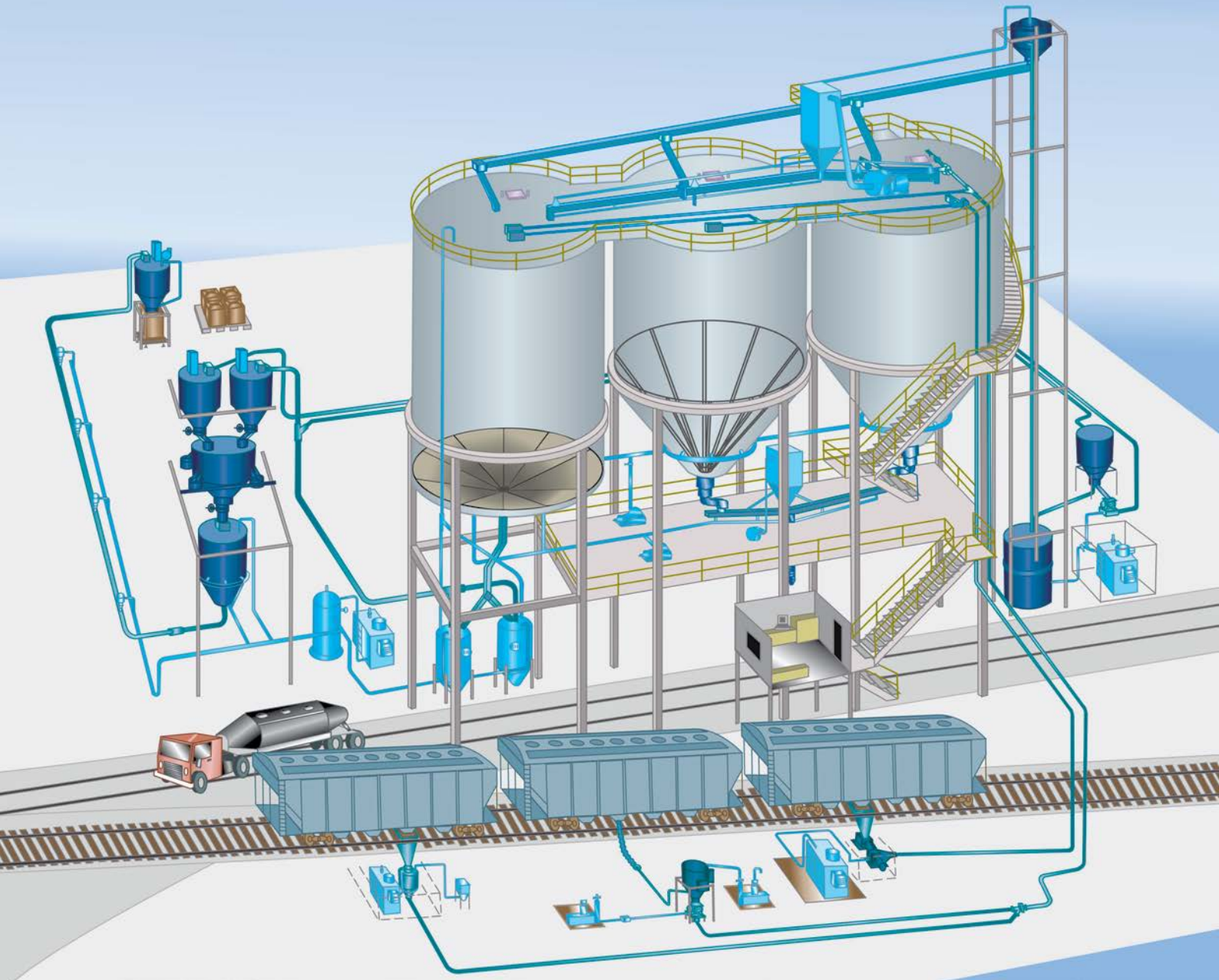


One Source

# Pneumatic conveying solutions



**Experience and proven technology for  
peak efficiency and reliability**

**FLSMIDTH**

# Technological leadership

## Complete capabilities

- **Railcar unloading**
  - **Fuller-Kinyon™ pump systems**
  - **Pressure, vacuum or combination systems**
- **Transfer systems**
  - **Dilute phase Airveyor™ systems**
  - **Mixed phase Fuller-Kinyon™ pump systems**
  - **Dense phase systems**
- **Process injection systems**
- **Airslide™ gravity conveying**
- **Product blending systems**
- **Product storage and loadout**
- **Research and development**

FLSmidth is a leading supplier of pneumatic conveying equipment and systems for the world's cement, mining and minerals, power generation, lime, and pulp and paper industries. Our products and systems are proven to provide clean, safe, economical methods to meet virtually every pneumatic conveying application.

As a customer-driven organization, we continually seek broader applications for our products, processes and technology to meet the ever-increasing demands of emerging and diverse industries. From low energy, dense phase conveying systems like our MODU-DENSE™ conveying systems, to high-efficiency blending systems like our Airmerge™ blender, the development of new products evolves to meet the specialized needs of global customers.

## World leader in development of new technology for pneumatic conveying

FLSmidth's research programs are aimed at maximizing the energy-efficiency and cost-effectiveness of pneumatic conveying systems. Test configurations are designed and equipped to permit field-scale testing under precisely controlled laboratory conditions. Worst-case scenarios can be identified and designed for, thereby eliminating costly downtime.

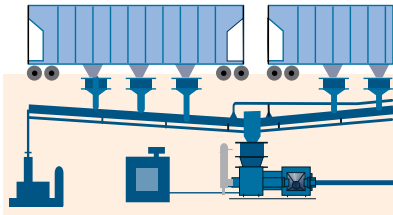
Computerized data acquisition systems permit continuous recording of variables including pressure drop, air volume, power consumption and material flow. Varying process conditions can be simulated in the laboratory, so that the effect on the conveying system can be observed prior to actual installation.

A full range of physical and chemical material tests are also available.



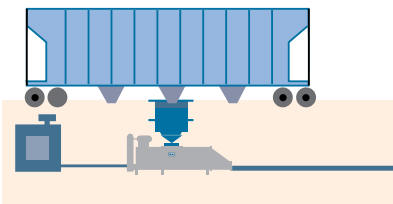
# Dependable and cost-effective railcar unloading

## High capacity/demand: Fuller-Kinyon™ pump system



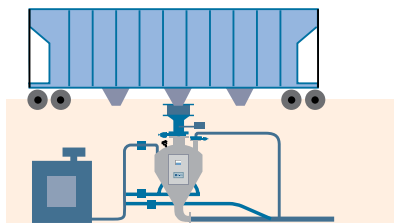
- Continuous railcar unloading
- Single or multiple cars simultaneously
- Dust-controlled, clean operations
- Automated, minimal labor
- Dependable, less unplanned downtime
- Maximum use of space, compact designs

## Moderate capacity/demand: Kompact II™ pump system



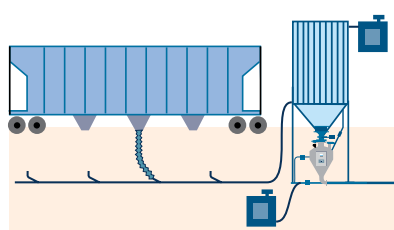
- Intermittent railcar unloading
- Up to 2 railcars per day
- Low maintenance
- User friendly, reliable
- Minimum height requirements

## Moderate capacity/demand: Pressure tank system



- Single or dual tank
- Batch or continuous operation
- Dilute or dense phase
- Cost effective

## Low capacity/demand: Vacuum/pressure system



- Multiple pickup/multiple destination
- High reliability
- Clean operation
- Continuous duty

## Optimize capacity with a Pneu-Boost™ system

The Pneu-Boost™ conveying booster system increases delivery rates resulting in faster turnaround of PD trucks and railcars with no modifications to existing equipment. Fuel-cost savings and less wear and tear on the vehicle increases unloading efficiency and saves money.

- Increased rates from delivery vehicles means faster turnaround
- Low weight and compact skid-mounted package design provides space saving and mobility
- External air supply (by FLSmidth or customer) proves fuel savings for delivery vehicle
- Self-regulating system essentially eliminates plugged lines
- Completely assembled and ready for use
- Overall system sizing analysis by FLSmidth ensures a properly designed system





# Dilute phase Airveyor™ system for effective process transfer

Airveyor™ dilute phase conveying systems move bulk materials horizontally or vertically, tying together a variety of plant functions into one coordinated automatic operation. From unloading bulk transport vehicles, throughout weighing, batching and blending; to unloading from process and into shipment, Airveyor systems keep your material moving cleanly, safely and economically.

**Pressure systems** offer high-capacity material transport over longer conveying distances. Operating at pressures up to 35 psig, pressure systems can satisfy conveying capacities up to 100 TPH.

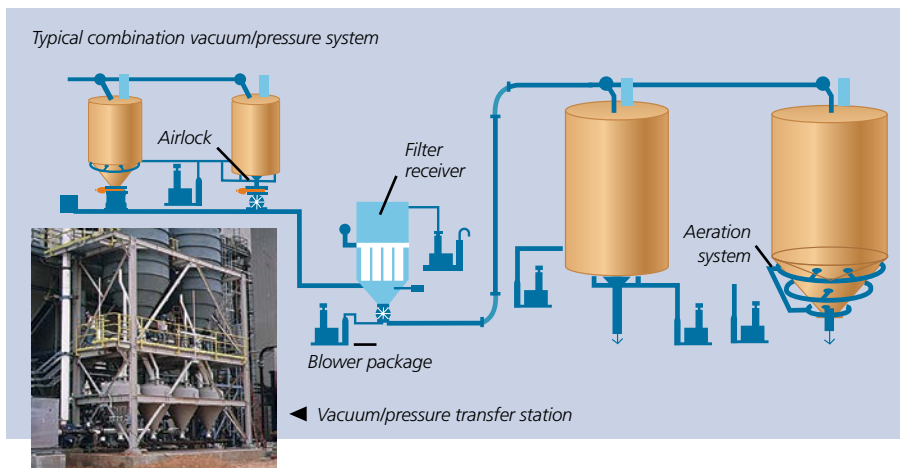
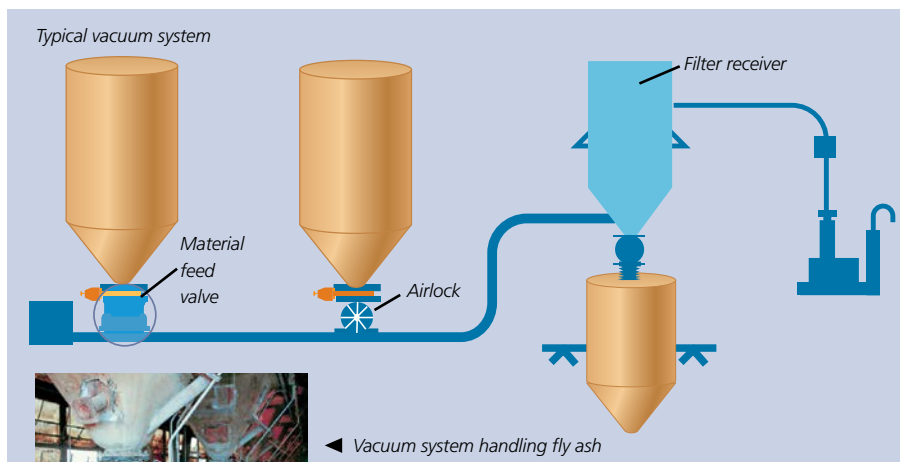
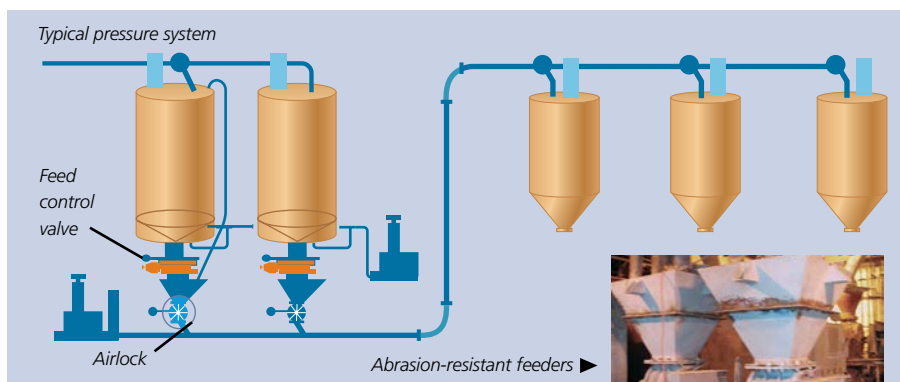
- Longer distance, higher capacity systems
- Multiple discharge points

**Vacuum systems** offer a low-cost alternative for low-capacity transport over short conveying distances. Vacuum systems feature simplified controls and low headroom.

- Shorter distance, low to mid-range capacities
- Single or multiple discharge points

**Combination vacuum/pressure systems** offer higher conveying capacities over longer distances, with reduced headroom requirements at the collection hoppers.

- Longer distance, higher capacity
- Multiple pickup points
- Multiple discharge points



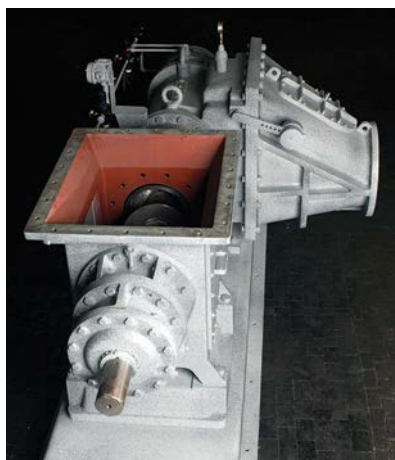
# Mixed phase Fuller-Kinyon™ pump transfer systems for simplicity and durability

Heavy-duty, screw-type Fuller-Kinyon pneumatic pumps are commonly used to convey dry, free-flowing materials from grinding mills, transfer materials from silo to silo, transfer dust from collectors, and load and unload railcars, ships and barges. The materials are conveyed literally anywhere a pipeline can be run and to any number of delivery points. Distances of 1371 meters (4500 feet) are not uncommon.

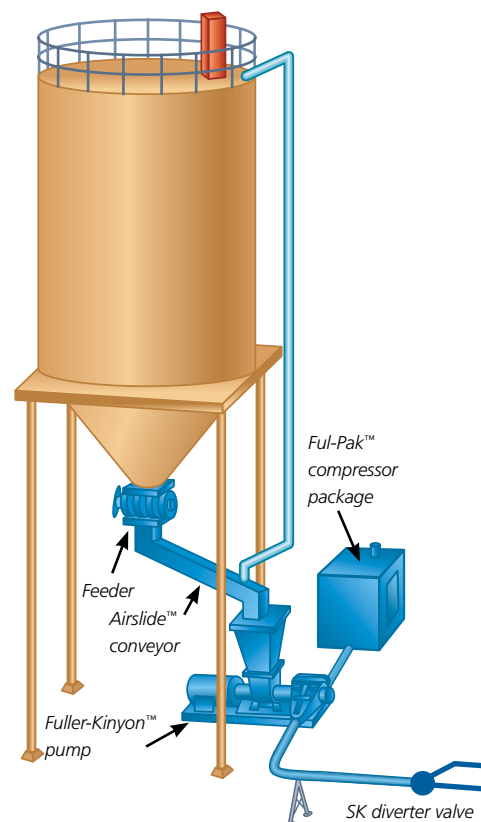
- Continuous operating systems
- Reliable for 24/7 duty
- Lower velocities than dilute phase
- Higher pressure than dilute phase
- Thousands in operation
- Most economical and reliable long-distance, high-capacity technology
- Operational simplicity - only one moving part
- Maintenance-friendly access
- Pneu-flap™ torque arm controller reduces maintenance costs, lowers power consumption and increases capacity



Fuller-Kinyon™ pump with parallel discharge



Fuller-Kinyon™ pump with right angle discharge (left angle also available)



## Abrasion-resistant feeders

help to maximize the performance and dependability of a pneumatic conveying system. The ceramic lining and tungsten carbide coatings provide a long operating life with minimal maintenance requirements.

## Airslide™ gravity conveyors

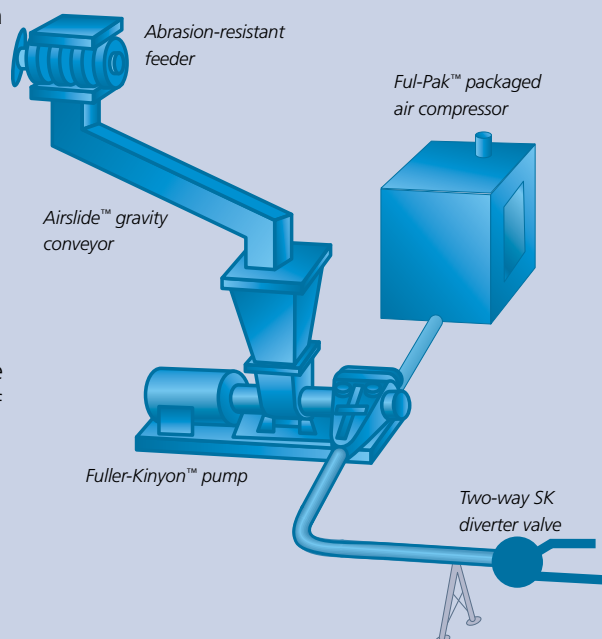
provide high-capacity material handling while offering many economical and environmental advantages. Energy requirements are minimal because Airslide systems use the forces of gravity to do most of the work with no moving parts.

**Ful-Pak™ packaged air compressors** are the ideal solution for the demanding conditions of pneumatic conveying applications.

Compact and totally self-contained in a low-noise enclosure, it is the complete air power source for reliable, efficient operations.

**Fuller-Kinyon™ pumps** are recognized worldwide as the most successful, most reliable, most versatile pneumatic conveying system, and are available in sizes and configurations to fit virtually every application. Economical and easy to maintain, these pumps are backed by over 125 years of pneumatic conveying experience.

**Two-way SK diverter valves** are maintenance-friendly and feature a large hinged port allowing full access to the internals. Replaceable seats are pre-mounted in a cartridge that makes replacements fast and simple.



# Dense phase system for maximum efficiency and cost effectiveness

## MODU-DENSE™

### conveying system

- Single or dual tank system; batch or continuous operation
- Automated operation
- Reduces plugging (modulating valve eliminates need for boosters for most materials)
- Low velocity conveying

## Fullveyor™ conveying system

- Lowest velocity conveying
- Continuous discharge – no need to purge the pipeline
- Reduces wear
- Reduces product degradation
- Reliable boosters

## EZ-Flow™ conveying system

- Low cost modular design
- Low cost installation
- Packaged system controls
- Tank assemblies shipped fully assembled
- Low velocity conveying

## MaxiDense™ conveying systems

maximize the amount of time material flows at the design pressure of the convey system, producing the most efficient conveying possible. MaxiDense technology utilizes a staged bypass to allow small increments of air to enter the convey line downstream of the tanks. This approach is far more efficient in charging the convey line with the proper amount of material than a single valve bypass. This results in the optimum material-to-air mixture entering the convey line to maintain design pressure throughout the convey cycle.

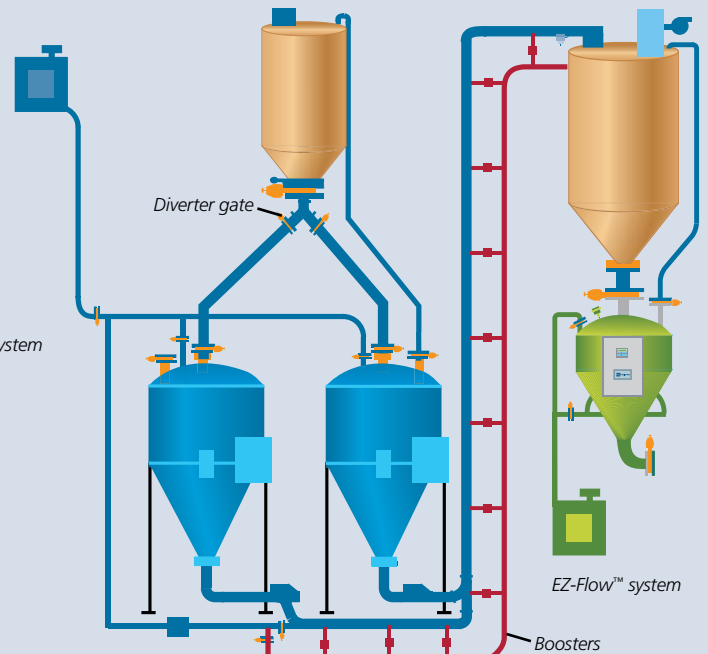
- Designed for long-distance, high-capacity applications
- Optimum material flow control maximizes overall system efficiency by utilizing more of the available compressor capability
- Low velocity, precisely controlled conveying is suitable for process injection of abrasive materials



MODU-DENSE™ conveying system



EZ-Flow™ conveying system



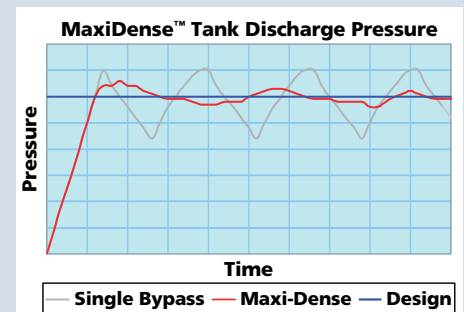
Typical MODU-DENSE™ system (no boosters)

Typical Fullveyor™ system (with boosters)

Typical EZ-Flow™ system



MaxiDense™ conveying system



## Fullerator™ high flow aeration/vibration pads,

available on all dense phase tanks, solve even the most difficult material flow problems by combining aeration with vibration. The rubber pad creates an aggressive vibration on the vessel wall as the result of airflow. Vibration is very effective to enhance flow for all types of dry bulk materials.



Fullerator™ aeration pads available for all tank systems

# Process injection systems for higher capacity with lower cost

## Fuller-Kinyon™ pump systems

provide pneumatic injection solutions that reduce energy and maintenance costs, reduce the emission of dust and harmful pollutants while improving productivity.

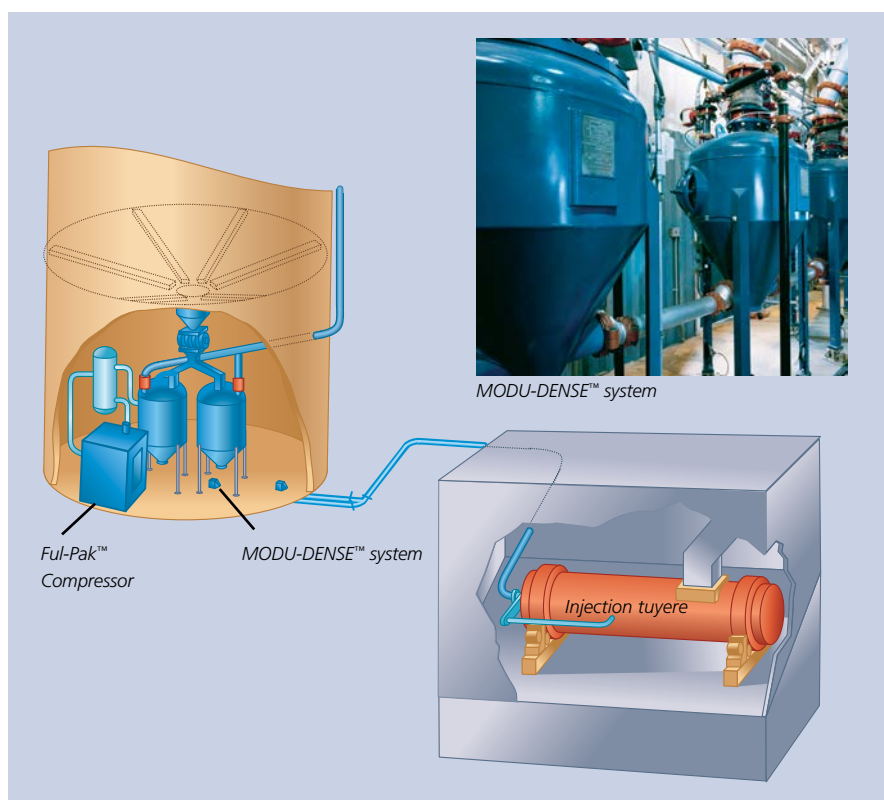
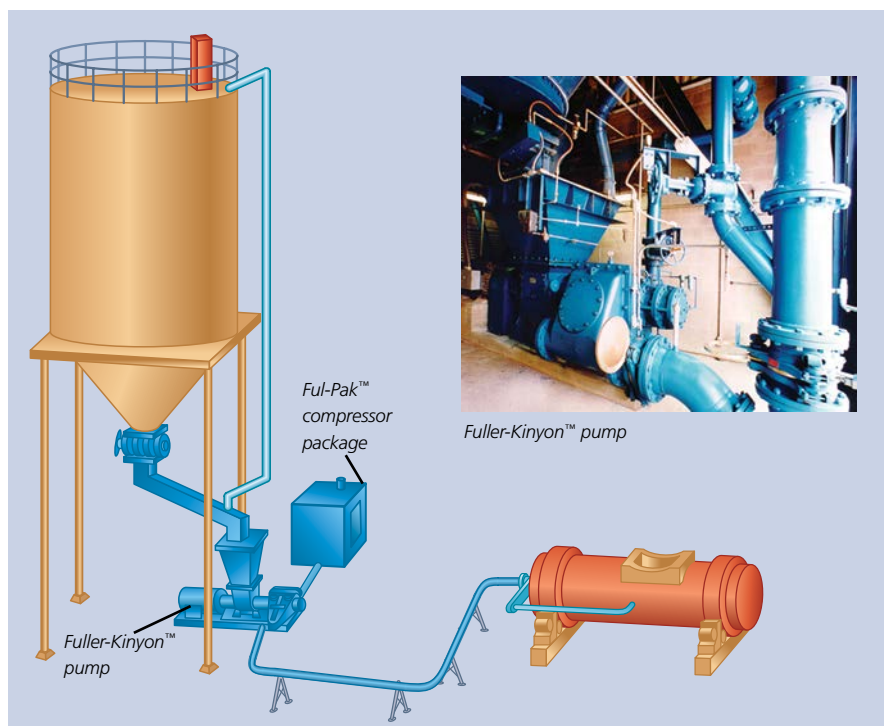
- Continuous conveying
- Low headroom requirements
- Simple operation
- Simple controls
- Rugged, heavy-duty design
- Can handle high-process back pressures without backflow due to continuous discharge

MODU-DENSE™ conveying systems rely on a simple air optimizing valve to accurately control convey line pressure and material-to-air mixture.

- Batch or continuous conveying
- Precise solids discharge rate control and turn down by means of an Injection System Airflow Controls (ISAC) air management system
- Efficiently transfers highly abrasive materials

All of our injection systems:

- Inject product through tuyeres, lances or chlorinators
- Result in faster chemical and thermal reaction
- Produce greater operational efficiency
- Reduce loss of expensive raw materials





# The original Fuller® Airslide™ gravity conveying system for efficiency

Developed from Fuller® design\* and technology, FLSmidth's Airslide air gravity conveying system uses the force of gravity to do most of the work. Material is fluidized through a porous media with low pressure air. Material flow is achieved by sloping the Airslide conveyor to match the fluidized angle of repose of the powdered material. At the correct slope, fluidized materials flow like a liquid.

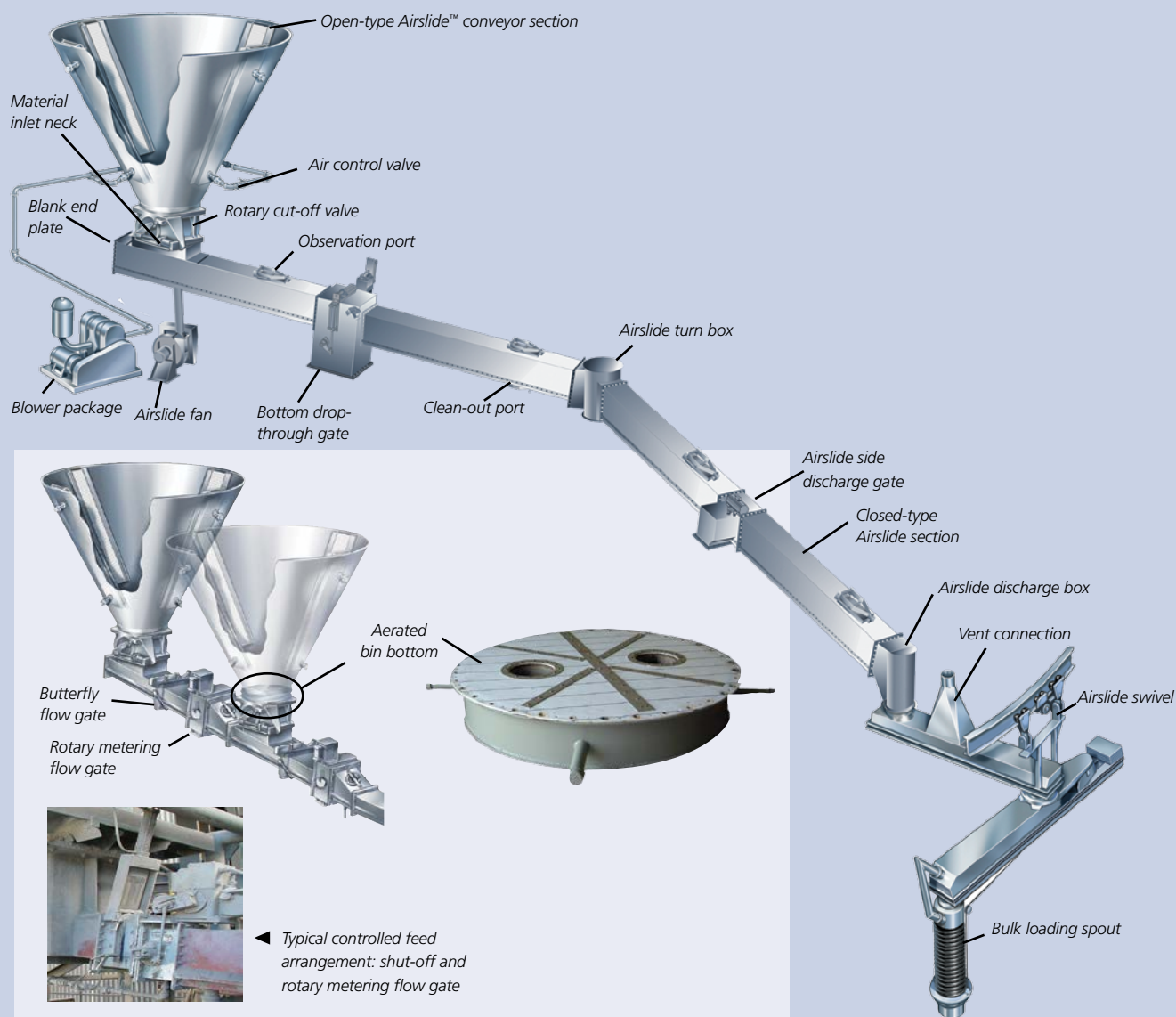
\* Developed by Fuller Company in 1945 in cooperation with Huron Portland Cement

- High capacities, +1500m<sup>3</sup>/hr (53,000 cf/hr)
- Alternative to high-maintenance screw, belt or drag conveyors
- Multiple inlet and discharge options
- Even permeability over entire length of fabric means fewer air connections
- Custom designs for special applications
- Fabric available for high temperature applications up to 454°C (850°F)

Airslide gravity conveyors have no moving parts, so there is low noise and low maintenance costs - just clean, gentle conveying.



Typical Airslide™ gravity conveying system





# Expert blending technologies

## Airmerge™ blender

Air blending is achieved by use of a porous membrane over the entire bin bottom, four air plenums and a simple flow control system. Together they change the density of material in the fluidized bed of material to generate a gentle folding action and a near perfect blend.

- Gentle blending action with diffused fluidizing air through porous membrane fabric for silos up to 2,832 cubic meters (100,000 cubic feet) in volume
- 3-in-1: blender, storage, efficient discharge
- No moving parts, low maintenance
- No mechanical wearing parts, low noise
- Effectively overcomes bridging or funnel flow when discharging material
- Rapid and total discharge capability



Airmerge™ blenders at a USA cement plant

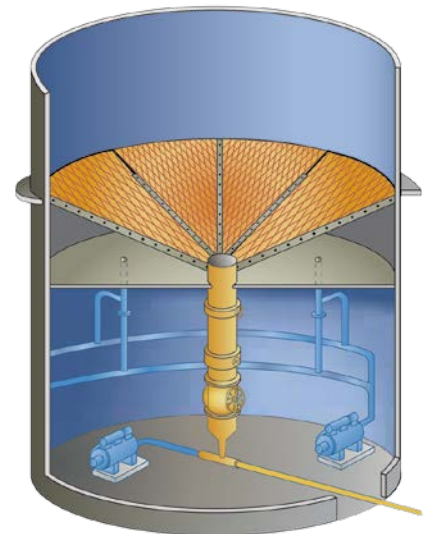
## Column blender

A fully fluidized cone, an upper and lower air plenum and an open-ended central column allow the principle of air blending to be applied to even the most difficult materials. The fluidizing air enters the cone beneath the column, reducing the density of the material within; which is displaced upward as the denser material from the annulus of the cone flows inward. This "fountain-flow" gives a radial circulation capable of blending ultrafine powders, coarser sandy materials and products with a wide particle size distribution.

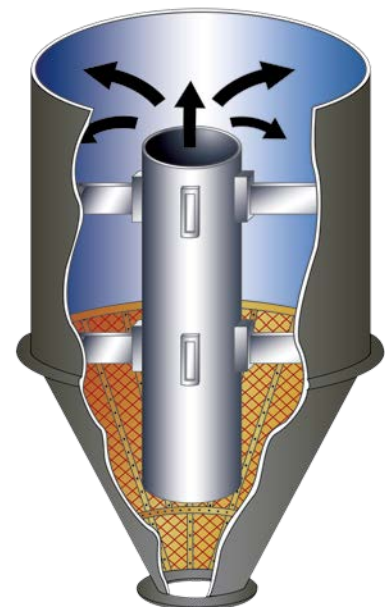
- No moving parts, low maintenance
- Gravity discharge 60° cone design
- Simple operation
- Robust design
- Greater flexibility in range of particle size
- Design for different batch sizes available

## Blending applications

- Homogenize truck/railcar shipments
- Drive off unwanted moisture
- Provide uniform process characteristics
- Reduce temperature of blended materials



Airmerge™ blender



Column blender

## Terminal solutions

[www.flsmidth.com](http://www.flsmidth.com)

CM 08-13 900-84-ENG



FLSmidth has a wide selection of products to meet your marine terminal needs – allowing you to focus on the planning and building of your new terminal, or the updating of your existing one:

- Complete project capability
- Mechanical and pneumatic ship unloaders
- Road mobile unloaders
- Barge unloaders
- Mechanical and pneumatic conveyors
- Storage silos
- Storage domes
- Flat storage
- Floating terminals
- System and project engineering
- Feasibility studies

**Ful-Floor™ reclaim systems** for dome silos use industry-proven Airslide™ fabric anchored to nearly 100% of the floor area. Imbedded aeration troughs and piping eliminate restrictions that can inhibit material flow. The results: complete reclaim of your stored material with minimal floor slope, low average power and low maintenance.

*Flexible – fill and reclaim simultaneously*

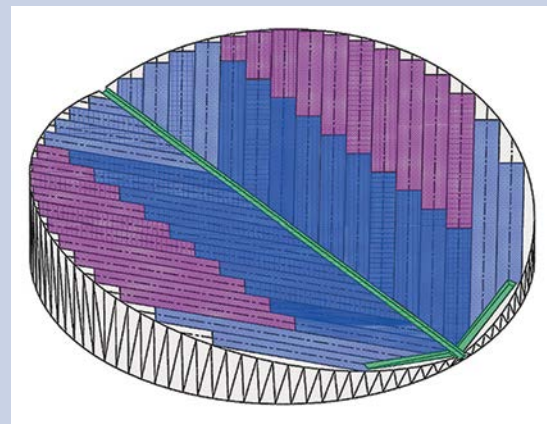
*Dependable – no moving parts inside the dome or silo*

*Low-maintenance – just blowers and air control valves*

*Minimal floor slope requirement – usually 8° to 10°*

*Increased cleanout efficiency – up to 99%*

*High-Capacity reclaim and transfer – up to 800 TPH*



### Project Centre Denmark

FLSmidth A/S  
Vigerslev Allé 77  
DK-2500 Valby  
Copenhagen  
Tel: +45 3618 1000  
Fax: +45 3630 1820  
E-mail: [info@flsmidth.com](mailto:info@flsmidth.com)

### Project Centre USA

FLSmidth Inc.  
2040 Avenue C  
Bethlehem, PA 18017-2188  
Tel: +1 610-264-6011  
Fax: +1 610-264-6170  
E-mail: [info-us@flsmidth.com](mailto:info-us@flsmidth.com)

### Project Centre India

FLSmidth Private Limited  
FLSmidth House  
34, Egatoor, Kelambakkam  
(Rajiv Gandhi Salai, Chennai)  
Tamil Nadu – 603 103  
Tel: +91-44-4748 1000  
Fax: +91-44-2747 0301  
E-mail: [indiainfo@flsmidth.com](mailto:indiainfo@flsmidth.com)