



High Performance Building

Consumer Solutions

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## Dow Solutions for Fiber-Reinforced Cement Products

Collaborate With Dow to Improve Your Product Performance and Process Technology

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# Working Together to Improve the Durability and Reliability of Your Fiber-Reinforced Cement Products

Dow offers comprehensive technology solutions for improving the fiber-reinforced cement (FRC) siding and panels you manufacture, as well as improving many steps in the production process. By collaborating to develop innovative, performance-enhancing solutions, you benefit in these ways:

## Water Resistance and Dimensional Stability –



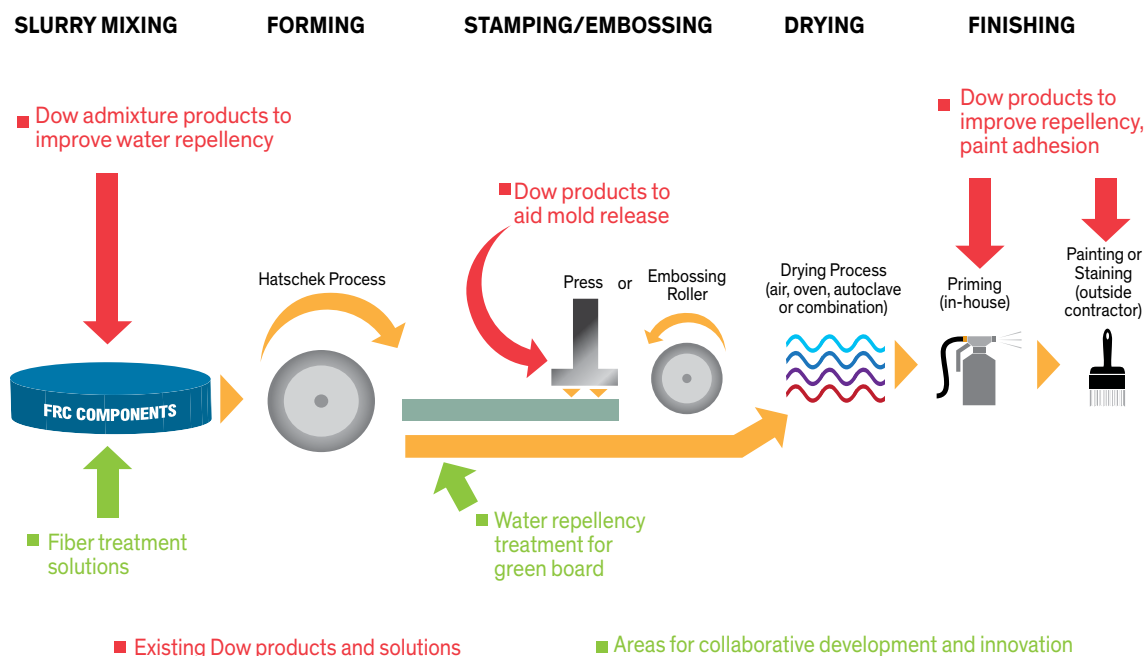
Moisture uptake is the principal cause of product failure in the field. Silicone products from Dow can be used to significantly reduce water uptake when used as admixtures mixed with board ingredients or when used as sealers or water repellents as part of the surface

finishing process. The benefit is reduced damage due to water absorption that can lead to product failure and liability claims.

**Adhesion** – Sealers formulated with specific Dow products can be applied without impacting primer or topcoat adhesion and help maintain the coating's appearance and ability to protect the FRC siding or panel.

**Processing Aids** – Dow mold release agents and antifoam products can help streamline your production process.

Figure 1 – FRC Process Flow



## Protecting Buildings Saves Energy

Beyond the cost savings of longer-lasting, more durable buildings, Dow construction chemical products can save energy costs, too. Treating substrates with hydrophobic materials from Dow makes buildings more energy-efficient, reducing two leading causes of structure heat loss:

- Heat loss from evaporation of absorbed water in untreated materials – As water evaporates, changing from liquid to vapor, it draws heat energy, cooling the substrate and structure and increasing energy consumption.
- Thermal conductivity – Testing shows that thermal conductivity of wet materials is higher than that of dry materials.

Figure 2 – Infrared Imaging

The heat loss from evaporation of treated, dry substrates compared to untreated, wet substrates is visibly demonstrated with infrared imaging.



Dow offers solutions to help improve many steps of the production process and the performance of the finished FRC product you make. New technology is emerging for fiber treatment and enhanced water repellency in green board production.

# Technology Solutions to Improve Product Performance

## Admixtures

The use of silicone-containing admixtures in the preparation of green FRC siding and panels results in reduced water absorption in the final product. Immersion tests<sup>1</sup> show that air-dried FRC boards prepared with a silicone-containing admixture absorb up to 85 percent less water in 24 hours compared to boards prepared without a silicone-containing admixture.

The benefit is that water-repellent properties are introduced into the FRC matrix, leaving no unprotected edges to absorb moisture, including edges exposed as a result of cutting during installation. The admixture does not impact paint adhesion.

## Sealers and Water Repellents

Using Dow sealers or water repellents as a post-cure treatment can improve the water resistance of FRC products.

**Sealers** – Silane-based penetrating sealers, applied prior to any other coating or pigmented paint, offer significant reduction in water and moisture uptake. Tests<sup>2</sup> show that FRC boards treated with a silane-containing sealer absorbed up to 73 percent less moisture compared to untreated boards over a 24-hour immersion test period.

**Water Repellents** – Water repellents are also silane-based, and they offer excellent water exclusion properties, as well as the ability to noticeably shed or bead water. Products that contain free siloxane (DOWSIL™ IE 6694 Water Repellent and DOWSIL™ IE 6683 Emulsion) are not recommended for applications where a topcoat or paint would be applied after treatment.

## Fiber Treatment

Dow has extensive experience in treating fillers and fibers used in plastics production, and similar technology may have application in treating fibers used in the fiber/cement matrix in FRC products. For more information on products and technology for fiber treatment, contact your Dow representative.

Table 1 – Dow Products for Admixtures

Product	Chemistry	Solids,† %/Weight	Cure System	Cure Volatiles
DOWSIL™ BY 16-606	Siloxane copolymer	100	Air	Ethanol
DOWSIL™ BY 16-846 Fluid	Siloxane copolymer	100	Autoclave	None
DOWSIL™ Z-6288 Silane	Methoxy functional resin	100	Air or Autoclave	Methanol
DOWSIL™ Z-6289 Resin	Ethoxy functional resin	100	Air or Autoclave	Ethanol

†Typical properties not to be construed as specifications.

<sup>1</sup>Test data from a collaborative study comparing the water absorption of air-dried FRC boards produced with an admixture containing DOWSIL™ Z-6288 Silane to untreated FRC boards.

Table 2 – Dow Products for Sealers and Water Repellents

	Product	Chemistry	Dilution System	VOC,† g/L*	Solids,† %/Weight	Benefits
Sealers	XIAMETER™ OFS-6403 Silane	Silane	Solvent	423	100	Good penetration into substrate
	DOWSIL™ 1-6184 Water Repellent	Water-dilutable Silane	Water	321	98	Water-dilutable penetrating treatment
	DOWSIL™ IE 6682 Emulsion	Silane + Resin Emulsion	Water	312	60	Excellent water exclusion; improves adhesion
Water Repellents	DOWSIL™ 520 Dilutable Water Repellent	Silane/MeH Siloxane	Water	<300	40	Quick absorption on board surface; good water beading on board surface
	DOWSIL™ IE 6694 Water Repellent	Silane/Siloxane	Water	<100	60	Very low VOC; good water beading on board surface; not suitable before primer/topcoat
	DOWSIL™ IE 6683 Emulsion	Silane/Siloxane	Water	<200	40	Good water beading on board surface; not suitable before primer/topcoat

\*Per United States calculation methodology - product only, not entire formulation.

†Typical properties not to be construed as specifications.

<sup>2</sup>Water absorption of FRC board treated with a penetrating sealer based on DOWSIL™ IE 6682 Emulsion compared to untreated reference over 24 hour immersion

## Collaborative Innovation Helps Shorten Time to Market

A thorough understanding of how silicone chemistry improves FRC products and processes, combined with proven success with customers around the world, makes Dow uniquely qualified to help you develop innovative solutions to improve both your manufacturing process and the products you market. Collaborative innovation puts our experts in silicone chemistry side-by-side with your experts in product development and manufacturing to eliminate the traditional “we suggest – you evaluate” method. The result is shorter time to market for new or improved products.

For more information about how we can work together, including how to initiate a project with Dow, please contact your Dow representative.

## Contact Us

Whether you need industry-leading innovation or greater cost efficiency, Dow can help. Learn how we can help you at [consumer.dow.com/buildingmaterialsprotection](http://consumer.dow.com/buildingmaterialsprotection).

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