



# Cooling Calcite Powder with a Screw Conveyor

Thank you for contacting us through Powder Bulk Solids – Ask the Experts. The following is our response. We are very interested in working with you on your application.

### Question

We have a calcite powder production line consisting of several machines after a ball mill in a closed circuit with an air separator. The powder will warm up to 60 to 70 degrees C, stick to body of separator and buildup in outlet cone, finally shutting down the line. We want to use a jacketed cooling screw conveyor with chilled water to drop the temperature to 35 to 40 degrees C. The capacity is 4 metric tons per hour. The specific heat value ( $C_p$ ) is 0.203 kcal per kgC. The bulk density is 1.8. What is the proper screw conveyor design for cooling the calcite powder in my application?

### Answer

The information you have provided is exactly what we need to size the cooling screw processor for you. We typically convert input parameters to imperial units since we are more familiar with them. The calculated heat load is 129,000 Btu per hour (32,510 kcal per hour). We are cooling the hot calcite powder with chilled water at 40 degrees F (4 degrees C) at 50 gallons per minute. The cooling screw processor must be designed with enough surface area to remove at least 129,000 Btu per hour. Based on the design requirements, an 18-inch diameter by 20-foot long hollow-flight screw processor is required for the application. The processor must operate at a very low speed, typically 3 to 6-rpm in order for the hot product to stay in contact with the cool surfaces of the hollow-flight screw and jacketed housing. A minimum retention time of 10 minutes is required. Hollow flight screw processors are ASME coded pressure vessels. KWS designs and manufactures thermal screw processors for applications just like yours and can definitely help you solve your problems with product build up in your process.



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