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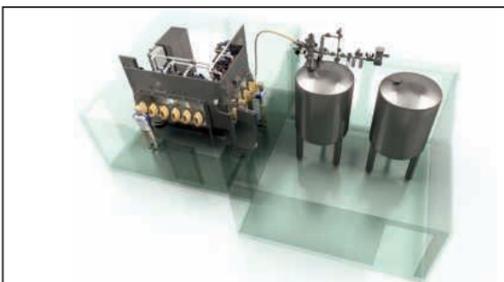


PROMIXON of Italy has opened a test plant where several advanced mixer installations are available for customer trials; these include a **PROBLEND-TC/400/1200** Hot/Cold mixing plant comprising a TMS turbomixer and a CMX horizontal cooler, well suited for production of rigid or plasticised PVC dry-blend, WPC, masterbatches, additives and powders as well as for bonding of powder coatings (see feature on p15).



Van Beek has delivered a screw conveyor system to Dutch mushroom processor **Prochamp** which is capable of handling sludge concentrate reliably at an angle of 40 degrees, a gradient at which many screw conveyor designs would not operate effectively for this specific application (see p14).

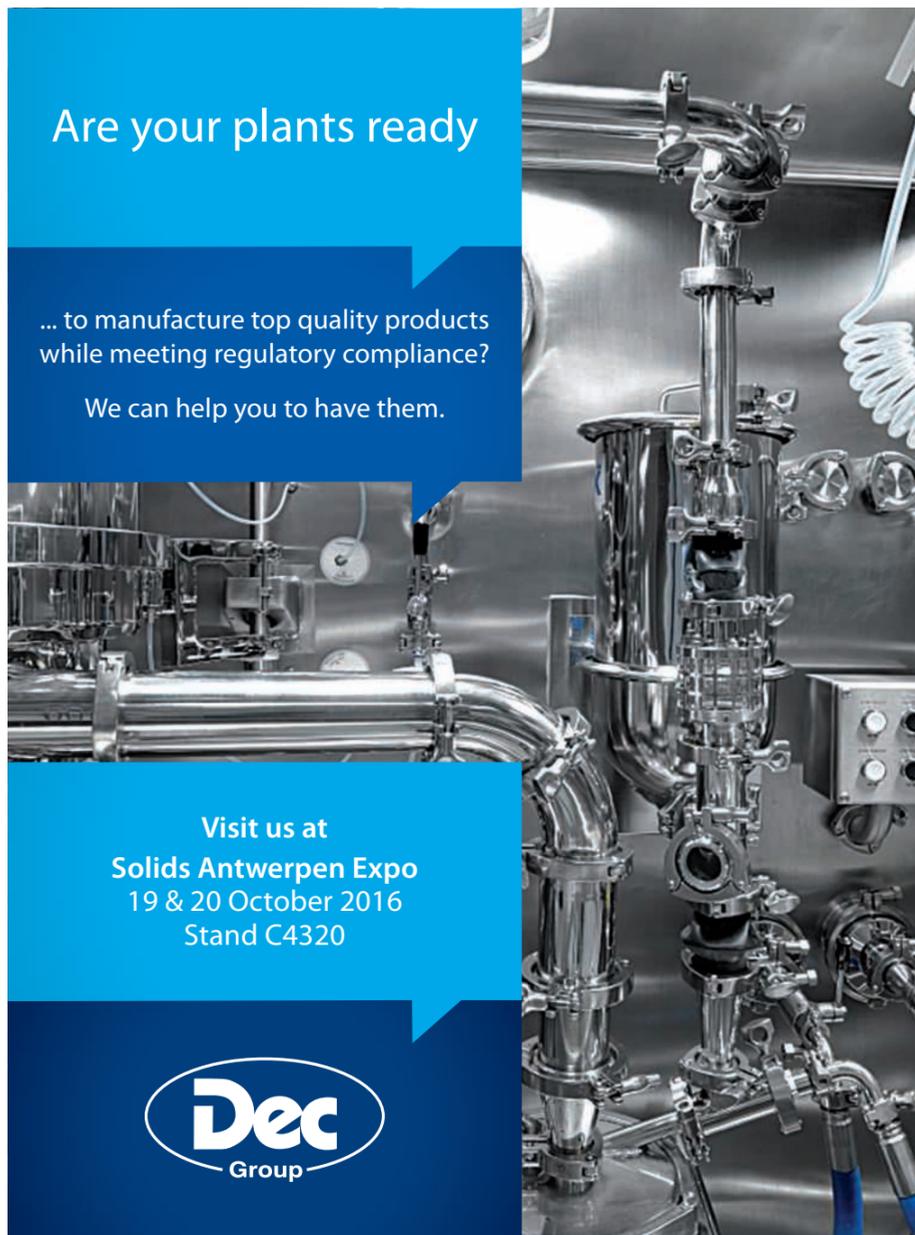
Dietrich Engineering Consultants has recently developed a system employing a sterile high-containment dispensing and charging isolator (pictured) for safe handling of highly potent compounds; it is capable of maintaining 100% containment without need for costly fixed or mobile cleanrooms, laminar flow cabinets or gloveboxes, as described on p14.



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Powder Handling Excellence

IN THIS ISSUE

News 2-14

FFS packaging of amorphous silica; multi-compartment silo fulfils function of 12 separate bins; seminar on fine powder processing; twin-screw feeder handles phosphate in Egypt; test centre offers extended explosion protection services; high-performance FIBC fabrics produced from rPET; Bosch and Bühler to work in closer cooperation; steep-angle screw conveyor transfers sludge concentrate; Dinnissen explores project engineering advantages of virtual reality and plant simulation

Mixing: latest technical advances and several innovative applications..... 15

Benefits of microwave moisture sensors..... 17

New Equipment 18-19

Accurate feeding of fibres; hygienic tubular chain drag conveyor; fast and reproducible pulverisation of large sample volumes; automated alert by text message of explosion panel activation; digital sorter breaks new ground in technical sophistication; novel sample gathering device

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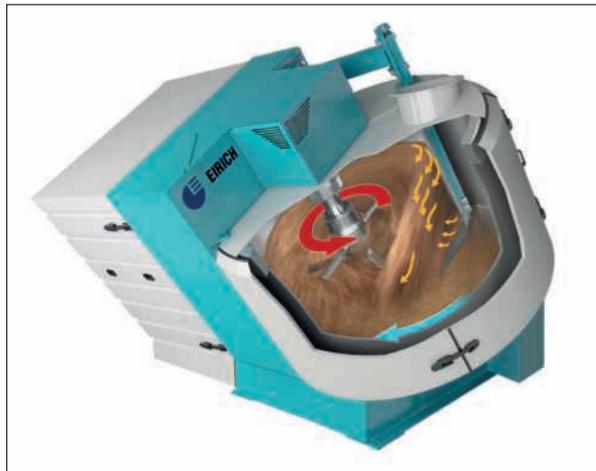
Eirich Ex-protected dispersion mixer extends EZD capabilities

Maschinenfabrik Gustav Eirich, Hardheim, Germany, has recently supplied an EVACTHERM® dispersion mixer to EZD (the European centre for dispersion technologies) to supplement its extensive range of mixing systems available at its headquarters in Selb. EZD is an interdisciplinary centre, the only one of its kind in Germany, that was established by the plastics research body SKZ Kunststoffzentrum in close cooperation with industry and with support from the State of Bavaria to undertake development work in production and characterisation of dispersions (suspensions and emulsions). SKZ has been providing independent services in plastics technology since it was founded in 1961. Today it is considered to be one of the biggest sector-specific institutes of its type. Over 350 staff are employed at its head office in Würzburg or at its branches

– including in China, Iran and UAE – with work encompassing R&D projects as well as further training, certification and inspection.

The newly acquired Eirich processing technology includes a 1-litre vacuum mixer with an EX-protection finish, 4kVv drive power, with an accompanying condenser, vacuum pump retort and fully automatic touch-panel controller. Using EVACTHERM vacuum technology brings further advantages for EZD: dry mixing achieves significantly better loosening of agglomerates; eliminating the buffering air significantly reduces energy consumption; and shearing forces can be introduced into the product with greater efficiency. Moreover, kneading and dispersion under vacuum ensures bubble-free suspensions.

www.eirich.com; www.ezd.eu



The unique EIRICH mixing principle and (right) the company's type RV02VAC 1-litre vacuum mixer.

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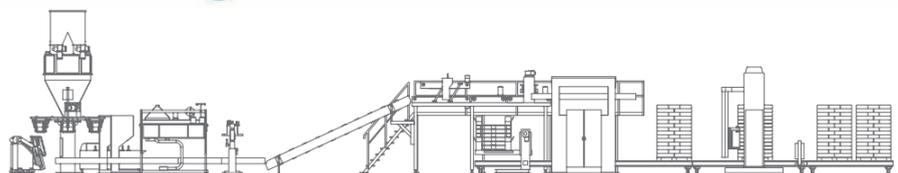
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Test centre offers extended explosion protection services

REMBE, Brilon, Germany, earlier this year introduced several new services at its in-house test plant. Here customers can have the design strength of their equipment checked, or have the usual key indicators determined for rarely tested or researched materials. Verification of the functional reliability of components under explosive conditions, fire tests, arc discharges and pressure tests complete the range of available test procedures. Producers of 3D printing machines, welding equipment and other manufacturers,

as well as plant engineers from the chemical, pharmaceutical, food, wood, metal and high-tech industry have already availed themselves of these latest facilities. This includes new applications and procedures that have not yet been taken into account in current guidelines. If necessary, it is possible also to organise approvals on-site through notified bodies. Contact: info@rembe.de or tel. +49-2961-74050.

www.rembe.de/unternehmen/rembe-test-center/



A closely monitored REMBE dust explosion trial.

Lödige wins its largest ever order

Gebrüder Lödige Maschinenbau, Paderborn, Germany, has secured the largest order in the history of the company. A Chinese manufacturer of fine chemicals ordered four mixing reactors of the DVT type. The customised machines with a total value in the upper single-digit million euro range are to be shipped to China in the second half of 2017.

The customer is investing in these

new machines, on the one hand, to increase production capacity and, on the other hand, to enhance product quality. Furthermore, these machines will allow the company to meet the requirements as laid down by the Chinese environmental authorities. Lödige was selected primarily for its experience in process and machine engineering. In addition it was recognised for its expertise in mixing technology, and specifically for its ability to produce machines in accordance with Chinese pressure vessel regulations.

As with all Lödige machines, these four mixing reactors with a volume of over 20m³ each will be engineered specifically to meet the customer's requirements. This order emphasises the importance of the Asian market for the Paderborn machine manufacturer which this year expects to derive over a quarter of its business from the region.

www.loedige.de



Lödige DVT type mixing reactor.

Prewashing of contaminated post-consumer plastics



As a washing machine for pre-shredded, highly contaminated post-consumer plastic waste, the new Rafter takes its place in the recycling line between the Micromat WS wet shredder and a downstream loop dryer.

Lindner washTech, Grossbottwar, Germany – part of Austria's Lindner Group which specialises in the development, manufacture and sales of shredding systems for plastics, waste materials and wood – will be exhibiting its new Rafter system at K-2016. This presents a gentle yet highly efficient solution for the thorough cleaning of highly contaminated, pre-shredded plastic waste by removing extraneous material and prewashing the load in one single step. In conjunction with another Lindner innovation, the Micromat WS wet shredder, this machine marks the rise of a new generation of plastic washing equipment of more compact design and superior economic efficiency.

The cleaning process performed in the Rafter comprises three phases. First, a special conveyor screw pulls the contaminated material under the water surface so that heavy contaminations such as metals, stones or glass can precipitate in a calm initial step. In

a second phase, particles adhering to the plastic such as sand, soil or other contaminants are removed by a paddled rotor. The rotor's rotational speed can be adapted to the degree of contamination, thus providing direct control of the cleanliness achieved. This step is performed in a stationary drum, with floating and precipitated particles being separated by means of plate screens. Upon completion of the washing cycle, the pre-cleaned waste rises to the surface again from where it is delivered to the downstream process steps by a feed screw. The separated extraneous materials and removed contaminants are discharged by an optional chain-type scraper conveyor.

With a nominal throughput of 1500 to 2500kg/h, the Rafter matches the capacity of today's recycling lines. It thus supports continuous in-line reconditioning of plastic waste all the way to the finished granulated recyclate or recycled film, respectively. The machine's actual throughput can

be adapted perfectly to the pace of upstream and downstream equipment by means of a frequency converter. Moreover, the Rafter is particularly cost-efficient to operate thanks to its energy-optimised drive system and a water demand of only 3-10m³/h.

Harald Hoffmann, managing director at Lindner washTech, commented: "By integrating the Rafter into a recycling line to prewash the plastic waste, operators gain an effective and also economical method of reducing wear in downstream reconditioning equipment and hence, boosting the line's cost efficiency as a whole. Moreover, all systems in Lindner's innovative washing system portfolio are distinguished by a characteristic, exceptionally rugged design. This feature, in conjunction with the use of stainless steel for water-wetted parts, contribute to a high long-term system availability and low maintenance needs."

www.lindner-washtech.com

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Explosion safety engineers awarded IECEx certification

REMBE, Brilon, Germany, points out that correct selection of suppliers is particularly crucial when it comes to safety system components. In this respect certificates of competence provided by independent bodies such as the DEKRA offer a useful selection criterion. Around 20 REMBE engineers have currently been personally certified in explosion safety by this organisation. The successful passing of the final exam confirms the extensive experience and in-depth knowledge of all the participants regarding (explosion) protection of industrial systems.

REMBE has been pursuing a total safety approach for several years: "To simply sell products is not the key goal in the field of explosion safety. In adherence with our motto 'Consulting/engineering/products/service' we support our customers in every project stage. And to prove our superior performance capability, we had it officially confirmed with the IECEx Certificate." commented Dr Johannes Lottermann, head of REMBE's explosion safety division.

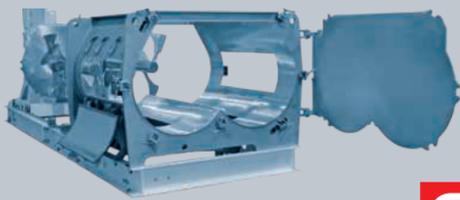
www.rembe.de; www.iecex.com



REMBE engineers undergoing tuition pending IECEx certification.



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Innovations in plastics handling

motan-colortronic, part of the motan group headquartered in Constance, Germany, will be exhibiting in Hall 9, Stand C64, at K 2016 which takes place 19-26 October in Düsseldorf. Here the motan innovation award will be made for the first time. The jury has shortlisted four innovative developments in the materials handling area to be put forward for the award.

- Dry doser: multiple use of energy for drying and dosing. This concept aims to use energy a number of times in both dosing and drying areas and to thereby significantly reduce overall energy consumption.
- Matrix coupler: automatic material

distribution station for small conveyor lines. Conventional material distribution stations require manual reconnection of hoses leading to the conveying equipment when changing material. The matrix coupler automates material distribution by means of a new multiple separator design, thus preventing risk of cross-contamination in adjacent lines.

- Octa-Flow-Bag: emptying of residual material from octabins. This type of semi-bulk packaging is widely used to deliver plastic granulate. Residual material often remains, however, in the corners and has to be manually removed by vacuuming. This new development involves automatically

taking these residual amounts of material to the centre of the octabin, from where they can be easily removed.

- Inductive heating: energy transfer by radiation. Pre-heated air flowing through plastic granulates removes humidity from the material. A novel means of automatic drying is based on inductive transfer of energy by radiation. This is highly efficient and can be precisely controlled.

The best innovation will be decided by an independent jury of experts, who possess extensive theoretical and practical knowledge in plastics production and processing. The jury

comprises: Prof. Dr Martin Bastian who since 2006 has been managing SKZ in Würzburg, the largest plastics institute in Germany; Prof. Dr-Ing. Carsten Manz, who since 2014 has been president of Konstanz University for Technology, Industry and Design; Dr-Ing. Peter Faatz,

who has been a professor for plastics technology and since 2005 has been managing plastics technology process development activities at INA Schaeffler; and Karl Miller, who currently manages motan-colortronic Ltd in the UK.

www.motan.com



The jury, from the left: Peter Faatz, Carsten Manz, Martin Bastian and Karl Miller.

AZO's French subsidiary relocates

AZO GmbH + Co.KG, Osterburken, Germany, reports that its French sister company AZO EURL has moved to new premises in Vallet, north-west France, situated in the heart of the Muscadet wine-growing area. The French company had previously been in Nantes and the move to the new larger building represents an investment of around two million euros, laying the foundations for further expansion of its market position in France as well as within Europe as a whole.

Apart from offices and storerooms, the elegant building provides two meeting rooms, showrooms, test labs and 1000m² warehouse space. The pleasant atmosphere is conducive to close collaboration with customers to find solutions to

meet their specific requirements and the new facilities provide a positive means of showcasing AZO's expertise in ingredient handling. AZO EURL, which was founded in Paris in 1998,

currently has 20 permanent employees and in 2015 achieved sales of some 6.8 million euros.

www.azo.de



AZO EURL's new building and (above) the official opening ceremony which took place in June. From the left are Frédéric Loiseau, sales management, AZO EURL; Robert Zimmermann, managing director, AZO GmbH; Denise Zimmermann, assistant to the management; Rainer Zimmermann, joint managing director, AZO GmbH; and Anthony Petiteau, technical management, AZO EURL.

Realignments at Daxner

Ing. Johann Daxner GmbH, Wels, Austria, has decided to streamline the company name just to Daxner GmbH. At the same time company email addresses ending "daxner.at" will in future be "daxner.com". These changes came into effect at the beginning of September. Earlier this year the company changed the name of its German sister company, the headquarters of its bakery division,

from Daxner International GmbH to Daxner Germany GmbH. The company additionally has subsidiaries in USA, Russia, Australia, Argentina and the UK. It specialises in design and engineering of advanced and hygienic handling installations for foodstuffs (notably bakery ingredients and spices) animal feeds and chemicals.

www.daxner.com



Part of a recently completed Daxner IBC-based blending and dosing installation for bakery formulations.

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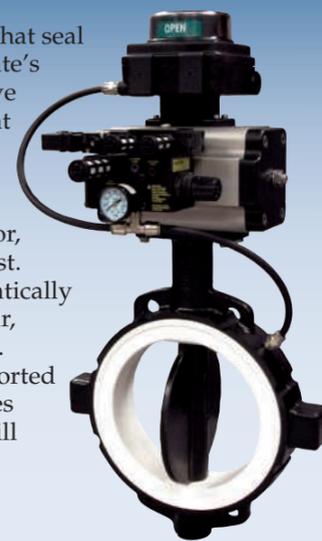
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New products and technical developments unveiled at Networking Days

Bühler showcased more than 30 innovations at its Networking Days which took place during three days in late August, further developing megatrends that are transforming the grain-processing industry: nutrition, food and feed safety, sustainability, and the Internet of Things (IoT). With every generation of solutions, Bühler aims at reducing the use of energy, water, and other resources by 30%. Every year, Bühler

invests 5% of its turnover in research and development. Key innovations included:

- CombiMill process with increased flexibility: this allows whole-wheat flour for flatbreads, dark and standard flours to be produced using the same milling system.
- New generation of the Tubex scale: this high-precision scale reduces energy costs by over 90%, maximises food safety, and features a user-friendly control.
- Novablue with increased food safety: the new, innovative sieve cleaner offers easier detection, both visually and through metal detectors.

www.buhlergroup.com



Top management team at Bühler (from left): Johannes Wick, CEO grains and food; group CEO Stefan Scheiber; and corporate technology officer Ian Roberts.

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Giant silo for Vassiliko Cement, Cyprus

Aumund Fördertechnik, Rheinberg, Germany, is providing technical leadership in the construction of a second large clinker silo for Cypriot cement producer Vassiliko Cement Works at its plant close to the coastal town of Limassol. The silo, with a capacity of around 100,000t, will be constructed within the next 18 months. Vassiliko has made considerable investments during the past 10 years, installing a cement grinding plant with vertical mill, a kiln line with a capacity for 2 million tonnes/yr of clinker, and a clinker silo with a capacity of 100,000t. The plant was first established here in 1963, and Vassiliko has been operating it since 2011 with a kiln capacity of 6000t/day. About 50% of the production is exported through its own port.

Under a semi-turnkey contract covering the construction of the additional clinker silo, complete with conveyor bridges, transfer towers, superstructures, loading silos and supports, Aumund will be responsible for the technical organisation and coordination. Back in 2008 the company had already won the order to supply conveying equipment for clinker. Its scope of supply and services also includes all drive units and instrumentation as well as the complete plant design and the supervision of all installation work on site up to commissioning of the clinker transport and silo system scheduled for end of 2017.

www.aumund.com



The new silo will be adjacent to the existing one and (right) various Aumund bulk handling systems supplied to Vassiliko in 2008.

Berthold Technologies makes Norwegian acquisition

Berthold Technologies, Bad Wildbad, Germany, the leading international supplier of radiometric instruments for process control, recently acquired Norway-based Sensor Technology AS (S-Tec). S-Tec is a specialist for nucleonic gauges as well. Its product range and the company's close cooperation with major customers and research institutes will continue. Berthold's products and services – including the unrivalled experience and facilities for radioactive source production and handling – as well as its leading sensing technologies will complement S-Tec's scope of supply for the Norwegian market. The acquisition is expected to benefit both current and future customers.

www.berthold.com



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Powder processing

NETZSCH Trockenmahltechnik, Hanau, Germany, will be organising a two-day seminar on 12th October on the subject of dry grinding to fine particle sizes, a discipline in which the company is recognised as being a world leader. The seminars are held alternately in German and English and this will be the eighth German-language event in the series.

Delegates are given an introduction to the theory of dry grinding and air separation, after which the transfer from laboratory to production scale is explained using practical examples. Here, aspects of process optimisation and energy efficiency are primary points of discussion. Various options for particle size analysis, its presentation and interpretation are also clearly

demonstrated, as well as particle separation with filters and cyclones, including ultrafine grinding using steam as the grinding medium. Latest technological innovations and future prospects are also discussed. The seminar is geared towards employees from all branches of industry and offers the opportunity to fully prepare for a new position, acquire additional qualifications or deepen existing knowledge with theoretical expertise. For large companies where, for example, entire departments are to be trained with respect to specific content, the company can offer in-house seminars that are designed around the individual requirements of the customer.

www.netzsch.com/fpp



Learning from experts: the seminar will provide a combination of theory and practical applications.

Care needed when transferring sieved dry food ingredients

Farleygreene, Mapledurwell, UK, has recently designed a number of suitable options to help processors faced with the challenge of moving sieved dry ingredients from low-care to high-care environments. Available for the small as well as the larger producer, each system provides a simple, effective and clean solution to segregate ingredient loading and also to comply with audit requirements.

The company points out that the days of throwing a bag of food product through an open sieving machine and collecting it in a bin on the floor, with the hope that it would not get contaminated further whilst waiting for it to be introduced into the process system are numbered. Today hygiene and quality control are of paramount importance to all manufacturers; the risks involved when leaving product within an unclassified area are not acceptable in today's climate of high consumer demand and quality production.

Due diligence must be seen to be carried out when any ingredients are being used, especially when dispensing ingredients from possibly dirty pallets and bins. The consequences of mishandling and contamination can be catastrophic to



Farleygreene low- to high-care options showing hygiene cabinet (above) and vacuum transfer.

all concerned: the manufacturer, the retailer, and the consumer. Litigation can be very expensive and the loss of a big retail purchaser can be disastrous. To overcome the possibility of cross-contamination between a 'dirty area' and a 'production clean area' has become an absolute necessity.

Segregation between the unloading and dispensing area and the manufacturing and processing area has required special consideration as to how ingredients can be properly handled and sieved; in addition operator safety becomes a key concern. Health and Safety demands that dust levels are maintained down to an acceptable level, and the need in many instances to comply with the ATEX regulations all add to the issues which need resolving.

When sourcing equipment to carry out this task, it is often difficult to find items which will easily fit together and will suit the space available. A bespoke design is required in nearly all cases.

Where small quantities of product are handled the simplest means of total segregation between areas is to locate the sieving machine to the outside of an enclosure protruding from the wall of the clean area. This allows the clean bin to be filled through the enclosure top. By using specially moulded diaphragm seals and sleeves, Farleygreene can provide a completely isolated sieving arrangement. In addition when combined with its 553-STs and Easilift sack tip stations, the need to clean all contact components becomes a simple and effortless job, requiring only a few seconds of downtime and just a single operator.

Where larger quantities of product are involved, and especially where space is at a premium or distance of product transfer becomes an issue, it is possible to incorporate a vacuum transfer conveyor within the system.



The sieve unit can be located up to 40m away from the discharge point, thus allowing enormous flexibility within a building. This arrangement provides wide scope of system design. In addition it is possible to charge a number of process points directly without the need for bins or storage hoppers. A system can be designed to suit almost any rate of throughput, and can be incorporated within any type of Farleygreene sieve.

For those requiring higher throughputs of multi ingredients, the company states that a sack tip counter is very often the best option. This comprises a counter located to the segregated area wall with individual sieves mounted upon it to allow one product to each sieve. Using the unique sealing system between sieve and clean area, this arrangement offers the high-rate throughput user many benefits. These include speed of cleaning without any tools, faster dispensing time and operator comfort. Each system can be supplied with a full dust extraction system, stairways and work platforms.

Farleygreene specialises in providing answers to difficult processing needs. Coupled to this, it can provide full certification of all parts within the system as well as spares and service packages to ensure traceability and optimum performance.

www.farleygreene.com

Magnetic separation featured at French trade show

Eclipse Magnetics, Sheffield, UK, will be attending VRAC TECH Expo which takes place 4-6 October at Le Mans, France. On display in Hall D, stand B19 will be a selection of products from the company's wide range of high performance magnetic separation and detection systems, including the Pneumag high intensity magnetic separator, the easy clean Housed Grid and the Auto-Shuttle magnetic separator.

Laurent Pirez, European sales manager for separation and filtration at Eclipse Magnetics said: "We are delighted to be exhibiting our foreign body removal systems at VRAC TECH Expo this year. It is of the utmost importance for companies within the processing industry to ensure the maximum integrity of the finished product. Magnetic separation and detection systems are key to eliminating the risk of contamination

during production. Eclipse products have a worldwide reputation within the bulk industries, enabling businesses to protect their brands and their customers."

www.eclipsemagnetics.com;
www.vractech.com



Auto-Shuttle and (right) Pneumag magnetic separators from Eclipse Magnetics.

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Multi-compartment silo fulfils function of 12 separate bins – and more

Silobau Thorwesten, Beckum, Germany, has supplied an ultra-modern silo to the Schnaittenbach plant of a leading local producer of fine quartz powder. With a diameter of 8m and 45m high, the new silo forms a key element of a new materials preparation plant. The operator is expecting an annual throughput of 650,000t of raw material during the separation and reworking of kaolin, feldspar and quartz. Because of the high specification of the end product, it was vital to avoid mixing of the raw materials, a problem exacerbated by the extremely small particle size of the product. The customer had opted for compact construction of a 12-compartment silo offering a total volume of 780m³. This design is characterised by short conveying paths during feeding, outlet, weighing, and loading, and also by a maximum reduction of the required assembly area. In line with the customer's specification, it was required that each silo compartment should be emptied by at least 99.5%, to permit problem-free storage of up to 16 products within the 12 compartments. The silo was specially designed so that joints, bolt heads, and other internal parts should offer minimal surface area to

which powder might adhere. This multi-compartment silo is much more compact, more efficient and lower-priced than an equivalent silo battery comprising 12 bins. www.thorwesten.com



The 12-compartment silo has been specially designed to avoid cross-contamination between different powdered products, as well as to have the capability of being erected within a confined space.



Hapman enters into Chinese partnership

US-based Hapman, which also has a European manufacturing operation in Opole, Poland, has recently appointed Eunori Ltd, located in Beijing, as its representative in China. "Our partnership with Eunori is strong. We selected their company to represent Hapman and our equipment because of their high-level technical skills, ability to help customers solve material handling challenges, and because the company has a positive reputation in China", commented Hapman vice president Greg Patterson. www.hapman.com; www.eunori.com

Daxner looks beyond Europe

Daxner, Wels, Austria, will be exhibiting on Stand 918 at IBE, the International Baking Industry Exposition, which takes place 8-11 October in Las Vegas, USA. The company, provides complete automated systems and equipment for powder and liquids ingredient handling in the bakery industry (bakeries, bakery and pastry ingredients, sweets, confectionery, etc.), as well as automated fermentation systems. Its scope of supply comprises – besides consulting, engineering and fabrication – also installation, start-up and service of its equipment throughout the entire life cycle (see also p6). www.daxner.com

Bosch and Bühler to work in closer cooperation

Bühler, Uzwil, Switzerland, and Bosch Connected Devices and Solutions, Reutlingen, Germany (a wholly owned subsidiary of Robert Bosch) have decided to extend their current collaboration agreement. Both companies are experts

in the areas of Industry 4.0 (the Internet of Things) and food process technology. Contractual proceedings to form a commercial partnership were completed on 22nd August at the occasion of the Bühler Networking Days which took

place in August (see p7). The cooperation provides great opportunities to leverage Bosch know-how in electronics, sensor technology, and software around the Internet of Things for the food processing industry. The two companies successfully cooperated in a two-year research project to integrate cutting-edge Bosch MEMS (micro-electro-mechanical systems) sensors into food production technology. The results are said to be very promising: individual rolls in rotating machines can now be equipped with wireless sensors to measure in real time temperature and vibration during the production process. This allows monitoring and optimisation of the end product through better alignment of the rolls. Operators also benefit from predictive maintenance services, reducing downtime and operating costs. First applications from this intensified cooperation will be launched in 2017. www.buhlergroup.com; www.bosch-connectivity.com



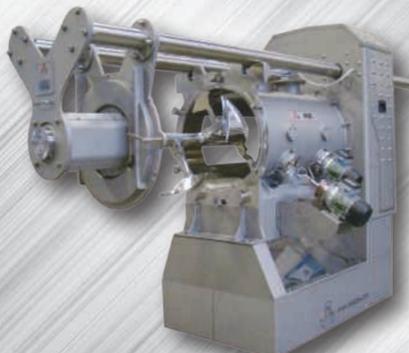
Johannes Wick (right), CEO grains and food at Bühler, and Thorsten Müller, CEO, Bosch Connected Devices and Solutions, sign the R&D cooperation agreement.



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Dinnissen builds hygienic mixer for new Synutra baby food plant in France

Synutra, one of the most important Chinese producers of baby food, has installed a 'greenfield' plant in Carhaix, France. For this project Dinnissen Process Technology, Sevenum, the Netherlands, has implemented a complete dry mix plant. The Dutch processing equipment manufacturer delivered, in accordance with its lean gravity mixing concept, a 14t/h baby food mixing system, incorporating latest technology relating to hygiene and rapid cleaning.

Synutra had specified a mixer with a capacity of 6500 litres, capable of meeting the highest hygiene standards. Dinnissen designed a special arrangement for this, whereby the cleaning of the mixer and the mixer hopper is guaranteed even beneath the pull-out shafts. It developed a Pegasus® mixer with a capacity of 6500 litres with large pivoted flaps, that allow easy access to all components of the mixer that require thorough cleaning.

The mixer features Dinnissen's well-

known counter-rotating double shaft technology, which creates a fluidised mixing zone and a very homogeneous mixing result, in short time without product damage and with a minimal

energy consumption. Beyond that the mixer is completely made in RVS.

Synutra already employs Pegasus mixers at its plants in China and therefore is familiar with the Dinnissen

technology. Thanks to the successful track record of its novel 'lean gravity mixing concept' the Dutch manufacturer was from the start in the forefront of companies tendering for this contract.

The mixer is fed from six bulk bag discharge stations equipped with Dinnissen feeder valves. The bulk bags are conveyed from level 0 to level 4 by means of a lift, after which they are transferred to one of the emptying stations. The outsides of the bags are cleaned on arrival in the hygiene zone. There is also provision for conveying, dosing and bag emptying of micro-

components which can be metered into the mixer. There are also sieving and metal detection facilities to guarantee the purity of the product, which is subsequently bagged at the packaging line.

In addition to its mixing line expertise, Dinnissen also delivered the complete 'plug and play 3D' engineering, control, installation and commissioning. For this it employed its own specialists, specially trained to handle a project of this magnitude and complexity.

www.dinnissen.nl



Dinnissen specially modified 6500-litre Pegasus mixer destined for the new Synutra infant nutrition plant in France.

Five steps to plastics recycling

Herbold Meckesheim, based in Meckesheim, Germany, will at K 2016 (Stand 9B 42 in Hall 9) be featuring five stages of recycling plastic waste, for all of which it is able to offer specialist equipment characterised by low operating costs and enhanced efficiency:

– Pre-size-reduction: for this purpose shredders, granulators, guillotines and hammer mills can be used.

– Size-reduction: the company's patented SB Type granulators with forced feeding ensure a continuous and even flow by means of feeding screws.

– Fine grinding: this is defined as pulverising below 1mm; for this purpose, depending on the product, granulators or impact disc pulverizers are used.

– Washing, separating and drying: a high-quality end product can be

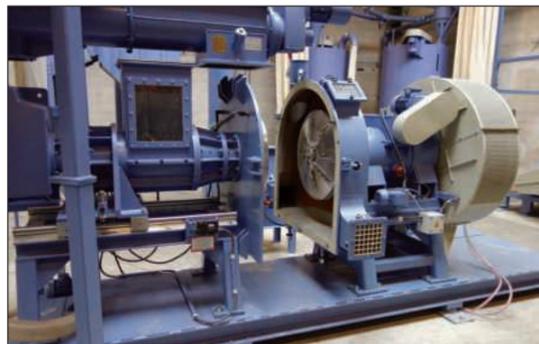
obtained by separating undesirable plastics with the hydrocyclone separation step.

– Agglomerating/densifying: with extreme materials such as stretch film or foams, adequate mechanical or thermal drying is not possible without high energy consumption; a solution to this problem is the Herbold Plastcompactor (pictured).

www.herbold.com



Herbold HGM 60/200 wet shredder, showing swivel-type screen support and (right) HV series Plastcompactor.



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New R&D facility for LPW Technology



LPW Technology has expanded into the Campus Technology Hub; below, newly appointed technical director Andrew Florentine.

LPW Technology, Runcorn, UK, a market leader in the development, manufacture and supply of metal powder solutions for additive manufacturing (AM), has established a new R&D facility located within the Daresbury Laboratory in Cheshire. This latest investment will focus on addressing issues of metal powder degradation and contamination during the AM process. The facility will be led by LPW's technical director, Andrew Florentine who joined the company this summer.

Dr Phil Carroll, managing director and founder of the business

commented: "In addition to expanding our powder manufacturing capabilities, we see the future of metal AM in solving the problems associated with how the powder is reused within the AM machine. We call the solution PowderLife - a metal powder lifecycle management system that strictly controls risk and traceability for AM metal part manufacturers". Established in 2007, LPW Technology is a market leader in the development and supply of metal powders for additive manufacturing, and provides a broad range of services for the AM industry.

www.lpwtechnology.com



Bulk bag filler for urea incorporates heat sealer



The Concetti bulk bag filler with corrosion protection and moisture-proofing features.

Concetti (see below) reports that it has also recently supplied a bulk bag filling station for urea to a Spanish manufacturer of quality fertiliser materials. High productivity and the practicality of this type of packaging

in the agriculture industry together with excellent corrosion resistance are among the key benefits of the new system. The installation fills hourly up to 100 bulk bags of 500kg capacity and can be operated by one person. With automatic height adjustment, it is possible to fill FIBCs up to 2000mm in height and weighing between 500 and 2000kg, thus guaranteeing extremely flexible operation.

The Concetti designed heat sealer is manually controlled by the operator and adjustable in height and allows significantly improved protection of the product during storage and transport. Urea is a water-soluble fertiliser and highly sensitive to external agents. The use of a resistant double-layer bulk bag with heat sealing closure (an alternative to simply tying off the FIBC neck) raises the level of product integrity and protection. Fertiliser materials are corrosive, so special attention was given to the free sliding wear surfaces, particularly in the most vulnerable areas, where hardened surfaces or corrosion-resistant steels are used to ensure long operating life. Other surfaces were treated with a special paint finish.

www.concetti.com

FFS packaging of amorphous silica

Concetti, Perugia, Italy, has designed, manufactured and supplied an innovative fully automatic FFS (form, fill, seal) bagging line for precipitated amorphous silica to the Huber Corporation, in Havre de Grace, Maryland, USA. This product is a very low-density white powder engineered with excellent absorptive characteristics. The particulate contains air, which is why it is such a good anti-caking, carrier and thickening agent.

This new packaging concept introduced by Concetti involves the use of sophisticated de-aeration techniques and allows, for the first time, packaging of precipitated silica from a tubular reel of PE film, replacing paper bags with more robust PE bags. Reducing air trapped in the material before

packaging was the main objective of the project. The more compact bag provides significant size reduction benefits across the supply chain, reduces packaging costs as well as improving stacking for more stable pallets during shipment, unloading, and warehousing. The new packaging is also easily recyclable.

The improved bags offer higher tensile strength, reduced dust and greater control of moisture to maintain the integrity of the material inside. The Huber installation consists of two complete FFS machines each with a gross weigher and complex densification screw feeders, including a double air evacuation process. Both packaging machines deliver filled bags to a four-column robot palletizer.

www.concetti.com Concetti FFS bagging line at the Huber plant.



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Powder Rheometer plays key R&D role at Haver & Boecker

Haver & Boecker, Oelde, Germany, has revealed the important contribution provided by the dynamic testing capabilities of UK-based Freeman Technology's FT4 Powder Rheometer® in ensuring successful development of efficient packaging solutions. Furthermore, with a decade of testing in place, at a rate of around 1000 products per year, the company is comfortably secure in its reliance on the instrument; reliability is reported

to remain consistently high and maintenance requirements are minimal. "Extensive physical characterisation provides the basis for the design/selection of each customised packaging solution," said Dr Thomas Hilling, general manager R&D Centre, at Haver & Boecker. "We measure a wide range of parameters, including particle size, moisture and fat content, and density, but, until we adopted flowability measurements with the

FT4, part of the picture was always missing. This was despite our best efforts with other testers such as a Jenike shear cell. We now measure the flowability of every sample we receive. Comparing the results with the database we have developed over a decade of testing helps us to identify the best packaging solution for every product and minimise investment risk."

The German equipment manufacturer develops integrated solutions, incorporating storage and conveying equipment, for packaging a wide range of industrial materials such as foodstuffs, chemicals, paints and cement. Ensuring continuous material flow through the system is vital and relies on selecting equipment that is well matched to the inherent characteristics of the material. Early attempts at measuring flowability

centred on the use of the Jenike shear cell but this proved both time-consuming and unreliable, and gave results that were difficult to interpret with respect to equipment choice. Dynamic testing, in contrast, is quick and efficient and provides highly relevant data.

"The FT4 is very easy to use. Freeman Technology provided us with great training at the outset and we have never had any problems with measurement or functionality. Over the years we have upgraded the associated computer but with regards to spares and hardware nothing has been required, despite the fact that we use the instrument every day. With an extensive database now in place testing helps us to identify, for example, which drive will work best in the conveyor and where we will need aeration jets to lubricate the powder

and enhance flowability." Minimising the air content in packed powders maximises bag fill and is a defining goal. By robustly quantifying flowability, dynamic testing helps Haver & Boecker to reduce the amount of air in the process to a minimum, thereby optimising throughput, while at the same time de-risking the process with respect to blockages/downtime.

"For us, customer satisfaction relies on defining a processing solution that will work reliably for their product, from the outset, without modification or troubleshooting. The FT4 plays an important role in helping us achieve this goal and is the most relevant instrument for powder flowability measurements that we have been able to identify."

www.freemantech.co.uk/ft4;
www.haverboecker.com

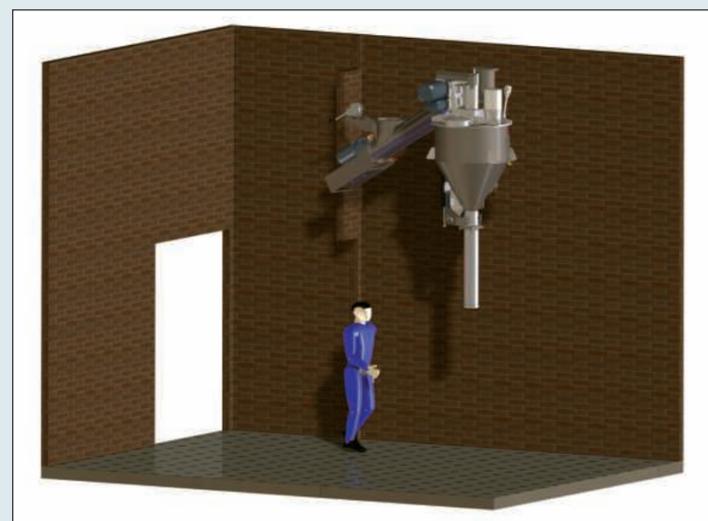
Customised feed screw for milk powder producer

Van Beek, Drunen, the Netherlands, recently supplied a specially adapted feed screw to bagging systems manufacturer Premier Tech Chronos, whose client was a major manufacturer of milk powder. The requirement was for a feed screw to deliver powder to a vertical dosing screw. Because of the restricted space available at the Swiss milk powder manufacturing plant, Van Beek was not able to install the feed screw horizontally, so powder input had to be carried out at an angle. It also had to be possible to clean the screw,

but there was insufficient space for cleaning hatches.

Van Beek therefore proposed a screw mounted on rails that could be slid right out manually. To ensure that one person could safely remove the screw, which weighs about 200kg, a hand winch was specified. It is very important for the screw to be easy to clean because the process line handles different products. In the past 15 years Premier Tech Chronos is reported to have purchased over a hundred Van Beek screw conveyors.

www.van-beek.nl



Computer-generated image of the feed screw arrangement.



FT4 Powder Rheometer in the Haver & Boecker laboratory.

Twin-screw feeder handles phosphate in Egypt

Ajax Equipment, Bolton, UK, has supplied engineering firm Bradley Pulverizer with a twin screw feeder for handling phosphate at an Egyptian processing plant. This material is prone to highly variable flow characteristics, with its physical properties changing in reaction to

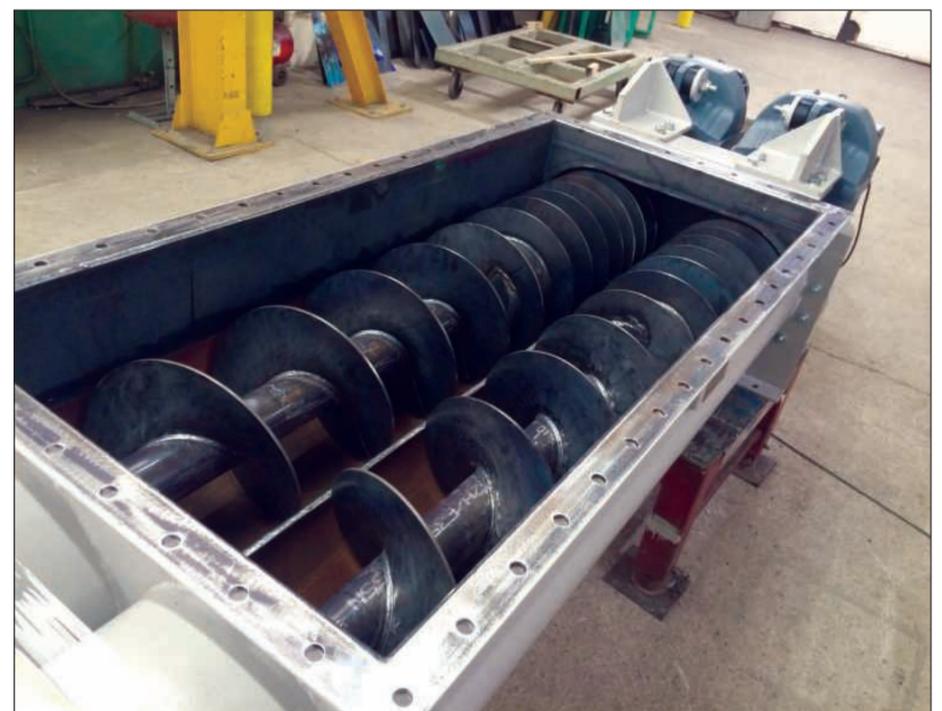
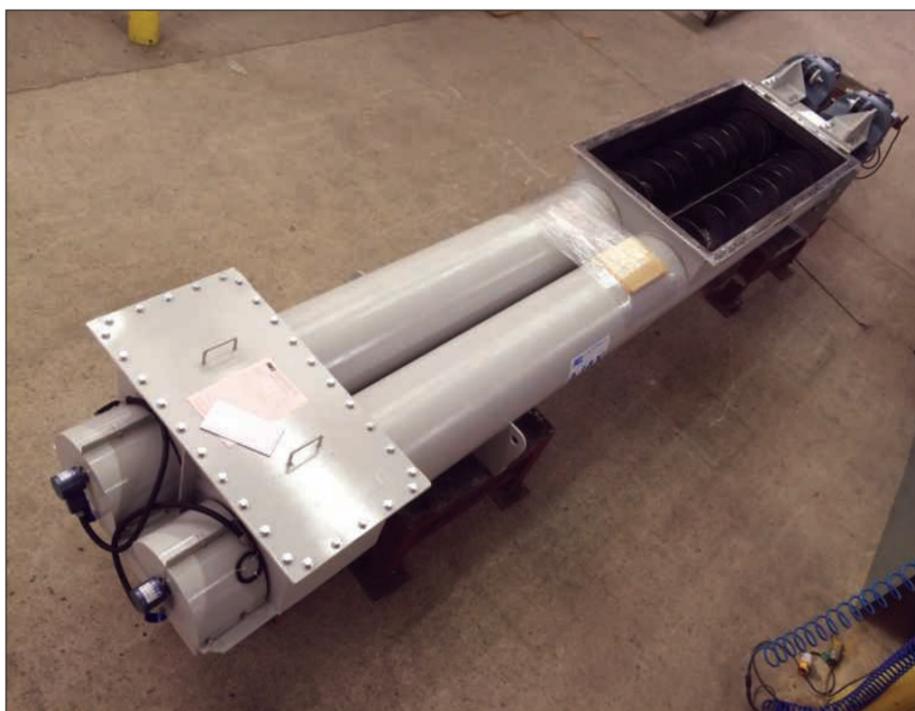
various factors including composition, temperature, residence time and consolidating pressures in the hopper.

At the same time Ajax also delivered designs for a hopper and flow insert to prevent 'ratholing' and to help achieve mass flow in a hopper

containing the phosphate powder. Undertaking powder testing allowed the company to determine the hopper wall inclination needed for phosphate powder mass flow, to increase the mean residence time of the hopper contents, and enhance de-aeration. Ajax recommended replacement of the

bottom section of the hopper, and designed the above-mentioned hopper insert to promote flow. Meanwhile the twin screw feeder's extraction geometry ensures material is drawn from the full width and length of the new hopper outlet.

www.ajax.co.uk



The feeder awaiting despatch at the Ajax factory and (right) parallel arrangement of the twin screws.

Some points of interest at SOLIDS Antwerp

Dietrich Engineering Consultants, Ecublens, Switzerland, will be showing its new re-engineered generation of MS Jetmills® along with other equipment at SOLIDS Antwerp which takes place 19-

20 October. The company states that particle size reduction is a key process in laboratories and small scale manufacturing, right through to full size production.

Dec's versatile and multi-format

micronising equipment is designed to satisfy the full range of these requirements. Available in open and contained arrangements, with the ability to handle difficult and hard to handle products, they are well suited for pharmaceutical, chemical and cosmetic production.

The systems can be provided in sterile, toxic or sterile-toxic arrangements in contained or non contained format. They also have the advantage of being both scalable and achieving very narrow particle size distribution (PSD). Correct optimisation product recovery rates of 99% are achievable, with production ranging between 0.2g on the smallest system, to better than 150kg/h on the larger ones. The new fourth generation of MC Jetmills demonstrates enhanced performance by achieving a much smaller particle size compared to conventional mills.

Computational fluid dynamics (CFD) analysis in conventional systems has

identified dead areas where powder build-up can occur. This creates waste and eventually leads to clogging and the need for time consuming cleaning. The new jet mill generation with its improved geometry of the grinding chamber allows for a very narrow PSD around one micron. Improved mill performance allows for the handling of 'difficult' powders (sticky, ultra-fine, etc).

www.dec-group.net

Also at SOLIDS Antwerp Danish industrial weighing specialist Jesma will be featuring latest versions of its weigh feeders and belt scales on Stand G4120. At the beginning of this year the company opened a Benelux office in Breda, the Netherlands, which is managed by sales director Naud Luijckink. He reports that the company's range of weigh feeders is now OIML R50 approved.

The company offers a wide selection of weigh feeders for use in food,

grain, chemical and feed milling industries, all systems being designed and constructed for the specific project required. An incremental encoder (Tacho) is mounted on the idler roller, its purpose being to improve continuous monitoring of the belt as well as providing an immediate alarm signal in the event of belt drive irregularities. The crowned driving roller improves tracking of the belt during operation and reduces risk of belt slide. Overdimensioned load cells ensure high accuracy even if material flow is uneven. All weigh feeders – which can be fabricated with painted steel, stainless steel or with stainless steel contact parts – are available in compliance with ATEX zone 21 and 22 directives.

In recent months Jesma has supplied a series of JesBelt process weighers to Danlind, one of Denmark's foremost producers of washing powder. These have been demonstrated to show in-line weighing accuracy levels to 0.2%. These Jesbelt weighers feature automatic cleaning, thereby avoiding any risk of stoppage due to accumulated dust.

www.jesma.com

On Stand H4340 Dinnissen (see also below) will be exhibiting its well-known Pegasus® mixer featuring mixing paddles which rotate in opposite directions. This creates a unique fluidised mixing zone with an excellent homogeneous mixing result, quickly and with minimal consumption of energy. The latest model on show will be equipped with latest cutting heads as well as an integral automatic sampling system. The mixer can be adjusted to all sorts of bulk goods, whether mixed with fluids or other solids. It is suitable for food, feed, pharma and chemical applications, either for small or high capacities. For further details, see the mixing article on the facing page. Dinnissen will also be exhibiting at Industrial Processing, 4-7 October, and at K-2016, 19-26 October.

www.dinnissen.nl

Inclined elevation of sludge concentrate by screw conveyor



Van Beek screw conveyors for transfer of sludge concentrate (see also front cover picture).

For its new wastewater treatment plant, Dutch mushroom processor Prochamp was looking for a way of conveying sludge concentrate to a container at an angle of 40 degrees. Its regular screw conveyor supplier was not able to guarantee that a screw conveyor could do this. Van Beek, Drunen, the Netherlands, welcomed the challenge. "We do in fact have a lot of experience with similar situations in previous projects", explained sales engineer Peter Verhoeven.

Owing to rising demand, Prochamp decided to expand its operation and to build a new wastewater treatment plant. When treating this wastewater a lot of sludge is produced. A decanter centrifuge splits the sludge into concentrate and waste water, after which the sludge concentrate ends up in a container.

"Such cases always involve a

customised solution", explained Verhoeven. "Because of experience in the past you know what is or is not possible. I then look back to previous similar projects and check whether we had problems here. It is also important that you ask the end user the right questions, so you are not faced with any surprises. Sometimes we conclude that we cannot in fact help, but that was certainly not the case here."

A system set-up with three screw conveyors now carries the sludge concentrate to the container. A horizontal screw collects the concentrate and carries it to an inclined screw conveyor that conveys it upwards. The concentrate disappears into the container via a downstream horizontal screw. Finally trucks take away the containers of sludge concentrate.

www.van-beek.nl



Latest version of the MS Jetmill.

Aseptic processing of high-potency APIs

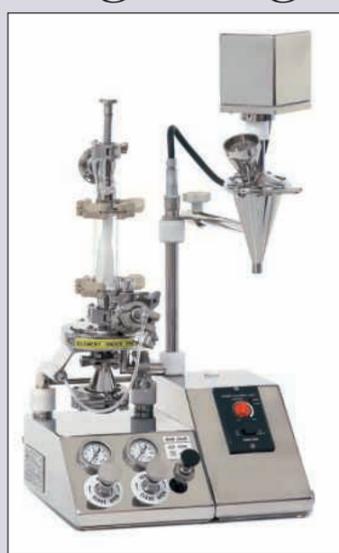
Switzerland's Dec Group (Dietrich Engineering Consultants) points out that aseptic high-potency API processing calls for specialised facility design to help the pharmaceutical industry improve and maintain the sterility of its drug products and protect staff.

Achieving high containment levels to minimise operator exposure whilst protecting sterile products, is a complex process in which nothing can be left to chance.

An effective solution can be provided by Dec's Powder Transfer System (PTS) technology with a sterile high containment powder dispensing and charging isolator (as pictured on the front cover) thereby avoiding the necessity for costly cleanroom construction.

Maintaining 100% containment in sterile handling of highly potent compounds usually demands specialised equipment and facilities, including costly fixed or mobile cleanrooms, restricted access barriers, laminar flow cabinets or gloveboxes. Ideally, the chosen equipment should not only be totally fit for purpose but also sufficiently flexible in use to allow easy process changes, especially in multipurpose facilities.

Dec Group recently worked in partnership with an animal health drug manufacturer to construct a solution using patented PTS technology



MC Jetmill: micronisation of very small quantities of powder (0.2g) with the MCOne model.

to handle powder dispensing and charging under high containment, using a twin chamber isolator. The customer needed to charge a reactor with sterile high potent ingredients while assuring complete operator and product protection.

The system had to meet a series of crucial requirements:

- OEL (occupational exposure limit) of < 1 µg/m³ time weighted average (TWA) over eight hours
- Ensure safe barrier between the

operator and the active drug substance to ensure both operator and product protection

- Achieving and maintaining an ISO 14644-1 class 5 environment for particles and viable micro organisms
- Plant designed to operate in both positive and negative pressure modes and in sterile and non-sterile conditions
- Multi-product use of OEB 5 category (sterile potent compounds)
- Clean or sterilise in place (CIP/SIP) with temperature mapping.

Dec's process containment experts designed a high level environment isolator as an L-shape twin chamber isolator consisting of a fast gassing airlock and a main charging chamber, connected via an internal transfer door. The system is designed for the charging of either sterile or high potent compounds supplied in various numbers of bags of different sizes and weights (max 15 x 10kg bags) into a process reactor by means of the PTS Powder Transfer System.

For utmost cleanliness the isolator features a through-the-wall design creating a dedicated technical area for maintenance and services at the rear of the system, which is accessed separately to the process area. The process operation mode is selectable either in positive or negative pressure via the operator interface (HMI).

www.dec-group.net

Dinnissen looks to virtual reality and plant simulation

A number of engineers from Dinnissen Process Technology, Sevenum, the Netherlands, are investigating the use of virtual reality in order to provide customers with a foretaste of the workings of a new plant even before it is built. Together with the customer, they walk virtually through the factory, which at this preliminary stage consists only of bits and bytes. At Industrial Processing and together with Vroom, Dinnissen is demonstrating this new application live in the Factory of the Future.

A small group of engineers is currently working with virtual reality in a research phase. The concept of design by employing SolidWorks does not change for them; however, they have to learn to make the transition from 3D CAD to virtual reality. These engineers are extremely enthusiastic because they see their designs virtually live in the environment in which they will be ultimately used. "By applying virtual reality, we let the customer experience the new system without it being constructed. The customer sees exactly what they can expect," Dinnissen states. According to the company, the activities of its D-innocenter in-house test plant and laboratory working in conjunction with plant simulation and virtual reality provided by SolidWorks, offers a golden combination for the future.

Because the customer can walk virtually through the installation together

with a Dinnissen engineer in the 'real environment', they can already anticipate in the design phase what they will encounter in the realisation phase, thereby creating a more complete picture. Bottlenecks become visible even before construction takes place, allowing commissioning times to be significantly reduced. For example, in the food industry where hygiene is a primary concern, with virtual reality the customer can directly see, for example, whether critical areas are easily accessible for the operators. This means that a new plant will operate faster and more efficiently, thus yielding improved revenues for the customer. Dinnissen also expects this procedure to result in reduced failure costs. The company sees virtual reality and plant simulation fitting seamlessly with its business ethos. "Innovation is in our DNA. We continue to innovate in technology and processes, but always focusing on how we can achieve better results for the customer," the company management states.

Maintenance training can also already be initiated before the installation is finished. Dinnissen expects that future-oriented maintenance will be the next phase, for which virtual reality offers something extra. "That will be the next step, possibly supplemented with augmented reality."

www.dinnissen.nl

Mixing with the very best

Current news and technical advances from several of Europe's foremost designers and manufacturers of industrial mixers.

Mixing-drying reactor for the synthesis of active ingredients (amixon, Germany)

A mixing-drying reactor, which amixon recently developed for a manufacturer of pesticides, can process substances of widely differing consistencies. The machine, which dries in a fine vacuum and performs an important process step in the synthesis of high-purity active ingredients, is also very flexible with regard to the filling level.

When active ingredients are synthesised in the production of pharmaceuticals or the manufacture of pesticides, the consistency of the product frequently changes during the mixing and drying process. Plants that additionally process different active ingredients must therefore exhibit a high degree of flexibility.

This requirement is fulfilled by a mixing-dryer/ reactor that amixon has developed and manufactured for a well-known manufacturer of pesticides. The plant can process mixtures with dusty, flaky and powdery consistencies just as well as pasty, sludgy and viscous products.

This is particularly important in the case of high-performance mixing-dryers, since viscoplastic phases have to be passed through in many drying processes. Typical is the transition from a pumpable suspended mass to a viscoplastic, rubber-like substance. As the liquid phase portion is further reduced, the mixture first becomes crumbly and granulate-like, then powdery and free-flowing.

The synthesis process requires the essential process steps to take place in the liquid phase. During the multi-step manufacturing process, different liquids are used in each case for rinsing and extracting. Transformation into a powder takes place in the last synthesis step by means of contact drying.

The flexibility requirement is also satisfied with regard to the mixing process: the machine is suitable both for the careful homogenisation of the mixture and also for more intensive de-agglomeration. In order to exclude undesired reactions and to ensure a constant quality level, the process takes place in a fine vacuum of 0.1 Torr (0.133 mbar).

This flexibility also applies to the quantities that are mixed and dried. The reactor supplies a constantly high mixing quality with filling levels from 10 to 100%. A very high degree of residue emptying is achieved when changing products thanks to the SinConvex® mixing tool developed and patented by amixon. In order to achieve this, the outer contour of this mixing tool is shaped like a sinusoidal curve.

The mixture is conveyed upwards along the wall of the vessel and flows downwards in the centre of the container. This geometry guarantees that all of the mixture flows down to the base of the container during the emptying process.

The vacuum mixer-dryer is capable of manufacturing a high-purity active ingredient. The mixing device is driven only from above and is fully heatable. The shaft seals of the mixing device shaft and the cutting rotor are implemented as face seals. In addition, the sealing valve at the end of the mixing chamber cone, which works without dead spaces, is highly gastight.

The mixing chamber of the reactor was manufactured from Hastelloy C 22. This material achieves a high strength and is at the same time resistant to corrosion. The entire plant was manufactured according to the principles of 'Good manufacturing practice' (GMP) and according to the requirements of the FDA. All qualification steps took place according to GMP. The complete documentation of development, manufacturing and commissioning also meets the high requirements of the pharmaceutical industry.

amixon was able to fall back on its extensive experience in the development of mixers and reactors for customers in the pharmaceutical production industry. For European customers the machines are manufactured according to GMP principles. Certification to ASME, which is continuously renewed, facilitates the production of mixing plants for the pharmaceutical industry in the USA. In the past, amixon has already developed and produced numerous mixing-

drying reactors for pharmaceutical applications with container sizes from 1 to 15,000 litres.

All components of the amixon mixers and dryers are made in Germany. The production of the machines takes place exclusively in the amixon factory in Paderborn, Germany. For the testing of mixing and drying processes, the company runs test centres in Paderborn / Germany, Memphis / USA and Osaka / Japan. Further company test centers are located in Bangkok, Thailand, and Satara, India. In addition to the equipment itself, amixon offers assistance with the qualification of the supplied equipment as a service. All the necessary documentation is drawn up, and qualification of the installation is carried out in cooperation with those who will later operate the plant.

www.amixon.com



amixon vacuum mixer for pesticide production.

Two different mixing procedures in one system (BHS-Sonthofen, Germany)

A new mixing plant from Germany's BHS-Sonthofen, which is believed to be unique in concept, has been operating in recent months at Nikolaus Müller Kalkwerk-Natursteinwerke (Müllerkalk) in Üxheim-Ahütte in Rhineland-Palatinate close to the Belgian border: It combines the continuous moistening of agricultural lime and the batch production of mixed binders for ground stabilisation applications. Müllerkalk supplies both special binders for ground stabilisation and agricultural lime from the Üxheim-Ahütte plant. The raw materials required for this mainly come from the lime works' own quarries.

The company has recently developed 'Müllermix', the new product for ground stabilisation; it consists of a mixture of various lime products and Portland cement. It avoids several work steps in road construction, thereby cutting costs: Müllermix is milled into the ground and hydraulically bound – the ground no longer has to be excavated.

Apart from standardised products, Müllerkalk also offers customised mixtures. Although both product lines have only been on offer for only a short time, demand for the products has been

steadily growing. The second product line consists of earth-moist agricultural limes for agriculture and forestry. They are used to neutralise the pH value of the soil.

Müllerkalk had been employing a single-shaft continuous mixer of type MFKG 0520 from BHS-Sonthofen to moisten agricultural lime for more than 10 years. With a throughput rate of around 50t/h, it could no longer cope with the continuously growing demand combined with the need for shortest possible truck loading times. The company management therefore planned a major expansion of production capacity.

Since the sale of the various lime products is subject to seasonal fluctuations, Müllerkalk was also looking for solutions which enable constant utilisation of the production facilities as far as possible.

The expansion of the product range with the new special binders finally tipped the scales in favour of investment in a new mixing system. It includes both product lines – both dry mixing in batches as well as continuous moistening. Another synergy effect for the company as a whole was provided by using the cement products of the parent company, Portlandzementwerk "Wotan". The homogeneity of the products and a consistent quality were of prime importance in the selection of the mixers. Since the plant had grown over decades from small beginnings, the extremely cramped conditions and the space requirement for the construction of the new mixing system were a particular challenge.

Owing to the excellent experience with the existing single-shaft mixer, Müllerkalk contacted BHS-Sonthofen, but only on the subject of 'mixing technology' to begin with. It quickly became clear that the dry powder batch mixers of type DMX would offer a perfect solution for the planned special binders. However, discussions were gradually extended from the mixers to the complete plant, because the concept was so far from a standard solution that the special application and engineering know-how of BHS was needed for the special plant technology.

In the course of the project, the specialists of BHS-Sonthofen developed a concept for a twin mixing plant together with the personnel of Müllerkalk. It combines the fundamentally different mixing procedures for agricultural lime and mixed binders in two mixers:

- The engineers from Sonthofen recommended the dry powder batch mixer of type DMX 2600 for the mixed binders; this provides an output of 2.2m³ per batch, which corresponds to an hourly output of approximately 100t.
- The MFKG 0728 single-shaft continuous mixer, which achieves an output between 80 and 90t/h, was planned for the earth-moist agricultural lime.

Apart from the BHS mixers, the system includes two binder scales for the batch process and a volume weighing unit for continuous metering. Both systems are supplied from ten 150m³ silos. The silos are filled with raw products

via a newly installed pneumatic conveying plant - firstly, directly from the lime plant and, secondly, with high-quality cement products from the adjoining Wotan cement plant.

The control of the two independent production lines was one of the challenges for the concept of the new mixing plant. It constitutes both dry mixing in batches as well as continuous wet mixing including the complete metering systems. The precise proportional control of limestone powder and water is of critical importance particularly in continuous mixing, because the mixing ratio must be configured to provide a dust-free, moistened, lump-free final product at all times. Both driving lanes have calibrated vehicle weighbridges which provide the control system with the precise loading quantities for optimum filling of the trucks, in order to systematically exclude the danger of overloading. The two mixing lines work in parallel, so that loading can take place simultaneously on the wet and the dry side.

BHS-Sonthofen has especially tailored the twin-shaft batch mixers of the DMX series to the particular requirements for mixing a variety of dry materials such as lime, cement or dry mortar. With the unique modular system, all the mixers are individually configured and tailored to the respective task, no matter whether it concerns fine materials such as binders or mortar mixes with particle sizes up to 8 mm. The dry powder batch mixer series at BHS extends from 20t/h to currently approximately 300t/h.

A special feature of the MFKG mixers, which BHS-Sonthofen manufactures for throughput rates between 10 and 700t/h, is the pulsating rubber trough. It prevents mixed material from caking on the inner wall – the mixer continuously cleans itself during operation. The wear of the mixing arms and the power consumption of the drive thereby decrease compared with machines with a steel mixing trough.

Single-shaft continuous mixers are used for all 'difficult' mixing tasks - also outside the construction industry - starting from the lump-free moistening of dust to the conditioning of sludges of all kinds.

The mixed material is accelerated to a high speed by the mixing arms in the MFKG. The centrifugal force creates a ring of material along the inner wall of the rubber trough with turbulence. The mixing arms generate a very high relative movement. This results in optimum mixing and prevents undesired agglomerations at the same time.

Special spiral jets, which generate an extensive, finely distributed mist, optimally wet the infeed good in the loading chamber.

www.bhs-sonthofen.com



DMX 3600 from BHS-Sonthofen.



MFKG 0520 from BHS-Sonthofen.



BHS twin mixing system at Müllerkalk.



Stainless steel Pegasus from Dinnissen.

Recent enhancements to the Pegasus mixer (Dinnissen, the Netherlands)

The well-known Pegasus® mixer still has its double-axle mixing paddles, which rotate in opposite directions. This creates a unique fluidised mixing zone with an excellent homogeneous mixing result, quickly and with minimal consumption of energy. The mixer can be adjusted to all sorts of bulk goods, either or not to be mixed with fluids. It is suitable for the food, feed, pharma and chemistry industries, with small to high capacities. But Dinnissen is continuously busy with improvements and adjustments to optimise the mixing results and to broaden the applications. The innovations are based on the requests of clients, but also on its own experience. All innovations are implemented immediately, because Dinnissen develops and manufactures everything in-house.

Therefore the most advanced mixer of the Pegasus series will be exhibited at several exhibitions this autumn. They are now equipped with the latest cutting heads. The design is completely fabricated from stainless steel, including the attached automatic sampling system. The design of the mixer has also been further improved so that no product residue stays behind. Hygiene aspects have always been very important during the development of this concept. For perfect cleaning not only are the mixing shafts completely withdrawable, but now you can also open the back cover plate. The cover plates are not flanged but welded, and all seals are fitted so that also wet cleaning is possible.

www.dinnissen.nl

Gentle treatment of polymers in high-capacity blenders (Lindor, the Netherlands)

Many Lindor mixing or blending machines (the use of both words seems more to depend on taste than on real technical definition) have found their way into the polymer industry. Be it for homogenising a single grade of material over time to even out process variability, be it the blending of different grades of material before compounding, or be it for treating polymers with liquid additives and/or temperature cycles. Here follows a selection of applications:

- Homogenising a special compound to even out

variability in extrusion over time (largest Lindor mixer by batch weight: up to 30t!)

- Blending various grades of polymers at high throughput while maintaining complete particle integrity – no dust creation
- Continuous ‘dusting’ after extrusion to prevent sticking
- Soaking and impregnating polymer pellets with liquid (organic) compounds for performance enhancement
- Heat treatment of polymers, like PUR, to provide them with specific performance characteristics
- Drying and maturing of special polymers, like super absorbents without reducing particle size and generating dust.

For these applications Lindor collaborates with manufacturers of extrusion lines, system integrators as well as with the compound manufacturers. Machines are installed around the world: Saudi Arabia, Taiwan, Germany, China, the Netherlands, Brazil, etc.

Each application requires a specially developed configuration of the blender. In case of the application for soaking polymer pellets, three things are crucial: a) to evenly spread the very small percentages of liquid over the pellets; b) to control an elevated temperature of the pellets as well as of the liquid organic compound; c) to avoid any ingress of dust, foreign particles, or other contamination in the product. Foreign particles, however small, should be a lot less than 1 ppm for some of these applications. This configuration therefore includes a jacketed and isolated mixing drum with water heating, water heated liquid injection lances, special non-contact air seals and ATEX ½ compatibility.

A complete different application is a small Lindor mixer in continuous mode for processing 5t/h of polymers and providing a fine distribution of a dusting agent (like talc) to prevent still warm and somewhat tacky polymer pellets from sticking and bridging.

A new development is to equip a Lindor mixing drum with the means to pull vacuum for charging the rotating mixer with pellets using vacuum transport technique. In this way base material can directly be pulled from a main silo while the other fractions can be pulled from a separate hopper.

Most mixers for use in polymer blending and processing are placed on load cells.



MXK6700 horizontal single shaft reactor/dryer.

Lindor mixers play a key role in the production of a variety of polymer products, ranging from engineering plastics for the automotive industry, precious compounds for medical devices, special ultra-high resistance polymers for high-voltage electrical cable isolation to super absorbent powders for baby diapers. Every application is unique, inventive and smart!

www.lindor.nl



Lindor mixer with heating jacket and special no-contact seals.



Lindor machine for blending fragile engineering plastics.



Dumping plastics into rotating Lindor mixer.



Lindor: gentle blending of PTFE ('Teflon') powders.

Reactor/dryer for food additives (MIX, Italy)

MIX Srl has been designing and manufacturing mixing systems and industrial components for bulk solids handling since 1990. In May of this year the company supplied an MXK6700 type horizontal single shaft reactor/dryer with paddle-shaped tools and a usable capacity of 7000 litres to a leading producer of food additives. The machine had been tailored for this specific process, where mixing of bulk solids with liquid additives causes a strong exothermic reaction inside the mixing vessel. It is equipped with mechanical seals and is able to withstand maximum pressure and temperature, up to 5 bar and 180°C respectively. Fabricated from AISI 316Ti stainless steel, the reactor/dryer is suitable for vacuum operation and has been provided with a heat exchanger, in order to control and modify the product temperature inside the mixing vessel.

MIX aims to operate not merely as a supplier to its customers, but additionally as a reliable partner with the capability of developing new solutions and increasing the efficiency of production processes. The company is certified in accordance with ISO 9001, ISO 14001 and BS-OHSAS 18001.

www.mixitaly.com

High-speed mixing of plastics and powder coatings (Primixon, Italy)

Italian mixer manufacturer Primixon, specialising in production of mixing plants for plastics and powder coatings, numbers among its prime products the high-speed TMX turbomixer as well as the high-speed TRX container mixer. The TMX is available in single configuration, or combined with the high-efficiency CMX horizontal cooler, for production of PVC dry-blend, WPC, thermoplastic polymers, master batch, additives and powders. The TRX is suitable for rapid mixing of powders, additives, colours, master batches, polymers and engineering plastic.

Since the company started trading three years ago it has acquired over 200 customers and has delivered some 200 mixing plants worldwide. It currently employs 40 skilled and qualified people and extra staff are in the process of being employed for engineering, plant assembly and servicing responsibilities. Primixon has just put into operation a further 1500m² of factory floor space as well as a new test plant which allows customers and guests to carry out trials with different materials and specific equipment. The company will be attending K-2016 in Germany next month at booth H02 in Hall 10.

www.promixon.com



Promixon container mixer.



Super absorbent polymer in Lindor KONTI mixer.

Benefits of microwave moisture sensors

Neal Cass, sales manager of Hydronix Ltd, describes how correct deployment of moisture measurement in rice production can increase quality and yield while at the same time reducing energy costs.

India is the second largest producer of rice in the world, second only to China, and processing approximately 155,682 million metric tons per year. Its rice cultivation area covers more than 44 million hectares and accounts for 40% of the food production in the country. This article explores the benefits that introducing microwave moisture measurement into the drying process can bring to the producer.

If rice is going to be stored for a period of time then the preferred choice is paddy rice as this is the grain in its natural unprocessed state, still containing the husk. Ideally this should have a moisture content of approximately 14% before storage. As a general rule of thumb, the storage life of the grain is halved for every 1% increase in moisture content, which means that accurate moisture measurement is vital to ensure profitability.

To increase the storage life of the grains and to preserve more of its nutritional value, the rice is often steamed or parboiled in the husk before drying for storage or processing further. This gelatinises the starch within the kernel and hardens the individual grains which makes them easier to handle and also reduces the amount of broken kernels during milling.

The processing of rice in India has typically been manual, relying on a workforce to turn the grains in the sun to dry them after steaming and before the rice is sent for milling or storage. Recent changes in dryer technologies have allowed larger processing plants to dry much larger quantities of rice. However, operators have still manually controlled the drying functions of these systems which can cause inefficient drying when the process is not fully understood.

The introduction of affordable digital microwave moisture measurement into the process is revolutionising the rice industry in India. It provides accurate moisture readings of the grain at important stages of the process enabling the producers to directly control the dryers in real time. This leads to rice that has been dried to the correct moisture percentage for processing and has the direct effect of increasing the quality of the grains and therefore an increase in the producers' profitability.

Parboiling paddy rice

The parboiling process consists of heating the rice in circulating hot water for up to 7-8 hours in boiling kettles or soaking tanks which typically hold between 1000 and 2000 litres each. The rice is at a moisture content of around 30% when it is discharged to a drying system.

Drying rice

There are two main objectives when drying rice:

the first is to minimise the amount of broken rice in the final product and the second is to get to the target moisture level as quickly and accurately as possible to reduce energy expenditure.

The rice is typically between 30-34% moisture when it enters the drying process after parboiling. It needs to be dried to reach a target of 14% before being passed across for storage or 10-12% for the milling process, where it is de-husked, sorted and polished before packaging.

Drying systems may be either a batch or continuous process. In a batch dryer, the rice is circulated until the moisture level reaches a set target. In a continuous dryer process the rice passes through a number of stages, often using different dryers, with each stage reducing the temperature of the dryer as the target moisture level is reached. This allows the rice to be dried quickly while the moisture level is higher and then more slowly as the rice gets drier. The end result is that the rice is dried as quickly as possible without affecting the quality of the final product.

The table below illustrates an example of the targets reached during this process:

Stage No:	Set moisture, %	Set temp, °C	Fan speed (Hz)
1	18.0	100	55
2	16.0	105	50
3	14.0	100	50
4	11.90	90	55

Installing a moisture sensor

The installation of a proven microwave moisture sensor into the system will enable the producer to accurately know the moisture level of the rice at critical parts of the process enabling the dryer temperature and drying time to be precisely controlled.

In a batch dryer system the best location for measuring moisture is in the outlet from the dryer where it goes to the elevator which either recirculates the rice or sends it forward to the milling hall.

In a multi-stage (continuous) dryer, the best results can be obtained by measuring at the outlet from each of the stages. This enables each stage to be individually controlled to get the correct moisture level before the rice is transferred to the next stage.

The most effective measurement for either system is achieved using a moisture sensor that is mounted in ducting.

Calibration and accuracy

Some sensor manufacturers sell their equipment with generic calibration constants for different materials or claim that calibration is not required, but this does not remove the need for the calibration process if users want to get the best



Hydronix sensor installed in ducting system.

results from their sensor. As an example of this, if the producer uses a generic value for the calibration constants an accuracy of +/-1% may be achieved. However, by using a full calibration technique it is possible to get a basic accuracy of +/-0.5% and, with the best care and testing, even achieve +/-0.3%. Therefore it is important to have a simple and effective way of performing a calibration.

Hydronix always recommends using real values from the process to define the calibration rather than generic values. This is usually done during commissioning of the sensor so that the producer has accurate values to work with from the start and there should be no need to recalibrate the sensor unless there is a distinct change in the material. However, it is simple to perform sensor calibrations if needed. The producer notes the reading from the sensor at the same time as taking a sample of the material. The material sample is then completely dried and analysed using the producers' current method, for example a moisture balance or desktop analyzer. Using the sensor software the resulting values from both processes are entered into a table. Hydronix sensors respond linearly to changes in moisture so a minimum of only two test results are required in order for the sensor to derive the moisture percentage for all other values.

Sensors that use older technology, for example those using analogue measurement techniques, do not have this linear relationship with the change in the moisture and this increases the work needed to define the relationship to the sensor value. These sensors are also more difficult to stabilise for environmental and manufacturing variations, which decreases the reliability and repeatability of the measurement.

Benefits of moisture measurement

In a batch dryer system, the automation control system would have the temperature set-points adjusted periodically to match each stage of the process. This was usually done manually by an operator using either an offline moisture tester to test a sample of rice, or by the look and feel of

the rice grains. By installing moisture measurement sensors, it is possible to automatically adjust the control loop set-points in real time to match the drying stage of the rice.

This automatic adjustment provides a major cost saving by reducing the amount of energy required to heat the dryers as the rice is automatically dried at the optimum rate for that stage of the process. This will also result in a final product quality improvement as there is less breakage due to the grains being dried too quickly.

A Hydronix customer, MJ Grain Products Pvt Ltd of Siliguri in India, has reported:

"Before installing moisture measurement we were experiencing a 5% loss due to broken or cracked rice. This has been reduced to 1.3% after installing four Hydronix moisture sensors into our process. This gives us an increased yield of 3.7% and the sensors have paid us back for the capital outlay very quickly".

About Hydronix

Hydronix is at the forefront of microwave moisture measurement research and development and is the world's leading manufacturer of online microwave moisture measurement sensors. Advances made by the company over recent years have uniquely enabled Hydronix digital sensors to be used successfully in applications that were not previously possible. The digital measurement technique is now proven to give highly accurate and reliable results allowing rice processors the ability to control their process more accurately. A significant increase in profitability may be achieved through waste reduction, yield maximisation and the efficient use of energy. The sensors will normally return a payback on the investment in a matter of weeks after installation. With over 60,000 systems installed in over 90 countries and with a global support network, Hydronix is the preferred choice for OEMs and end-users alike.

Contact details:

Tel: +44 1483 468900; enquiries@hydronix.com; www.hydronix.com



Rice dryers at MJ Grains, India.

What's new?

Latest innovations in handling and processing equipment, storage and transport vessels, bagging, components, measurement and control instrumentation, including environmental/safety technology.

Accurate feeding of fibres

Brabender Technologie, Duisburg, Germany, has introduced a new fibre feeder, which is said to break new ground in the metering of long and uneven fibres. While conventional feeders were previously restricted to short and compact bundles of fibres such as, for example, glass fibres, the new feeder is now capable of accurately metering natural fibres, wood fibres, long carbon fibres and film chips.

As one of the main fields of application, the new feeder can be used for shredded film strips. These are waste material from plastic film production processes, where the film edges are cut off by film edge trimmers. This results in 10-30% of unspoiled material, further utilisation of which has until now been difficult. The new feeder allows the remnants to be fed back into the production process as film chips so that they can be recycled.

Feeding of natural fibres is another field of application. The fibre feeder is capable of metering them reliably, accurately and continuously in filling material or wood-plastic composites production processes. Feeding of such long fibres is made possible by using a special fibre screw, a large steep walled hopper and a novel design and special position of the stirring agitator in the hopper. "This unique and innovative design promotes forced ingredient flow into the screw", explained Norbert Marek, who provided the idea for the fibre feeder. Considering that the flow characteristics of the ingredients differ



Brabender Technologie's fibre feeder.

significantly, design details vary in each individual case. The company maintains confidentiality regarding the exact construction of the feeder. The unit will be featured by Brabender

Technologie (Hall 10, Stand A41) at K 2016 which takes place 19-26 October in Düsseldorf, Germany. www.brabender-technologie.com

Fast and reproducible pulverisation of large sample volumes

Retsch, Haan, Germany, claims that no grinder can beat the speed of a vibratory disc mill when it comes to preparing samples, for example for XRF analyses. In addition to its well proven RS 200 vibratory disc mill, the company is now offering the RS 300 XL for sample volumes up to 2000ml. This new model allows for simultaneous processing of up to four samples. Thanks to the robust universal drive shaft, which sets the grinding jar into a 3-D motion, it accepts grinding sets weighing up to 30kg. The RS 300 XL very effectively grinds hard, brittle and fibrous samples like cement, coal, minerals or electronic components by impact and friction. Grind sizes below 50 microns are typically obtained in a matter of seconds. For safe operation the grinding set is firmly attached to the vibration plate with a pneumatic clamping device. A selection of grinding jar materials and sizes makes



RS 300 XL vibratory disc mill.

this mill versatile and suitable for grinding a variety of sample materials without affecting analysis results.

www.retsch.com

Hygienic tubular chain drag conveyor



The Chainflow drag conveyor and (right) gentle and hygienic handling is provided by UHMWPE discs connected by robust stainless steel chain.

Spiroflow, Clitheroe, UK, has launched the Chainflow tubular chain drag conveyor in response to increasingly stringent requirements of the food industry. Fragile foodstuffs such as coffee beans, cereals, breakfast cereals, nuts, dried fruit and confectionery can be transferred gently, hygienically and in a dust-free manner at capacities up to 10.5m/h by means of ultra-strong 304 or 316 stainless steel chain fitted with moulded UHMWPE discs. The conveyor can be cleaned in place and is engineered to run continuously.

Users can achieve intricate layouts with multiple inlets and outlets in

complex three-dimensional circuits where required. The system can convey over long distances with maximum straight line lengths up to 76m per conveyor, with the possibility of linking multiple conveyors for longer distances. The conveyor can run empty, be stopped and started under load, and flood or meter fed for maximum operational flexibility. It has a drive assembly at one end of the circuit and a return housing, fitted with an automatic tensioner, at the other end. Chainflow components are designed for hygienic applications and the tubular conveying path is crevice-free.

www.spiroflow.com

Collecting samples that are truly representative

INADCO Systems, Eersel, the Netherlands, has recently developed an automatic sampler which incorporates several design features of its Densimeter – a machine which has a track record of success in the potting compost industry dating back 16 years. With the new sampler a rotating shovel collects a small sample from a vertical product stream and brings this to a weighing collecting cylinder. The interval time to collect the subsamples and the end weight of the total collected sample can be pre-programmed by the user. When the

end weight is reached the sampling stops, the weighing cylinder opens at its base to discharge the collected sample into a bin or similar receptacle for later analysis. Sampling will then restart automatically.

The INADCO sampler can be extended by means of a moving chute so that multiple bins can be used for storing the collected samples in sequence, in the event that there is insufficient time to process a sample immediately while another batch may have already begun. The sampler can be used for basically any bulk

material, ranging from fine to coarse, and including sand, rice, biomass, peat, clay and even French fries. In its basic form it simply collects the sample in accordance with the selected parameters. A data connection facility is optionally available with a process computer for transferring data such as time, date and weight. The control system incorporates a Siemens S7 PLC, thus allowing multiple possibilities for customisation. INADCO is also a leading specialist in the field of moisture measurement.

www.inadco.nl



The INADCO sampler in its basic form and (right) fitted with chute.



INADCO

Automated alert of explosion panel activation by text message

Elfab, North Shields, UK, a specialist manufacturer of pressure relief systems, will be exhibiting at SyMas which takes place 5-6 October in Krakow, Poland. The company is taking the opportunity to showcase 80 years' experience by demonstrating its latest product developments in bursting-panel technology relating to bulk storage and handling.

Elfab will share its extensive knowledge and offer advice on correctly specifying the most appropriate explosion panel for

the process conditions in order to reduce potential safety hazards and unnecessary costs. At the show the company will be introducing the industry's first GSM Alert monitoring system, designed to send an SMS text message alert in the event of an explosion panel activation. This dual-channel remote deployment and monitoring system is capable of interfacing with any of Elfab's explosion panel burst detection systems.

www.elfab.com

Digital sorter breaks new ground in technical sophistication



VERYX belt-fed digital sorter.

Key Technology, Walla Walla, WA, has introduced VERYX® belt-fed digital sorters to complement the chute-fed version of the VERYX

launched last year. With a highly innovative mechanical architecture, sustainable all-sided surface inspection, multi-sensor Pixel Fusion™,

the highest resolution cameras and laser sensors available on a digital sorter and extreme ease-of-use, VERYX is claimed to maximise foreign material (FM) and defect detection and removal while virtually eliminating false rejects. Believed to be the world's most intelligent sorter, VERYX improves product quality, increases yields and reduces the need for human intervention. It is mainly intended for food industry applications.

"Our next-generation VERYX sorters achieve more accurate discrimination – they detect additional kinds of defects and smaller defects; at the same time they sacrifice almost no good product to the reject stream. More intelligent automated decision-making minimises the need for operator interaction and helps maintain optimal sorting performance," said product manager Marco Azzaretti. Key Technology's European head office is in Beusichem, the Netherlands.

www.key.net

Weigh batch discharge of bulk bags

Flexicon Europe, Whitstable, UK, has introduced a new BULK-OUT® bulk bag weigh batch unloading system with manual dumping station and flexible screw conveyor. Designed for easy cleaning, it automatically conveys weighed batches of contamination-sensitive materials to downstream processes. The BFC model discharger frame is equipped with a cantilevered I-beam with electric hoist and trolley for positioning of bulk bags without the use of a forklift. The unit incorporates various tried and tested Flexicon technical features,

including: SPOUT-LOCK™ clamp ring; TELE-TUBE™ telescoping tube which securely connects the clean side of the bag spout to the clean side of the equipment intake; FLOW-FLEXER™ bag activators; BAG-VAC™ dust collection system; FLEX-FORCE® lump breaker integral to the hopper; and POWER-CINCHER™ pneumatically actuated flow control valve. A bag dump station with folding bag shelf allows manual dumping of minor additions into the hopper from hand-held packaging and containers.

www.flexicon.co.uk



The entire system is constructed of stainless steel finished to sanitary standards, and is rated for washdown regimes.

ON OTHER PAGES....

- Prewashing of contaminated plastic (p4)
- Innovations in plastics handling (p6)
- Hygienic transfer of sieved dry food ingredients (p8)
- Aseptic processing of APIs (p14)
- Microwave moisture sensors (p17)

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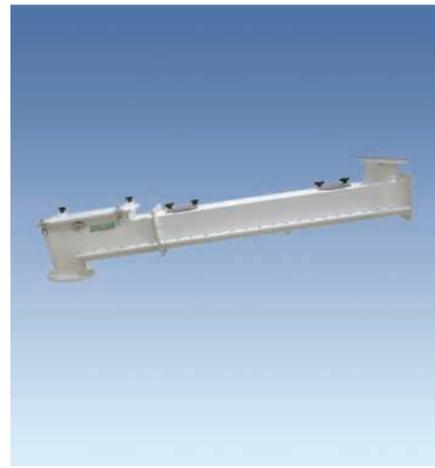
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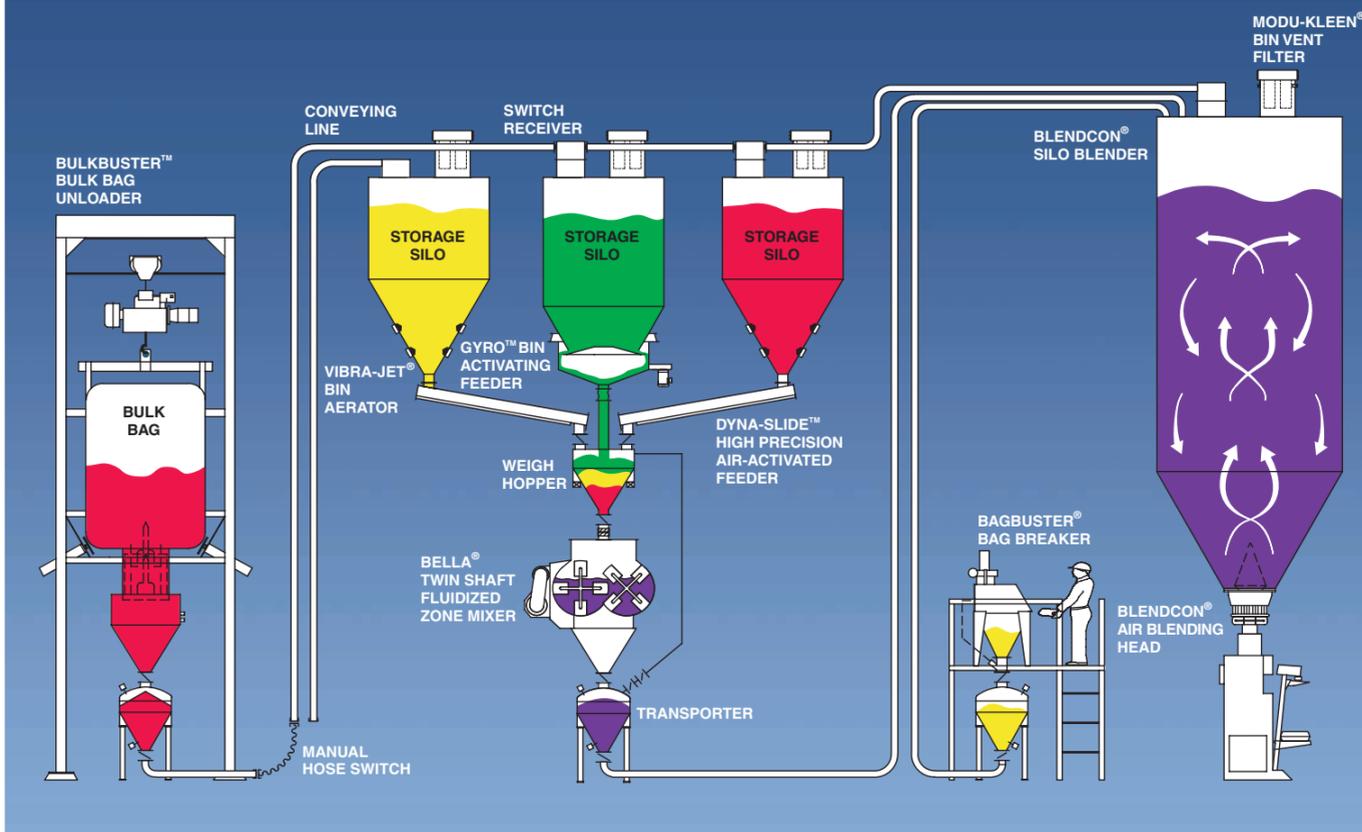
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