

W A T E R T R E A T M E N T

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An exchange of tips and techniques on the treatment of water, wastewater and sludge...sponsored by Allied Corporation

CST: A rapid, accurate method for determining sludge filtrability

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Sludge dewatering can be one of the most costly operations at a treatment plant and one of the most difficult to optimize. The dewatering ability of a sludge can change rapidly in response to changing plant conditions, especially in industrial waste treatment where waste characteristics may vary from one day to the next, or even hourly in extreme cases. Minimizing the cost of the dewatering

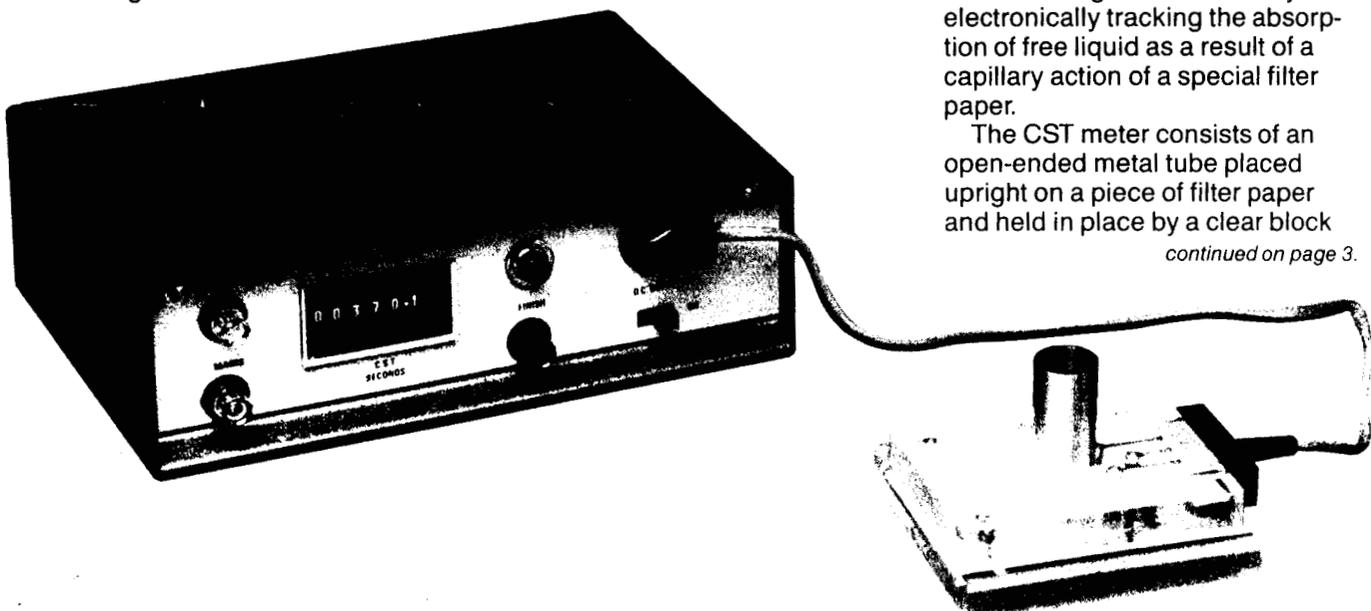
operation, therefore, often requires frequent laboratory tests to determine the most cost effective dosages of sludge conditioners and coagulant aids. In order to detect and respond quickly to the need for a dosage adjustment, the laboratory test used must not only be rapid and simple, it must also produce a measurement which is related to the actual

dewaterability of the sludge. This requirement may be obvious, but some commonly used laboratory procedures sacrifice this relationship to some extent in order to maintain speed or simplicity.

One test method, called Capillary Suction Time, indicates the filtrability of a sludge and at the same time is fast and simple. The CST meter, measures the rate at which a sludge will dewater by electronically tracking the absorption of free liquid as a result of a capillary action of a special filter paper.

The CST meter consists of an open-ended metal tube placed upright on a piece of filter paper and held in place by a clear block

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CST meter

of plastic. Electrodes protrude through the block and rest on the filter paper. When the tube is filled with a sludge sample, the capillary action of the filter paper draws liquid from the sludge, causing the liquid to spread out in a circular shape across the paper. As the liquid front passes one pair of electrodes, the timer is stopped. A short Capillary Suction Time indicates a readily dewaterable material, while a long CST indicates poor performance due to retention of liquid within the sludge. The test procedure requires only two to three minutes per sample, thus making it easy to evaluate several different combinations and concentrations of sludge conditioners.

As an example of the use of the CST meter in a treatment plant,

consider a typical sludge filtration operation employing a belt filter press. Once the desired CST value is known, the addition of conditioners or filter aids to the sludge can be adjusted throughout the day by periodically checking the CST of the feed sludge, thus preventing poor dewatering events before they can occur. Alternate sludge conditioners can also be screened in the laboratory by measuring the CST over a range of dose levels and comparing the results to the optimum CST values obtained from plant operation.

Due to its simplicity, the CST meter is a device which can rapidly pay for itself through the optimization of sludge dewatering. It can also be a valuable tool for a treatment plant by providing real time control over the dewatering process.