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# Cutters reduce pellets to powder

Cal-Chlor Corp, a US producer of in-demand calcium chloride, is using screen classifying cutters from Munson in its production of powders destined for the petroleum sector.

The surge in production of North American oil and natural gas has been good for petroleum producers and the businesses that supply them with material for drilling.

One important product in this category is calcium chloride (CaCl<sub>2</sub>), a two-part chloride salt that provides benefits in such applications as drilling shale formations, flushing mud from oil-field holes, and filling casings when drilling ends.

Demand for CaCl<sub>2</sub> is so high among oil producers that supplier Cal-Chlor Corp of Lafayette, Louisiana, has solidified its standing as the largest distributor of CaCl<sub>2</sub> in the world on the strength of oilfield use, says Brett Davis, operations director of the company's Opelousas, LA, plant.

The plant downsizes CaCl<sub>2</sub> pellets into a powder comprised of uniformly sized particles using five Screen Classifying Cutters (SCC) from Munson Machinery Co of Utica, New York.

Each cutter processes up to 11,793 kg of product per hour, says Davis. He says that they are so important to meeting oil-field on-time demand that Cal-Chlor runs four of them and keeps the fifth for emergency use if one goes offline. The plant's daily CaCl<sub>2</sub> powder production ranges from 181 to 363 tonnes.

*Below: Each SCC 30 Screen Classifying Cutter reduces calcium chloride pellets into powder comprised of uniformly sized particles at rates of up to 11,793 kg per hour. The cutters resist abrasion, corrosion, heat generation and other problems associated with size reduction of CaCl<sub>2</sub>.*



## Process is automated from railcars to packaging line

Cal-Chlor sources its CaCl<sub>2</sub> in Michigan. The salt is refined from natural brines found in underground sandstone formations, and then manufactured and shipped as pellets (about 4.5mm in diameter) to Cal-Chlor's Opelousas, LA, and Ludington, MI, plants for processing.

At the Opelousas plant, loading, conveying and feeding of CaCl<sub>2</sub> is automated; no worker handles the calcium chloride prior to bagging, loading and shipping. The railcars are diverted to a spur where they park over a pit that contains a loader and conveying mechanism.

The raw CaCl<sub>2</sub> empties into the loader through the bottom of the railcar, and is conveyed to a surge hopper in the plant. The hopper meters CaCl<sub>2</sub> pellets to the four of the plant's five SCC-30 cutters through an intake chute at the top of each unit.

Davis says it is important to maintain a constant feed rate. If material backs up it will strain the cutter bearings, causing them to overheat and possibly fail. To assure an even flow of CaCl<sub>2</sub> into each cutter, Cal-Chlor installed a mechanical flow control valve with a variable frequency drive above each cutter.

*Below: The surge hopper (top) meters CaCl<sub>2</sub> pellets, which flow through two intake chutes to the cutters.*







Left: The SCC Cutter's helical rotor design provides maximum throughput with minimal fines and little to no heat generation, while ensuring uniform wear.

Above: Cal-Chlor is the world's largest distributor of CaCl<sub>2</sub> powder, which is shipped in 23 kg plastic valve bags.

CaCl<sub>2</sub> powder into 23 kg plastic valve bags, palletise them and load them on trucks for shipping. Davis says valve bags are used because CaCl<sub>2</sub> is too oily to effectively seal with conventional plastic bags.

When Davis joined the company in 2006, Cal-Chlor had two SCC cutters which proved successful, prompting the addition of three additional units in Opelousas and the sixth in Ludington.

Munson is represented in Australia by iBulk of Melbourne. ■

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### Cutters resist 'nasty' effects

Davis points out that the cutters are "near bulletproof" when it comes to processing CaCl<sub>2</sub>. This toughness is needed due to the nature of CaCl<sub>2</sub>, which is abrasive, generates heat when collected in large volume, attracts moisture, and generally is a "nasty product" that "does strange things to whatever equipment it comes in contact with." He notes that as little as 84 - 112 gm of CaCl<sub>2</sub> in a cup with water will become too hot to hold in minutes.

In fact CaCl<sub>2</sub>'s heat-generating and hygroscopic properties become an asset in snow melt and de-icing treatments for sidewalks and driveways.

The Opelousas plant operates SCC-30 models, which have 76 cm long feed throats that, like all SCC units, are 28 cm wide. The power range is 15 to 30 kw. Cal-Chlor operates them at between 1,200 to 1,800 rpm.

The units feature a helical rotor design with dozens of cutter tips attached to a helical array of staggered holders called "inter-connected parallelgrams" to continuously shear oversize materials against twin, stationary bed knives.

The cutter tips are aligned along the entire shaft, making total contact with the product. The helical pattern of cutter tips eliminates dead spots and hot spots by moving material throughout the length of the rotor, taking full advantage of the screen area for maximum throughput with minimal fines and little to no heat generation, while ensuring uniform wear.

The cutters are typically made of stainless steel, which in Cal-Chlor's case is vital to resist abrasion, corrosion and other problems that CaCl<sub>2</sub> presents.

Cal-Chlor also operates a sixth SCC-48 model (122 X 28 cm feed throat) at its plant in Ludington, Michigan, to fill oil-field demand for CaCl<sub>2</sub> powder in the Rockies, New York and Pennsylvania.

### Powdered CaCl<sub>2</sub> bagged, palletised

Powdered CaCl<sub>2</sub> exiting the cutters is gravity discharged onto a conveyor and automatically transported to another surge hopper that feeds a bagging station. At this point workers fill the



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