One Source

Blending silo techniques for bulk material handling systems

FLSmidth

Blending silo techniques

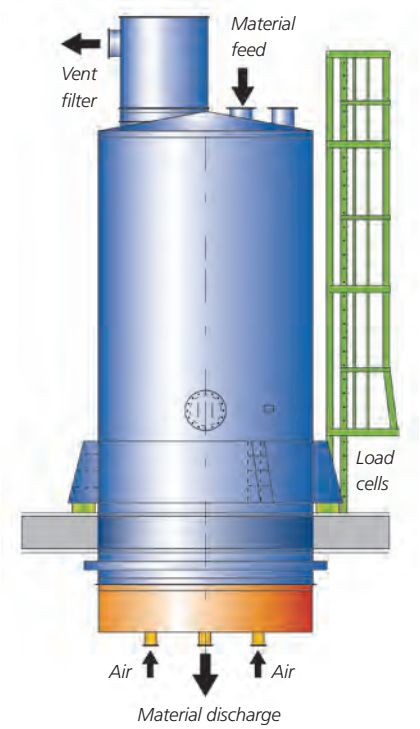
Blending applications

- **Mixing two or more products**
- **Homogenation of individual products**
- **Size uniformity**
- **Color uniformity**
- **Chemical uniformity**
- **Temperature uniformity**
- **Reduce process variations**
- **Recycle out-of-spec material**
- **Add trace elements**
- **Chemical modification**

Reliable performance
We engineer our pneumatic blending silos to maximize the benefits of fluidization and gravity technologies over mechanical blending.

FLSmidth technologies give you operating efficiency, low power consumption, flexibility and increased productivity. Our product range can combine storage and blending for space-saving plant layouts.

Scope of supply can include:
- Silos
- 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



Experience counts
FLSmidth has supplied over 500 blenders to industrial customers worldwide over the past 70 years.

Our technology and commitment to product development and testing have made us the #1 supplier of air gravity blenders.

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 more.

Low power consumption

Central inverted cone: air assisted gravity blending

Multiple outlet gravity discharge combined with central cone construction gives advanced gravity blending and storage with a power consumption as low as 0.25 to 0.5 kWh/metric ton of cement raw meal. Open Airslide™ conveyor sections in the flat annulus ensure full clean-out when required.

Material enters the central bin via multiple Airslide conveyors, blending materials from different areas of the silo floor.

An arrangement of air valves activates sequential discharge and provides a continuous blending of materials from the side of the silo through a funnel effect.

Features and benefits

- Total cleanout
- High capacity (6,000 ton+)
- High discharge rates (150 tph+)
- Controlled flow withdrawal
- Reduced silo profile
- Discharge equipment located under cone
- Minimum dust collection
- No segregation
- Reduced foundation cost

Central inverted cone blender

RANDOM-FLOW™ blender

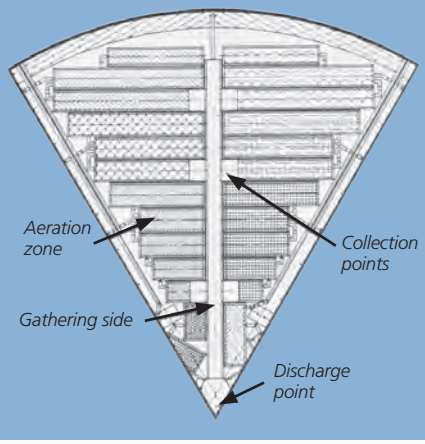
Six pie-shaped sectors (each subdivided into six aeration zones) and continuous blending in a timed discharge pattern provide the lowest energy gravity blending silo available. Power consumption on cement raw meal as low as 0.07 kWh / metric ton. New and retrofit installations with minimum downtime.

Features and benefits

- 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

Space-saving layout of blowers beneath the silo

RANDOM-FLOW™ blender



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.

Near-perfect blending

AIRMERGE™ blending
Air blending is achieved by use of a porous membrane over the entire bin bottom, 4 air plenums and a simple flow control system enable. Together they change the density of material in the fluidized bed of material to generate a gentle folding action and a near perfect blend.

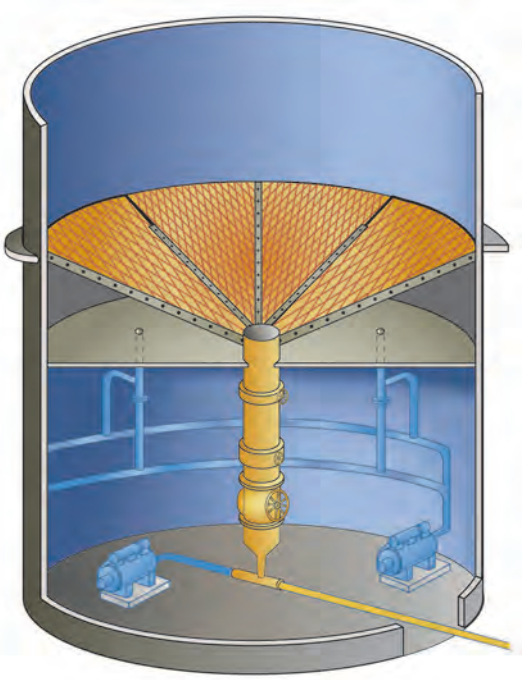
AIRMERGE blenders can be designed for batch or continuous operation to meet your requirements.

Porous fabric held with binding strips on top of removable grating panels in the air plenum allows access for fabric to be replaced in place.

Higher air velocities in the blending quadrant lower the bulk density causing the denser material in the three fluidized quadrants to flow into it and be displaced upward in a continuously circulating bed.

Air for fluidization and blending can be supplied from common or separate blowers as required.

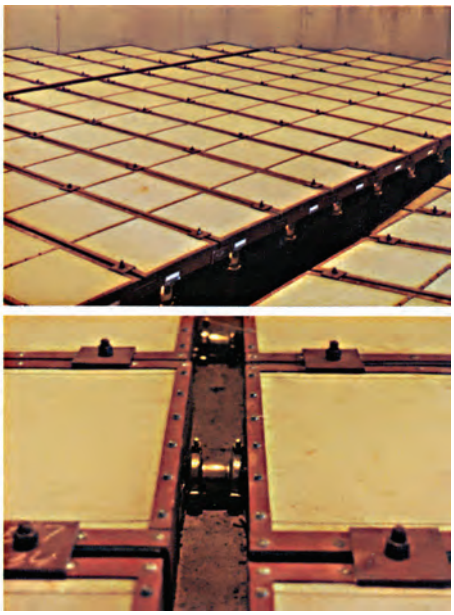
Features and benefits
- No moving parts in contact with the material
- Simple operation
- Gentle blending action
- Low pressure air
- ~20° slope on fluid bed
- Steel flange connection
- Batch or continuous working
- Standard and FDA fabric option
- Low maintenance
- Long life
- No complicated controls
- Little dynamic loading
- Usually PD blowers
- Complete cleanout
- New or retrofit installations
- System design flexibility
- Food applications available



AIRMERGE™ blender cut-away

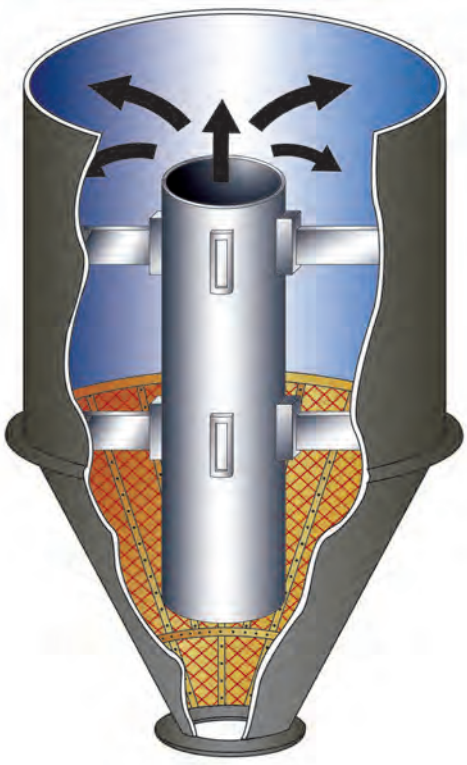
AIRMERGE™ blender

Top: complete coverage for maximum fluidizing effect; Bottom: center or side withdrawal - all material flows toward center trough



Top: minimal hold-down points for easy installation and maintenance
Bottom: quick-disconnect type couplings

Blending for difficult materials



"Fountain-flow" gives a radial circulation capable of blending the most difficult materials.

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.

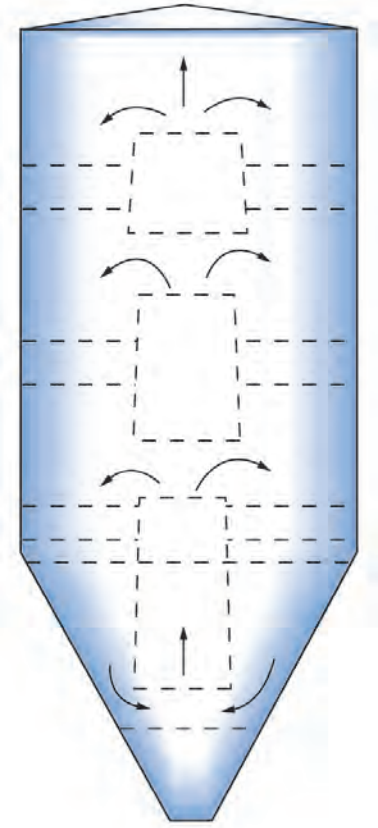
Column blender

Features and benefits

- No moving parts
- Gravity discharge 60° cone design
- Simple operation
- Robust design
- Greater flexibility in particle size range

Different batch sizes

By dividing the central column into two or more separate pieces, the column blender can accommodate different volumetric batch sizes. In the smaller batches, material is lifted up in the same way but "fountain-flow" into the surrounding fluidized bed is via the spaces between the upper and lower column. For design purposes, batch volumes must be known in advance.



The column blender can accommodate different volumetric batch sizes.

Materials testing and research

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FLSmidth's research programs are aimed at maximizing the energy-efficiency and cost-effectiveness of pneumatic conveying systems.

FLSmidth's world-class R&D facility near Bethlehem, PA enables us to demonstrate both the column and AIRMERGE™ blenders on your materials prior to contract, avoiding costly site trials and possible re-work.
We can perform the following tests:

- Size analysis
- Moisture content
- Bulk density
- Angle of rupture
- Bed expansion
- Air flow/pressure
- Airslide™ conveyor angle
- Conveying tests

Test configurations are designed and equipped to permit field-scale testing under precisely controlled laboratory conditions. Flexibility allows operators to go from vacuum to pressure in combinations of line lengths and pipe diameters.

State-of-the-art 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. Worst-case scenarios can be identified and designed for, thereby eliminating costly downtime.

Complete capability of evaluating materials to determine the most energy-efficient and cost-effective system design parameters are also available.

Modular equipment assemblies facilitate test programs.

Multi-unit receiving and transfer stations allow full-scale testing and material evaluations.

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