IIBCC 10th Int. Inorganic-Bonded Fiber Composites Conference
2006
November, 15th - 18th São Paulo Brazil

SILICONE WATER REPELLENTS FOR (FRC) FIBER-CEMENT BOARDS

DAVID B. SELLEY, DR.VANDERLEY MOACYR, JOHN FLÁVIO LEAL MARANHÃO
Dow Corning Corporation; University of São Paulo; University of São Paulo

ABSTRACT

Fiber Reinforced (FRC) Composites, commonly referred to as Fiber-Cement boards and panels, are finding increased usage globally for applications in siding, roofing and other exterior applications because of their ability to provide a cost-effective, durable and substantial covering. Water absorption is an important degradation factor with fiber-cement products, especially the ones using hydrophilic fibers like cellulose or wood particles. First of all, water causes volume changes, introducing internal stresses. Secondly, water promotes alkaline attack to cellulose fibers, reducing the toughness. Finally, water retention or dampness makes mould growth possible. Mould growth reduces the aesthetic performance of the fiber-cement products and increases their absorbance to solar radiation, which greatly reduces the energy efficiency of the building and further contributes to urban heat islands. Silicone based water repellents are well established in the industry, and have been successfully used to improve the hydrophobicity and durability of gypsum boards. The ability of silicones to efficiently hydrophobe surfaces, and their excellent durability against UV, heat and other environmental conditions makes them a natural fit for use on fiber-cement products. To date, however, silicone-based products have not been widely used in finer-cement applications, and they are mostly employed as additives or primers. This paper presents results of a joint project between Dow Corning Corporation and the University of Sao Paulo to evaluate hydrophobic properties of fiber-cement products treated with silicones. Results are presented for a variety of silicone based materials such as silanes, polysiloxanes and their combinations. The silicones are either used as admixtures or applied via a pos-treatment.