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MIND THE WATER: UNDERSTADING HOW WATER AND CALCIUM CARBONATE INTERACT IN ADHESIVES AND SEALANTS MANUFACTURING

ABSTRACT:
Calcium carbonate is the most widely used mineral filler in Adhesives and Sealants. Untreated products coarser than 5 µm (extenders) are valued for their optical properties and controlled particle size, as well as cost reduction purposes. However, treated products finer than 5 µm (functional fillers) have additional values, such as mechanical reinforcement and rheological modification. When formulating moisture curing systems, the amount of water carried by calcium carbonate must be known and controlled. Time-consuming and costly processing steps are common in manufacturing: filler drying, mixing under vacuum, heating/cooling, chemical drying. This paper explains the fundamental interaction between calcium carbonate and water. Water pick-up is discussed using models from scientific literature, which are then applied to the behavior of calcium carbonate in humid conditions. Our discussion also covers surface treatments, the most common technology for hydrophobization. A final overview of the industrial relevance of the phenomena is supported by case studies.