FLSMIDTH CEMENT

STORAGE RECLAIM

Techniques for bulk material handling

STORAGE SOLUTIONS TO KEEP YOUR PROCESS MOVING

When it comes to removing materials from the silo and moving them around the plant or terminal, the priority is consistent operation, reliability, smooth movement, easy discharge and minimal manual intervention. Our Pneumatic Transport group's fluidization and withdrawal technologies are designed to make the process of emptying your silo swift, simple and safe.

Ideal for new storage facilities, easy to retrofit to older flat bottom silos, and suitable for use in existing flat storage buildings, our storage reclaim solutions are flexible, efficient and proven through decades of experience.

KEY BENEFITS

Quick and efficient silo discharge

Proven over more than 75 years

Versatile for many bulk powder materials

ENERGY-EFFICIENT FLUIDIZATION

We have three key demands for storage silo discharge – it should be safe, easy to use and efficient.

By using advanced aeration techniques, our solutions maximise the benefits of fluidization and minimise power consumption. In short, we make your bulk materials behave like liquid for easy, efficient discharge. This technique enables higher densities, giving you both maximum product availability and optimum product discharge efficiency.

Reliable performance

Whether you need a complete system or just a component, let the Pneumatic Transport engineering team at FLSmidth Cement put our resources to work for you. Over the past 75+ years, we have supplied thousands of storage silos / bins and discharge solutions to industrial customers worldwide. Our scope of supply can include:

- Aerated bin bottoms
- Airslide® gravity conveyor
- Solids flow control valves
- Fan and blower packages
- Dust collectors
- Pneumatic conveying
- Compressor packages
- Pipes and bends
- Diverter valves
- Control panels

Material versatility

Our comprehensive material database of our R&D Lab tested materials, gives us the ability to ensure proper performance or possibly non-performance of a system based on material characteristics before we even issue a proposal. Materials handled include:

- Ascorbic acid
- Carbon black
- Cement raw mix
- Delrin plastic
- D.S. nickel
- Edible protein
- Finish cement
- Fly ash
- Graphite
- Ground alumina
- Iron powder
- Kaolin
- Magnesite mix
- Natural gypsum
- Nickel oxide
- Pigments
- Polyethylene
- Polyolefin
- Polypropylene
- PVC
- PPO resin
- Rutile
- Silica
- Slag cement
- Starch
- Synthetic gypsum
- TBBA
- Un-ground alumina
- Vitamin C
- Zinc dust
- and moren C

Airslide® gravity conveyor

FUL-FLOOR™ PNEUMATIC RECLAIM SYSTEM

Material that's stuck in storage is frustrating. It's not making you money – in fact, it's costing you money to get in there and retrieve it.

Our Pneumtaic Transport group engineers our storage reclaim systems to ensure you get maximum reclaim efficiency, with minimum power consumption. No more wasted materials. No more wasted time.

Key benefits

- 100% floor coverage – no dead spots
- Reclaim rates of up to 1200 tph
- Greater than 99% reclaim efficiency
- Low power consumption
- Low maintenance
- Low power usage
- Low pressure, clean, dry air

Advanced fluidization for optimal withdrawal of materials

Dry bulk materials can be tricky. They tend to bridge and cake, making it difficult to discharge them from the silo when the time comes. Materials that are left in storage can build up over time, causing yet more issues – and all the product you can't reclaim is money and time wasted on retrieval operations that can be risky to personnel and silo structures.

We use advanced fluidization technology to move material out of storage smoothly and effortlessly. Our Ful-Floor™ reclaim systems use industry-proven FLSmidth Cement Airslide® fabric anchored to nearly 100% of the floor area. Pushing air through the Airslide® fabric enables material to move swiftly and easily. Embedded aerator troughs and piping eliminate restrictions that can inhibit material flow. The gentle slope directs the flow of material out of storage, ensuring nothing is left behind. That's it – air, gravity, and very little power consumption. Simple, but effective. And because there are no moving parts inside the storage area, the system requires little maintenance, giving you maximum availability at low operating costs.

More product, less power – efficient aerated storage reclaim solutions

Using advanced Airslide aerator technology enables you to move more material, faster. With reclaim rates upwards of 1200 tph, you can guarantee it won't be your storage reclaim system slowing you down. And with clean out efficiencies greater than 99% you'll also be happy to spend less time retrieving product from storage. In fact, there is rarely a reason to enter a partially filled storage dome when you're using Ful-Floor aeration.

It's a flexible system that allows simultaneous filling and reclaim. It's also possible to select reclaim areas for complete drawdown, giving you a means of stock rotation that's not possible with mechanical systems. You can opt to have the discharge point at the side or centre, according to your installation requirements.

Maintenance and dependability

There are no moving parts inside the storage area, and with minimal abrasion on the floor surface, fabric wear life can exceed 20 years. Routine maintenance on the blowers and air control valves is the only requirement for automatic, trouble-free material reclaim.

Photo courtesy of Dome Technology

DOME STORAGE

Dome storage provides large volume storage with full floor aeration. It is the logical evolution of the Airslide™ fluidized reclaim system, offering complete floor coverage and nearly 100% cleanout with lower equipment costs and lower power consumption. When compared to mechanical reclaim systems, high volume dome storage with fluidized reclaim excels.

Flexibility

Unlike some mechanical systems, the Ful-Floor™ reclaim system allows simultaneous filling and reclaim. Reclaim areas can also be selected for complete drawdown, which provides a means of stock rotation that cannot be done mechanically. The discharge point of the dome may be from one side, two sides (180° from each other) or center, depending on the installation requirement.

Safety

With a Ful-Floor aeration there is rarely ever a reason to enter a partially filled storage area. Some dome storage operators have claimed, “No one has entered the dome in years!”

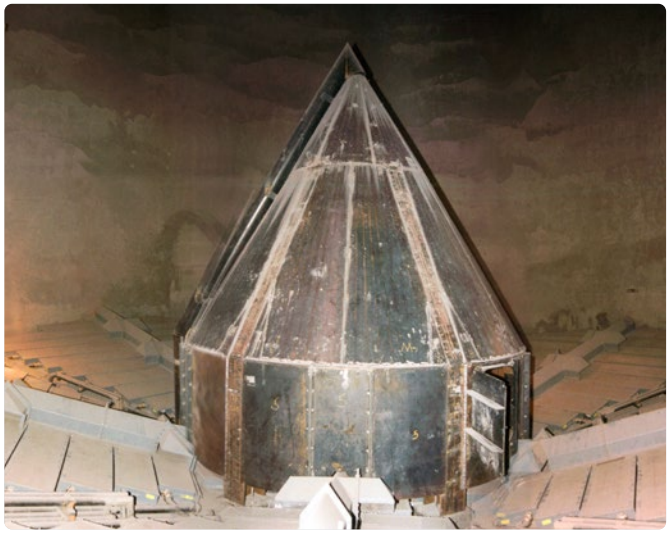
Silo fluidization configurations that suit your application

Every installation is designed with you in mind. Your materials, your capacity requirement, your application. Cone bottom storage silos are the most common for silo diameters under 14 meters (46 feet). Simple fluidization is usually provided on the cone walls to aid in continuous flow of material during the discharge operation. Open Airslide sections spaced equally around the cone can be activated all at once, individually, or in groups. Storage silos with 50 – 70˚ cone bottoms require minimal fluidization to prevent rat-holing and material bridging.

RANDOM FLOW™ STORAGE AND WITHDRAWAL SYSTEM

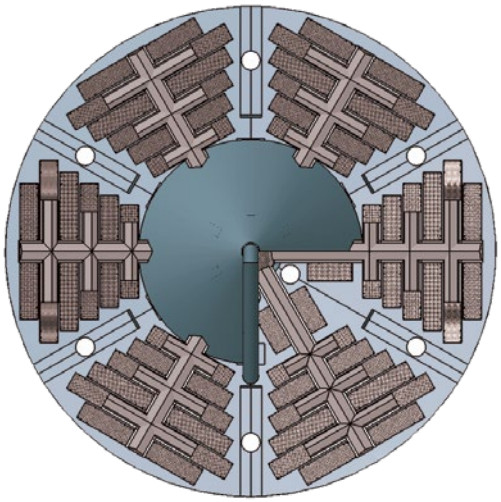
With six pie-shaped sectors (each subdivided into six aeration zones) and continuous withdrawal in a timed discharge pattern, the Random Flow™ storage and withdrawal system provides the lowest energy silo discharge method available. Power consumption on finish cement storage is as low as 0.07 kWh / metric ton. We can carry out both new and retrofit installations with minimum downtime.

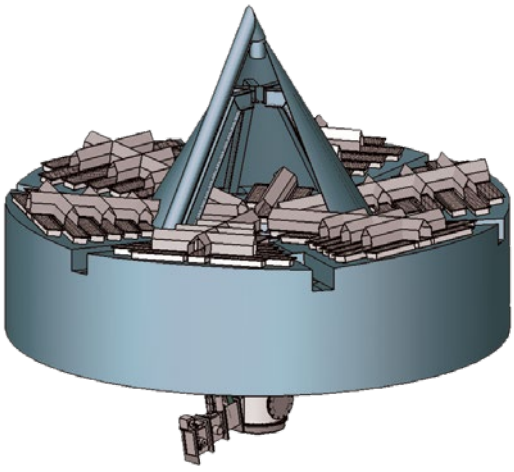
- No moving parts
- Low pressure air
- Compact PD blowers
- Gravity withdrawal
- Center or side discharge
- Maximum bottom aeration coverage
- Small inverted central cone
- Reduced maintenance
- Clean, dry, oil free
- Low power usage
- Space on ground floor
- No segregation
- Flexible plant layout
- Maximum cleanout
- Low installation cost
- Maximum storage capacity

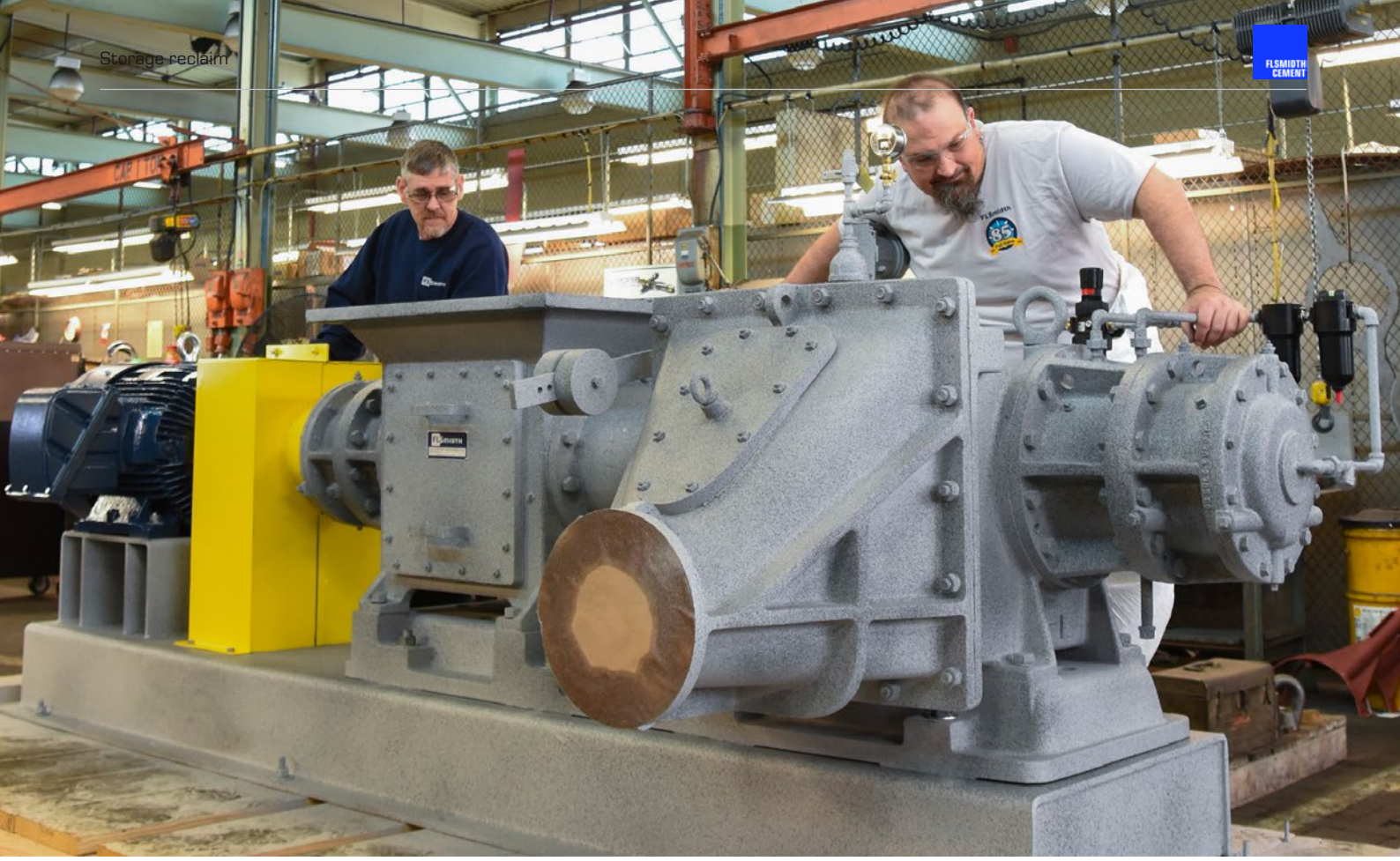


Aeration zones

When an aeration zone is activated, layers are mixed through a funnel effect, as material in the zone flows to its designated collection point on the gathering Airslide™ conveyor. The inverted cone prevents material exiting without flowing through a collection point.







FULLER-KINYON® PUMP

Originally designed in 1919 as a way to safely transport pulverized fuels, the Fuller-Kinyon® screw pump has proven itself to be a must-have component in materials handling systems worldwide.

The latest generation, the FK N Pump, is based on the same design principles as the M Pump, but includes upgrades that enable higher convey line pressure with greater energy efficiency, as well as the ability to serve ship and barge unloading applications.

Flexible enough to handle every application

Common applications include conveying dry, free-flowing pulverized materials from grinding mills, between silos, transport from dust collectors, and for loading and unloading railcars, ships and barges. But materials can be conveyed literally anywhere a pipe can be run. Long conveying distances are not uncommon, including in excess of 5000 ft (~1525 m).

How does it work?

The screw pump hopper is gravity-fed. Materials are pushed through the barrel by the screw, which compacts the material as it advances. The material density is further increased in the space between the terminal flight of the screw and the face of the non-return valve, forming a seal against the transport line pressure, which prevents blowback. When the material enters the discharge body it is fluidized by compressed air and conveyed into the transport line.

Standard features

- Cast iron and steel construction, with a cast iron base.
- Ball bearings support a pump screw at both ends for smooth, balanced operation.
- Critical parts that come into contact with material to be conveyed are made of hardened, wear-resistant material and special hard surfacing.
- Screw is coupled to the driving motor but can be v-belt driven.
- Easy, low-cost maintenance thanks to the 3-piece screw.
- Diameters from 150 mm – 350 mm with capacities up to 600 mtph depending on bulk density.
- Conveying air pressure range up to 35 psig (~2.4 Bar)
- Built to withstand material temperatures up to 400 °F (~200 °C) as standard.

TOTAL TERMINAL SYSTEM MANAGEMENT

Our technology and commitment to product development and testing have made FLSmidth Cement the leading supplier of storage silo fluidization and withdrawal. But reclaim from storage is just one part of terminal system management.

FLSmidth Cement can design and supply your complete control system to distribute the material flow, monitor inventory and transfer between storage facilities or directly to trucks, railcars, barges or ships.

And throughout all these projects our focus remains on finding you the best solutions to improve productivity and profitability, safely, cleanly and effectively.

CM 04-23 900-132-ENG

FLSMIDTH CEMENT

www.flsmidth-cement.com