

News and application reports on screening, sifting, scalping, dewatering, and fluid bed drying, cooling, moisturizing

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Circular Screener Improves Soy Concentrate Process

RICHMOND HILL, ONTARIO—Pak Fok Food Products, Inc. improved the flavor, texture and "mouthfeel" of soy milk concentrate while increasing production rates tenfold in a newly designed plant that is automated, energy efficient, and waste-free.

The unique process, designed by Simon Kwan, owner and president, produces concentrate that is whiter, more neutral and free of the "beany" flavor considered undesirable in soy beverages.



Soybeans are de-hulled, washed and crushed after which juice is extracted, screened, filtered, pasteurized and chilled. The fully automated plant requires only two operators and produces no waste.

Smooth mouthfeel, a key attribute, is achieved by removing particles larger than 118 microns (.00465-in.) from the juice extracted from crushed soy beans using a 48-in. (122 cm) diameter Kason Vibroscreen circular vibratory screener.

Producing soy concentrate

Producing soy concentrate at the new plant involves: de-hulling the soy beans; washing, hydrating and crushing them into a slurry; and extracting, filtering and pasteurizing the juice prior to chilling and shipping the concentrate.

In researching methods to improve the extraction and filtration/separation stages of the process, Kwan found that a circular vibratory separator could screen to 118 microns at 6000 l/h (1584 gal/h).

In the former plant's extraction process, a dual rotary drum filter,

followed by a filter press, removed most of the solids from the slurry. A Kason 30-in. (762 mm) diameter screener separated the balance of the solids to 75 microns. But the flow rate was limited to 600 l/h (158 gal/h).

A new extraction process increases the flow rate tenfold while increasing viscosity of the feed. The screener accommodates this volume after a switch to a tough "market-grade" stainless steel wire mesh that can be highly tensioned to increase shear, and by optimizing the screener's vibration and discharge pattern according to the flow characteristics of the soy solution—a service performed by Separator Engineering, Ltd., Scarborough, Ontario, the Canadian affiliate of Kason Corporation.

Screening the slurry

The circular vibratory screener is equipped with an imbalanced-weight gyratory motor positioned beneath the screening chamber. The motor imparts multi-plane inertial vibration to the spring-mounted screening deck, causing oversize particles to vibrate across the screen in controlled pathways to the screen periphery where they are discharged. Undersize particles pass rapidly through the screen and fall through the bottom outlet.

Protein and agglomerates clogging the screen are cleared once per hour using a clean-in-place (CIP) system that sprays hot water multi-directionally through perforated, ball-shaped spray nozzles positioned strategically within the screening chamber. The entire screener is manually disassembled every 24 hours for thorough washdown.

Eliminating waste

The new process is fully automated, requiring only two operators, and is environmentally friendly. The plant receives soybeans from railcars, eliminating packaging waste, and sells

Double-Deck Fluid Bed Dryer/Cooler Cuts Energy Usage, Capital Cost



Double-Deck Circular Vibratory Fluid Bed Processor utilizes heated or cooled air that would otherwise be exhausted after passing through the lower deck, significantly reducing energy usage, floor space and capital cost per pound of material being dried or cooled.

MILLBURN, NJ—A new Double-Deck, Circular Vibratory Fluid Bed Processor from Kason Corporation significantly reduces capital cost, energy usage and floor space per pound of product being dried or cooled according to Lawrence Stone, CEO.

"The addition of an upper deck makes use of heated or cooled air that would otherwise be exhausted after passing through the lower deck, and requires little to no increase in the size or energy consumption of imbalanced-weight motors or blower fans, nearly doubling capacity and efficiency with little to no increase in operating cost or floor space," says Stone.

Unlike rectangular fluid bed processors that require heavy-gauge construction to withstand constant vibration, circular fluid bed processors are inherently rigid, allowing materials of construction to be down-gauged and vibratory motors to be downsized. Associated components are also eliminated, such as multiple air inlets and outlets and their associated ducting—the circular unit requiring only one of each.

Centrifugal Sifter Beats the Heat in High-Volume Powder Process

ASBURY, NJ— Wedco Processing Services, a division of ICO Polymers North America, specializes in size reduction of thermoplastics and other materials into custom powders that are specified for numerous applications. The company, based in Asbury, NJ, uses its particle-size-reduction processes to produce granular to sub-micron particles from an array of materials, in lab-size volume to thousands of tons per year. Wedco has a long history of size-reducing polyolefins, engineering resins, fluoropolymers, and waxes, among other organic and inorganic materials.

Wedco's capabilities not only include production scale ambient and cryogenic mechanical grinding and jet pulverizing, but also batch and continuous blending, product testing and analysis, and research and product development. To maintain flexibility to address many types of custom processing requirements, Wedco employs proprietary equipment as well as equipment sourced from suppliers.

In one line, the company integrated a continuous heat treater/mixer of its own design called the "Wedco Polisher" in-line with a "Centri-Sifter MO" centrifugal screener from Kason Corporation. The polisher controls the level of heat and energy imparted to a powder to yield uniform flow and moisture properties. It is also used to mix in performance-enhancing additives on a continuous or batch basis. The Centri-Sifter unit not only screens particles to size but discharges any agglomerates generated by the process. Its ability to work efficiently within demanding production environments contributes to the quality of powder processed on the line.

One notable application of the line improved the flow properties of a new powder grade. This began with a customer that was using a polypropylene powder cryogenically ground by

Wedco for a fluid-bed dip process. In this technique, hot parts are dipped in a powdered fluid bed. The powder melts when it comes in contact with the part, coating it. During process improvement efforts, the customer reported inconsistencies in powder flow properties, which affected the quality of the coating, says Craig Davis, vice president of sales and marketing for ICO Polymers North America. Wedco analyzed the powder and determined that the particle shape might be contributing to the variability in flow, and decided to run it through the Polisher to improve flow characteristics.

The Polisher's high-speed mixing action smoothed particle surfaces (hence the term "polisher"), which improved both bulk density and flowability. This resulted in improved performance in the fluid bed process.

Screener achieves high level of sizing accuracy

The Centri-Sifter MO screener has a number of features that were beneficial to this job and to other inline operations. It handled the process heat from the Wedco Polisher, which can range from 125 to 450°F (52 to 233°C), met throughput needs of up to 1000 lb/hr (453 kg/hr), and importantly, sized 97 to 99% of the powder it screened. Due to the process heat, some of the polypropylene powder melted and formed large particles. The screener was able to break up the softer agglomerates for sizing and eject large pieces through a discharge spout.

The company also benefited from the unit's rapid, thorough cleaning that prevents contamination after a material change, and fast screen changes that minimize downtime.

The screener's high rate of particle-sizing accuracy stems from its internal



Wedco Polisher (left) is a continuous inline mixer that improves the flow properties of materials. After mixing and surface-smoothing, particles are transferred to Kason Corporation's Centri-Sifter MO screener (right) that separates on-size particles from oversize agglomerates.

design. Powder is screw-fed into the unit's horizontally oriented, cylindrical screening chamber, where a series of rotating helical paddles create centrifugal force that accelerates the flow of particles through apertures in the screen.

Davis explains that metal or nylon screens with apertures ranging in size from 6 mesh down to 200 mesh can be used in conjunction with the polishing process, depending on the powder being processed. The average particle size of the polypropylene powder was approximately 150 microns.

He says, "The screener is a significant part of Wedco's unique heat treater system, meeting the company's process needs with ease."



Cylindrical screen and helical paddles slide out of the Centri-Sifter MO screener end for thorough washdown and rapid screen changes.

Test Lab for Screeners, Fluid Bed Dryers/Coolers

A fully re-equipped test laboratory at Kason Corporation contains a full range of screening and fluid bed

processing equipment that is readily reconfigured to simulate customer installations for trials using supplied materials, announced Henry Alamzad, president.

All models of laboratory screeners are quick-clean designs allowing easy access to interior components for rapid inspection, disassembly, screen changes and cleaning.

Vibroscreen circular vibratory screeners include units with single and multiple decks for measuring sifting, scalping, classifying, dedusting and dewatering performance in both gravity-fed and vacuum/pressurized applications. Similarly, Centri-Sifter centrifugal screeners verify sifting, scalping, de-agglomerating and dewatering efficiencies in both gravity- and pneumatically-fed models using customer-supplied materials.

Most notable is the lab's new, full-scale, fluid bed processing equipment for drying, cooling and moisturizing of bulk solid materials. The exclusive, circular vibratory design enables entire systems consisting of fluid bed processor, heater/cooler/moisturizer, blower and dust collector to be self-contained on mobile frames with casters, offering testing flexibility not practical with larger, heavier, rectangular units of equivalent capacity.

Cont. page 4



Fluid Bed Processor with Air-Lift Device Speeds Cleaning, Inspection

Kason's circular, vibratory fluid bed dryers, coolers and moisturizers are available with a new Air-Lift device that allows rapid disassembly, cleaning and inspection of the fluid bed processing chamber, it was announced by Henry Alamzad, President.

The interior of the unit is easily accessed for thorough washdown by loosening one clamp ring assembly that connects top and bottom housing sections, then activating the Air-Lift device to raise the upper section.

"Lifting the upper frame/cover assembly of the fluid bed processor pneumatically, allows operators to access its interior many times faster," claims Alamzad, adding that one operator can now perform what was previously a two person task, depending on diameter of the unit.

The self-contained system is comprised of circular fluid bed processor, heating, cooling or moisturizing unit, blower, and cyclone separator on a single skid. With on-site connections to a power

source, bag house and material inlet/outlet, the system is ready to run.

At less than half the size and weight of rectangular fluid bed processors of equivalent capacity, the circular fluid bed unit allows all primary system components to be consolidated on a shippable frame for the first time.

Inherent strength of the circular processor eliminates the need for heavy-gauge walls and cross braces otherwise required to withstand continuous vibration, allowing vibratory motors to be downsized. The circular unit also requires only one air inlet and outlet and has fewer weld seams, reducing overall size and construction cost, especially when finished to 3A, FDA, and BISSC sanitary standards.

The circular fluid bed processing system dries, cools or moisturizes bulk chemicals, minerals, stone products, foods, dairy products and pharmaceuticals on a batch or continuous basis, for laboratory to high-volume applications.



The Air-Lift device is available on fluid bed processors in diameters from 18-in. to 84-in. (460 mm to 2135 mm). Other options are available for de-lumping, agglomerating, scalping or powder coating of bulk materials in conjunction with fluid bed drying, cooling or moisturizing. Rental units equipped with the Air-Lift device are inventoried in 18-in. and 24-in. (450 mm and 600 mm) diameters for laboratory and pilot plant testing.

Kason Sanitary Sifters USDA Certified

Kason sanitary screening equipment now officially complies with stringent USDA requirements for sanitary dry product sifters, it was announced by Henry Alamzad, Kason president.

The acceptance, which remains in effect through March 10, 2010, covers a total of 16 Kason circular vibratory screener models ranging in diameter from 18-in. to 84-in. (460 mm to 2135 mm), specifically: VIBROSCREEN

models K18, K24, K30, K40, K48, K60, K72 and K84; and FLO-THRU low profile models K18-FT, K24-FT, K30-FT, K40-FT, K48-FT, K60-FT, K72-FT and K84-FT.

"In addition, Kason equipment complies with 3-A, FDA and BISSC standards, enabling engineering management to meet cGMP and other sanitary regulations with confidence," says Alamzad.

The issuance is based on the U.S. Department of Agriculture, Dairy Grading Branch, Equipment Design Review Section's evaluation of the above Kason models for compliance with USDA Dairy Equipment Review Guidelines.

Kason is also certified to ISO 9001:2000 quality standards.



circular screener cont. from page 1

the "Okara" soy bean byproduct discharged from the extractor and screener (consisting of agglomerates, protein, undissolved sugar and fiber solids) as an ingredient for Asian-style soups, vegetable dishes and tofu, and as animal feed.

The plant also conserves energy by reusing process water and recycling heat energy consumed in various stages of the process.

The soy concentrate ultimately is diluted to produce soy milk, other soy-based beverages, and other soy food products.

Particles larger than 118 microns (.00465-in.) are removed from soy juice using a tough, market-grade stainless steel wire mesh that can be highly tensioned to increase shear. The screener is cleaned hourly using integral clean-in-place nozzles, and disassembled (as shown) for thorough washdown every 24 hours.



A 48-in. (122 cm) diameter circular vibratory screener from Kason Corporation removes particles larger than 118 microns (.00465-in.) from soy juice at the rate of 4800 L/h (1267 gal/h).



test lab cont. from page 3

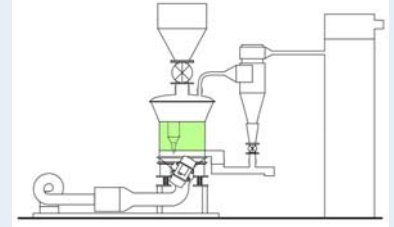
A full complement of hoppers, mechanical and pneumatic conveyors, and flow promotion devices enables Kason lab technicians to replicate virtually any process layout and production scenario, including running of customer-supplied materials at elevated temperatures.

In addition to providing free testing services for the company's customers prior to equipment fabrication, the test lab is utilized to test-run completed equipment and to measure performance characteristics of new equipment designs.

The company also provides screeners for on-site trials at no charge to customers unable to ship materials for testing, and offers the equipment for pilot plant testing and other long-term trials on a rental basis. Fluid bed processors are also available for weekly rental for on-site testing.

Kason's line of screeners handles bulk chemicals, minerals, plastics, foods, dairy products, pharmaceuticals and other materials ranging from dry bulk solids to solids-laden slurries containing particles from 5 cm to 25 microns (500 mesh) in size, at capacities in excess of 50 tons/h. Its fluid bed processors dry, cool, or moisturize bulk materials on a batch or continuous basis, on a laboratory or production scale.

double deck cont. from page 1



Double-Deck Circular Vibratory Fluid Bed Processor dries or cools bulk solid materials with high efficiency by causing a column of heated or chilled air to pass through material on two vibratory screens instead of one.

The result, says Stone, is a unit of significantly lighter weight and higher operating efficiency, with lower capital cost and a smaller footprint, than rectangular fluid bed processors of equivalent bed area and capacity.

Reductions in material, weld seams, and associated labor decrease fabrication cost, particularly when units are finished to FDA, USDA, BISSC or 3-A standards.

With reduced weld seams, a quick-disconnect housing, and no internal cross-members, circular fluid bed processors cut cleaning time dramatically.

Four models of the patent pending, double-deck fluid bed processor range in diameter from 48-in. to 84-in. (1220 mm to 2135 mm), satisfying medium- to high-volume production requirements. All are available configured for continuous drying or cooling applications.

Parting Shot of Outbound Equipment: Cross-Flo Sieves

These two Cross-Flo model CF72545S dewatering sieves, positioned back-to-back for shipping, are bound for a resin manufacturing plant where they will separate pellets and fines larger than 0.02-in. (0.5 mm) from

recycled pellet water at the rate of 2000 gal/min (7570 l/min) per unit. Totally enclosed, the sieves are equipped with a spray wash system for intermittent cleansing of the wedgewire screen.



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