Static Fluid Bed Dryers, Vibrating Fluid Bed Dryers and Exhaust Technology

Overcome industry challenges through knowledge and experience
Salt is our passion and that’s why we are at the forefront of drying technology. Our knowledge in process, equipment design, fabrication, installation and operation of dryers has been used to craft Titan Salt’s easy-to-operate systems. We’re confident in our equipment and can guarantee our customers a continuous flow of dry, clean and undamaged salts as:

- Sodium Chloride
- Sodium Bicarbonate
- Sodium Sulphate
- Calcium Chloride
- Various other mineral salt products

Dryer technologies we offer:

- Static fluid bed dryers/coolers
- Vibrating fluid bed dryers/coolers
- Calcining
- Steam driven, gas fired or oil heated
- Several techniques for heat recovery and reuse of available energy
- Design optimized and dedicated for salt
- From 250 kg/h up to 100 t/h

**Fluidization**

A cross sectional look at a fluid bed dryer shows three different sections: air plenum, salt bed, and the exhaust hood. The salt bed is separated from the air plenum by a screen which is specifically designed to provide equal air distribution without crystal damage and fines recovery. Fluidization technology is used to evenly dry and transport the product. Titan Salt’s dryers are designed with multiple fan technology to ensure a perfectly controlled and dense fluid bed. Our design guarantees better energy efficiency, less short circuiting and carry over. Air velocity through the salt bed is a critical design parameter to ensure proper fluidization. Titan Salt has decades of experience and a pilot system which allows us to properly design the fluidization for various salts and other products.
After mechanical de-watering, residual moisture of the crystal is fully removed by evaporation. The ambient air, also utilized for fluidization, is heated to a high temperature to supply sufficient amount of energy for the evaporation process. The heating of the air can be fulfilled either through an indirect (i.e. steam coils) or direct (i.e. natural gas burner) source of energy. For static fluid bed dryers, internal heat exchanger coils can be used to supply the required energy by heat transfer through contact and therefore reduce the amount of air and footprint required of the dryer. Titan Salt works effortlessly with our clients to utilize the most cost-effective heat source to reduce operating costs.

To achieve the desired moisture content in the product, the salt must be heated to a specific temperature. During the drying phase, at a certain moisture content, also referred to as the critical moisture, the product temperature will begin to rise as the residual moisture is removed. This is a critical aspect for sizing of the burner and the overall dryer geometry. Titan Salt has the ability to pilot test unique products in order to create a drying curve which allows us to properly size our equipment.

Cooling of the product is critical for product storage and packaging. When storing various salts at higher temperatures, the after-cooling of the salt will cause crystal surface condensation within the silo. As the salt reabsorbs this moisture, it will clump together to form large salt chunks which are difficult to remove from the silo. High salt temperatures are also a nuisance for packaging. Our fluid bed dryer designs incorporate a cooling zone to combat these issues. Similar to the drying zone, the fluidization air is utilized to remove the excess heat from the product. Our fluid bed dryer can be fitted with cooling coils which allows a cooling medium to absorb/recover the excess heat. For systems operated in high humid environments we can supply our dryers with dehumidified cooling air.

Key aspects for a properly operating dryer are the geometry and construction. Most products being dried have corrosive aspects or corrosive byproducts which are created during the drying process. Titan Salt is a specialist in metallurgy and therefore can guarantee time lasting equipment. Specially designed dryer inlets of non-stick material prevent the buildup of product and therefore eliminate chunks in the end product. In addition to the choice of material, it is also important to ensure proper mechanical design and fabrication of the dryer. With our technology and quality of build, our dryer systems can operate multiple months without requiring a wash. Titan Salt’s dryer design ensures easy access for inspection, maintenance and cleaning.
Vibrating Fluid Bed Dryers

Titan Salt’s fluid bed dryer can operate effectively over multiple months without washing. Due to years of experience and refinement, Titan Salt has created their own process control system to monitor the key performance indicators ensuring a predictable and constant product quality. Besides the product quality a big benefit is the energy consumption. We constantly monitor the product temperature and pressure at several stages. Our software analyses this information and uses this input to control the system. Together with a continuously improved design, our dryers are made for the future. Saving energy day after day.

Vibrating fluid bed dryers are typically used with the following operation aspects and capacity:

- Large product size distribution
- Large or very fine product size
- Particle size up to 30 mm
- Unique crystal shape (i.e. plates)
- “Sticky” product
- Low capacity (up to 60 t/h)
- Wet cake moisture less than 10%
- Difficult to fluidize products
- Allowable extended footprint
Static Fluid Bed Dryers

Static fluid-bed dryers are popular due to their versatility, size and heat transfer efficiency. The big difference with the vibrating fluid bed dryer is that the product bed is several feet deep due to the use of heat exchanger coils. Titan Salt is able to design and fabricate static fluid-bed and hybrid fluid-bed dryers. A hybrid fluid-bed dryer has tube bundles inside the drying chamber. The tube bundles are fed with the available hot water/oil or steam, reducing the amount of gas required and decreasing the overall footprint of the dryer.

Static fluid bed dryers are typically used with the following operation aspects and capacity:

- Limited product size distribution
- Particle size 100 – 3000 µm
- Use of internal heat exchanger coils
- High capacity (up to 100 t/h)
- Wet cake moisture less than 4% or, re-mixing for higher moisture products
- Low heat and e-power consumption
- Low maintenance
- Low available dryer foot print

Emission and Product Recovery

In some regions emission limits can be strict, but with our help, definitely not unattainable. Titan Salt will guarantee that our systems are always in compliance with the latest environmental rules and regulations. Based on the emission limits and client’s specifications, Titan Salt is able to design the most efficient and economical exhaust system. Titan Salt is able to reduce the amount of carry over and recover the fines as dry product or as dissolved product.

Titan Salt’s Dedusting and Exhaust Technology:

- Single and Multiple Cyclone Systems
- Ultra-Low Emission Cyclone Battery
- Wet Scrubber
- Centrifugal Force Wet Scrubbing System CFWS
- Bag House Filter
- Low Sound Emission Exhaust Stacks
Our basic Centrifugal Force Wet Scrubbing (CFWS) air-dedusting system is based on the design principle of counter flowing liquid and gas with no internal moving parts, no small orifices and inherent self-cleaning and self-draining.

The air-dedusting feature of CFWS system for air pollution control is just one of the physical results of the air and liquid interaction during the process. The high velocity and turbulence of the air moving upwards against the downwards cascade of liquid creates a natural cooling and condensing action which makes the CFWS system ideal for use in cooling, quenching and condensing, as well as absorption, air pollution control, scrubbing and collecting.

**Titan Salt’s CFWS System**

1. Inlet in the collector cone
2. Centrifugal removal of heavier particles
3. Lighter particles are swirled upward
4. Scrubbing water inlet
5. Violent air/liquid mixture where the air gets scrubbed
6. Demisting zone
7. Liquid/Brine outlet

**Advantages of our CFWS System:**

- No internal moving parts
- No small orifices to clog or plug
- No spray nozzles to clog or plug
- Inherent self-cleaning
- Less potential plugging
- Drains completely within seconds after shutdown
- Maintenance free operation
- In brine operation the CFWS can recover product and heat
Titan Salt’s CFWS System

Energy is one of the biggest cost components of produced salt, for that reason and for our environment, it is Titan Salt’s mission to design the most energy efficient drying systems. On top of that we can supply our customers several technologies to recover part of the energy used in the drying process.

Why choose a Titan Salt Dryer?

- Efficient and smooth operation due to state-of-art process automation
- Fast and easy start-up due to designated feed zone with agitation technology and zone divider
- Guaranteed long runtimes without cleaning of several months
- Ability to design and deliver integrated dewatering and drying solutions that guarantee the most optimal performance
- Titan’s material technology ensures a long lasting drying experience
- Low maintenance
- Optimal bed control due to multiple VFD driven fan air intake
- Controlled airflows ensure a perfect energy transfer into the salt
- Our dryers are optimized for Salts and Salts only
- The best drying experience you will get when you let Titan Salt integrate the system in a complete slurry handling, dewatering and drying system. This ensures extreme run times and very low agglomerations formed in the system.