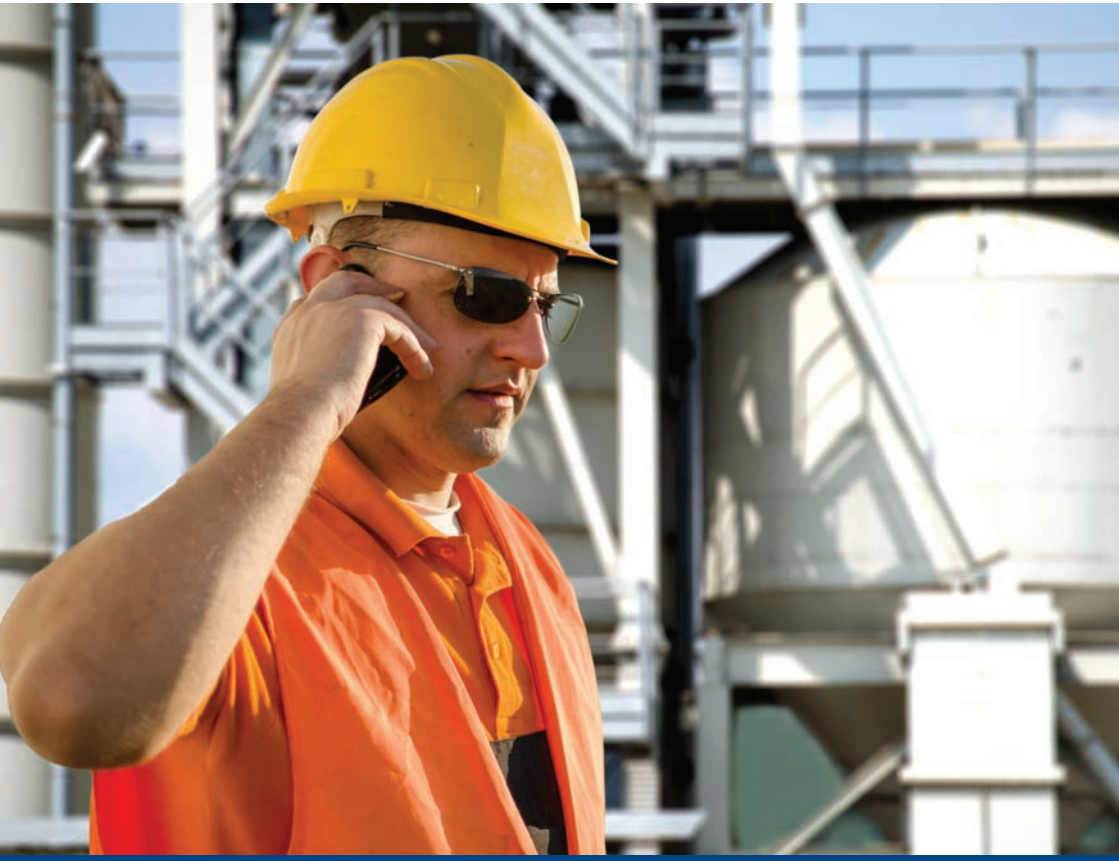

Application World

An application guide to the 3D Solids Scanner

EMERSON™
Process Management

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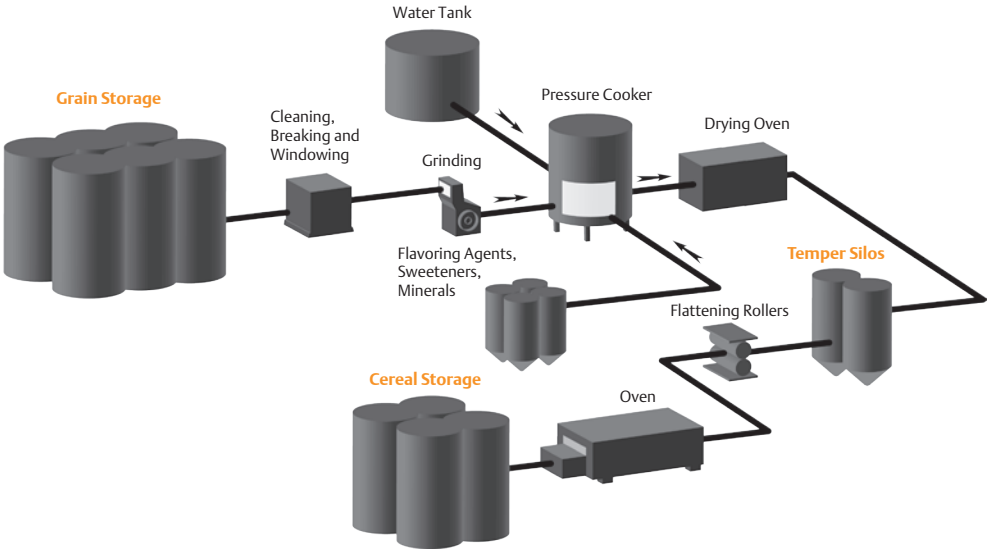
A guide to volume measurement solutions for the

Food & Beverage Industry

Cereal Production

Industry Applications Series

Cereal Production Diagram



Grain Storage

Application: Grains (wheat, corn, rice etc.) arrive at the plant and are stored in large silos before being further processed

Challenges: The grains are stored in large silos making it difficult to accurately measure the volume of inventory available to ensure continuous supply for the cereal production process.

Knowing the exact amount of grain entering and exiting the silos is also important for correctly calculating material costs to meet quarterly and annual financial reporting requirements. With a Rosemount 3D Solids Scanner system, reliable and accurate inventory readings are possible even in these large silos.

Temper Silos

Application: Cooked grains are allowed to cool for several hours, stabilizing the moisture content of each grain.

Challenges: The humid condition of the cooked grains together with the time the grain remains stored inside the temper silo promotes the formation of build-up on the silo walls. The additional dust generated during the process further complicates accurate measurement of the true volume of the inventory.

The Rosemount 3D Solids Scanner delivers accurate volume measurements regardless of the harsh storage environment, and its 3D visualization tool generates a real-time 3D display of the distribution of the cooked grains inside the silo, allowing early detection of material build-up. This enables the scheduling of maintenance and avoids unexpected interruptions in the process and associated losses in time and money.

Sugar Storage

Application: Sugar is an important ingredient in the production of cereal and is stored in silos before being mixed with the grains.

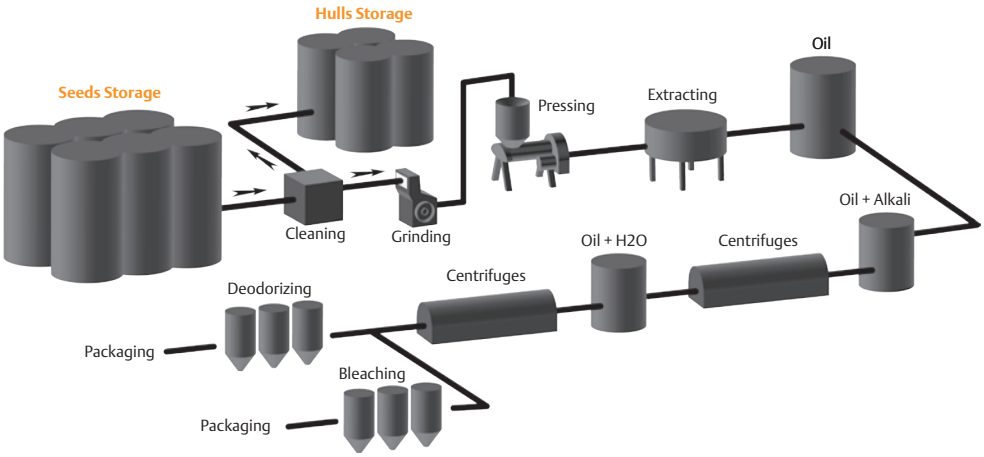
Challenges: Sugar and sugar dust tend to accumulate, creating build-up and rat holes. Moreover, the materials' sticky nature challenges level measurements as they need to operate even when wetted parts become coated. To continuously assess sugar inventory levels is very challenging.

The Rosemount 3D Solids Scanner is capable of working in this harsh environment and accurately measures the amount of sugar inside the silo. The 3D visualization tool allows the user to see the allocation of material inside the silos in real time, including build-up. This facilitates timely maintenance and reduces the risk of production interruptions.

Seed Oil Production

Industry Applications Series

Seed Oil Production Diagram



Seed Storage

Application: Prior to being processed into various kinds of oils, seeds such as sunflower, palm kernel, safflower, soybeans, sesame, and canola, or nuts such as peanuts, almonds, and walnuts, are delivered to the plant and stored in big silos to ensure a continuous production process.

Challenges: The sizes of the silos that carry these raw materials can have diameters greater than 15m (50 ft) and may be over 40m (132 ft) tall. Knowing the exact amount of raw material entering the oil extracting machines is the key to tracking and controlling production efficiency. Build-up of the material occurs inside the silo and can damage the quality of the beans.

Since the temperature inside the build-up rises over time, the seeds inside the build-up get burnt and stick to each other, forming hard bulks that cannot be used. Therefore, operators need to detect the build-up as soon as it begins to form.

The Rosemount 3D Solids Scanner provides accurate real-time measurements of the volume of the stored beans in the silos. The 3D visualization tool allows the end-user to see the allocation of material inside the silos in real time, including build-up, and to schedule maintenance and cleaning before damage is caused to the product or unexpected interruptions of the production process occur.

Accurate inventory control is required to ensure a sufficient supply of raw materials to meet the specific production plan, taking into account delivery times which can vary considerably. The Rosemount 3D Solids Scanner systems, using multiple-point surface mapping technology, provide end-users with accurate, reliable and continuous non-contact volume measurements enabling them to better manage inventories.

Hull Storage

Application: By-products from oil processing (meals, hulls, Lecithin, hominy / dried maize and others) are stored in silos before being shipped for use in the production of fertilizers, animal feeds, cosmetics and other products.

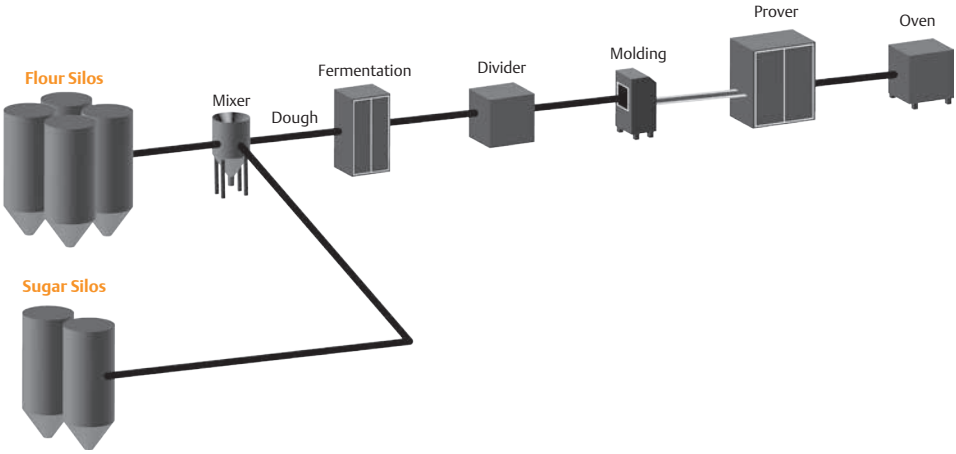
Challenges: A major challenge, apart from continuous measurement of the material inside the silo, is early identification of material build-up. This can damage the quality of the product since the temperature inside the build-up rises over time, the by-products inside get burnt and stick to each other, forming hard bulks that cannot be used. To eliminate the loss, operators need to surmount this challenge by being able to detect the build-up as it begins to form.

The Rosemount 3D Solids Scanner provides accurate real-time measurements of the volume of the stored by-products remaining in the silos, taking into account such material build-up. The 3D visualization tool allows the end-user to see the allocation of material inside the silos in real time, facilitating the scheduling of any required maintenance and cleaning before damage is caused to the product or unexpected interruptions of the production process occur.

Pastry Production

Industry Applications Series

Pastry Production Diagram



Flour Storage

Application: Flour is stored in silos before being transferred into the production process.

Challenges: Knowing the amount of stored flour is critical for the production flow since a lack of insight could interrupt or even stop production altogether. Enabling on-time ordering of the right quantities will prevent overflows as well as wasted production time. Flour tends to stick to the silo walls, creating build-ups and rat holes.

Early detection will ease maintenance, reduce maintenance cost and allow optimal use of the silo content. Different types of flour cannot be mixed together in some cases, and knowing the actual volumes of stored flours can be crucial to the quality of the final product.

The Rosemount 3D Solids Scanner provides accurate real-time measurements of the volume of the different types of flour stored in separate silos, taking into account such build-ups and rat holes. The 3D visualization tool allows the user to see the allocation of material inside the silos in real time, facilitating the scheduling of any required maintenance and cleaning before damage is caused to the product or unexpected interruptions to the baking process occur.

Sugar Storage

Application: Sugar is stored in silos before being added to the mixture.

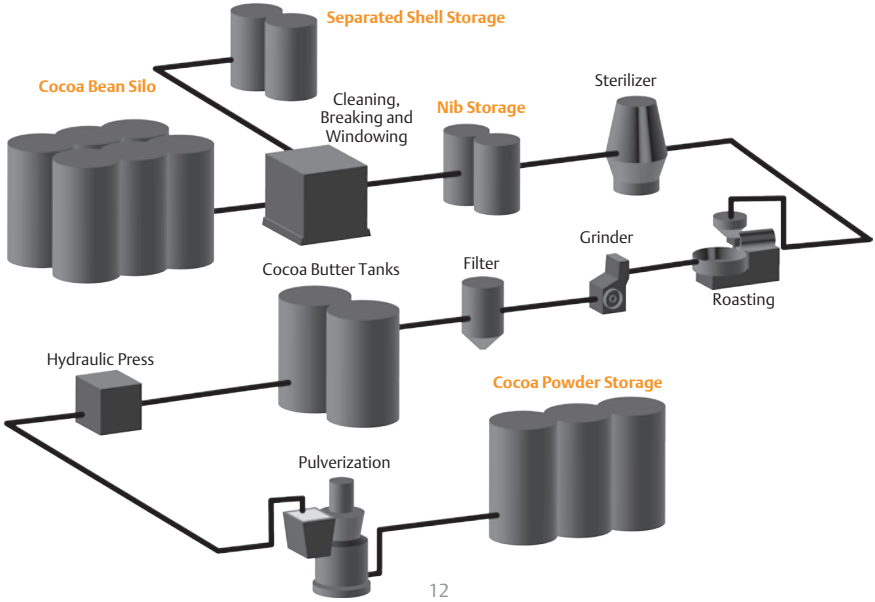
Challenges: Sugar and sugar dust tend to accumulate, creating build ups and rat holes, so understanding actual material content continuously becomes very difficult. The materials' sticky nature challenges level measuring systems which need to operate even if sugar sticks to the antenna or other system parts.

The Rosemount 3D Solids Scanner is capable of working in this harsh environment. The 3D visualization tool provides a real time 3D display of the sugar's distribution inside the silos, including build-up, facilitating timely maintenance and reducing interruption risks to the delivery schedule and the associated losses of time and money.

Cocoa Processing

Industry Applications Series

Cocoa Processing Diagram



Cocoa Bean Storage

Application: Cocoa beans are stored in large silos prior to being transferred onward for further processing.

Challenges: The large sizes of storage silos combined with the dusty environment and the irregular allocation of material inside the silo make accurate measurement of the stored beans' volume very difficult. Accurate volume measurement is the basis for continuous inventory tracking to ensure the supply of beans to the production.

The Rosemount 3D Solids Scanner multiple-point mapping technology overcomes these problems, enabling accurate assessment of the volume of the beans remaining in the silo at any time.

Separated Shell Storage

Application: Separated shells are stored in silos before being shipped for use, often in agricultural mulch or to fertilizer producers.

Challenges: Humidity and temperature cause build-up and irregular formations and can generate damage to the silo and the quality of the product, since the internal temperature during build-up rises over time and the shells inside get burnt and stick to each other, forming hard bulks that cannot be used. The ability to view the build-up as it occurs and knowing how much material is available are both crucial to the end user. Rosemount 3D Solids Scanner provides the solution to the above challenges.

Nib Storage

Application: Nibs are stored in silos prior to entering the cocoa production process.

Challenges: The nibs feed the entire cocoa production process, so end-users need to accurately monitor inventory levels in order to ensure a continuous supply and to avoid unexpected interruptions of the process and their associated losses in time and money.

The Rosemount 3D Solids Scanner accurately and reliably measures the real-time volume of nibs remaining in the silo, greatly improving inventory management and control capabilities.

Cocoa Powder Storage

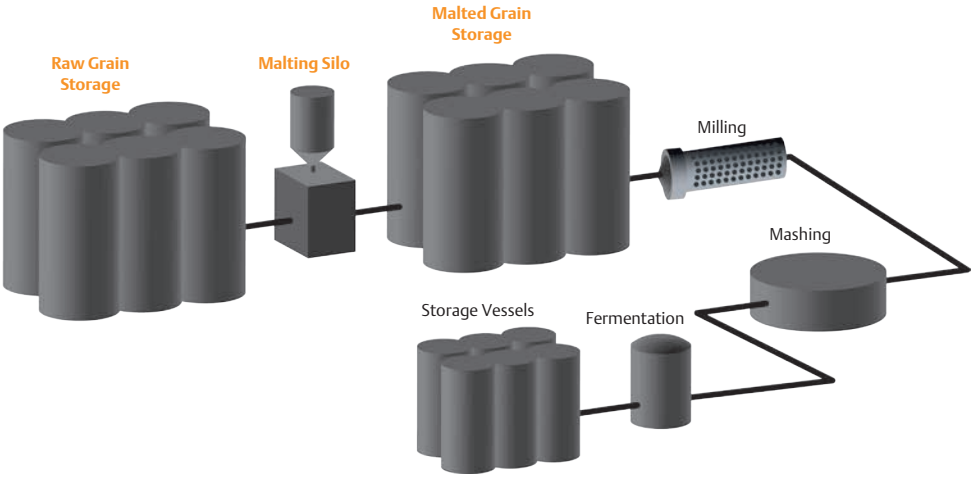
Application: Final material is stored both for bulk and bagging.

Challenges: Accurately measuring the silos' content is important for efficient delivery from the production to the final silos.

Beer Production

Industry Applications Series

Beer Production Diagram



Raw Grain Storage

Application: Prior to being processed the grains are delivered to the plant and stored in big silos to ensure continuous production process.

Challenges: Silos can reach more than 15m (50 ft) in diameter and over 40m (132 ft) in height. Knowing the exact amount of raw material entering the malting process is the key to tracking and controlling production efficiency. Raw material delivery times can vary considerably; therefore it is essential to ensure the raw material is sufficient for the production plan.

Rosemount 3D Solids Scanner systems, using multiple point surface mapping technology, overcome this problem by delivering accurate, reliable and continuous non-contact volume measurements. Moreover, 3D visualization allows early detection of the build-up in order to control it and allow timely maintenance.

Malted Grain Storage

Application: Malted grains (grist)/distiller's rice are stored in large silos prior to entering the beer brewing process.

Challenges: Malted grains / distiller's rice have a tendency to form build-ups and rat holes, and also create a great deal of dust during the filling process.

The Rosemount 3D Solids Scanner system can generate accurate volume measurement for process management and inventory control requirements under such difficult conditions, due to its unique dust-penetrating technology and 3D surface mapping capabilities. The 3D visualization tool provides a real-time 3D display showing the actual distribution of the silo contents, allowing early detection of wall build-up and rat holes as they occur. This permits scheduling of timely maintenance inside the silos and avoids unexpected process stoppages.

Malting Silo

Application: The seeds go through a chemical and malting process before being further processed.

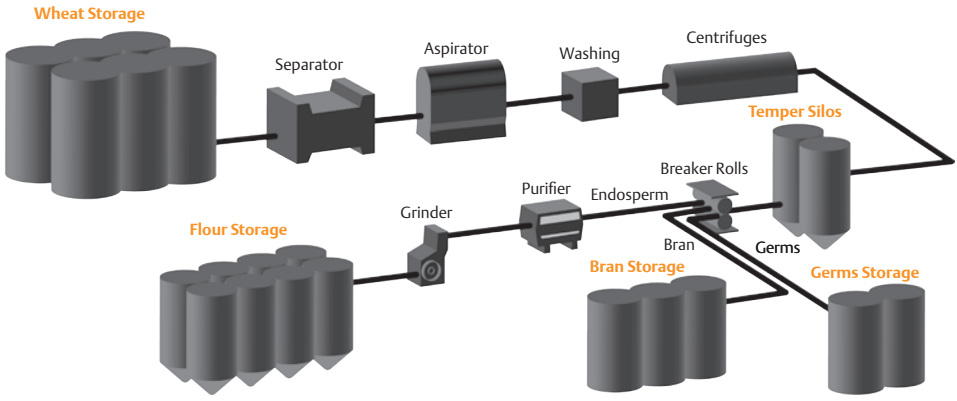
Challenges: The humid condition of the cooked grains together with the time the grains remain stored inside the malting silo promotes the formation of build-up on the silo walls. The additional dust generated during the process further complicates accurate measurement of the true volume of the inventory.

The Rosemount 3D Solids Scanner reliably delivers accurate volume measurements regardless of the harsh storage environment, and its 3D visualization tool generates a real-time 3D display of the malted grains' distribution inside the silo, allowing early detection of material build-up. This enables the end-user to schedule timely maintenance to avoid unexpected interruptions in the process and associated losses in time and money.

Flour Production

Industry Applications Series

Flour Production Diagram



Wheat Storage

Application: Wheat is classified by grade and each grade is stored separately in different silos.

Challenges: Wheat is stored in large silos, generating a great deal of dust during the filling operation. Different grades of wheat should not be mixed together, so continuous monitoring of the volumes of each grade of wheat remaining in each silo is required. The large sizes of the silos, normally with multiple emptying points, promote the creation of irregular formations and build-up inside the silo, making it difficult to measure inventory volume accurately.

The Rosemount 3D Solids Scanner provides unique dust-penetrating technology, delivering accurate and reliable real-time measurements of the volume of stored wheat even in harsh environments, and provides a real-time 3D image of grains distribution inside the silo. This permits early detection of build-up and rat holes, facilitating scheduling of maintenance and cleaning to avoid unexpected interruptions of the production process and associated losses in time and money.

Temper Silos

Application: Tempered wheat is stored in bins for a specific time, depending on the type of wheat: soft, medium or hard.

Challenges: The humid condition of the material, along with the time it lingers inside the vessel, creates build-up. The additional dust generated during the process makes the measuring of the actual content difficult.

Bran Storage

Application: Bran is a by-product of the wheat milling process used to enrich breads and breakfast cereals as well as producing whole wheat flour. Following milling, the bran is stored in silos before shipment to bakeries and other entities for further processing.

Challenges: Bran is an essential ingredient for the production of whole wheat flour and various processes in bakeries. Flour manufacturers need to accurately monitor the bran inventory to avoid unexpected interruptions to the flour production process or delivery schedules.

Germs Storage

Application: Wheat germ, like bran, is a by-product of wheat milling and serves as an additive to different types of baked goods. Following the milling process, it is stored in silos prior to being shipped.

Challenges: Wheat germ is sold and shipped in bulk, and flour manufacturers need to accurately monitor the volume of inventory remaining in the silo to ensure that packing and delivery schedules can be met without interruptions to the process.

Flour Storage

Application: Flour is stored in silos both for bulk shipping and bagging.

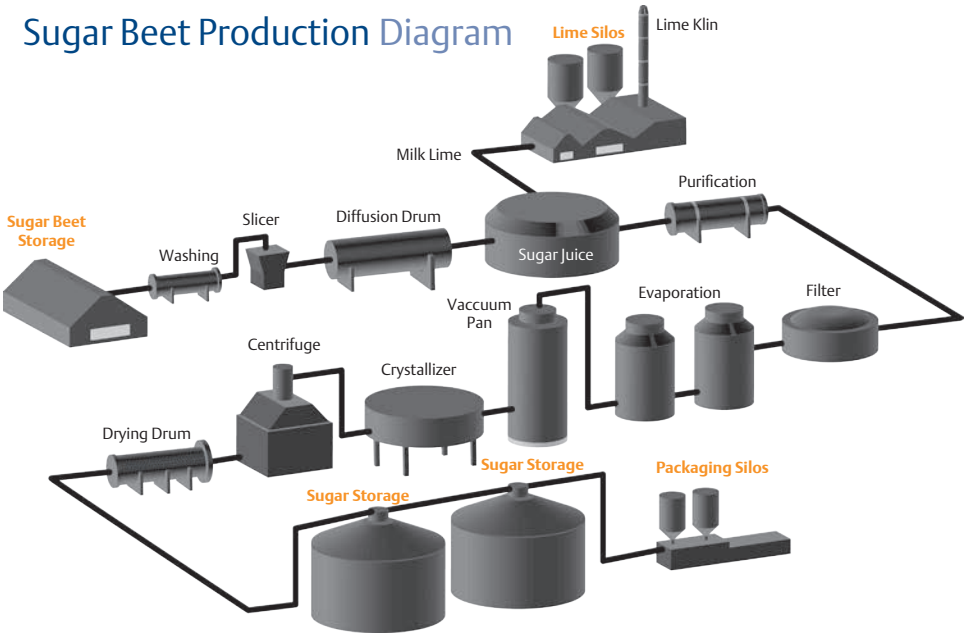
Challenges: In order to ensure efficient delivery from the production process, through the storage silos and to the bulk deliveries or bagging, accurate volume tracking of the flour remaining in the silos is crucial. Since flour generates a great deal of dust during both filling and emptying, and since it tends to form build-up on the silo walls, true estimates of the volume are hard to achieve.

The Rosemount 3D Solids Scanner delivers accurate and reliable real-time measurements of the volume of flour even in these challenging conditions. The 3D visualization tool allows the end-user to see the actual allocation of material inside the silos, including build-up. The combination of these features improves inventory management and control capabilities and permits the timely scheduling of maintenance and cleaning to avoid delivery schedule interruptions.

Sugar Beet Production

Industry Applications Series

Sugar Beet Production Diagram



Sugar Beet Storage

Application: Sugar beets are stored in warehouses prior to being transferred to processing.

Challenges: The material stored in the warehouse feeds the entire process. Accurate measurement to ensure continuous production and accurate inventory readings are the main challenges for the end user.

Rosemount products can offer solutions for all types and sizes of storage silos, bins and warehouses and can generate 3D mapping of the material surface for accurate volume output, and 3D images of stored content to better understand material allocation inside the warehouse.

Sugar Storage Silos

Application: After the wet sugar is dried, screened and cooled it is sent to large bulk storage silos/ domes, each of which can contain up to 50,000 tons. From the storage silos, the sugar is either delivered via trucks or transferred to a packaging silo to be packed in bags.

Challenges: Raw sugar is stored in very large silos or domed warehouses where it is widely distributed in order to use maximum capacity. The stickiness of the sugar leads to random formations of material build-up and rat holes inside the silo or dome. Both silo or dome size and the material properties make it extremely challenging for users to continuously assess sugar inventory levels.

The Rosemount 3D Solids Scanner has the ability to work in this harsh environment and profiles the surface of the material in order to accurately measure the amount of sugar inside the silo. The 3D visualization tool allows end-users to see the allocation of material inside the silos in real time, including build-up, facilitating timely maintenance and reducing risks of interruption to the production process.

Packaging Silos

Application: Sugar is delivered to the packaging silos where it is packed in bags and packages.

Challenges: Sugar and sugar dust tend to accumulate, creating build ups and rat holes, so understanding actual material content continuously becomes very difficult. The materials' sticky nature challenges level measuring systems which need to operate even if sugar sticks to the antenna.

The Rosemount 3D Solids Scanner is capable of working in this harsh environment. The 3D visualization tool provides a real time 3D display of the sugars distribution inside the silos, including build-up, facilitating timely maintenance and reducing interruptions risks to the delivery schedule and the associated losses of time and money.

Lime Silos

Application: Lime is stored in silos before being sent to the kiln and into the process.

Challenges: Continuous monitoring of lime inside the silo is challenging since lime generates heavy dust during the process, with a tendency to adhere to the silo walls, creating build-up and rat holes. Achieving accurate real-time volume measurements of the lime stored in the silos is critical for ensuring continuous production.

The Rosemount 3D Solids Scanner product line operates well in dusty and moist conditions, and also includes a 3D visualization tool to allow the end-user to detect build ups as they occur.

A guide to volume
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Energy Industry

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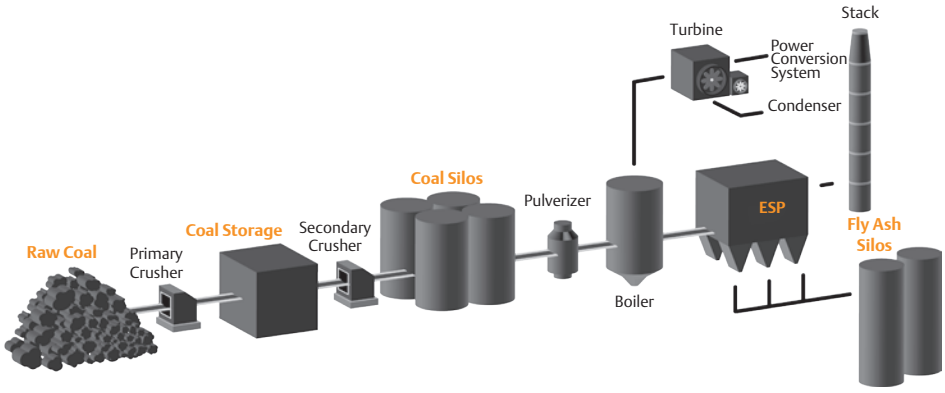
Coal Fired Power Plant

Industry Applications Series

Coal Fired Power Plant Diagram



Raw Coal

Application: Raw Coal Yard / Warehouse - Raw coal is delivered to a coal yard in aggregate pieces of approximately 15 cm (6”) that are later reduced in size by a crusher to approximately 4 cm (1.5”).

Challenge: The raw coal is stored in stock piles. A system of Rosemount 3D Solids Scanners can accurately measure coal in outside piles or warehouses despite the very wide surfaces. This information can then be integrated into ERP systems, greatly improving inventory management, control and reporting capabilities.

Coal Storage

Application: Coal Storage / Bunker / Coal Blending Facility - The coal goes through a moderate grinding process and then is stored in a coal bunker.

Challenges: Coal bunkers can contain thousands of tons of material. Their size and the dusty conditions make it difficult to accurately measure the amount of coal in the bunker or blending facility. There are also safety risks to personnel who enter the storage areas to “guesstimate” levels.

The Rosemount 3D Solids Scanner is self-cleaning and virtually maintenance-free. It accurately measures coal inventory even in dusty and harsh conditions. It also greatly reduces the time, costs and risks associated with sending maintenance personnel into such hazardous environments.

Coal Silos

Application: Coal Hoppers / Coal Day Vessels / Coal Silos - Coal is transported by conveyor and tripper cars to coal hoppers. These hoppers feed ball mills which in turn feed the pulverized coal to the boilers. There will be at least one hopper for each boiler. Typically there are two boilers per unit.

Challenges: Coal hoppers and silos storing pre-pulverized coal are large and very dusty. The silos hold several hours' supply of coal and can continue to supply coal to the boiler in the event of a problem in the coal handling system. As coal is critical for the continuous process, it is necessary to monitor and control the actual volume of coal in to prevent process stoppages.

The Rosemount 3D Solids Scanner’s sophisticated surface mapping technology delivers accurate real-time volume measurements of the coal, taking into account irregular build-up of material or other problems that may occur. The Scanner’s 3D visualization tool allows the user to see the actual allocation of material inside the bunker/silos, including build-up, avoiding costly interruptions to the process.

ESP Hoppers

Application: Fly ash is captured and removed from the flue gas by electrostatic precipitators or fabric bag filters located at the outlet of the furnace and before the induced draft fan. The fly ash is collected in hoppers below the precipitators or bag filters and periodically removed from them.

Challenges: ESP hoppers are continuously filled with hot fly ash. Along with the effects of humidity and high temperature, fly ash tends to stick to the sides of the hopper, causing build-up and clogging which may damage the ESP plates.

Users need to continuously monitor the volume and distribution of fly ash inside the hopper so that they can be emptied on time, maintained and cleaned when necessary. This is essential in order to prevent damage to the ESP plates. Damaged plates can also create environmental and health concerns.

The Rosemount 3D Solids Scanner provides continuous volume level measurement of fly ash inside an ESP hopper. The 3D visualization tool allows the user to see the actual allocation of material inside the hopper and detect build-up as it occurs, facilitating timely maintenance and avoiding interruptions to the process, and damage to the ESP plates.

At coal-fired power plants where Rosemount scanning technology is not used in ESP processes, the hopper emptying is disconnected from the filling. With no reliable way to measure the fly ash in the hopper,a timer is set to turn on the emptying process regardless of the amount of fly ash in the hopper, making the process inefficient. The Rosemount 3D Solids Scanner allows users to reliably coordinate and automate the filling and emptying process.

Fly Ash Silo

Application: The contents of the fly ash hopper are pneumatically conveyed to a fly ash storage silo. The silo is emptied on to trucks that then haul the material off for use in other applications.

Challenges: Fly ash derived from burning coal creates a very dusty environment and tends to stick, creating build-up inside the silo. Fly ash silos are typically very large to allow continuous flow from the hoppers. Density and dielectric constant of fly ash is low. Users need to continuously monitor the amount of fly ash inside the silo so that it can be emptied on time, and maintained and cleaned when necessary.

The Rosemount 3D Solids Scanner's unique dust-penetrating technology, sophisticated surface mapping approach and 3D visualization tool provide accurate measurements of the fly ash volume and a 3D display of the ash distribution inside the silo. The measurements take into account irregular formations, including build-up and rat holes that may form over time.

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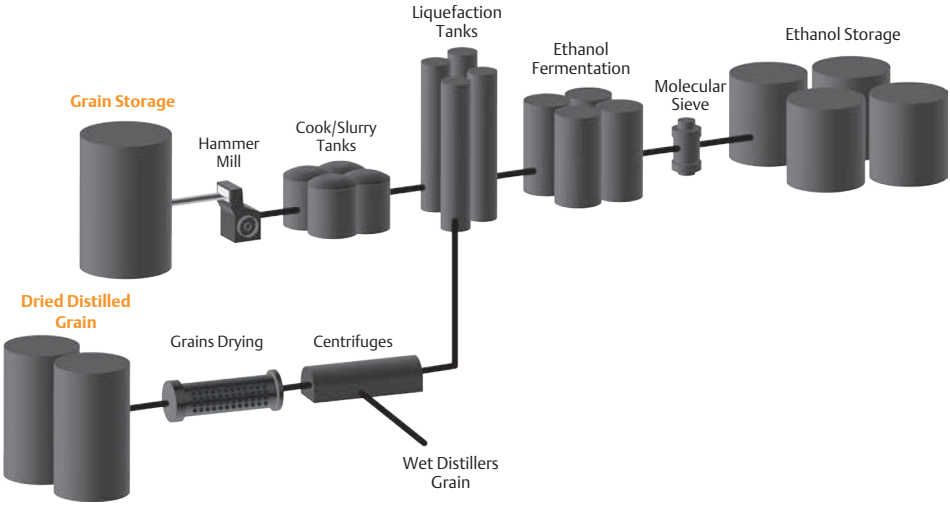
Ethanol Production

Industry Applications Series

Ethanol Production Diagram



Grain Storage

Application: Grain is delivered by truck or rail to the plant where it is analyzed, unloaded and pre-cleaned prior to loading into storage silos designed to supply the plant for 7-10 days.

Challenges: Grain storage silos are large in size and it is essential to know the silo contents in order to closely monitor inventory levels and ensure ongoing production process.

Accurate grain inventory measurements give plant managers an understanding of how much grain was used in the manufacturing process of the ethanol, allowing them to better calculate the cost of goods sold and the profitability of the plant. The size of the silos makes it problematic for conventional instrumentation to yield accurate volume measurements of the stored material.

The Rosemount 3D Solids Scanner system can accurately and reliably measure the volume of the stored grain, and also presents a real-time 3D profile showing how the material is distributed inside the silo.

Dried Distillers Grain

Application: Wet distiller grains are often sent through a drying system to remove moisture and extend shelf life. These dried distillers grains (DDGs) are commonly used as high-protein ingredients in cattle, swine, poultry and fish diets. The DDGs are removed from site by a conveyor to an adjacent dedicated storage silo/warehouse.

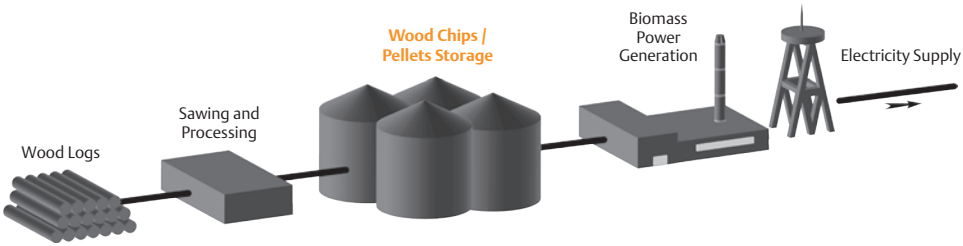
Challenges: The DDGs are stored in very large silos/warehouses/open bins. The material (containing about 10% fat and corn oil) is sticky and can settle in irregular shapes. This combination presents a real problem for end-users trying to assess the inventory levels.

The Rosemount Solids Scanner system solves this problem and can provide a highly accurate profile and volume reading in any type of silo/warehouse/open bin.

Wood Biomass Production

Industry Applications Series

Wood Biomass Production Diagram



Wood Chips/Wood Pellets

Application: these primary source materials are stored in very large silos or warehouses before entering the production process.

Challenges: Wood chips, wood pellets or sawdust is stored in very large silos or warehouses. It tends to stick together creating irregular settling of the material and often causes problems when emptied through nozzles along the silo bottom. The combination of large silos and irregular settling makes it difficult for operators to assess the true volume of the stored inventory.

The Rosemount 3D Solids Scanner provides very accurate and reliable profile and volume readings in any size type of silo or warehouse, regardless of irregular distribution of the silo contents.

A guide to volume
measurement solutions for the

Cement Industry

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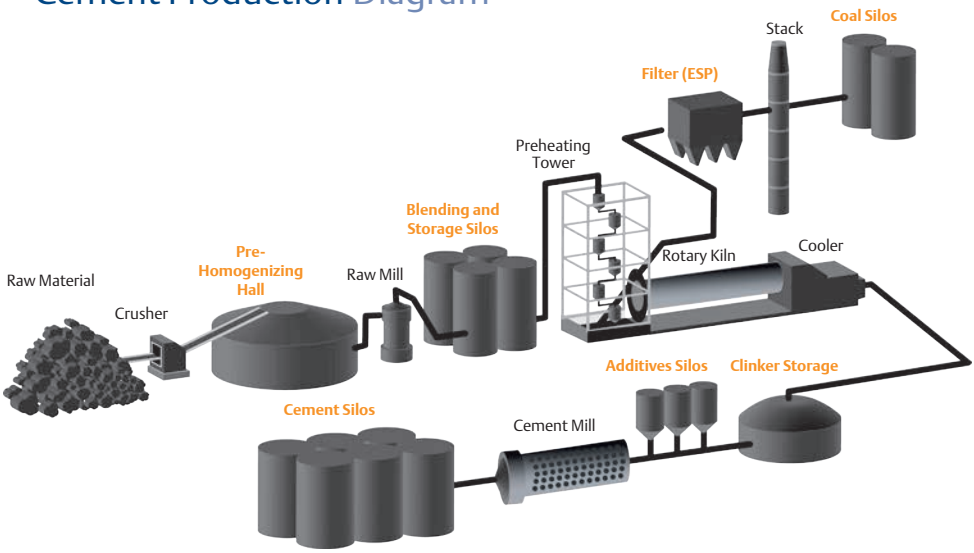
Cement Production

Industry Applications Series

Cement Production Diagram



Pre-homogenizing Hall

Application: The raw materials required to manufacture cement are limestone and clay. Rocks extracted from the quarry are routed to the nearby cement plant on a conveyor belt and are routed to a grinding plant where they undergo initial milling before being reduced to a fine powder. The raw materials (80% limestone and 20% clay) are then stored in the pre-homogenization pile. This mixture is called the raw mix.

Challenges: The raw materials are stored in very large silos/warehouses. The material is in piles, often settling in irregular shapes, making it difficult for users to assess true inventory levels.

A system of Rosemount 3D Solids Scanners, with its unique multi-point surface mapping capabilities, reliably and accurately measures the volume of the stored raw mix in any type of silo/warehouse/open bin. In addition, the 3D visualization tool allows operators to see the raw mix distribution inside the silos/warehouse/open bin in real time.

Blending and Storage Silos

Application: Homogenous mix of the material is stored in silos as part of the raw meal homogenization process.

Challenges: The raw materials are stored in large silos. The material settles in irregular shapes, making it difficult for operators to assess true inventory levels.

The Rosemount 3D Solids Scanner's multi-point surface mapping capabilities reliably and accurately measure the volume of the stored mix in the silos. In addition, the 3D visualization tool allows operators to see the mix distribution inside the silos in real time.

Coal Storage

Application: Coal is stored in silos which feed the coal to the kiln.

Challenges: The silos hold several hours supply of coal and can continue to supply coal to the kiln in the event of a downstream problem in the coal handling system, since the kiln would need to be shut down if the coal silo was completely empty.

Users require technology that will give them continuous and accurate readings of exactly how much material is in a given silo. The Rosemount 3D Solids Scanner multiple-point mapping technology provides accurate measurement even when the storage environment is extremely dusty and harsh.

Filter

Application: Fly ash is captured and removed from the flue gas by electrostatic precipitators (ESP) or fabric bag filters located at the outlet of the furnace and before the induced draft fan. The fly ash is collected in hoppers below the precipitators or bag filters and periodically removed.

Challenges: ESP hoppers are continuously filled with hot fly ash. The combined effect of humidity and temperature causes the fly ash to stick to the sides of the hopper. This can cause material build-up and clogging of the hopper which in turn can damage the ESP plates.

Continuously monitoring and understanding of the distribution of fly ash in the hoppers is very important. With accurate real-time information at hand, preventative action can be taken to empty the hoppers on time, and to clean and perform maintenance work if and when necessary. This is essential in order to prevent clogging and risks of damage to the ESP plates. Damaged plates can create environmental and health concerns as well.

The Rosemount 3D Solids Scanner provides continuous volume and level measurement of fly ash inside the ESP hopper. The 3D visualization tool allows the user to see the actual allocation of material inside the hopper and detect build-up as it occurs, facilitating maintenance scheduling to avoid unexpected and costly interruptions to the process, and damage to the ESP plates.
The device allows users to coordinate and automate the filling and emptying of the hoppers.

Cement Production

Industry Applications Series

Clinker Storage

Application: The raw mix is fed into a pre-heating tower and reaches 800 °C (1470 °F) before returning to the vertical rotary kiln where it is heated to a temperature of 1450 °C (2640 °F). Combustion causes a chemical reaction called de-carbonation which releases CO2 contained in the limestone.

The fired materials take the form of hard granules called clinker, which resembles pellets about the size of marbles. Following re-cooling, clinker is stored in silos, and then transformed into cement according to production requirements.

Challenges: Clinker silos usually have very large diameters and hold tens of thousands of tons of material. The material is very dusty and fed into the silo at relatively high temperature of approximately 100 °C (210 °F). The main problem is knowing the quantities of clinker stored in the silo at all times.

The Rosemount 3D Solids Scanner system can provide an accurate volume measurement in any sized clinker silo, allowing users to see how the material is distributed inside the silo and to accurately monitor inventory levels.

Additives Storage

Application: Limestone is combined with clay, ground in a crusher and fed into the additive silos. Sand, iron and bottom-ash are then mixed together with the limestone and clay in carefully controlled proportions and ground together with the clinker into a fine powder in a roller mill.

Challenges: Materials such as iron are expensive and the customer's main challenge is to carefully control the amount of additive that is added to the cement manufacturing process.

The Rosemount 3D Solids Scanner accurately measures the amount of additives in the silo during the mixing process, allowing operators greater control over the process, as well as the ability to calculate cost of goods sold with improved confidence. This leads to improved manufacturing efficiency.

Cement Storage

Application: Cement is stored in silos before being packaged into bags or delivered in bulk using tanker trucks.

Challenges: The finished cement is a fine powder-like material, creating a very dusty environment during the filling process, and is usually stored in large silos. Build-up occurs from time to time making inventory management and control even more challenging.

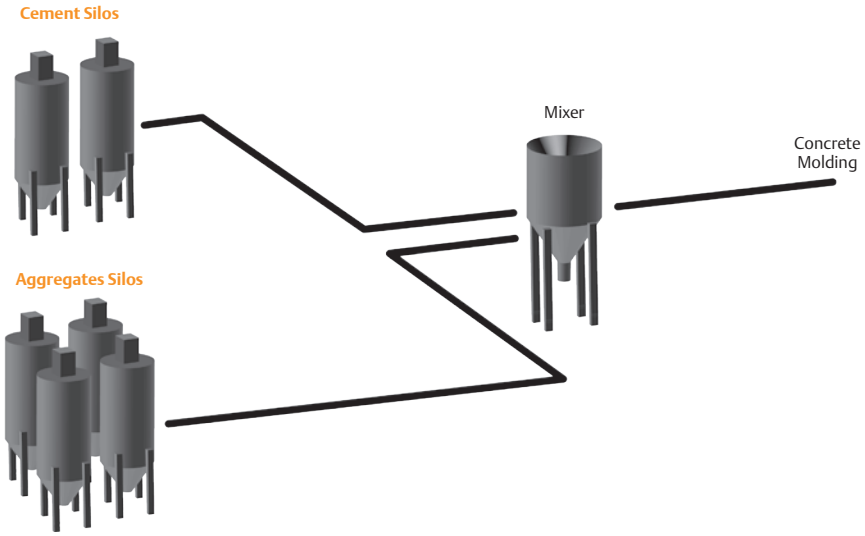
The Rosemount 3D Solids Scanner system provides accurate measures of the true volume of the stored cement, even in this extremely dusty and harsh storage environment. The system also presents a real-time 3D profile showing how the material is distributed inside the silo, allowing early detection of build-up for timely maintenance and prevention.

EMERSON.
Process Management

Concrete Production

Industry Applications Series

Concrete Production Diagram



Cement Silos

Application: Cement is stored in large silos before entering the mixing process.

Challenges: The process creates a very dusty environment inside the silo. Build-up and rat holes tend to occur, risking damage to the silo. Knowing the quantity of material is important to ensure continuous production process.

In addition to providing accurate, reliable measurements of the cement volume stored in the silo, the Rosemount 3D visualization tool allows users to see the actual distribution of cement inside the silo, allowing early detection of build-up on the silo walls. This facilitates timely scheduling of maintenance and cleaning to avoid unexpected interruptions of the concrete manufacturing process and associated losses in time and money.

Aggregates Silos

Application: Aggregates are stored in silos before entering the mixing process.

Challenges: Concrete is produced by a mixture of fixed amounts of raw materials coming from different silos, so it is essential to have sufficient quantities of all raw materials on hand to avoid unnecessary and unexpected production stoppages. Therefore knowing the accurate amounts of the different types of materials stored in each silo is crucial to control the overall production cycle.

The Rosemount 3D Solids Scanner provides accurate real-time measurements of the stored materials' volume per silo, significantly enhancing inventory management and control capabilities.

A guide to volume
measurement solutions for the

Plastics Industry

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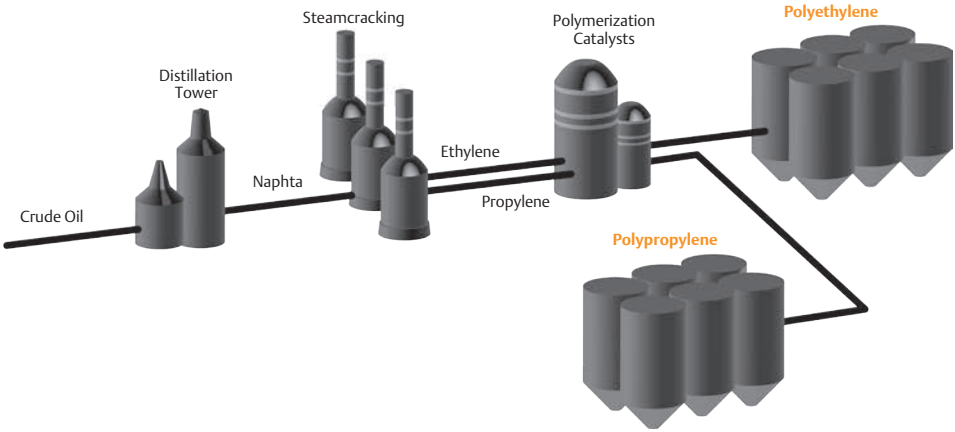
Process Management

Polypropylene / Polyethylene Production

Industry Applications Series

Plastic Production Diagram



PP/PE Storage Silos

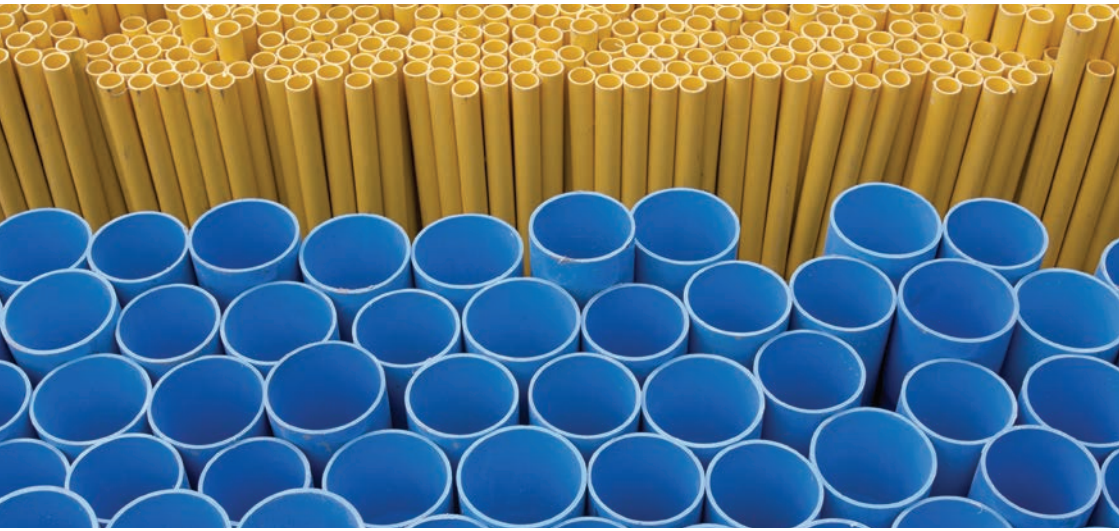
Application: The final granular product is stored in silos before being shipped to plastic product manufacturing plants or packed in bags.

Challenges: PP and PE pellets have a low dielectric constant which adversely affects the ability of radar-based devices to reliably measure the amount of stored PP and PE pellets remaining in the silo at any given time. Further barriers to obtaining accurate measures of the stored inventory are caused by the dust generated in the filling process, electrostatic charge (especially problematic for GWR) and occasional moisture, which combine to create build-up and measurement issues on wetted parts.

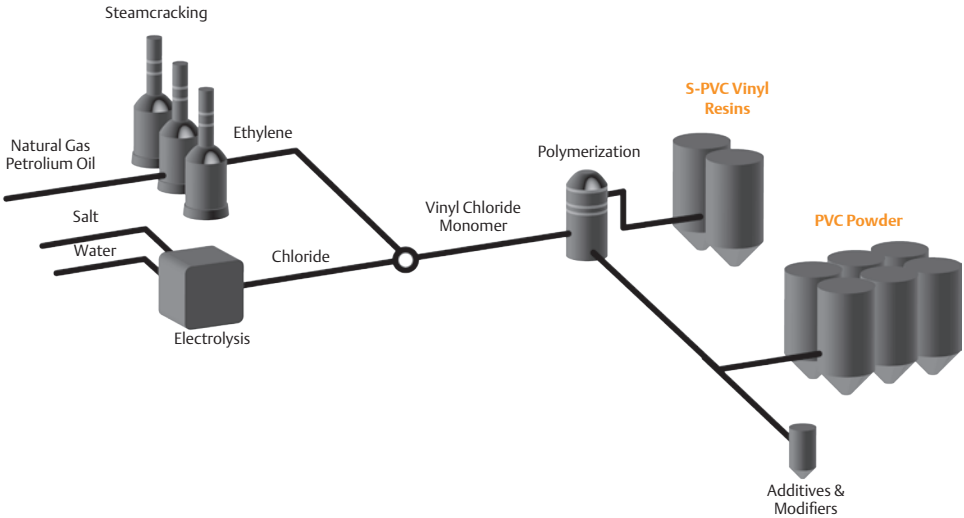
The Rosemount 3D Solids Scanner unique dust-penetrating technology delivers accurate and reliable measures of the PP / PE pellets in the silos, even in harsh conditions, and its self-cleaning mechanism allows it to operate continuously and virtually maintenance-free. PP / PE prices are rising, so it is even more important for users to accurately assess the amount of inventory in the silos.

PVC Production

Industry Applications Series



PVC Production Diagram



S-PVC Vinyl Resins

Application: S-PVC is stored in storage silos prior to being delivered or packed.

Challenges: S-PVC in a PVC production facility is an end product. Operators seek to closely monitor the inventory levels, but the great amount of dust generated during the filling process complicates the task. The relatively low dielectric constant makes measuring the true volume of the stored S-PVC very challenging for any non-contacting radar technology.

The Rosemount 3D Solids Scanner systems, using multiple point-surface mapping technology, overcomes this problem and delivers accurate, reliable and continuous non-contact volume measurements even in dusty conditions.

PVC Powder

Application: PVC powder is stored in silos prior to being delivered or packed. The silos can be very large in size containing thousands of tons per silo.

Challenges: PVC powder is the end product in a PVC production facility. Operators seek to closely monitor the inventory levels, but the great amount of dust generated during the filling process complicates the task. The relatively low dielectric constant makes measuring the true volume of the stored PVC powder very challenging for any radar technology.

The Rosemount 3D Solids Scanner systems, using multiple point-surface mapping technology, overcomes this problem and delivers accurate, reliable and continuous non-contact volume measurements even in dusty conditions.

A guide to volume
measurement solutions for the

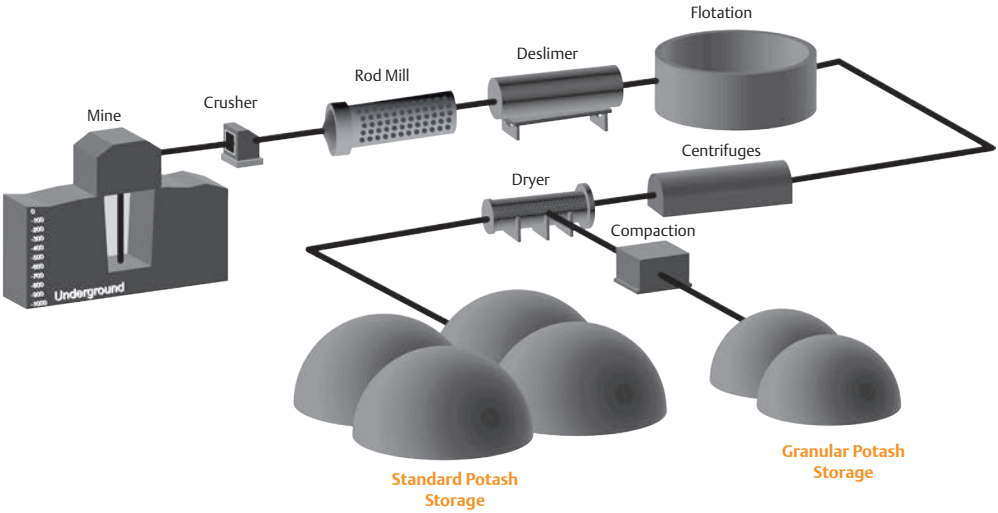
Mining Industry

EMERSON.
Process Management

Potash Production

Industry Applications Series

Potash Production Diagram



Granular Potash

Application: The finished granular potash product is transferred to onsite warehouses/large silos. Different grades of potash are stored separately.

Challenges: The granular potash is stored in large domes that can reach 50m (165 ft) in diameter making accurate volume measurement of the dome's contents very difficult, impacting on inventory management and control capabilities.

The Rosemount 3D Solids Scanner system provides accurate real-time volume measurement with 3D visualization of the actual distribution of the material stored inside the dome, solving these issues.

Standard Potash

Application: Standard-grade potash is transferred to onsite warehouses/large silos/domes. Different grades of potash are stored separately.

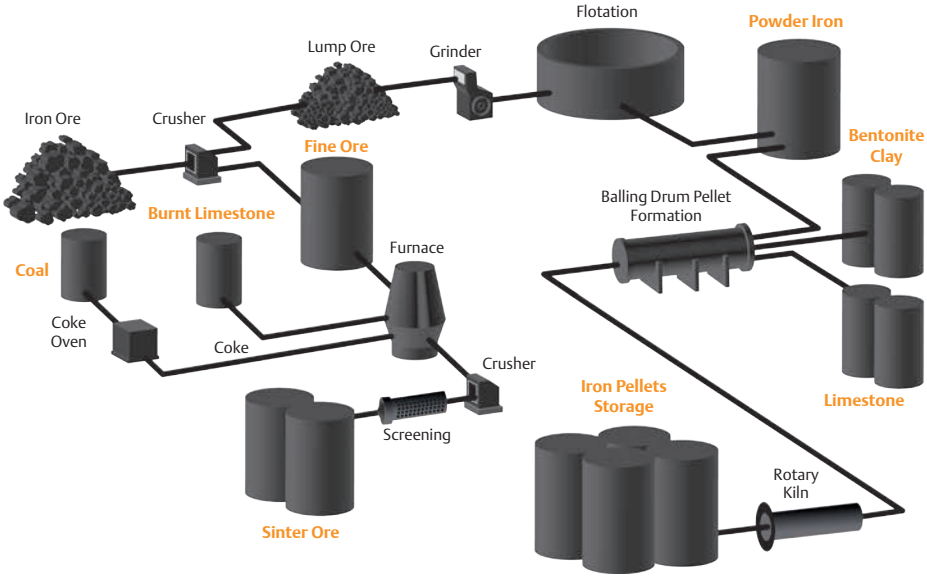
Challenges: Standard-grade potash is stored in large domes that can reach 50m (165 ft) in diameter, making accurate volume measurement of the dome's contents very difficult and impacting on the end-user's inventory management and control capabilities.

The Rosemount 3D Solids Scanner system provides accurate real-time volume measurement with 3D visualization of the actual distribution of the potash stored inside the dome, solving these issues.

Iron Ore Processing

Industry Applications Series

Iron Ore Processing Diagram



Fine Ore Storage

Application: Fine ore is stored in silos before being processed.

Challenges: The silos hold a supply of fine ore that can be continuously supplied to a furnace in the event of a problem downstream in the ore handling system. If the fine ore silos feeding a furnace are completely empty, the furnace must be shut down. End-users, therefore, require the best technology to ensure continuous and accurate measurements of the material stored in a given silo, to ensure smooth production.

The Rosemount 3D Solids Scanner provides reliable, accurate real-time measurements of the volume of fine ore stored in the silos, significantly improving inventory management and control capabilities.

Burnt Limestone Storage

Application: The burnt limestone is stored in silos before being processed.

Challenges: Burnt limestone generates dust during the filling process and tends to stick to the silo walls, creating rat holes and build-up. As it is a critical material for the process, users need to control and monitor the actual volume in the silo in order to prevent process stoppage.

The Rosemount 3D Solids Scanner's sophisticated multi-point surface mapping technology meets the challenges by providing actual real-time volume measurements of the stored material and in addition, its 3D visualization tool lets end-users see how the burnt limestone is actually distributed inside the silo, allowing early detection of build-up. This facilitates scheduling of timely maintenance and cleaning to avoid unexpected interruptions of the process and associated losses in time and money.

Coal Storage

Application: Coal is stored in silos that feed the coke oven which feeds the coke to the furnace. There will be at least one silo for each furnace.

Challenges: If the coal silos are completely empty, the furnace would need to be shut down. As coal is critical for the process, end-users need to control and monitor the actual volume in the silo, to prevent process stoppage.

The Rosemount 3D Solids Scanner's sophisticated surface mapping technology meets the challenges by providing actual real-time volume measurements of the coal remaining in all silos feeding the furnace.

Sinter Ore Storage

Application: Sinter ore is stored in silos prior to being transferred / shipped.

Challenges: Sinter ore creates a very dusty environment during the filling process and tends to stick to the silo walls, forming build-up inside the silo. Sinter ore storage silos are typically very large. The combination of large silos and harsh storage environment makes it difficult for the user to continuously monitor inventory levels.

The Rosemount 3D Solids Scanner's unique dust penetrating technology overcomes the challenges and delivers accurate and reliable real-time measurements of the volume of sinter ore in the silos.

Powder Iron Storage

Application: Iron powder is stored in a silo before it is mixed with bentonite clay/dolomite and limestone in the balling drum.

Challenges: Iron powder generates heavy dust during the filling process and tends to stick to the silo walls, creating rat holes and build-ups. As it is a critical material for the process, the users seek to control and monitor the actual volume in the silo, to prevent process stoppages.

The Rosemount 3D Solids Scanner's sophisticated surface mapping technology answers these needs by providing real-time volume measurements of the stored material. Its 3D visualization tool generates a 3D display of the stored content to allow early detection of build-ups and rat holes. This supports scheduling of timely maintenance and cleaning to avoid unexpected process interruptions and the associated losses in time and money.

Bentonite Clay Storage

Application: Bentonite clay is stored in silos before processing.

Challenges: Bentonite generates a great deal of dust during the filling process and tends to stick to the walls of the silo, creating irregular build-up and rat holing. Because bentonite is an essential raw material for the production process, it is important to quantify the amount of inventory available in the silo to ensure continuous production.

The Rosemount 3D Solids Scanner's sophisticated mapping technology delivers real-time volume measurements of the stored material to allow real time inventory tracking. The 3D visualization tool generates a 3D display of the stored content, enabling early detection of build-up.

Limestone Storage

Application: Limestone is stored in silos before processing.

Challenges: Limestone generates a great deal of dust during the filling process and tends to stick to the walls of the silo, creating irregular build-up and rat holing. Because limestone is essential to the production process, it is important to quantify the amount of raw material available in the silo to ensure continuous production.

The Rosemount 3D Solids Scanner's sophisticated mapping technology delivers real-time volume measurements of the stored material to allow real time inventory tracking. The 3D visualization tool generates a 3D display of the stored content, enabling early detection of build-up. This facilitates scheduling of timely maintenance and cleaning to avoid unexpected process interruptions and the associated losses in time and money.

Iron Pellets Storage

Application: Iron pellets (the final product) are stored in silos before being transferred / shipped.

Challenges: Iron pellets are usually stored in wide silos. A typical iron ore processing site will have multiple silos for the pellets. It is very difficult for operators to closely monitor overall inventory levels across all silos in the field, in order to ensure sufficient supplies for efficient delivery schedules of the final product.

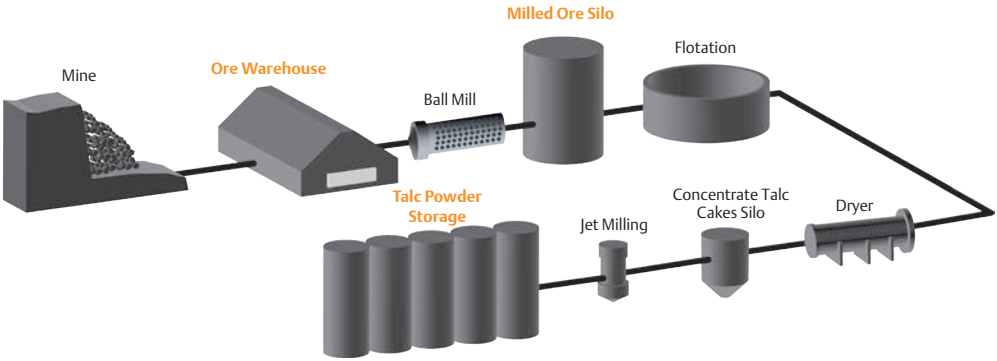
The Rosemount 3D Solids Scanner delivers accurate real-time volume measurements of the iron pellets stored in any sized silo, and for all silos in a given field or even for silos located in multiple fields at remote sites. In addition, the 3D visualization tool provides a 3D display of the stored pellets to allow early detection of problems with filling or emptying the silos. This facilitates scheduling of timely maintenance to avoid unexpected interruptions of the process and associated losses in time and money.

EMERSON.
Process Management

Talc Production

Industry Applications Series

Talc Production Diagram



Ore Warehouse

Application: Talc ore is delivered from the mine to a warehouse at the start of the milling process.

Challenges: Talc ore is stored in piles in large warehouses. End-users need to accurately measure the inventory level on a daily basis.

The Rosemount 3D Solids Scanner system delivers accurate real-time volume measurements of the talc ore inventory, regardless of warehouse size or the irregular surface of piles of material. The system also provides a 3D display showing how the talc ore is distributed inside the silo, helping operators to improve management and control over inventories and related costs.

Milled Ore Silo

Application: Concentrate slurry is dried under pressure and stored before being further processed into powder.

Challenges: Concentrate slurry, an intermediate product, is stored in silos where it tends to stick to the silo walls, often creating build-up which is difficult to measure. This impedes the ability to manage and control inventory in order to ensure continuous production upstream.

The Rosemount 3D Solids Scanner delivers both accurate real-time volume measurement of the stored concentrate slurry and a 3D image of how the material is actually distributed inside the silo. This allows early detection of build-up in order to schedule timely maintenance and cleaning activities to avoid unexpected interruptions of the process and associated losses in time and money.

Talc Powder Storage

Application: The final fine talc powder is stored in silos until it is packed or shipped in bulk.

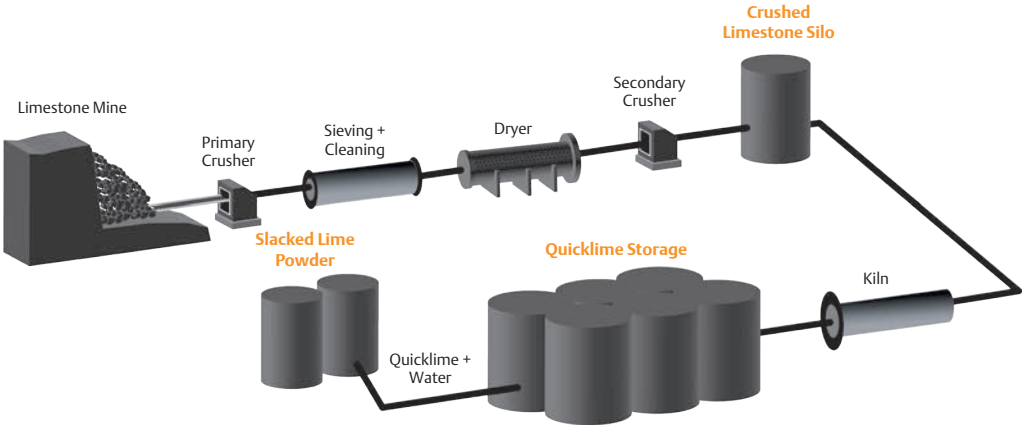
Challenges: Talc powder generates a great deal of dust during the filling and emptying processes, leading to harsh dusty conditions in the silo. The user needs to accurately measure the quantity of talc powder stored in order to meet delivery schedules and to satisfy the plant's inventory reporting requirements that are fed into its ERP system.

The Rosemount 3D Solids Scanner's unique dust-penetrating technology delivers accurate and reliable real-time measurements of the talc powder's volume, even under harsh conditions, giving end-users improved inventory management and control capabilities.

Lime Production

Industry Applications Series

Lime Production Diagram



Crushed Limestone Silo

Application: After mining, the limestone is crushed and then stored in silos before entering the kiln.

Challenges: Lime generates a great deal of dust during the filling and emptying process. The material tends to become sticky and creates build-up on the silo walls. Since it is an essential raw material, operators need to continuously monitor inventory levels to ensure an ongoing supply to the limestone production process.

The Rosemount 3D Solids Scanner system generates accurate volume measurements even in such harsh environments due to its unique dust-penetrating technology and 3D surface mapping capabilities. Its 3D visualization tool provides a real-time 3D display showing the actual distribution of the silo contents, allowing early detection of build-ups as they occur. This permits scheduling of timely maintenance inside the silos to avoid unexpected process stoppages and the associated losses in time and money.

Quicklime Storage

Application: The quicklime, both in powder and granular form, is stored in silos before being shipped for various applications.

Challenges: Both quicklime powder and quicklime granules generate a great deal of dust during the filling and emptying process and tend to become sticky, creating rat holes and build-up. Operators need to monitor and control the actual volume of the material remaining in the silo in order to prevent disruptions of delivery schedules or the production process.

The Rosemount 3D Solids Scanner's sophisticated surface mapping technology delivers accurate real-time volume measurements of the quicklime inventory, taking into account irregular build-up of material even under such harsh conditions. The 3D visualization tool displays the actual allocation of material inside the storage bin, allowing early detection as they occur, facilitating the scheduling of timely maintenance to avoid unexpected and costly interruptions to the process.

Slacked Lime Powder

Application: Slacked lime is stored in silos prior to being packed and shipped.

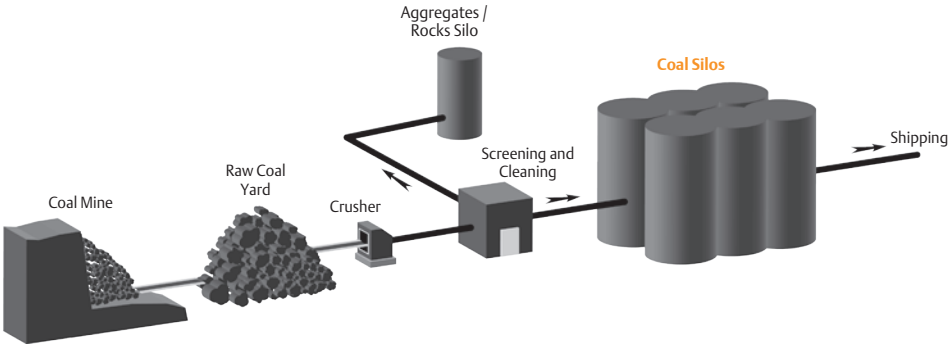
Challenges: Slacked lime is a very fine powder that generates a great deal of dust during filling and emptying. It also tends to become sticky, creating rat holes and build-up. Operators need to monitor and control the actual volume of the slacked lime remaining in the silo in order to prevent disruptions of delivery schedules or the production process.

The Rosemount 3D Solids Scanner's sophisticated surface mapping technology delivers accurate real-time volume measurements of the slacked lime inventory, taking into account irregular build-up of material even under such harsh conditions. The 3D visualization tool displays the actual allocation of material inside the silo, including build-up, allowing early detection of build-up as it occurs, facilitating maintenance scheduling and avoiding interruptions to the process.

Coal Processing

Industry Applications Series

Coal Processing Diagram



Coal Silo

Application: Following a screening and grinding process, coal is typically delivered to large storage silos via rail or conveyor belt.

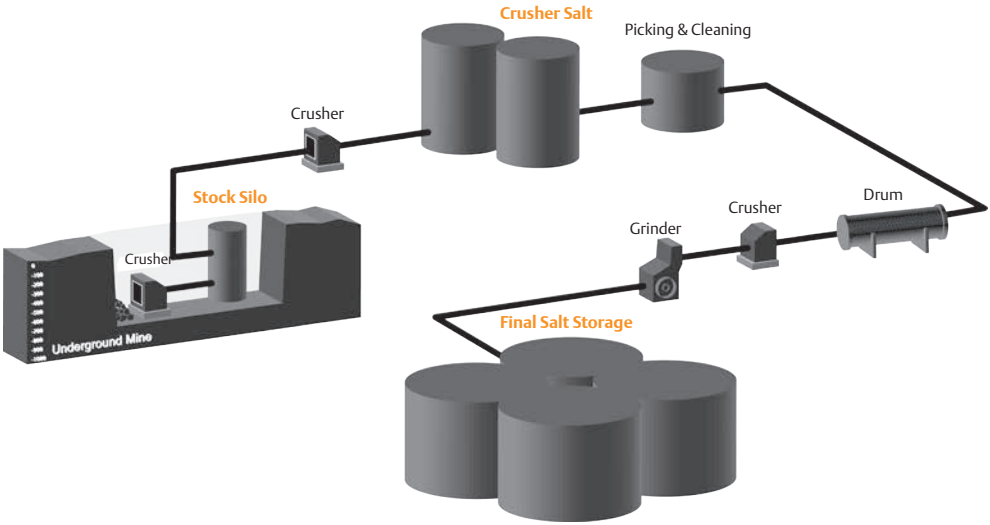
Challenges: The coal silos are large in size, containing thousands of tons of material. If the user wishes to know the real time inventory of raw coal and have it connected to the ERP systems in addition to being able to make room for raw coal coming into the silos, and getting shipments ready, then an accurate measuring system is required.

The Rosemount 3D Solids Scanner systems are the only systems that can accurately measure the coal in such big silos, by using the unique surface mapping technology.

Salt Production

Industry Applications Series

Salt Production Diagram



Stock Silo

Application: Primary crushed salt rocks are further crushed in an underground mine prior to being processed and stored in large underground silos.

Challenges: The primary crushed rock storage silo is the initial stage in the production of salt, feeding a secondary crusher, and therefore needs to be monitored to provide consistent production supply. Since the silo is underground, it is usually created by controlled explosions and the walls are not smooth, making accurate volume measurement of the stored salt rocks inside very difficult. Early detection of build-up that forms inside the silo is important to the user to allow timely maintenance and to reduce risk of material collapse to the bottom of the silo, which could cause damage to the silo, the crusher and other mechanical parts.

The Rosemount 3D Solids Scanner's sophisticated mapping technology overcomes these challenges and provides actual real-time volume measurements of the stored material for these complex silos and, in addition, displays a 3D image of the stored content to allow early detection of build-up.

Crushed Salt

Application: Smaller-sized secondary crushed salt rocks (approximately 2 cm (1 in.) diameter) from the secondary crusher are stored in production silos, allowing better control of the process.

Challenges: The secondary crushed rock storage silo is located outside the mine and feeds the finished material production process; therefore it needs to be monitored to allow a smooth production cycle. Early detection of build-up that forms inside the silo is important to allow timely maintenance that will reduce risk of damage to the silo and unexpected interruptions to production.

The Rosemount 3D Solids Scanner's sophisticated mapping technology answers all these needs by providing actual, real-time volume measurements of the stored material and, in addition, displays a 3D image of the stored content to allow early detection of build-up.

Final Salt Storage

Application: Ground salt is stored in large silos for shipment to consumers from various industries.

Challenges: The salt storage silos are wide (often exceeding 25m (80 ft) diameter) and the user faces constant difficulties trying to closely monitor the salt's inventory levels. Understanding the accurate volume of salt stored in each silo allows production optimization.

The Rosemount 3D Solids Scanner system provides accurate, real-time volume measurements for any size of silo, contributing to improved management and control over inventories and related costs.

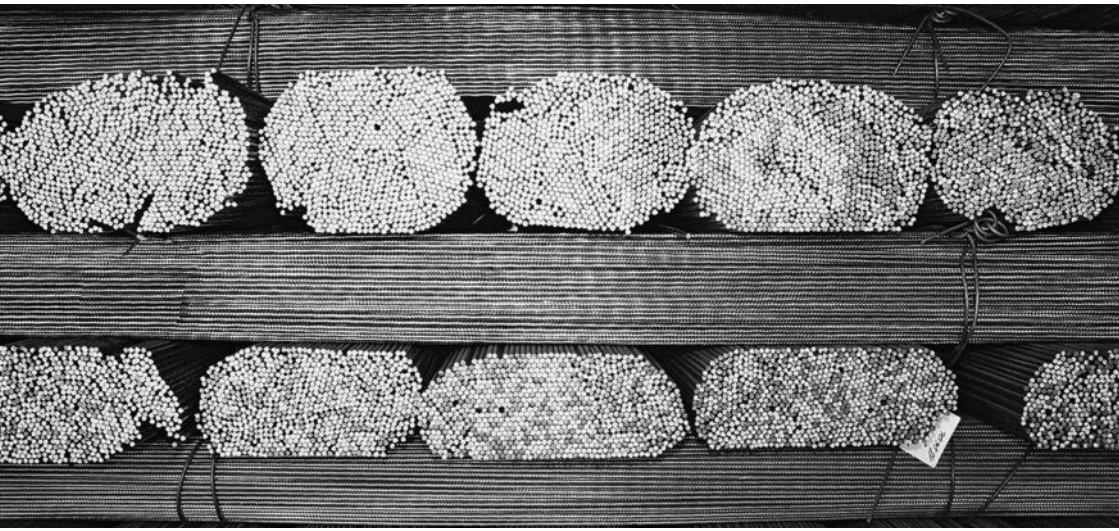
A guide to volume measurement solutions for the

Metal Industry

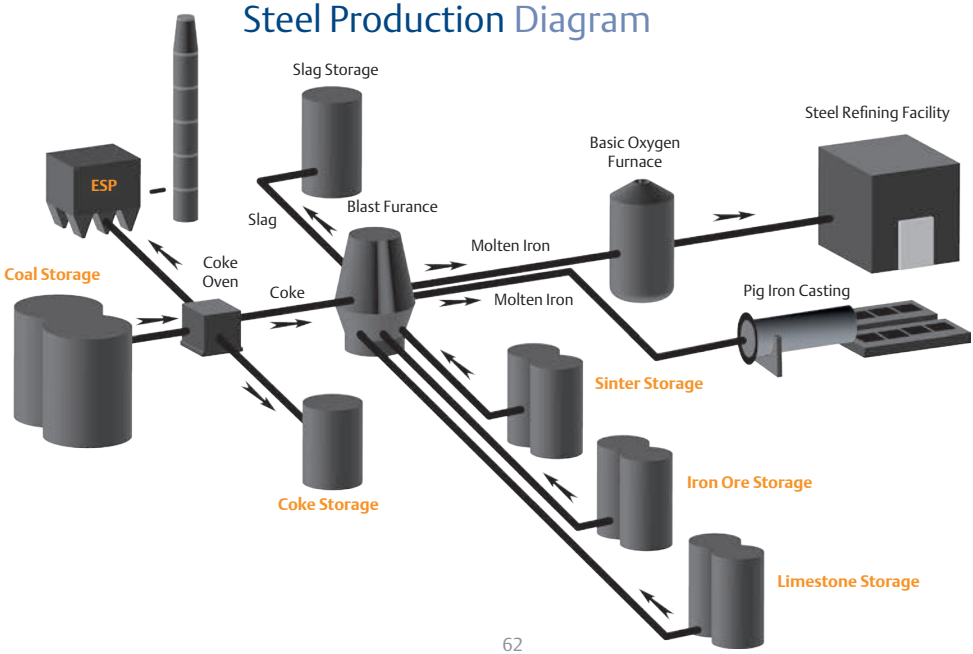
EMERSON
Process Management

Steel Production

Industry Applications Series



Steel Production Diagram



Coal Storage

Application: Coal is stored in silos that feed the coke oven, which feeds the coke to the furnace. There will be at least one silo for each furnace.

Challenges: If the coal silo were completely empty, the furnace would need to be shut down. As coal is critical for the process, it is vital to control and monitor the actual volume of coal in the silo in order to prevent process stoppages.

The Rosemount 3D Solids Scanner's sophisticated surface mapping technology delivers real-time volume measurements of the coal remaining in all silos.

ESP

Application: Fly ash is captured and removed from the flue gas by electrostatic precipitators or fabric bag filters located at the outlet of the furnace and before the induced draft fan. The fly ash is collected in hoppers below the precipitators or bag filters and periodically removed from them.

Challenges: ESP hoppers are continuously filled with hot fly ash. Along with the effects of humidity and high temperature, fly ash tends to stick to the sides of the hopper which can cause material build-up and clogging of the hopper which can damage the ESP plates.

It is necessary to continuously monitor the volume of fly ash and its actual distribution inside the hopper so that they can be emptied on time, maintained and cleaned when necessary. This is essential in order to prevent clogging-up and risk of damage to the ESP plates. Damaged plates can also create environmental and health concerns.

The 3D Solids Scanner provides continuous volume level measurement of fly ash inside an ESP hopper. The 3D visualization tool allows the end-user to see the actual allocation of material inside the hopper and detect build-up as it occurs, facilitating the scheduling of timely maintenance to avoid unexpected and costly interruptions of the process, and damage to the ESP plates.

At coal-fired plants where Rosemount scanning technology is not used in ESP processes, the emptying of the hopper is disconnected from the filling. There is no reliable way to measure the amount of fly ash in the hopper so a timer is set to turn on emptying, regardless of the amount of fly ash remaining in the hopper. This makes the whole process very inefficient, and causes, for example, the air compressors to work unnecessarily.

The Rosemount 3D Solids Scanner allows users to reliably coordinate and automate the filling and emptying of these hoppers.

Coke Storage

Application: The coke is stored in silos before being sent onward for additional processing.

Challenges: The coke material generates dust during the filling and emptying processes, is stored under harsh dusty conditions, and tends to adhere to the silo walls, creating build-up and rat holes. These significantly challenge the user's ability to accurately measure inventories, which is especially important because coke is essential to the steel production process.

The Rosemount 3D Solids Scanner's unique dust-penetrating technology delivers accurate and reliable real-time measurements of the volume of stored coke even in these harsh environments, and also provides a 3D image of how the coke is distributed inside the silo. This permits early detection of build-up and rat holes, facilitating the scheduling of timely maintenance and cleaning to avoid unexpected interruptions to the process and losses in time and money.

Limestone Storage

Application: Limestone is stored in silos before entering the production process.

Challenges: The limestone material generates dust during the filling and emptying processes, is stored under harsh dusty conditions, and tends to adhere to the silo walls creating build-up and rat holes. These significantly challenge the user's ability to accurately measure inventories, which is important because the limestone is essential to the steel production process.

The Rosemount 3D Solids Scanner's unique dust-penetrating technology delivers accurate and reliable real-time measurements of the volume of stored coke even in these harsh environments, and in addition provides a 3D image of how the limestone is distributed inside the silo. This permits early detection of build-up and rat holes, facilitating the scheduling of timely maintenance and cleaning to avoid unexpected interruptions of the process and associated losses in time and money.

Sinter Ore Storage

Application: Sinter ore is stored in silos before entering the production process.

Challenges: Sinter ore creates a very dusty environment during the filling process and tends to stick and form build-up along the silo walls. Sinter ore storage silos are typically very large. The large size of the silos and the harsh storage environment make it difficult for the end-user to continuously monitor inventory levels.

The Rosemount 3D Solids Scanner's unique dust- penetrating technology delivers accurate and reliable real-time measurements of the volume of sinter ore in the silos, taking into account any build-up, even under these harsh conditions. The 3D visualization tool generates a real-time 3D display showing how the sinter ore is distributed inside the silo, allowing early detection of build-up as it occurs. This avoids unexpected and costly interruptions to the process, and improves the end-user's inventory management and control capabilities.

Iron Ore Storage

Application: Iron ore is stored in silos before being sent onwards in the production process.

Challenges: The silos hold a supply of iron ore that can be continuously supplied to the furnace. If the iron ore silo is completely empty, a furnace shut down would be required.

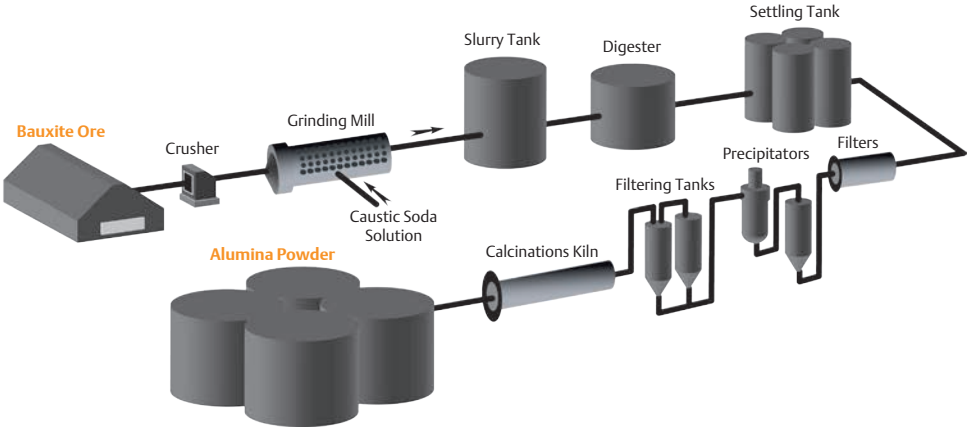
The Rosemount 3D Solids Scanner's unique dust- penetrating technology delivers accurate and reliable real-time measurements of the volume of ore in the silos, taking into account any build-up, even under these harsh conditions. This allows scheduling of timely maintenance and cleaning to avoid unexpected interruptions to the process and associated losses in time and money.

EMERSON.
Process Management

Alumina Production

Industry Applications Series

Alumina Production Diagram



Bauxite Ore

Application: Bauxite ore is delivered from the mine to a warehouse at the start of the process.

Challenges: Bauxite ore is stored in large warehouses where its volume is difficult to measure. The Rosemount 3D Solids Scanner system offers the only solution for measuring the true volume of materials stored in such large warehouses.

Alumina Powder Storage

Application: The final product, powdered alumina, is stored in big silos prior to shipment.

Challenges: The alumina powder is stored in silos that reach 30m (100 ft) in diameter and 60m (200ft) in height. In addition to to the size and quantity of material stored, these silos have multiple filling and emptying points, making it difficult to monitor the silo's inventory level and volume.

Rosemount 3D Solids Scanner systems offer accurate real-time volume measurement with 3D visualization of the silo content, to allow improved inventory management of the finished goods and visualization of build-up that may occur inside the silo from time to time. This is important for scheduling maintenance and cleaning when necessary, in order to avoid costly interruptions in the filling and emptying processes.

A guide to volume measurement solutions for the

Chemical Industry

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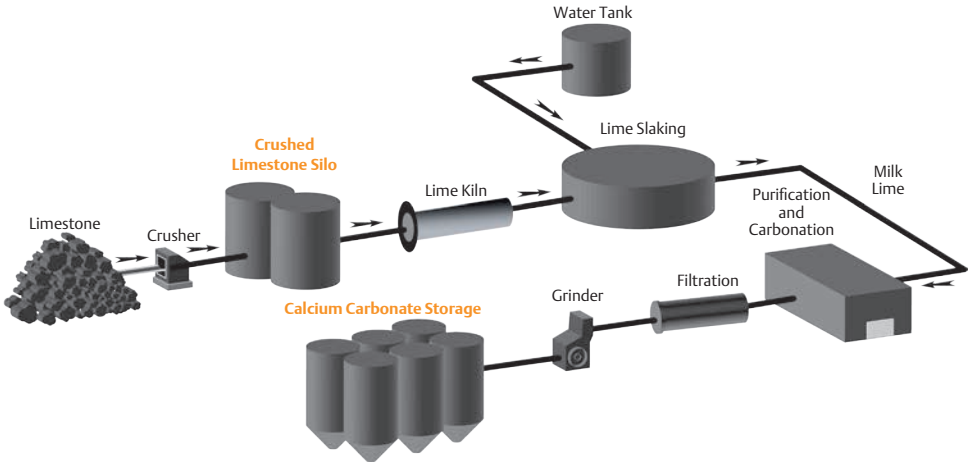
Process Management

Calcium Carbonate Production

Industry Applications Series

Calcium Carbonate Production Diagram



Calcium Carbonate Storage

Application: The final product, calcium carbonate, is stored in silos before being shipped in bulk or packed.

Challenges: Calcium carbonate is a very fine, powder-like material that creates a great deal of dust during the filling process, and also tends to stick to the walls of the silo as well as to the measurement devices.

The sticky nature of the product creates build-up on the silo walls, making it difficult to continuously monitor and accurately measure the volume of the stored inventory. This in turn creates obstacles to efficient maintenance and impedes the ability to effectively manage and control inventories so that the process itself is not interrupted or stopped unexpectedly.

Rosemount 3D surface-mapping technology allows accurate volume measurement, taking into account build-up on the silo walls. The 3D visualization tool provides a real-time 3D display showing the actual distribution of the calcium carbonate inside the silo, allowing early detection of build-up as it occurs.

Crushed Limestone Silo

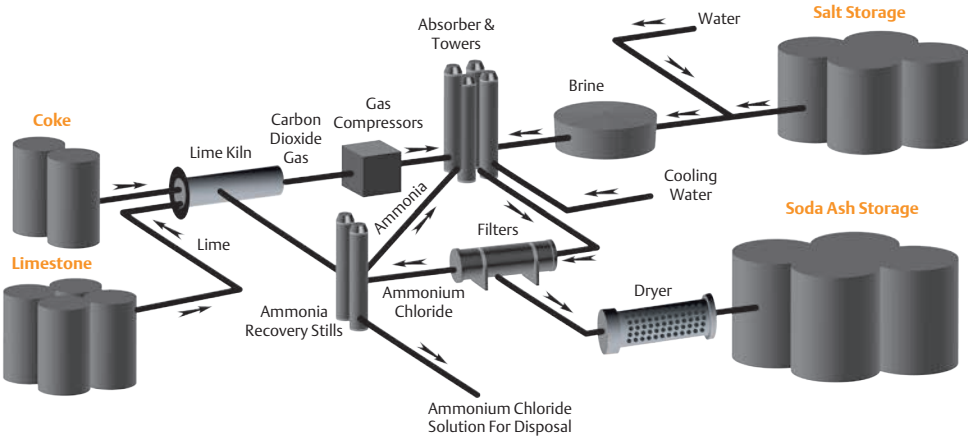
Application: Crushed limestone is stored in silos before entering the production process.

Challenges: Limestone generates a great deal of dust during the filling process and tends to stick to the walls of the silo, creating irregular build-up and rat holes. Because limestone is essential for the steel production process, it is important to quantify the amount of raw material available in the silo to ensure continuous production. The Rosemount 3D Solids Scanner's sophisticated surface mapping technology and dust-penetrating capabilities delivers real-time volume measurements of the stored limestone and generates a 3D display of the silo contents to allow early detection of build-up. This allows scheduling of timely maintenance and cleaning to avoid unexpected interruptions to the process and associated losses in time and money.

Soda Ash Production

Industry Applications Series

Soda Ash Production Diagram



Coke Storage

Application: The coke is stored in silos before processing.

Challenges: The coke material generates a great deal of dust during the filling and emptying processes, leading to harsh dusty conditions in the silo. The coke also tends to adhere to the silo walls creating build-up and rat holes. These attributes significantly challenge the ability to accurately measure inventories. This is important since coke is essential to the soda ash production process.

The Rosemount 3D Solids Scanner's unique dust-penetrating technology delivers accurate and reliable real-time measurements of stored coke volume even in harsh environments. The Scanner also provides a 3D image of how the coke is distributed inside the silo, supporting early detection of build-up and rat holes. This facilitates the scheduling of maintenance and cleaning in order to avoid unexpected interruptions to the process and associated losses in time and money.

Limestone Storage

Application: Limestone is stored in silos before being processed.

Challenges: Limestone generates a great deal of dust during the filling process and tends to stick to the walls of the silo, creating irregular build-up and rat holes. Since limestone is essential for the soda ash production process, quantifying the amount of limestone available in the silo is essential for ensuring continuous production. The Rosemount 3D Solids Scanner's unique surface mapping technology supports this by delivering real-time volume measurements of the stored material and by generating a 3D image of the stored content allowing early detection of build-up. This is the basis for timely scheduling of maintenance and cleaning work in order to avoid unexpected interruptions to the process.

Salt Storage

Application: Salt rock is stored in big silos for the brine producing process.

Challenges: It is difficult to assess the true volume of salt rock remaining in the silo; therefore operators can't ensure continuous salt supply to the brine making process, which is essential for the production of soda ash. The Rosemount 3D Solids Scanner reliably and accurately measures the volume of salt rock in the silo, taking into account any irregular surfaces caused by build-up. In addition, it generates a 3D image of the actual salt rock distribution inside the silo, allowing early detection of build-up and the timely scheduling of maintenance and cleaning work in order to avoid unexpected interruptions to the process and the associated time and money losses.

Soda Ash Storage

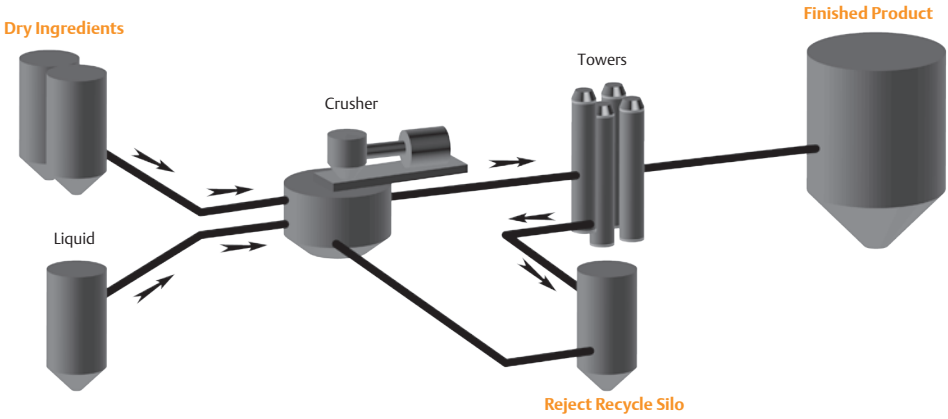
Application: Final product (usually in powder form) is stored in big silos until it is shipped for industrial uses.

Challenges: Soda ash is stored in large silos and generates a great deal of dust during the filling and emptying processes. The soda ash also tends to adhere to the silo walls creating build-up and rat holes, making it difficult for operators to continuously and accurately monitor the inventory levels in these silos. The Rosemount 3D Solids Scanner, using multiple-point surface mapping technology, delivers accurate, reliable and continuous non-contact volume measurements, even in harsh environments. In addition, the scanner's visualization tool generates a 3D display of the actual distribution of soda ash inside the silo, allowing early detection of build-up as it occurs and the scheduling of timely maintenance and cleaning work to avoid unexpected interruptions to the process and the associated losses in time and money.

Detergent Production

Industry Applications Series

Detergent Production Diagram



Dry Ingredients

Application: Raw materials are stored in silos before being transferred to the production process.

Challenges: As the raw materials are processed together, it is important to accurately measure the content of the silos to ensure continuous production. The Rosemount 3D Solids Scanner uses multiple-point surface mapping technology to generate true volume levels inside the silos in real-time, enhancing the ability to better manage inventories.

Finished Product

Application: The final product is stored in silos before being packed and shipped.

Challenges: Accurately measuring the inventory of the final product is a continuous necessity for operators. The Rosemount 3D Solids Scanner accurately measures the volume of the contents inside the silos, providing better control over inventory management and delivery schedules, and enhancing the reliability of related financial reporting.

Reject Recycle Silo

Application: The dried granules are screened to obtain a relatively standard size; unscreened material is transferred to a storage silo, and is later sent back to the process as part of the ingredients.

Challenges: The material generates dust during the process and tends to create build-up at the bottom of the silo. The user's main challenges are to continuously monitor the silo for the volume of stored material and also to discover build-up as early as possible. Maintenance can then be scheduled and cleaning performed to avoid damage to the silo and costly interruptions to the production process. Only the Rosemount 3D Solids Scanner for volume measurement and the 3D visualization tool allows such continuous monitoring and early detection of build-up.

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Glass Industry

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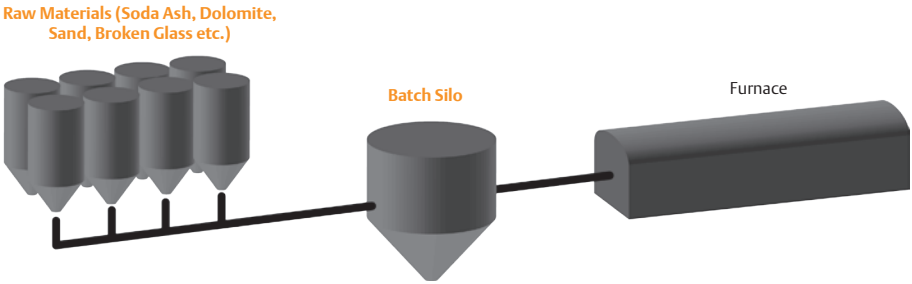
Process Management

Glass Production

Industry Applications Series

Glass Production Diagram



Raw Materials Storage

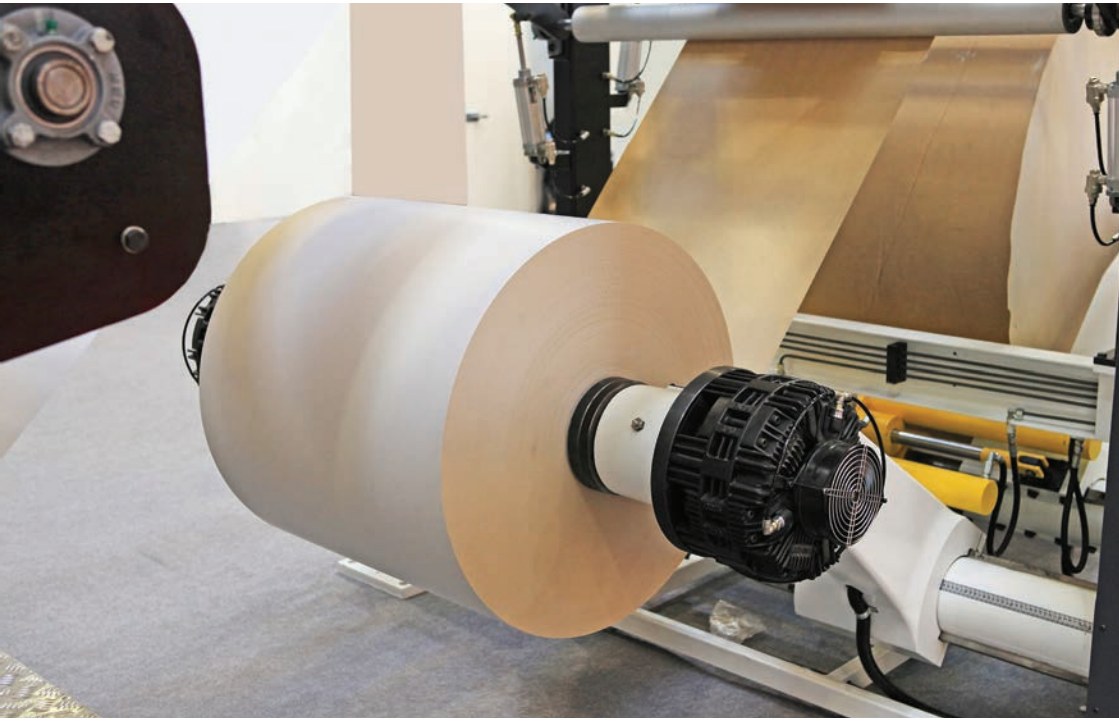
Application: Raw materials used for the production of glass (sand, dolomite, soda ash, broken glass, and manganese oxide) are stored in silos before entering the batch processing.

Challenges: Batches that feed the furnace are produced by mixing fixed amounts of the different raw materials that come from the different silos. For some of these materials each batch must be supplied from a single supplier and cannot be mixed with material coming from a different supplier. Therefore, it is essential to have sufficient quantities of all the materials before the batching starts. When operators know how much of each material is available, they can avoid unnecessary and unexpected production stoppages. The Rosemount 3D Solids Scanner reliably and accurately measures the volume of the stored materials, in multiple silos, enhancing operators' inventory management and control capabilities.

Batch Silo

Application: Different raw materials are mixed using a specific recipe for each glass production cycle and are kept in the batch silo before entering the furnace.

Challenges: The batch silos feed the furnace. Since the furnace needs to be fed continuously it is crucial to control the batch silo inventory for the on-going process. Operators need to ensure continuous production and to avoid unnecessary and unexpected production stoppages and associated losses in time and money. The Rosemount 3D Solids Scanner provides reliable, accurate real-time measurements of the volume of the raw materials stored in the batch silo, giving the operators significantly improved inventory management and control capabilities.



A guide to volume measurement solutions for the

Pulp and Paper Production

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Pulp and Paper Production

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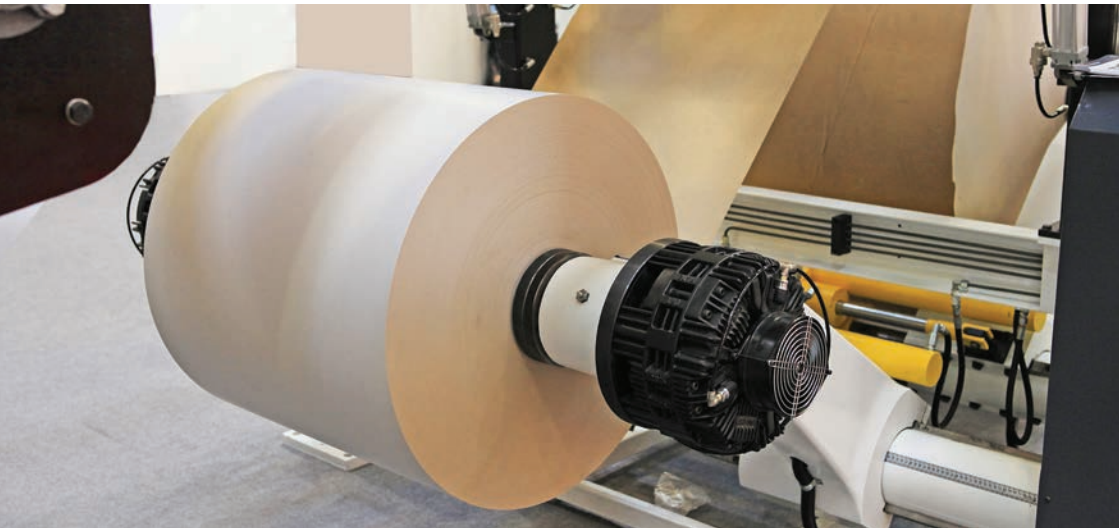
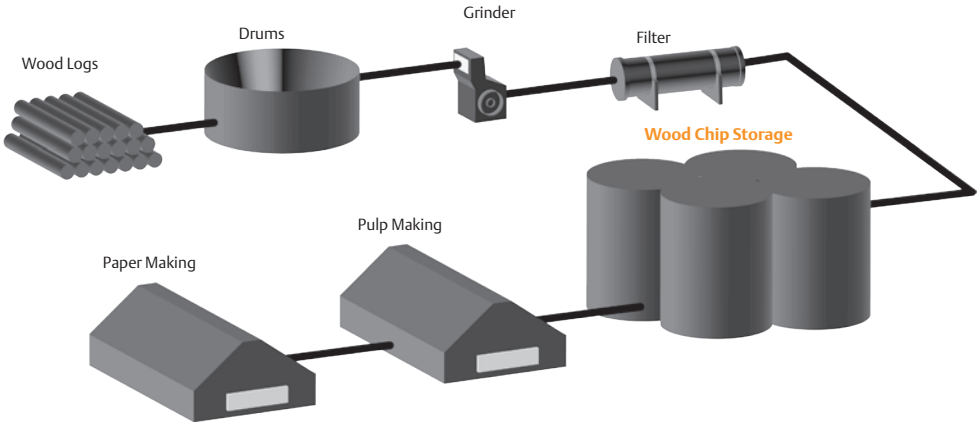


Pulp & Paper Production Diagram



Wood Chip Storage

Application: Wood chips are transported to the production line and stored in silos before being processed into pulp.

Challenges: Wood chip storage facilities are usually very large, the material tends to stick and the emptying process is carried out through nozzles along the silo bottom which create irregular formations inside the silo. As the storage silos feed the pulp-making process, it is important to make sure enough material is available for production. Continuous inventory management is critical to allow smooth operation.

Rosemount 3D Solids Scanner systems accurately measure the true volume of chips remaining in the silo, taking into account material build-up on the silo walls. In addition, the 3D visualization tool allows operators to see the allocation of wood chips inside the silos in real time. This facilitates the scheduling of any required maintenance and cleaning before unexpected interruptions of the emptying process occur that could cause stoppages or delays in the pulp production process that in turn would have led to losses in time and money.

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