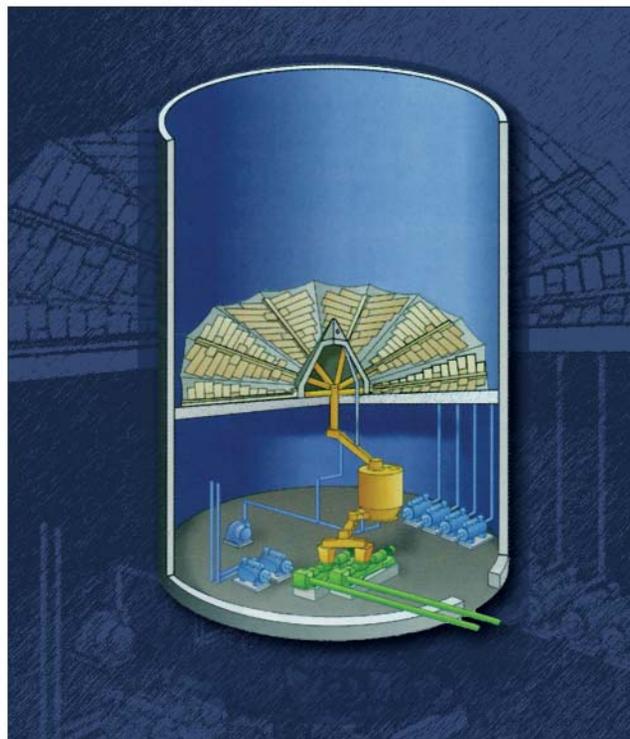
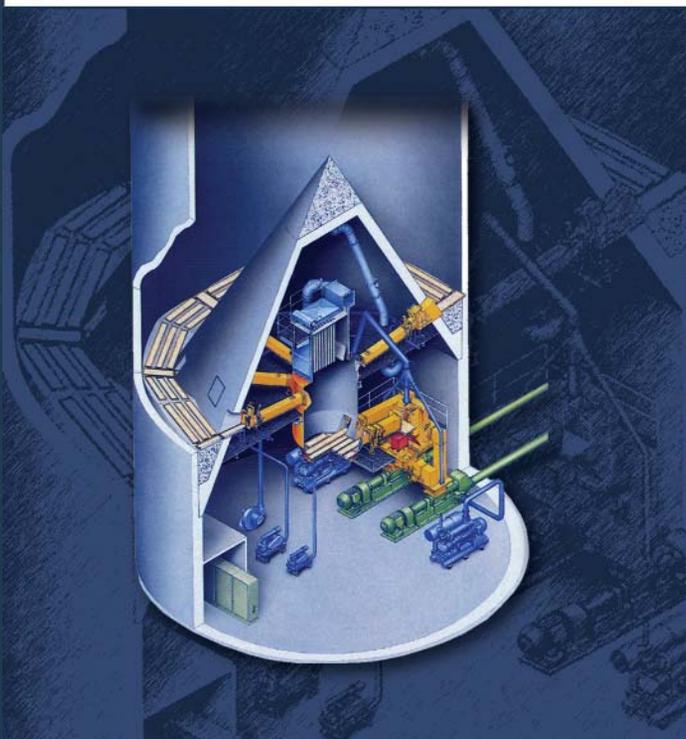
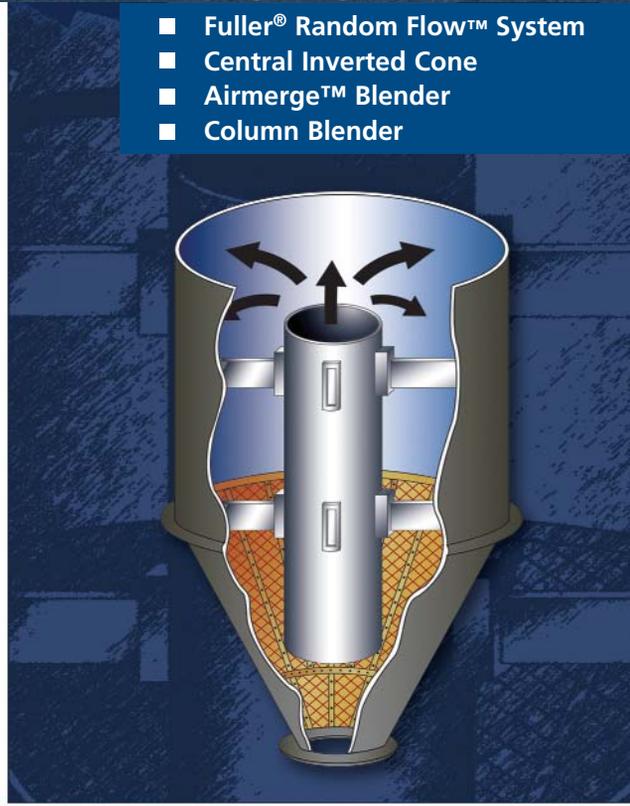
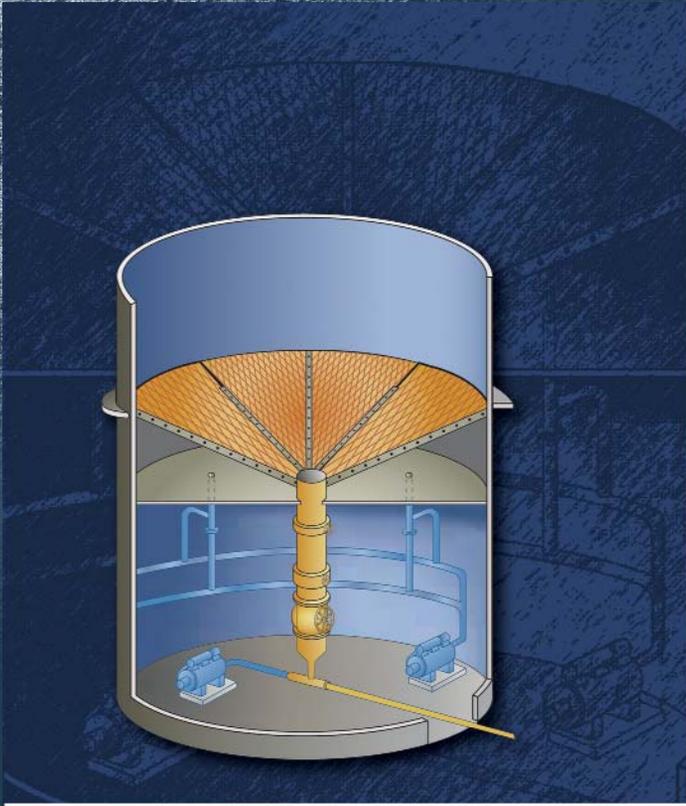


# Blending Silo Techniques for Bulk Material Handling Systems

- Fuller® Random Flow™ System
- Central Inverted Cone
- Airmerge™ Blender
- Column Blender



# Blending Silo Techniques

## BLENDING APPLICATIONS

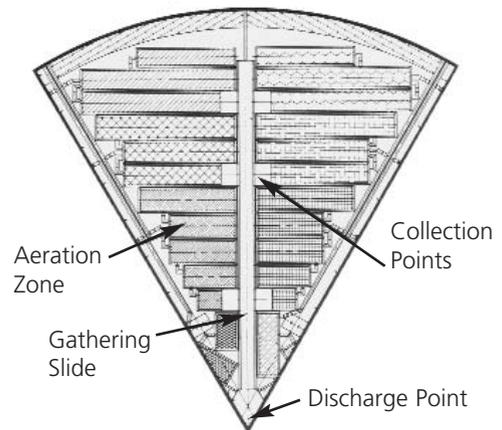
- Mixing two or more products
- Homogenation of individual products
- Size uniformity
- Color uniformity
- Chemical uniformity
- Temperature uniformity
- Reduce process variations
- Recycle out spec material
- Add trace elements
- Chemical modification

At FLSmidth we engineer all our blending silos to maximize the benefits of fluidization and gravity technologies over mechanical.

Technologies that give you operating efficiency, flexibility and increased productivity. Our product range can also combine storage and blending for space-saving plant layouts.

## Fuller® Random-Flow™

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.



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



Space-saving layout of blowers beneath the silo

### Features

- No moving parts
- Low pressure air
- Compact PD blowers
- Gravity withdrawal
- Center or side discharge
- Maximum bottom aeration coverage
- Small inverted central cone

### Benefits

- 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

# Central Inverted Cone

*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™ sections in the flat annulus ensure full clean-out when required.

Material enters the central bin via multiple Airslide 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 include:

- 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

## Experience counts

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

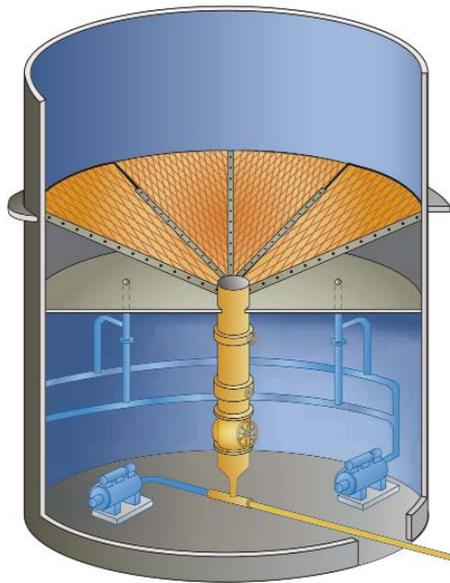
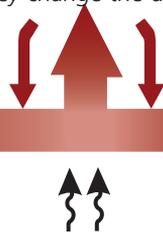
Our technology and commitment to product development and testing have made us the #1 supplier of air/gravity blenders.

## 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

# Airmerge Blenders™

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.

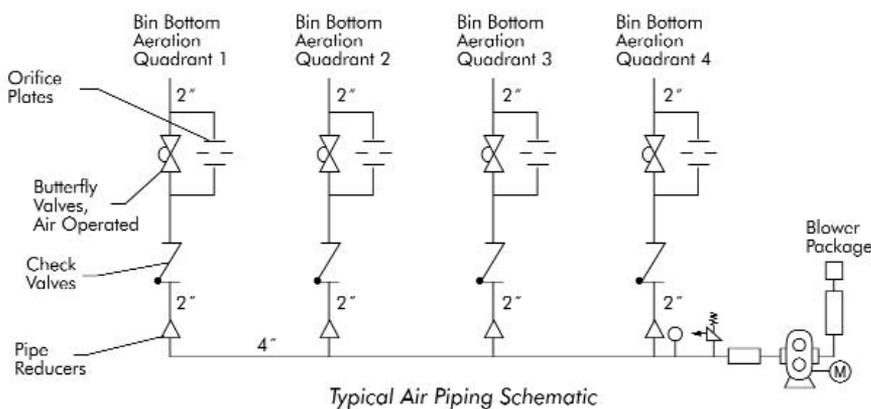
Air for fluidization and blending can be supplied from common or separate blowers as required.

## Benefits:

- 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

## Features:

- 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



Typical Air Piping Schematic

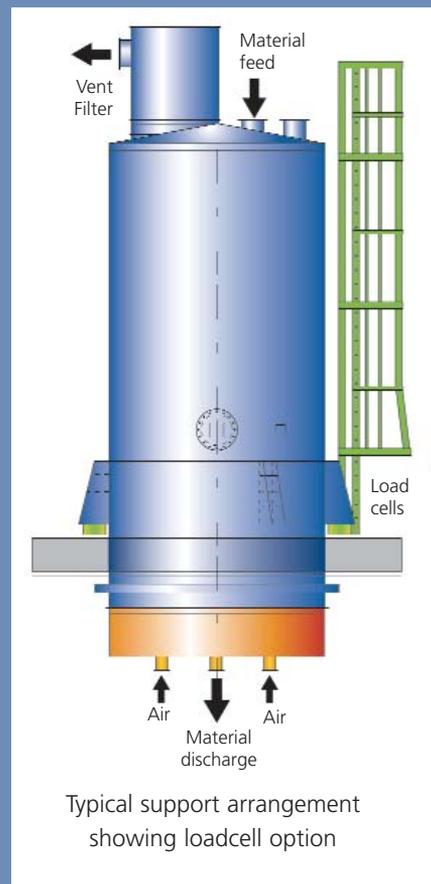
## Reliable Performance

Whether you need a complete system or just a component, let the engineering team at FLSmidth put its resources to work for you.

Our attention to detail will make it work.

## Scope of supply can include:

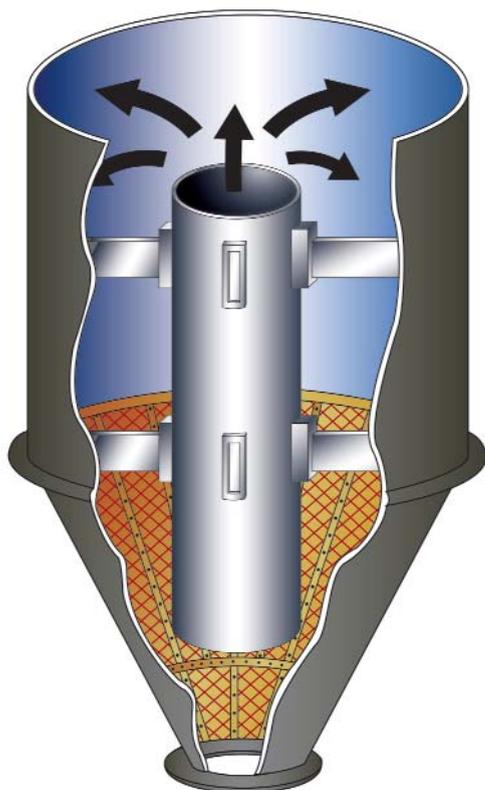
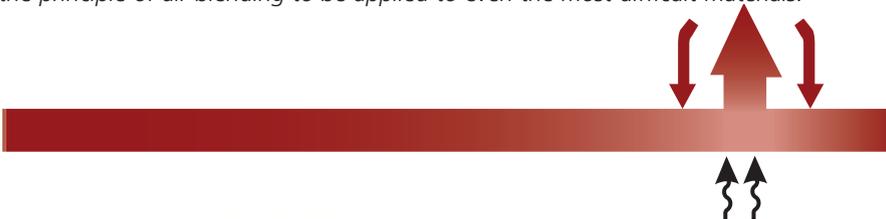
- Silos
- Aerated Bin Bottoms
- Airslide™ Gravity Conveyor
- Solids Flow Control Valves
- Fan & Blower Packages
- Dust Collectors
- Pneumatic Conveying Compressor Packages
- Pipes and Bends
- Diverter Valves
- Control Panels



Typical support arrangement showing loadcell option

# 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.

## Features:

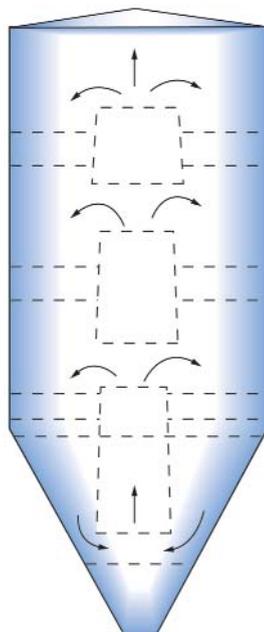
- No moving parts
- Gravity discharge 60° cone design
- Simple operation
- Robust design
- Greater flexibility in particle size range
- Design for different batch sizes available\*

## \* 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.

Batch volumes must be known for design purposes in advance.



## Materials Testing



Column Blender, Catasauqua, PA

FLSmidth's world-class R&D facility near Bethlehem, PA enables us to demonstrate both the Airmerge™ and Column Blenders on your materials prior to contract.

- Size Analysis
- Moisture Content
- Bulk Density
- Angle of Rupture
- Bed Expansion
- Air Flow/Pressure
- Airslide Angle
- Conveying Tests

Come to FLSmidth and avoid costly site trials and possible re-work.

# Materials Testing and Research



*Modular equipment assemblies facilitate test programs*

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. Flexibility allows operators to go from vacuum to pressure in combinations of line lengths and pipe diameters.



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

Computerized data acquisition systems permit continuous recording of variables including pressure drop, air volume, power consumption and material flow. Complete capability of evaluating materials to determine the most energy-efficient and cost-effective system design parameters also exist. 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.



*FLSmidth Airmerge Blender*

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