intense W light, and cycles of moisture, heat, cold, and dry-to meet recommended building codes.

Thermocouples have been installed under the roof panels and connected to a computer to record daily outdoor temperatures. GE Plastics will use the data to design new, custom-tailored materials for the roofing industry. The Nailite roof is targeted for the remodeling market.

Masonite Corp., a subsidiary of International Paper, uses panels made from Azloy+ composites, a polycarbonate-based, glass-filled technopolymer structure. Based on UL test results, a new, highly UV-stabilized grade of the Azloy composite was developed specifically for this application. The material is undergoing UL 790 Class A developmental testing, the highest flame and fire protection listing for roofing systems.

The Masonite roof is targeted for both new and reroof construction in the residential and light commercial markets, and where demanding fire performance is desired.

The material is flow formed into large panels that offer the same easy installation as the Nailite system. Each 1- by 4-foot Masonite panel features molded-in nail holes and requires eight nails for installation. To cover the same area in cedar shakes would require 20 nails.

Both the Nailite and Masonite panels eliminate the lime-consuming task of installing one shingle at a time and trying to follow a straight
The light weight of both systems provides another labor-saving benefit: on an installed per-square-foot basis, the Nailite and Masonite systems are less than one-third the weight of dry cedar shakes.

Carlisle SynTec Systems, a leader in single-ply commercial and industrial roofing systems, has undertaken a program with GE Plastics to develop a plastic panelized roof system. Thermoplastics and structural foam materials would be used for major parts of the roofing assembly- structural decking, weatherproofing, insulation, fire barrier, and aesthetic covering.

The roof, a prototype of which is displayed in the Living Environments concept house, would provide a tremendous labor savings. Currently, the framing contractor installs the roof decking, and a separate rooting contractor installs the asphalt/felt waterproofing layer and shingles. With the all-in-one system, one contractor installs the entire assembly.

Carlisle, a division of Carlisle Corp., Carlisle, Pa., and GE Plastics are also investigating cost-competitive cathedral-style roofing. The roof design currently incorporates an Azloy structure skin with a PPO® foamable resin core for insulation. This investigation of panelized architectural plastic rooting includes research and development commissioned at MIT.

Designers at GE Plastics have developed scale models of two factories; a panel stock factory (pictured) and a finishing facility. The models detail how panels are manufactured in one factory, then customized for assembly with doors and windows in an automated finished components factory.

GECET™ resin replaces wood and metal in three-dimensional building panels in GE Plastics’ Living Environments concepts house. The panels are featured in the bay windows and towers (pictured here) of the concept house. The material provides molded-in detail for an added three-dimensional look and insulation value.