

## GE Helps ArmorLite™ Raise the Roof to New Heights of Beauty, Durability, and Safety while Helping the Environment

### Transforming Roof Tile, Shake, and Slate with GE's Weatherable Geloy\* XTW Resin

Pursuing the vision of creating beautiful roofing material that is lightweight, and durable, with the potential to be recyclable, ArmorLite™ Roofing spent nearly a decade perfecting the first patented aesthetic polymer shake, slate, and tile. The Santa Ana, Calif. research and development company sought to solve a number of challenges facing roofing contractors and homeowners, including degradation and color shift from weathering; worker injuries and excessive transportation costs from heavy roofing materials; poor energy efficiency; and the environmental impact of non-recyclable materials. To achieve its goal of a unique and commercially viable roofing product, ArmorLite™ recognized the need to obtain support from a leading company that could provide excellent materials, technology, and support.



### GE Plastics and ArmorLite Roofing, LLC

#### The Challenge: Bringing Unique Aesthetic Polymer Roofing to Market

The U.S. roofing market, a \$30 billion industry, has long relied on traditional materials including asphalt, wood, metal, concrete, and fiber that present a number of drawbacks. First, they often discolor, degrade, or deform over time due to the impact of temperature and weather, detracting from the appearance of the building. Second, they are heavy, raising the cost of shipping – especially with today's high fuel prices – and putting installers at greater risk of injury. Many of these materials are poor insulators, absorbing solar heat that increases the need for air conditioning. They are also utilitarian and drab in appearance. Finally, few can be recycled, adding to waste in landfills.

ArmorLite aimed to solve all these issues with polymer roofing. After experimenting with different resins, the company found that acrylic-styrene-acrylonitrile (ASA) best

met its specifications for the top layer of its proprietary roofing system.

However, ArmorLite required more than resin; the company needed a strong supplier that could provide expertise and resources for the commercialization process: material formulation, physical property testing, resin processing, and marketing assistance.

Frank Lane, President of ArmorLite, said, "Several years into the project, we were working with a resin supplier that wasn't providing the value-added services we needed to move things forward. And their ASA wasn't performing as well as we had hoped. So when GE Plastics contacted us about Geloy\* XTW resin, we realized that by working with a world leader in the plastics industry we could get an outstanding ASA resin and a great go-to-market supplier."

#### The Solution: GE's Geloy XTW Resin for a New Generation of Roofing Material

GE Plastics helped ArmorLite identify candidate materials and ArmorLite ultimately selected Geloy XTWE240 resin, an extremely weatherable, lower-gloss extrusion grade of ASA copolymer. The GE material is supplied in a natural tint to enable customized coloring and special effects. It promotes color and gloss retention for excellent aesthetics; is impervious to rot, mold, and mildew; and offers excellent impact resistance to minimize damage from hail.

The patented ArmorLite roofing is composed of two laminated sheets. The flame-resistant substrate is a copolymer alloy that incorporates GE's Cyclocac\* acrylonitrile-butadiene-styrene (ABS) resin, while the capstock is made of the Geloy XTW resin. The one-inch-thick tiles, shakes, and shingles are available in a variety of colors and textures to mimic slate, wood, copper, and other materials.



GE imagination at work

## Geloy\* XTW Resin / ArmorLite Roofing, LLC Case Study

### The Value-Added Services: Teaming for Success

Working with ArmorLite and its extruder and thermoformer over a period of more than two years, the GE team provided a number of value-added services, including physical property testing on ArmorLite's proprietary substrate blend, processing assistance, and marketing support. Lane commented, "GE provided exceptional technical and marketing support that was instrumental in getting this product ready for launch."

### The Benefits: "Beauty and Brains"

GE's Geloy XTW resin provides a number of critical advantages to ArmorLite's roofing that the company terms "beauty and brains." Its exceptional weatherability enables the roof tiles or shingles to retain their attractive appearance for significantly longer than conventional materials. Geloy resin resists degradation from UV light, temperature extremes, precipitation, and mold/mildew.

For homeowners, builders, and architects who complain about the dull, drab, and utilitarian look of roofing materials, ArmorLite roofing offers shake, slate, and tile designs with wood

grain and marble colorations never seen before.

According to Lane, ArmorLite's mission has been accomplished by creating beautiful roofing materials. "With new technologies like GE's Geloy XTW resin, it makes perfect sense to apply these aesthetic qualities because a roof is 40 percent of what you see in a home."

That's the "beauty" of this innovative GE polymer.

Equally important, the Geloy XTW resin helps make ArmorLite roofing a very smart choice for environmental protection and safety. Because polymer weighs so much less than wood, concrete, metal, and asphalt, ArmorLite roofing can significantly reduce fuel consumption used in shipping. Further, Geloy resin meets recyclability standards, and manufacturing waste is reused in new roofing. Finally, because the roofing is lightweight and easier to handle, installation can be completed much more quickly and safely, helping to reduce work-related injuries. An innovative interlocking panel design allows the roofing to be installed up to 50 percent faster than conventional shingles or tiles, with less wear and tear on workers.

"GE is proud of our work with ArmorLite to help create these aesthetic polymer roofing materials," said Kelli Schott, Application Development Specialist for GE Plastics. "Durable, lightweight roofing featuring Geloy XTW resin offers a number of environmental benefits while giving contractors and homeowners exciting new choices. This is a great example of the work GE is doing to support our ecomagination\* initiative, which aims to build innovative solutions that benefit our customers and society."

ArmorLite, which plans to make its roofing commercially available in Q2 2006, has already taken orders for several large housing developments. "Even before formally launching our new products, we've won us some large contracts through word of mouth," said Lane. "With GE's materials innovation and our unique designs we have created a range of next generation roofing to benefit customers and the environment."

Details at:  
[armorliterateofing.com](http://armorliterateofing.com)

### About GE Plastics

GE Plastics ([geplastics.com](http://geplastics.com)) is a global supplier of plastic resins widely used in automotive, healthcare, consumer electronics, transportation, performance packaging, building & construction, telecommunications, and optical media applications. The company manufactures and compounds polycarbonate, ABS, SAN, ASA, PPE, PC/ABS, PBT and PEI resins, as well as the LNP\* line of high-performance specialty compounds. GE Plastics, Specialty Film & Sheet manufactures high-performance Lexan sheet and film products used in thousands of demanding applications worldwide. In addition, GE Plastics' dedicated Automotive organization is an experienced, world-wide competitor, offering leading plastics solutions for five key automotive segments: body panels and glazing; under the hood applications; component; structures and interiors; and lighting. As a Worldwide Partner of the Olympic Games, GE is the exclusive provider of a wide range of innovative products and services that are integral to a successful Games.

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