Minerals Gas Suspension Calciners (GSC)
Gas Suspension Calcination (GSC)

**GSC advantages**
- Lower capital cost
- No moving components
- No grid plate or nozzles
- Smaller foot print
- Extremely fast response to process changes
- Lower power consumption
- Higher thermal efficiency

**Gas suspension calcination for fine ores**
Gas suspension calcination (GSC) is an economical method for processing fine materials such as potash, phosphate, limestone fines, alumina, trona, clays, talc and other mineral products.

Calcination takes place in a stationary vertical column. There are no rotating parts or grid plates with simple PID control of the fuel.

FLSmidth is the world leader in gas suspension technology. Supplying GSC systems since the 1970s, we have designed units from 1 ton per hour up to 800 tons per hour.

**How the FLSmidth GSC works**
The FLSmidth gas suspension calciner is a vertical cylindrical design in which fuel is combusted in an external air heater. Fine ore (typically less than 1mm) is introduced above the GSD venturi where it directly contacts hot gases from the external air heater. The ore is immediately entrained in the hot gases and dried in seconds. Dry ore and spent gas is separated in a cyclone. Spent gas and dust reports to a dust collector and vented to atmosphere. Cyclone and dust collector underflow reports as product.

Preheated combustion air is introduced into the bottom of the dryer where it is mixed with fuel and preheated feed material. The turbulent swirling mixture of combustion gases, fuel and material produces a highly uniform temperature profile throughout the calciner. A cyclone at the outlet of the calciner separates the gas and material. The calcining temperature and atmosphere can be closely controlled for even burning, uniform product quality and emission control.

The number of stages in the system is custom designed based on the materials being processed, process requirements, thermal and system efficiency optimization and capacity. In addition, to preheat stages, cooling stages can also be incorporated to maximize heat recovery and limit downstream cooling requirements.

**Your choice of fuel**
Many types of fuels are being used successfully in commercial operations including natural gas, fuel oil, coal, petroleum coke, low heating value gases and alternate fuels.
Operating Characteristics

- High-efficiency cyclone with low pressure drop resulting in low fuel and power consumption
- Uncomplicated operation – Simple PID fuel control and fast start-up and shut down
- Limited maintenance – Very limited moving parts
- Suitable for firing both traditional and alternate fuels.

One Source Supplier

FLSmidth is your One Source Supplier for complete systems. We can design supply and operate complete Gas Suspension Dryer systems. FLSmidth has expertise and equipment for ore and fuel preparation, ore storage and reclaim, calcining, product cooling, finished product storage with load out, and off gas treatment. We also maintain an extensive network of Customer Service engineers and designers to maintain peak operation long after initial startup.

Comparison of calciner technologies

<table>
<thead>
<tr>
<th></th>
<th>Gas Suspension Calciner</th>
<th>Fluid Bed Calciner</th>
<th>Rotary Calciner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capex</td>
<td>0.6</td>
<td>0.75</td>
<td>1.0</td>
</tr>
<tr>
<td>Opex</td>
<td>0.95</td>
<td>1.1</td>
<td>1.0</td>
</tr>
</tbody>
</table>

(A) Raw material is fed into the Preheating system to increase temperature prior to calcination, which increases the efficiency of heating during calcination.

(B) Material is heated to a temperature between 800°C - 1450°C.

(C) Calcined Material is stored in a Fluidized air bed prior to cooling.

(D) Air is fed in and flows counter-current to cool it down for handling.