
Abstract

Eternit and Momentive partnered to develop a durable water-beading (hydrophobic) effect on fiber-cement roofing, replacing the conventional immersion bath with an on-line aspersion treatment that preserves the substrate's breathability while repelling liquid water.

Experiment variations: A design of experiments evaluated several hydrophobic chemistries — a novel hydrophobically modified acrylic copolymer, silane-siloxane emulsions alone and combined with PDMS silicone or nitrile silane, octyl silane, and silicone emulsions with different functional groups. Process variables were also tested, including solids content, flow rate, felt and conveyor-belt speed, and grammage applied across large-scale production batches.

Results obtained: Silane-siloxane chemistry delivered the strongest, most durable beading effect, with contact angles up to 148.6° (and 169.7° in later trials) that remained above 99 – 116° after 6 – 12 months of natural outdoor aging. The new aspersion process produced more uniform, longer-lasting beading while cutting water consumption by over 61%, lowering CO₂ emissions, labor, weight and cost, and improving operational safety, process control and final product quality.

Future opportunities: Development continues toward best-in-class, longer-lasting performance. Combining different chemistries — such as the CoatOSil PRIM-2 system for fiber cement — has already shown promising durability gains, supporting further optimization, factory-wide standardization of the bead effect, and stronger market positioning of the Imper+ technology.
