

# Fluid Bed Drying and Calcining

## Processes for the Soda Ash Industry



# CONTACT FLUIDIZER™

## The right choice for synthetic or natural soda ash producers

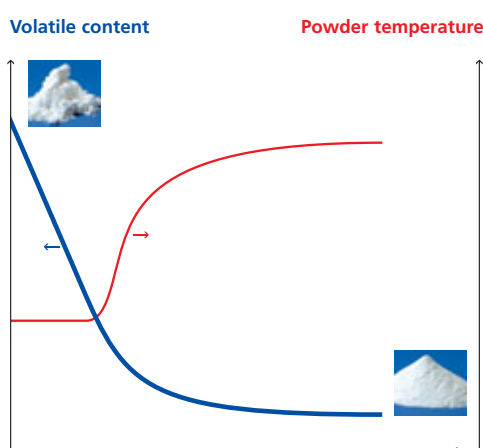
In the soda ash industry, the GEA Niro CONTACT FLUIDIZER™ has proven to be an excellent alternative to the traditional rotary dryer/calciner due to higher energy utilization, improved product quality, less maintenance and higher productivity.

Within the last 10 years, we have supplied several large fluid bed plants to this industry, with capacities ranging from 20 to 90 tons per hour. Actually our design is capable of handling even higher rates in a single unit!

### Greater design flexibility for the optimal solution

The CONTACT FLUIDIZER™ is a fluid bed with internal heating panels submerged into the fluidized product layer. The highly effective method of transferring the heat from the panels to the powder through the fluidizing gas makes the design unique when it comes to thermal efficiency and possible usage of low pressure steam. Compared with other types of dryers/calciners the energy savings are as high as 20%, depending on the application and overall steam balance in the plant.

### Product drying curve



The wet powder is introduced into the back-mix section where the evaporation of the free water takes place, whereby the powder becomes directly fluidizable. To ensure trouble-free operation it is important that the "homogeneity" of the back-mix section is maintained. As a good distribution of the wet feed material is a prerequisite for this, the fluid bed is equipped with our proprietary rotary feed spreader.

The semi-dried powder enters the plug flow section, where the powder residence time is fully controlled by applying a baffle arrangement. This provides a long and narrow transport path. When dealing with more energy and time consuming reactions—like removal of chemically bonded crystal water to produce dense soda ash from sodium carbonate monohydrate or calcining of sodium bicarbonate into light soda ash—the plug flow design is in many respects perfect.

If, as a final step, product cooling is required, this is included simply by extending the fluid bed with a plug flow section equipped with internal cooling panels.

The gas required for the fluidization of the product is distributed by the GILL PLATE™, which is tailor made for each plant to ensure even gas distribution over the bed, good transport of lumps and effective emptying of the fluid bed at shut-down. The plates are equipped with gas orifices (gills) in a pattern specially designed for the product application in question.

Heating panels of the plate design are used to improve energy efficiency. Furthermore, in combination with our rotary feed spreader, they greatly diminish the risk of powder deposits building up in the feeding zone, due to the high spacing between the vertical plates.

We apply a kinetic computer model to optimize the design of the fluid bed, not only for the final design work but also to assist the customer during the feasibility stage.



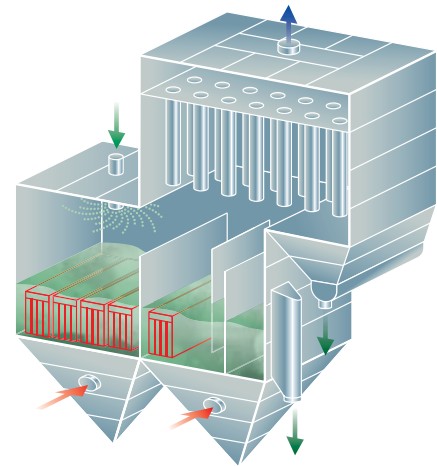


## Fluid bed process schemes for the soda ash industry

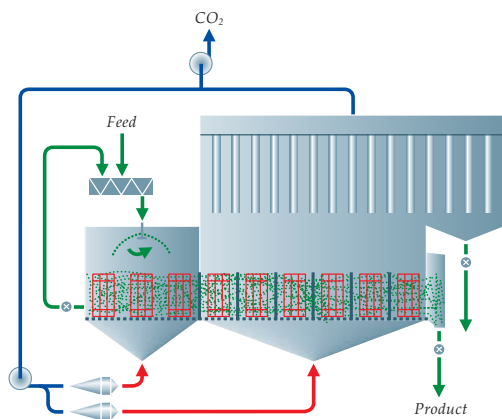
### Integrated Bag Filter Concept

We would like to draw special attention to our integrated filter concept. Besides providing a more compact design (less building space requirement and lower pressure drop in the system), the integrated filter design ensures that all product fractions leaving the fluid bed are fully converted, which again leads to higher product yield and eliminates treatment of waste streams (gas or liquid phase) containing fines.

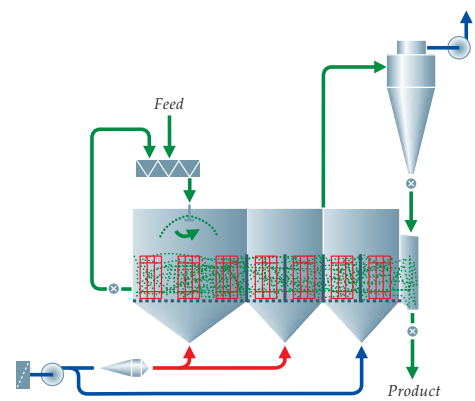
### CONTACT FLUIDIZER™ with integrated filters



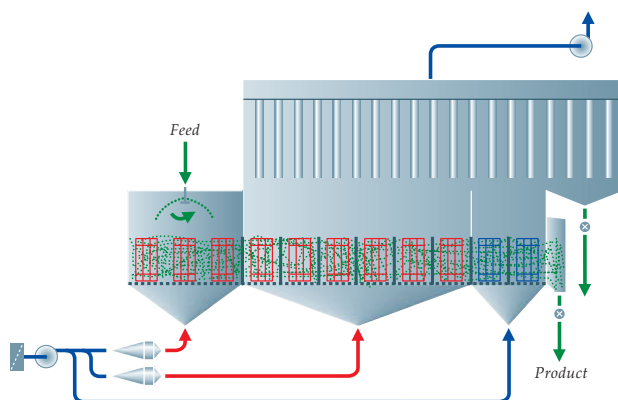
### Closed cycle CONTACT FLUIDIZER™ with integrated filters (Patented)



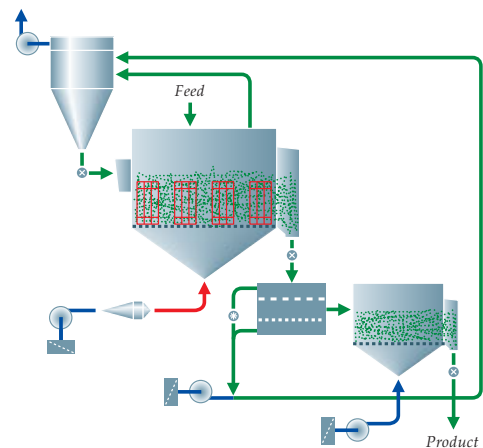
### Open system CONTACT FLUIDIZER™



### Open system CONTACT FLUIDIZER™ with integrated filters



### SPRAY FLUIDIZER™ for drying and granulation of calcium chloride





## Experience

GEA Niro has contracted and installed more than 10,000 plants worldwide

GEA Niro is a world leader in industrial drying, with spray drying, spray cooling/congealing, flash drying, freeze drying, granulation and fluid bed processing as core technologies. Having installed more than 10,000 plants around the globe, GEA Niro is known for delivering solutions that meet customers' exact requirements. The GEA Niro companies are part of GEA Process Engineering.



GEA Process Engineering

### **GEA Niro**

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