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ANTICAKING METHODS FOR PHARMACEUTICAL GRADE SALT

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ABSTRACT

This is an investigation into the causes of caking in the pharmaceutical grade salt produced by Dominion Salt Limited. It was found that the caking mechanism that occurs in sodium chloride is humidity caking. A moisture audit of the Dominion Salt plant showed that the primary factors causing caking are the initial water activity of the salt and the temperature gradient that the salt is exposed to during packing and storage.

Experiments were conducted to determine the physical properties of the salt: the bulk density, the thermal conductivity, the particle size distribution and the moisture sorption isotherm. Using these properties, a mathematical model was modified to predict whether caking would occur in a salt bed subjected to specific temperature and moisture conditions.

Model validation experiments were performed, where caking was produced by exposure to a temperature gradient. The mathematical model was compared to experimental data and altered until it accurately simulated observed results. The model was then used to predict the circumstances that will induce significant caking in a salt bed and a chart of the results collated to show when caking will occur. Given the salt temperature, the ambient temperature and the initial water activity, the chart can be used to determine whether caking will occur in the bagged salt.

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