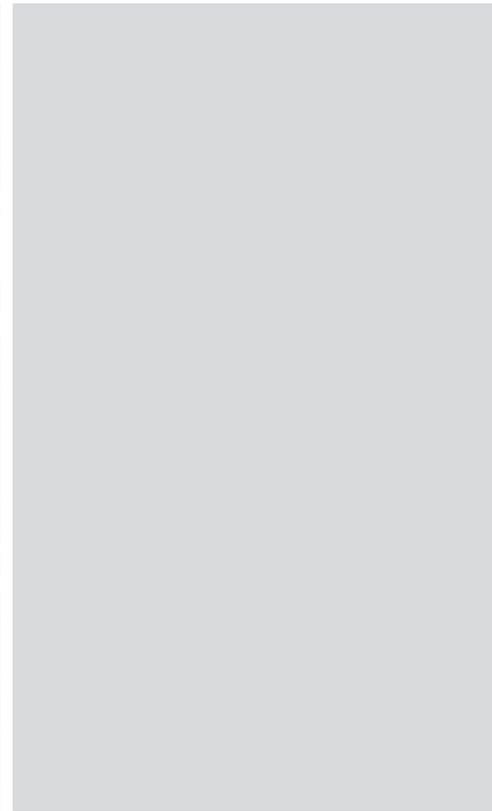
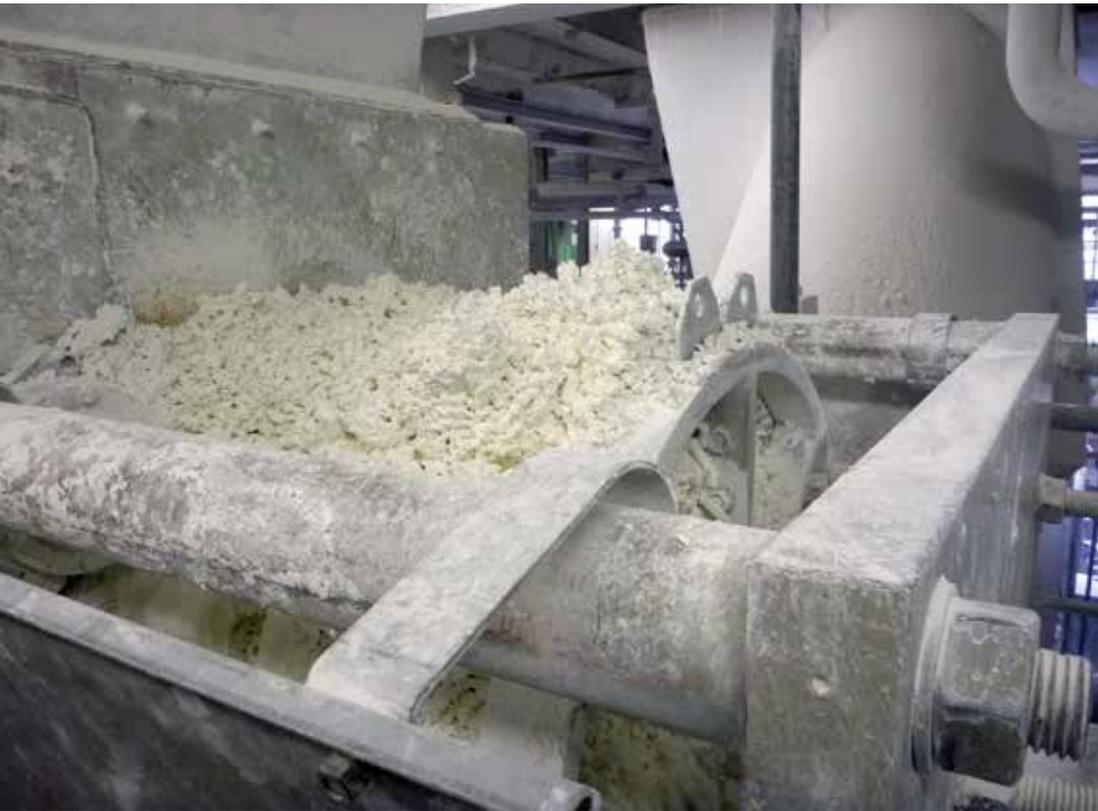


Drying moist filter cake

Filter cake granulator



Drying moist, thixotropic filter cake: The filter cake granulator

The task

In many chemical processes, solid materials are obtained from suspensions by means of chamber filter presses. The resulting filter cake must be dried, because the solid material is to be processed further as dry material or has to be provided as a dry finished product.

Examples are:

- Titanium dioxide and titanium oxide hydrate
- Magnesium hydroxide and oxide
- Aluminium oxide and hydroxide
- Strontium chromate
- Barium chromate
- Kaolin



The suspended solid material in the suspensions that are to be filtered usually consists of extremely finely grained primary particles in the micrometre or even nanometre range.

This leads to a characteristic behaviour in the moist filter cake which is referred to as „thixotropy“. Thixotropic filter cakes are produced from the filter press in the form of lumps of moist material without specific shape or size. If these moist, apparently solid materials are processed or transported in augers, extruders or pelletisers of a usual design, they revert to a paste-like consistency or can even liquefy. As a result, auger conveyors or extruders are not suitable for transporting the moist material into fluidised-bed dryers, because they require the moist material to be loaded as a granulated product with the best possible free-flowing properties.

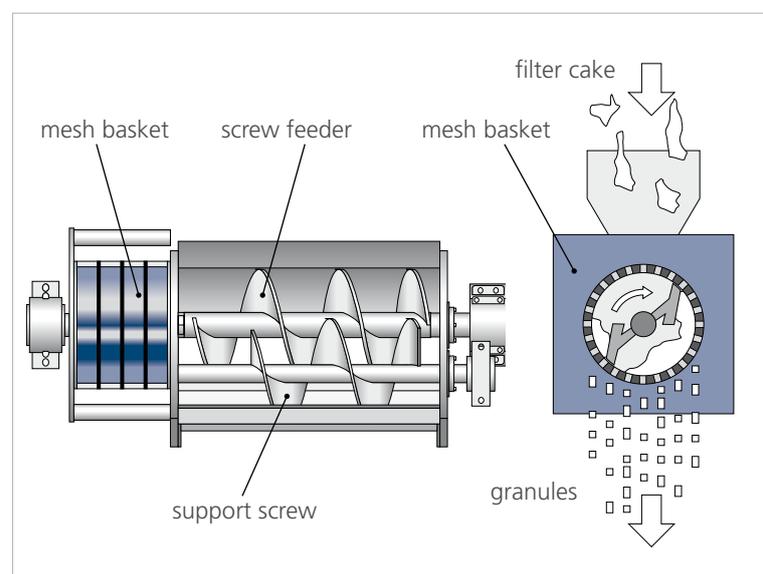
Drying processes that can process paste-like wet materials or even materials in liquid form produce a very fine, powdery dry material. Frequently, this is undesirable, generates a lot of dust or gives rise to problems in downstream processes steps, e.g. in pneumatic transport.

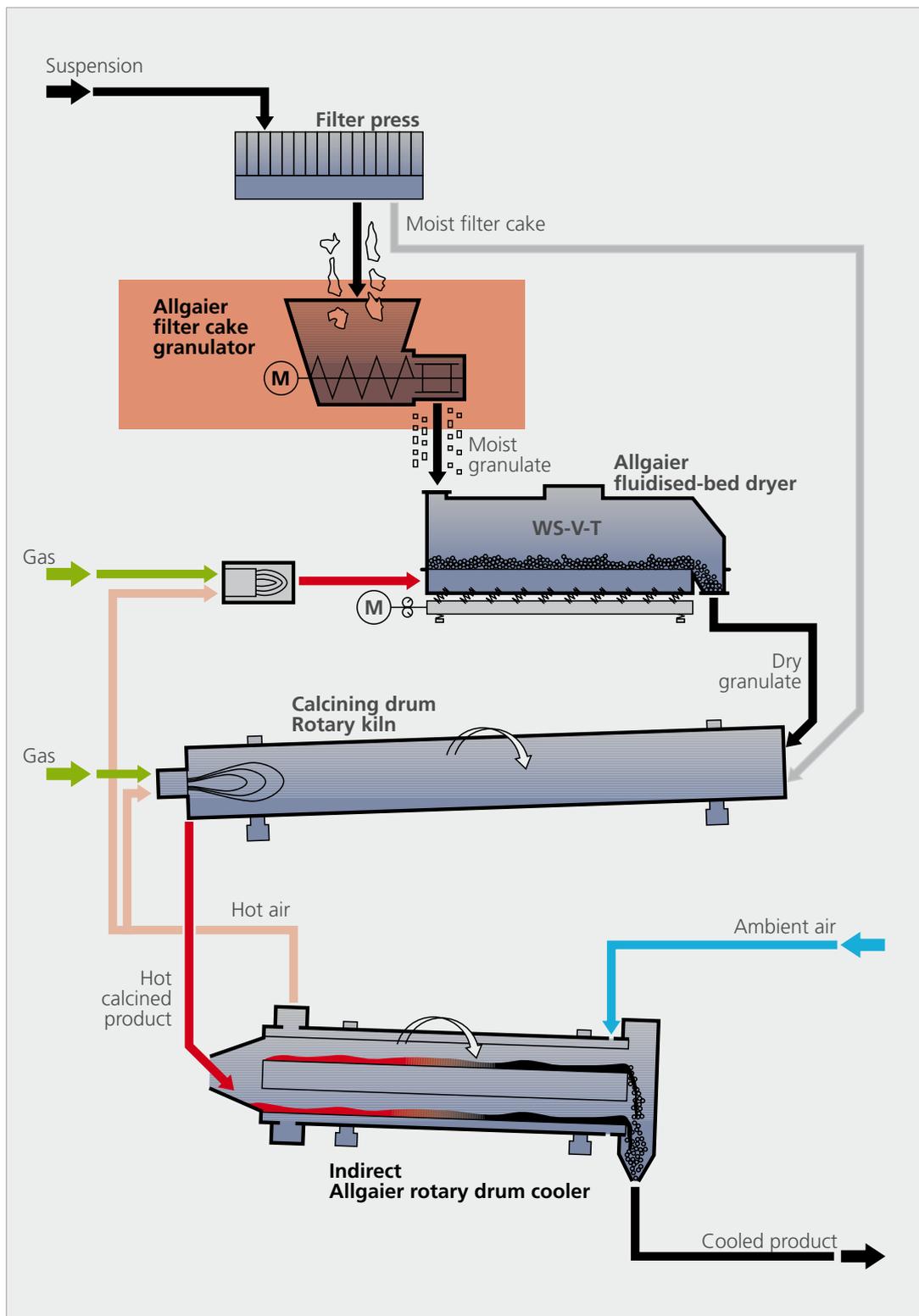
The solution

In order to use the advantages of vibratory fluidised-bed dryers even for drying thixotropic moist filter cake, Allgaier has developed a unique filter cake granulator.

The special design of this granulator means it is capable of treating thixotropic filter cake in such a way that it neither liquefies nor causes clogging. Granules are manufactured which, despite being moist, are suitable for direct input as well as for immediate fluidisation and drying in fluidised-bed dryers.

In the Allgaier filter cake granulator, the coarsely broken lumps of filter cake are transported out of a drop chute and supply hopper by means of two intermeshing auger conveyors. This transport is performed very gently and without shearing, compressing or stirring the pieces of filter cake, which are continuously delivered into a horizontally attached granulating cage.





Sample application of the filter cake granulator

Slowly rotating tools pick up the filter cake in the granulating cage and pass it through a screen plate attached to the circumference of the granulating cage, without pressurising the filter cake. The design of the screen cage and the rotating tools is decisive for the function of the procedure, and must be selected according to the characteristics of the particular filter cake. In the granulating cage too, the filter cake only undergoes a small amount of shearing, compression or mixing. To a large extent, the thixotropy of the moist filter cake is not broken up.

The moist granules that are manufactured are input directly into the fluidised bed of the fluidised-bed dryer, where they are picked up by the fluidised bed and immediately dried very effectively.

Your benefits

Only some of the granules are broken up as they pass through the fluidised-bed dryer, meaning that a granulated dry material is produced with a small proportion of fine material and dust. The fine proportion of the dry material can be optimised by the set granulate moisture.

Linking the filter cake granulator to a vibratory fluidised-bed dryer permits very efficient filter cake preparation and drying to be achieved.

- Fluidised-bed dryers operate with low waste air temperatures and low heat losses at the same time as variably adjustable product moisture levels.
- This means low-cost filter bag qualities can be used in the waste air filter systems, or alternatively the service life of the filter bags used in the waste air filter systems is extended.
- Fluidised-bed dryers achieve very good energy consumption values even with relatively low drying air temperatures.
- Fluidised-bed dryers generate a granulated dry material and remove dust from the product with the waste air.

Granulated dry materials

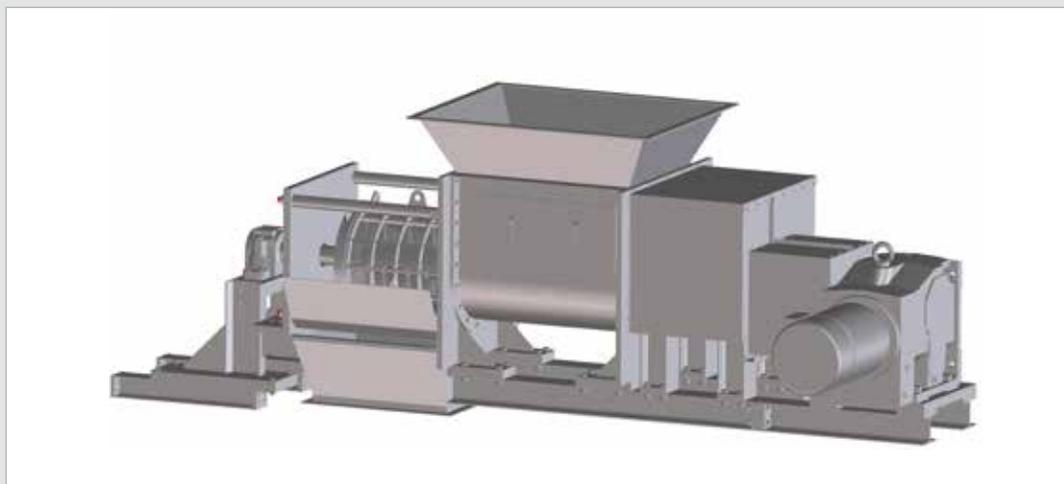
- can be easily stored and transported,
- have a higher bulk density than dust, and trickle well,
- reduce the tendency for bridge building or blockages in silos, pneumatic transport devices or automatic packaging systems,
- offer advantages in micronisation of pigments, for example, such as titanium dioxide in steam jet grinders.



Sample application

Using a system comprising an Allgaier filter cake granulator and an Allgaier vibratory fluidised-bed dryer ahead of a rotary kiln in titanium dioxide production allows the following advantages to be achieved:

- Increasing the capacity of the rotary kiln (calcining drum) by transferring the drying process out of the rotary kiln
- Reducing the energy consumption of the rotary kiln
- Drying in the fluidised-bed dryer with reduced energy requirement
- Improving the quality of the calcined product by improved pass-through behaviour and a tighter holding time distribution of the evenly granulated dry material in the rotary kiln during calcining
- Extending the service life of the kiln lining by reducing the moisture and acid content of the waste gases from the calcinator



Allgaier has developed a special granulator in order to process paste-like or thixotropic filter cake for drying in fluidised-bed dryers.

The filter cake in the form of lumps without specific shape or size is converted into a moist granulate which can be loaded directly into a fluidised bed, and thus dried in a continuous process. The special design of the granulator means the filter cake undergoes little shearing. This means any break-up of the thixotropy is largely avoided, as is the creation of a paste which is difficult to process.

The filter cake is gently transported into the granulator cage by two intermeshing, horizontal screws. There, slowly rotating tools pass the cake through a screen plate without pressure, thus splitting up the cake in the process. The resulting moist granules are suitable for fluidisation in the fluidised bed, without the perforated air distributor plate of the fluidised-bed dryer becoming clogged or blocked.

ALLGAIER

Allgaier-Group

Competent customer and spare parts service

Spare parts hotline: +49 7161 301-293
service-tro@allgaier.de

- Original quality spare and wear parts
- Upgrading, conversion, retrofitting and maintenance of existing drying systems
- Process control advice
- Power and energy advice



ALLGAIER PROCESS TECHNOLOGY

ALLGAIER Process Technology GmbH

Ulmer Str. 75
73066 Uhingen
Germany
Phone: +49 7161 301-100
Fax: +49 7161 301-5035
process-technology@allgaier.de
www.allgaier.de

