

IN-HOUSE TEST CENTRES FOR PRECISION BULK HANDLING, PROCESSING & PLANT SAFETY

This 2017 EuroBulkSystems Test Plant Supplement is the eighth in the popular annual series. It provides useful data, not available elsewhere from a single source, on testing facilities and specialist laboratories serving various areas of technology for handling, processing and measuring bulk powders and granulates. During the next 12 months it can be accessed online at eurobulksystems.com.

Apart from providing invaluable research & development facilities for plant and equipment manufacturers developing new prototype machines, in-house test centres are becoming increasingly important as a marketing tool. Initially they help to kindle a working relationship with a potential new customer and at a later stage can be instrumental in determining whether a new contract, for just one piece of equipment or for an entire integrated materials handling system, is won or lost.

AVA-Huep GmbH & Co KG, Germany

Area of specialisation: mixers, dryers, reactors in horizontal and vertical design.

What is available: AVA offers a fully equipped test centre to the customer. The AVA Test Centre is one of the few in the world to test horizontal and vertical mixers and dryers. Thus, the company is not limited to a specific technology, but can provide the optimal solution for the customer's application.

- Simple mixing tasks up to complex drying processes under vacuum

(Mixing, drying, reacting, sterilising, evaporating, granulating, moistening, de-agglomerating, heating, cooling)

- Availability of horizontal and vertical mixing systems in various sizes

- Implementation of batch, fed-batch and continuous processes

- Wide range of adjustment options

Product temperature: 5-350°C

Pressure range: -1 to +4 barg

Tool speeds: 0 - 27m/s

- Different types of heating

Indirect: contact heating via double jacket

Directly: steam or air heating

- Various mixing tools and options (such as chopper)

- ATEX tests: blanketing with nitrogen

- Determination of the physical and chemical properties of the end products

The experience of a variety of built machines and the high process engineering know-how of the AVA development department ensures a reliable scale-up of the test results on production machines of any size.

Terms of use: Experiments in the AVA Test Centre can be carried out by all interested parties worldwide, who want to test their application on AVA mixing and drying technology. In the run-up to the tests a feasibility analysis is prepared by our process engineering department. Together

with the customer, a test plan including product specifications and customer objective is designed. The duration of the tests is not limited and a fee is levied depending on the effort and scope. After completion of the tests, a comprehensive test documentation is prepared for the customer. The test results are confidential.

Location: Herrsching near Munich, Germany

Contact: Team Process Engineering (process@ava-huep.com; tel +49 8152 93920)

www.ava-huep.com

Dynamic Air Ltd, UK (also USA and Brazil)

Areas of specialisation: Pneumatic conveying and mixing/blending.

What is available: Full pneumatic conveying testing as well as bulk bag unloading, blending, mixing, agglomerating, coating, bin discharging, and dust collection. All dry material characteristics are analysed to determine their exact handling and product performance values. Most tests are fully instrumented and computerised, using the latest in testing software. A full evaluation can be provided, including equipment performance criteria, efficiencies, hygroscopic effects, build-up tendencies, respective velocities, material-to-air ratios, capacity values, degradation issues, dust collector requirements, optimum conveying pressures, fill times, air volume requirements, bulk densities, segregation, and other relevant data as might be required. The UK test facility serves the UK and Europe. The company offers 16 different pneumatic conveying concepts, including 7 dense phase systems, two medium phase pressure systems, three dilute phase pressure systems, two dilute phase vacuum systems, and two dense phase vacuum systems. Dynamic Air also has full scale testing capabilities at its US and Brazil facilities.

Terms of use: Testing is available to everyone. The company does charge for use of the test plant but does not impose a time limit on the duration of the trials. All test results are confidential.

Location: Milton Keynes, UK; outside Europe at St. Paul, MN, USA and at Sao Paulo, Brazil.

Contact: Mark Williams (sales@dynamicair.co.uk; tel +44 1908 622344).

www.dynamicair.com

Maschinenfabrik Gustav Eirich GmbH & Co KG, Germany (also USA, Japan, India, Brazil, China and South Africa)

Area of specialisation: Mixing blending, granulating, coating, kneading, dispersing, suspending, drying, grinding.

What is available: At the Eirich Process Technology Center in Hardheim, the activities of the Eirich Group are combined in research, development and



Dynamic Air's Milton Keynes, UK, test plant is especially well equipped for pneumatic conveying trials and serves a Europe-wide customer base.

application technology. The process engineering experience and knowledge on the production and processing of a wide range of solids systems in various industries are bundled here.

In addition to mixing, innovative and above all particularly economical solutions in the field of granulating, coating, dispersing, kneading, suspending, drying, reacting and fine grinding are presented to customers.

Engineers and technicians from different disciplines analyse the results and experiences from more than 300 tests per year, dozens of start-ups and hundreds of running production plants from a wide range of industrial sectors. Individual customer problems are analysed jointly with the company's highly experienced process engineers and customer-specific solutions are developed taking into account the respective boundary conditions. In this way, suggestions are being made for new technologies, cross-sectoral technology transfer and process engineering concepts which enable a practical development and improvement of new and well known processing and production processes.

Classical as well as alternative preparation procedures and solutions are practically demonstrated to the customer at the Eirich test centres after that, in order to enable the



Different aspects of the AVA Test Centre.

customer to select the best possible solution for his requirements. The achieved results and solutions guarantee all customers an economically and technically optimal preparation technology.

State-of-the-art machinery and equipment for grinding and mixing / granulating, etc. from laboratory (1 litre) to production scale (400 litres) together with extensive process data acquisition and analysis technology allow flexible and versatile experimentation for both feasibility studies and scale-up tests. Individual test setups enable production-oriented testing.

The comprehensive database, determined in this way, combined with many years of practical experience of the employees from tests and commissioning, enables a secure machine and system design.

After the installation of rented or purchased machinery and systems, they are commissioned by Eirich's experienced engineers on site. The accumulated operating experience is directly beneficial to customers during commissioning and consulting.

Terms of use: The company's test centres are available to every interested customer. A fee is usually charged for testing services, part of which can be refunded when customers buy equipment. Each project is individually assessed in this respect and special discounts may apply. Trials usually last from several hours to several days, but there is no time limit. Results are kept confidential (NDAs can be concluded upon request) and are for use of the customer. Rental machines are available and can be hired for further on-site testing and small scale sample production.

The test centres are always available to customers from around the world. Normally most customers carry out tests in the nearest test centre.

Location:

Germany: Process Technology Department/Test Center, Dr Stefan Gerl (technikum@eirich.de; tel +49 6283 51 302 /303)

USA: Eirich Machines Inc., Gurnee, IL (eirich@eirichusa.com; tel +1 847 3362444)

Japan: Nippon Eirich Co, Ltd, Nagoya (eirich@nippon-eirich.co.jp; tel +81 52 533 2577)

India: Eirich India Pvt Ltd, Mumbai (info@eirich.in; tel +91 22 286794 44/45/46)

Brazil: Eirich Industrial Ltda, Jandira SP (eirich@eirich.com.br; tel +55 11 46198900)

China: Eirich Group China Ltd, Shanghai (eirich.shanghai@eirichchina.com; tel +86 21 6043 1116)

South Africa: H Birkenmayer (Pty) Ltd, Isando (info@birkenmayer.co.za ; tel +27 11 9703880).

Within the Eirich Group, the German test centre is the largest and most comprehensive. A close cooperation exists between the different test centres. Additional special machinery is available at different locations.

www.eirich.com



Inside the Eirich Process Technology Center in Hardheim.

EKATO SYSTEMS GmbH, Germany (also USA and China)

Area of specialisation: Solids mixers, solids dryers, solvent extraction reactors.

What is available: Even with over 80 years of experience in the field of mixing, small-scale trials are still mandatory to determine the best mixing solution for the customer's product. In addition, the EKATO SYSTEMS products undergo a continuous process of re-evaluation and improvement.

In order to do this professionally, R&D competence and R&D testing facilities are required. Customers find both at the company's test centres.

The company's application engineers are able to demonstrate the capabilities of the equipment in small-scale testing equipment which is also available for rent. The test results provide the basis for scale-up to commercial size.

The main test centre located at the EKATO SYSTEMS facility in Schopfheim, Germany, is rated for handling of solvents/dust (ATEX) and maintains vacuum and pressure rated equipment including solvent recovery systems.

- VPT 3 test dryer: 3-5 litre usable volume, F.V. 120°C rated, mobile unit.
- VPT 25 test dryer 25-50 litre usable volume, F.V. 131°C rated, mobile unit.
- VPT 50 test dryer 50-100 litre usable volume, F.V. 230°C rated, stationary unit.

All test equipment is of stainless steel construction and provides in-line data collection of all relevant test data, including but not limited to torque, temperatures and pressure. Sample taking as well as product analysis such as sieve analysis or moisture content is available.

Terms of use: The test facilities are available for everyone. As every engineering service the use of the test centre as well as the rental of the test equipment is subject to a contribution charge. Some restrictions apply for the testing of hazardous materials. Long-term testing or 24/7 testing is available, however, subject to availability. The use of the test facility for small-scale production is limited but the company maintains a database of toll manufacturers using EKATO SYSTEMS equipment.

Customers from all countries are travelling to the Black Forest for testing. Next to the scenery, the EKATO SYSTEMS Germany test facility offers access to a total of three test centres:

- EKATO SYSTEMS: mixing in solids
- EKATO UNIMIX: mixing stable emulsions
- EKATO Rühr- und Mischtechnik: mixing liquids.

Locations: EKATO SYSTEMS GmbH as a part of the EKATO GROUP maintains testing facilities for its solids mixer and solids dryer range in three locations:

- EKATO SYSTEMS GmbH, Schopfheim, Germany
- EKATO Corporation, Oakland, NJ, USA
- EKATO China, Shanghai, China

EKATO SYSTEMS application engineers are able to demonstrate the capabilities of the equipment in small-scale testing equipment which is also available for rent. The company also maintains testing equipment for the production of stable emulsions. Mobile mini-plants in the 3 litre and 25 litre capacity range are available. Stationary testing equipment ranges from 100 litre to 1000 litre capacity.

EKATO SYSTEMS GmbH is part of the EKATO GROUP, located in Schopfheim, Germany. Within the Group, access to the test centre of EKATO Rühr- und Mischtechnik GmbH is available. The test facilities for liquid mixing processes include but are not limited to:

- 100m³ test pit
- 100 bar, 100 litre hydrogenation reactor
- 50 litre coaxial agitator (dual shaft) reactor for high viscous mixing.

For details, customers are invited to contact their local EKATO SYSTEMS representative at:

www.ekato.com



A mixer trial underway at the Schopfheim test centre of EKATO SYSTEMS.

FPE Global Ltd, UK

Area of specialisation: Pneumatic conveying, FIBC discharging and filling systems and a wide range of materials handling technology products.

What is available: Launched in 2016, FPE's new test facility is at the forefront of Materials Handling innovation. Housed within FPE's bespoke 30,000 sq ft manufacturing facility, it has the ability to pneumatically convey some of the most specialist materials up to 500m.

The test facility covers an area 3120 sq ft. It has been designed by experts to challenge and innovate the way specialist materials are handled. The range of equipment allows different pneumatic conveying regimes to be tested with a wide variety of customer products. FPE Global's customer trials have successfully pioneered materials handling technologies across a various industries, including specialist materials, food and beverage, pet food, renewables, detergents and chemicals.

The full-scale test plant is configured to test the following systems and processes:

- Lean phase pneumatic conveying – both positive and negative pressure
- Dense phase conveying – discontinuous and continuous systems
- Plug suction conveying for batch transfer
- Neuphase low velocity pneumatic conveying (blowtank systems)
- Variflow low velocity pneumatic conveying (rotary valve systems)
- Screw conveyors
- En-masse chain conveyors
- FIBC discharging
- FIBC filling
- Aero-mechanical conveying.

FPE Global states that for over 30 years it has conducted significant lab tests for customers including major blue chip companies to determine product handling characteristics, prior to actual conveying or other materials handling trials. The tests carried out in the new test facility include particle size analysis, moisture content, bulk density measurement, angle of repose and slip measurement, fluidisation tests and flow evaluations. The test facility is secure for the handling of potentially hazardous materials.

Terms of use: To guarantee maximum efficiency and return on investment, FPE Global works closely with customers throughout the testing process.

Whilst every effort has been made to verify the information contained in this Test Plant Supplement, the publishers do not accept responsibility for the accuracy of its content.

The output from any trials is presented in a detailed report, providing customers with specific advice and recommendations regarding equipment design. This also allows the company to scale up with confidence when designing larger systems and solutions for customers. It maintains full records of materials tested to assist with future designs and guarantee the confidentiality of any information provided by customers.

Location: Manchester, UK.

Contact: Jeremy Booth, sales director (jbooth@fpegroup.co.uk; tel +44 161 477 4775).

www.fpeglobal.com



Part of the pneumatic conveying test rig at FPE Global's new Manchester test facility.

J-Tec Material Handling, Belgium

Areas of specialisation: Pneumatic conveying, mixing (dissolving of solids into liquids), product characteristic determination.

What is available: J-Tec's test room offers a multitude of testing possibilities, such as the determination of product characteristics in the company's product laboratory, discharging, extraction, pneumatic and mechanical conveying, sieving, mixing, dissolving of solids into liquids, dosing, dedusting, etc.

All the necessary equipment is available for discharging bags, bulk bags and containers and there is the capability to run tests with fluidisation bottoms or bin activators.

Pneumatic conveying can be tested over a distance of up to 450m, vacuum or pressure, dense and dilute phase, pressure vessel/rotary valve. Compressor with air drier and vacuum pumps are available. For certain products (sensitive to

degradation, high density or sticky/greasy) an overflow system with bypass can be installed in a very low velocity dense phase conveying system.

The test facility offers the possibility for dosing of bulk materials, gravimetric and volumetric, batch and continuous, with LIW feeders or J-Tec's patented dosing valve. There is also a deduster with a capacity of about 1t/h and a final dust content of no more than 20 ppm maximum.

The test plant also offers inline and batch powder/liquids mixing systems. Inline mixing is achieved with a loss-in-weight feeder, combined with an inline mixer. The solid:liquid ratio can be changed throughout the entire process, and heating is possible. Powder ratios up to 80% can be reached with this system. It can be used for solids stored in all kinds of receptacles: bags, bulk bags, silos, etc. For batch mixing tests, J-Tec provides a vacuum batch mixer. This test plant is used internationally.

Terms of use: The test plant is available to everybody and J-Tec charges a fee for testing. Time limits can be discussed depending on the application. The test results are confidential.

Location: Kapellen, Belgium.

Contact: Jonathan Van der Auwera (jonathan.vanderauwera@j-tec.com; tel +32 3 660 5272).

www.j-tec.com

Köppern Aufbereitungstechnik GmbH, Germany

Areas of specialisation: Briquetting, compaction, comminution/high pressure grinding.

What is available: The company was established more than 115 years ago and has developed considerable experience in the fabrication of roller presses as well as engineering services for complete plants incorporating roller presses. Köppern roller presses are designed for briquetting and compaction of fine-grained bulk materials and also for crushing brittle material. The company is particularly well qualified for applications where materials are hot (700°C), abrasive, or if high capacities are required.

In cooperation with the technical university Bergakademie Freiberg it operates a pilot plant where basic data for the design of its customers' equipment and processes are established. This test facility is equipped with all equipment required for material preparation (such as milling, screening, mixing, drying, as well as heating with ovens offering temperatures up to 900°C), briquetting/compaction and a variety of components capable of analysing numerous physical parameters of feed material and product. For all tests industrial-scale roller presses are used. Tasks required for high-pressure grinding with roller presses can be analysed at open and/or closed circuit operation conditions.

Another roller press pilot plant located at Studiengesellschaft für Erzaufbereitung (SGA) in the town of Othfresen serves to acquire data for the comminution of ores. In addition high-pressure grinding facilities are located in Australia, Canada, and Russia and mobile crushing units are available on request worldwide. The process-related knowledge acquired during many years of pilot plant operation is a prerequisite for the successful implementation of industrial projects. Customers

frequently accompany the testing activities. After completion of the investigations, a detailed test report is prepared outlining testing conditions and results.

Terms of use: Not specified.

Location: Freiberg, Germany.

Contact: Dr Harald Günter (info@koeppern-kat.de; tel +49 3731 2018-10)

www.koeppern.de



Köppern Pilot Plant operates in cooperation with the technical university Bergakademie Freiberg.

KREYENBORG Plant Technology GmbH & Co KG, Germany

Area of specialisation: Food: Germ reduction, stock protection, drying and roasting.

Plastics & chemicals: Drying, mixing, storing, conveying and dosing.

What is available: The company operates two trial centres.

In the main trial centre in Senden (Germany), continuous or discontinuous experiments in the plastics, food and chemical industries can be performed. Here the company is able to demonstrate all its services – storage, mixing, conveying, dosing, drying, crystallising, reducing germs, decontaminating, disinfecting, roasting, toasting and aroma release. It is also able to demonstrate performance by subcontracting for smaller batches.

In the smaller trial centre in Rohr there is the capability to perform discontinuous tests for the food industry to reduce germs, decontaminate, disinfect, roast, toast and release aromas. There are several options for analysis available.

Experienced personnel supervise demanding tests and applications. Our equipment is furnished with comprehensive automation and measurement technologies.

Sample trial objectives:

- Drying and crystallisation of material (plastic, food, chemical) to determine residual moisture, residence time, energy input and material properties.
- Germ reduction and disinfecting of various foodstuffs. Diverse food products can be tested in a single trial day. The treated material can then be examined in a laboratory.
- Roasting of various food products and setting the optimum roasting level.
- Continuous processing of larger quantities, to validate the first discontinuous tests and to adapt to later production conditions.

Terms of use: Available to existing customers and



J-Tec's test facility has up to 450m of conveying lines and offers state-of-the-art process technology for its customers worldwide.



The main trial centre in Senden of KREYENBORG Plant Technology.

potential new customers worldwide.

In accordance with a customer's material and production requirements, KREYENBORG can map out a plan of action. Customers' employees are cordially invited to participate in joint trials. Thus there is both the possibility to contribute actively and the opportunity to actually see KREYENBORG products in operation.

Locations: Main trial centre (food, plastics, chemical): 48308 Senden (Germany)

Batch trial centre (food): 98530 Rohr (Germany)

Contact: Plastics, chemicals: Matthias Draganski (m.draganski@kreyenborg.com; +49 2597 93997 153)

Food: Wilfried Binternagel (w.binternagel@kreyenborg.com; +49 2597 93997 151)

www.kreyenborg.com

Lindor Products BV, the Netherlands (see also Winkworth Machinery Ltd)

Area of specialisation: Mixing of precious and sensitive powders and granulate, liquid injection (1 phase, 2 phase, ultrasonic), steam injection, contact drying (double jacket water or 8 bar steam), air-drying (up to 350°C air flow while rotating) heating and cooling (double jacket hot or cold water, air flow).

What is available: Dedicated testing facilities are provided at Lindor's main office and plant site in Dordrecht, near Rotterdam in the Netherlands. Here mixing trials are following a protocol prepared by Lindor together with the customer. With the tests, information about the mixing effects and final properties of the mixed product is obtained. Basically five models of mixer are available for testing: the L10 (10 litre max. net product volume), L70, L750 and L1000 with double jacket for hot & cold water or steam. The L10 can be equipped with a transparent drum. Besides the Lindor mixers, Winkworth mixers are available for trials as well (see below).

Instrumentation and process add-ons include temperature monitor, camera, halogen moisture tester, liquid injection, hot/cold air, micro dosing during mixing, etc. After conducting in-house tests, a mixer for on-site trials can be rented if needed.

Terms of use: Available to existing customers and potential new customers worldwide.

Location: In addition to the test plant in Dordrecht, the Netherlands, trials can be conducted in England (Winkworth), Poland, Malaysia, Japan and India.

Contact: Bastiaan Soeteman (bastiaan.soeteman@lindor.nl; tel +31 78 6550655)

www.lindor.nl



Part of Lindor's Dordrecht test plant.

Matcon Ltd, UK (also USA and China)

Areas of specialisation: Intermediate bulk container (IBC) systems for recipe formulation, mixing and packing of powders, granules and tablets; delivering value to both B2B and B2C organisations worldwide spanning the food, pharmaceutical and chemical industries.

What is available: The state-of-the-art test plants are equipped with full-scale materials handling equipment to provide accurately simulated working



View of sack tip module inside Matcon's UK test plant, which provides a closed transfer of material from sack to IBC.

conditions for testing real product wherever possible. Clients are encouraged to witness the tests to give them peace of mind when making their capital investment.

The test plants are used to prove:

- Dispersal and homogeneity
- Blending performance
- Prevention of segregation on discharge
- Accuracy and speed of dosing/packing performance
- Levels of containment
- Material flow and discharge capability
- Cleaning capabilities for both wet wash and air wash
- Gentle tablet handling
- System interface/integration
- Throughput and production capacity.

The largest of the test plants is located at the company's UK headquarters and features a fully functioning IBC-based RFID tracking system, 'Track-Record', in addition to modules for formulation, blending, packing and washing.

Laboratory equipment assists in the analysis of material properties such as bulk density, angle of repose, flowability, drying properties, particle sizes, etc. Our experienced process engineers use these test results to create a detailed view of the product and define the key operating parameters and equipment settings needed to handle and process the materials correctly.

A detailed, confidential test report offers recommendations on system design and equipment settings for use when designing a full application.

In addition, the UK test plant is also used by IDEX Group companies Fitzpatrick, Quadro and Microfluidics to evaluate and prove the processes of milling, roller compacting, dry granulation, sieving, particle size reduction, de-agglomeration of product and cell disruption.

Rental units are also available for trials at the client's own production site for further testing under real environmental conditions.

Terms of use: The test plants are internationally available. Prior to any testing, a feasibility study is undertaken to ensure product suitability with MSDs submitted in advance for review. When handling and testing hazardous products, Matcon operates

a strict Health & Safety management system which ensures COSHH analyses and chemical risk assessments are completed on all products.

Dates are scheduled dependent upon availability. The associated cost of shipping the product to and from the site is covered by the client.

Locations: Test plants are located in Evesham (UK), New Jersey (USA) and Shanghai (China).

Contact: Evesham, UK – Richard Lockwood (rlockwood@idexcorp.com; tel +44 1386 769000)

New Jersey, USA - Dan Ruble (druble@idexcorp.com; tel +1 856 256 1330)

Shanghai, China – Ming Zhao (mzhao@idexcorp.com; tel. +86 21 3116 5599)

www.matconibc.com

MIX Srl, Italy

Area of specialisation: Mixing/blending, reactors, drying, granulating.

What is available: MIX projects and manufactures single shaft horizontal batch and continuous mixers, dryers, reactors, granulators, sterilizers, heaters, coolers and blenders suitable for the most complicated industrial processes for a wide range of applications in food, chemical, cosmetic, building, plastics and feed industries. In the recently enhanced in-house testing facility, thanks to new machinery installations, it is now possible to perform trials with even more demanding parameters, including: temperatures up to +200°C; pressure up to +5bar or vacuum. Powders, granules, fibres or pastes can be tested in the new laboratory, even in classified hazardous atmosphere (ATEX). Batch as well as continuous processes can be tested in the laboratory. The handling of chemical reactions, the measurement of moisture content of the products and the increase or decrease of pressure and temperature inside the mixer is fully automated. Many different kind of products can be tested. Different kinds of process can be carried out: homogenisation, granulation, size reduction, drying and chemical reaction. The fully automated control system allows the control of all parameters such as speed, temperature and pressure during every step of the process.

Terms of use: The test laboratory is available for both customers and potential customers. Preliminary analysis of the process is performed before organising the test. A safety data sheet for each product to be handled is required in advance. A fee is charged to perform the tests and can vary according to the required process and is partly or fully refundable if the test leads to a machine sale. All data and results are strictly confidential. The test plant is used by Italian as well as international companies.

Location: Cavezzo, Italy

Contact: Mr Andrea Baravelli (astec@mixsrl.it; tel +39 0535 46 577)

www.mixitaly.com



Blending tests being carried out at Mix's Cavezzo test plant.

MTI Mischtechnik International GmbH, Germany

Area of specialisation: Mixing, coating, drying, agglomeration, granulation and heating/cooling under conditions likely to be encountered in industrial practice as well as facilities to produce small quantities.

What is available: In 2015, MTI completely refitted its R&D centre. Equipped with perfectly configured machines of the latest generation, it is ideally suited for developing new products, optimising processes and improving existing customer applications.

Lindor Winkworth test centres

Lindor and Winkworth both belong to the same group of companies. Together they have the largest offering of different types of mixers. From Rotary Drum Mixers to Z (kneader)-Blade Extruders, from Powder to Paste - 12 different types of mixers. In its test centres in Basingstoke (UK) and Dordrecht (NL) these mixers can be tested, not only to prove whether a certain type of mixer works well for an application, but for users to establish which type of mixer works best!

At the MTI R&D centre, process development, process optimisation and performance design is accomplishable as well as a reliable scale-up for plants up to 8000 litres or production of sample quantities and trainings for machine operators.

For simulating batch processes, the German manufacturer has various vertical and horizontal mixing systems available for trials, such as:

- Vertical laboratory mixer for small quantities from 1 to 10kg
- Vertical universal mixer Uni tec for batches up to 220 l
- Horizontal mixer 1,600 l
- Vertical high-speed mixer 400 l
- Heating/cooling mixer combination on a production scale for outputs of up to 2.5t/h

All machines are equipped with a wide variety of special extras and peripherals for virtually any mixing task, use a product-neutral stainless steel design, state-of-art instrumentation and control technology. Detailed mixing protocols analysing the tests are provided to the customer.

Terms of use: The MTI R&D centre is available for both customers and potential customers. Mostly it is used by customers for developing new products or optimising processes/mixers as well as by potential customers for testing the MTI mixers for a particular process. All data and results are strictly confidential. The charged fee for the trials is refundable if an order is being placed within one year. MTI imposes no time limit on the duration of the trials which typically last from one day up to one week.

Location: Detmold, Germany

Contact: Mr René Weiffen (rene.weiffen@mti-mixer.de; +49 5231 914-125)

www.mti-mixer.de



MTI's R&D centre – completely refitted in 2015.

NEU PROCESS, France

The NEU Group brings together businesses specialising in the use of air processing: DELTA NEU (solutions for ventilation, dust extraction, pneumatic waste transfer and filtration), NEU PROCESS (equipment for powder and granule processing, material reception, pneumatic conveying, storage, dosing, weighing, mixing), NEU FEVI (manufacture of fans), NEU AUTOMATION (automation solutions).

Area of specialisation: The purpose of the new NEU Air Processing Testing and Training Centre is to perform testing, measurement and inspection on systems and equipment involving industrial air utilisation techniques. The centre has over 10 test and simulation points over an area covering 1000m², to simulate all kinds of air handling and process solutions using air processing.

What is available: Pneumatic conveying tests: To define the best customer solution and to analyse product behaviour during pneumatic transfer, the centre aims to characterise the product in order to define the best conveying phase and to establish the conveying parameters for sizing an installation. Several product tests are available: fluidisation column, particle size analysis, pipe-wall friction, impact test rig, determination of shape factor, product degradation trials, etc. The centre has different automated loops so that different pneumatic conveying techniques can then be tested: dilute or dense phases, continuous or discontinuous, suck/blow system, open or closed

loops, etc. Conveying distance up to 220m with pipe diameters up to 100mm, introduction device rotary valve, blow tank, screw conveyor... Also, dosing and mixing tests, pellets cleaning trials and fines content analysis are available.

Air filtration & dedusting test centre: This facility can simulate how dust, waste and air behave in industrial applications. The test points are used to answer questions like:

- How to convey continuous/discontinuous waste
- How to prevent explosion accidents (ATEX)
- How to optimise energy consumption in dust extraction
- How to convey dust
- How to optimise air movement.

Training in air techniques: This centre, equipped with training rooms and practical test benches, offers a comprehensive range of instruction courses in air technology (dust extraction, pneumatic conveying, ventilation, air conditioning, fans, aerodynamic measurement courses).

Terms of use: Specific tests are charged. They are free of charge as part of a global project. All tests are run for all customers: either existing or new ones, local or worldwide.

Location: The NEU Air Processing Testing and Training Centre is located in the north of France at La Chapelle d'Armentières, (20km from Lille Europe railway station).

Contact: Trials: Dr Thierry Destoop (process@neu-process.com; tel +33 320 45 65 86). Training courses: Mrs Myriam Munoz (cefan@delta-neu.fr; tel +33 320 10 14 98)

www.neu-air-technologies.com



Part of the extensive NEU Air Processing and Testing Centre in northern France.

Nol-Tec Europe Srl, Italy (also USA)

Area of specialisation: Pneumatic conveying, blending and bulk handling.

What is available: Nol-Tec Europe has a complete and multi-line test plant where customers can personally check how the product is conveyed or blended, and how the conveying lines are regulated.

After the test, Nol-Tec will draw up a complete and detailed report, containing: convey/blending characteristics - rate conveyability of the system/blender (maximum rate) - conveying pressure - compressed air consumption - conveying/blending time - product degradation (if required, quantified with sieving, for powdered products) - comparison between pneumatic and mechanical blending.

Mixing is carried out with a BLENDER M244, a mixer that, without mechanical parts, uses the force of air to achieve products mixing of products having different bulk density and particle size.

Dense phase pneumatic conveying (with TRANSPORTER M201) uses a reduced volume of compressed air to transport large quantities of product, thereby decreasing pipe and components abrasion and reducing degradation of conveyed products and air consumption. AIR ASSIST®, strategically positioned along the conveying pipe, injects air causing short and regular product slugs.

M512 (IBC) e M513 stations are used for storage and distribution of products, and are positioned on the unloading and dosing station with cone valve

M510, to flexibly compose any batch type. This ensures no contamination, short cleaning times, accuracy of dosing directly from bulk bags, control, traceability and mixing.

Nol-Tec dilute phase pneumatic conveying (low pressure) is suitable for continuous conveying systems, not abrasive and not mixed products.

Tests can also be performed with NOL-VAC™, suitable for vacuum dense phase conveying (medium capacity) and distances up to 30m (vacuum dense phase).

Nol-Tec also performs tests with nitrogen, for example regarding temperature and inerting potentially explosive biomass silos, while conveying can be made in the inert area, with information shared with the customer on rate and nitrogen consumption.

Thanks to the cooperation with new technological partners, Nol-Tec completely renewed its test plant in 2016 by introducing new stainless steel hoppers and conveying lines for food and pharmaceutical tests. New items of stand alone equipment were also introduced and are suitable for tests to be performed both in Nol-Tec test plant as well as by the customer (Evapor, Nol-Vac, Ribocone, Skid Circle Feeder Skid, Normijet Skid Venturi Skid, Spray Drier). At the same time, through the collaboration with Schneider Electric, the control system of Nol-Tec test plant was implemented by improving the interface with a new PLC with additional reporting functions and a 22in touch screen. Finally, also the test plant laboratory was renewed by being equipped with new machinery for products characterisation for a better systems engineering.

Terms of use: The Nol-Tec Europe Research Centre is mainly used for customers and potential customers, but it is available to everybody who wants to carry out research, such as universities, sub-suppliers, etc. Nol-Tec also organises open days to present new technologies.

Locations: Pessano con Bornago (MI), Italy; also Lino Lakes (Minnesota) USA.

Contact: Eng. Emanuele Fratto (emanuele.fratto@nol-teceurope.com; tel +39 3356961224 or +39 029516875)

www.nol-teceurope.com



Pneumatic blender, spray dryer, Ribocone and Circle Feeder at Nol-Tec Europe's research centre.

PROMIXON Srl, Italy

Area of specialisation: Mixers for solids, continuous/batch mixers, heating/cooling, internal mixers.

What is available: Thanks to the expansion of the production unit with the addition of a new building of around 1500 square metres, the Italian mixer manufacture PROMIXON Srl, based in Magnago – Milan, has recently opened an in-house test facility to offer customers more comprehensive and personalised services.

The new facility supports systems efficiency testing and real-time checking of blending results with customers' production materials.

The mixing systems available for customers and prospects internal trials are:

The hot/cold mixing combination XBLEND-

This 2017 Supplement of In-house Test Centres can also be accessed at www.eurobulksystems.com where it will remain available throughout 2017.

MC/400/1200, comprising a XM Turbomixer and a XC horizontal cooler, ideal for the production of rigid or plasticised PVC dry-blend, WPC, master-batch, additives, powders and for bonding of powder coatings.

The container mixer FX-300, well suited for the production of concentrated pigment master-batches, pre-mixing and blending of powder coatings and engineering plastic compounds.

Analysing the results of trials carried out in the first six months of the PROMIXON test plant, the new mixers, designed by PROMIXON engineers and launched at the recent K-2016 exhibition in Düsseldorf, are reported to be showing highly efficient results, performing + 30% of productivity both for plastics and powder coatings applications, with an increased customer satisfaction resulting in the signing of several new orders.

Terms of use: PROMIXON's testing facility is available both for existing and potential customers.

Trials can be carried out without any charge and time limit/duration of the testing, but normally last from one to two days. The test results are fully confidential. The company counts national and international prospects and customers among companies which have already availed themselves of the in-house test plant. Some examples: Italy, Germany, Eastern European countries, USA, Argentina and China.

Location: The test plant is located in Magnago, close to Milano Malpensa airport – Italy.

Contact: Marco Marinello, CEO (marco.marinello@promixon.com ; tel +39 0331 307122 / +39 0331 658419; mob +39 342 8736968)

www.promixon.com



PROMIXON's Magnago test facility.

Spiroflow Ltd, UK (also USA)

Areas of specialisation: The company's testing facilities reflect the focus of its business: conveying of dry bulk solids and additives/ingredients, and the filling and discharge of these same materials into and out of bulk bags.

What is available: Spiroflow welcomes the opportunity to invite customers to its Technology Centre, but increasingly customers are availing themselves of the company's video service. They are either sent a video of the test on their product, or the test is conducted in real time via a computer link.

Specifically, trials are offered on:

- Flexible screw conveyors, including straight-forward conveying at required rates; metered feeding; and coating/depositing material over a given area.
- Aero-mechanical conveyors.
- Tubular cable/chain drag conveyors.
- Pneumatic conveyors – both pressure and vacuum.
- In-line mixing.
- Bulk bag filling.
- Bulk bag discharging.

Conveying lengths, conveying rates, etc are all designed to reflect the customers' needs. Trials are also offered at customers' premises where the product and/or application dictate that this is the best course of action. Spiroflow has recently opened a new 400 square metre Technology Centre in Clitheroe, a short distance from its UK head office.

Terms of use: Normally there is no charge for trials at the company's test centres. Customers are asked to pay for transport of equipment when tests

are conducted on their own sites. If a customer wishes to conduct an extended on-site trial which results in a saleable product, an appropriate charge is levied – all or part of which might be refundable upon placement of an order, again according to circumstances.

Spiroflow test plants are used by the company's network of representatives who are encouraged to accompany their customers to witness tests.

Locations: Clitheroe, Lancashire, UK; Monroe, NC, USA.

Contacts: Clitheroe (sales@spiroflow.com; tel +44 1200 422525); Monroe (info@spiroflow.com; tel +1 704 246 0900)

www.spiroflow.com



At the Spiroflow Technology Centre one of the company's bulk bag dischargers is pictured feeding material into a flexible screw which transfers it to an aero-mechanical conveyor which then feeds it to another bag.

Starlinger & Co Ges mbH, Austria

Area of specialisation: Machinery for the production of raffia packaging, FIBC testing, testing of PP and PE tape and raffia fabric properties.

What is available: The Starlinger showroom is a 1650m² facility with a laboratory nearby where the entire range of woven bag production machinery is available for material trials. Existing and potential customers can send new raw materials, PP or PE raffia fabric or finished raffia bags for tests to obtain critical process knowledge and to eliminate any potential risks when they plan to launch new products or make changes to existing equipment. The following tests can be performed:

- MFI of PP, PE and PET resin and its suitability for tape extrusion
- geometry and mechanical properties such as elongation, residual shrinkage and tear resistance of PP PE and PET tapes as well as raffia fabric produced out of them
- UV stability of PP, PE, PET raffia fabric
- coating adhesion of coated PP and PE raffia fabric
- geometry, strength and elongation properties of finished bags as well as air permeability (e.g. valve bags for cement packaging)
- Microscopic analysis of material composites (microtome sections)
- Top lift tests, compression tests, cyclic load tests for FIBCs (for loads of up to 20t).

The FIBC test rig stacoTEST is one of the few test rigs for bulk bags in Europe and can perform tests for one-, two- and four-point lift containers according to EFIBCA, British and French standards and UN regulations. However, Starlinger does not issue any certifications.

If desired, customers can witness the tests on their materials. The showroom equipment is also used for testing customer raw materials and operation and maintenance training of customer staff.

Terms of use: The tests are carried for every interested company. Depending on the test and test specifications a fee will be charged that may be credited towards any purchase of equipment. The test results are strictly confidential. The facilities are used by companies from all over the world.

Location: Weissenbach, Austria

Contact: Klaus Niederl (technik.ni@starlinger.com; tel +43 2674 800-0)

www.starlinger.com



Top lift test of a four-point FIBC on the stacoTEST FIBC test rig in the Starlinger testing facility in Weissenbach, Austria.

UniTrak Powderflight Ltd, UK

Area of specialisation: Mechanical/aero-mechanical conveying, FIBC filling and discharging, gentle handling and elevating.

What is available: UniTrak Powderflight attaches high priority to testing at the design stage. It is in the company's dedicated testing facility that it demonstrates the capabilities of Powderflight conveyors, TipTrak bucket conveyors, UniFlex and Bagstander equipment for a specific project. Finding the solution for difficult products is what UniTrak Powderflight states it does best, proving that its equipment operates effectively on the most challenging of bulk materials, products and ingredients. When customers place an order, the company wants them to have 100% confidence that UniTrak Powderflight has the best solution for their project. For this reason UniTrak prefers where possible to have had the opportunity to test materials beforehand in the industrial environment of its dedicated testing facility. Here different conveyors are installed together with FIBC handling equipment to identify the suitability of the equipment based on flow rate, damage to the product (if any), as well as abrasiveness of the product and how that may impact on wear. This also helps determine what optional accessories may be required.

Customers or potential new customers are invited to bring a sample of the material they would like to be tested. They are given the option of witnessing at first-hand how the equipment performs. Customers (potential or existing) are also welcomed to submit a sample if they prefer. A live test video of the product along with a full detailed report and any recommendations will be provided.

Terms of use: The test plant is available to both existing and potential customers and is free of charge. It is used not only by UK companies but from others all over the world.

Locations: Glossop, Derbyshire, UK, and Port Hope, Ontario, Canada.

Contact: Phil Booth (pbooth@unitrak.co.uk; tel +44 1457 865038)

www.unitrak.co.uk



Client tests being undertaken at the UniTrak Powderflight test plant.

Winkworth Machinery Ltd, UK (see also Lindor BV)

Area of specialisation: Mixing gums, slurries and pastes, heating and cooling, vacuum (double jacket hot or cold water, steam).

What is available: Dedicated testing facilities are provided at Winkworth's main office and plant site in Basingstoke, England, about one hour from London Heathrow airport. Here mixing trials are conducted to customer specifications. Various models of smaller Lab-Z, RT (plough share), DC (double cone),

TS (twin shaft paddle) and UT (ribbon) mixers are available as well as PVs (process vessels), coating pans and liquid mixers. The facilities at Winkworth are equipped to perform trials as well as to produce pilot production runs.

Besides the Winkworth mixers, Lindor mixers are available for trials as well.

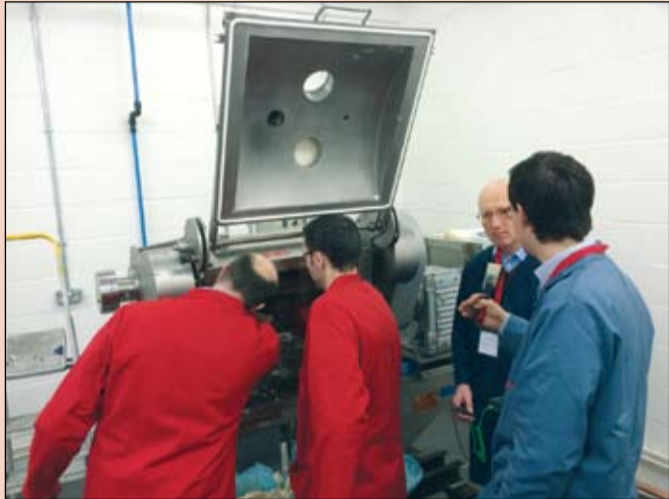
After conducting in-house trials, mixers from Winkworth's vast range of models can be rented for longer term on-site trials or genuine production.

Terms of use: Available to existing customers and potential new customers worldwide.

Location: Basingstoke, England and Dordrecht, the Netherlands

Contact: Kul Gidda (kul.gidda@mixer.co.uk); Tim Simpson (tim.simpson@mixer.co.uk; tel + 44 1256305600)

www.mixer.co.uk



Winkworth testing facilities in Basingstoke, England.

The Wolfson Centre for Bulk Solids Handling Technology, UK

Area of specialisation: All aspects of flow, handling and processing of powders and bulk materials.

What is available: The plant extends over 450m², and includes almost anything that is in a real processing and logistics chain:

- Pneumatic conveyors with varying sized pipelines
- Pharmaceutical dosing test rigs
- Belt and mechanical conveyors
- Hoppers and silos
- Screening machinery
- Blenders
- Feeders (vibratory, screw, belt and others)
- Presses
- Transport simulators
- Drying test facilities
- Granulation & pelleting facilities
- Size reduction facilities
- Environmental test facilities
- Control systems rigs.

Many of the tests and models have been developed at the Wolfson Centre and are not available anywhere else in the world.

The pilot plant is used extensively for:

Consultancy: Frequent pilot plant test project objectives include:

- Assessing a new or reformulated material – will it go through the existing systems, or what changes will be needed to accommodate it?
- Obtaining the behavioural characteristics of powders and bulk solids for use in system design;
- Setting up a short production run on a proposed new powder-route product, to test formulation and manufacturing proposals;
- Testing a proposed new handling system.

A) Short Courses: For hands-on demonstration of different techniques for the Wolfson Centre's range of short courses providing specially designed practical sessions suited to the individual.

B) Research: The Centre's team of researchers continually develop and test ideas for novel or innovative solids processing methods, to push back the boundaries in the bulk solids world.

Terms of use: The laboratories are available to anyone in the bulk solids industry either to test their own materials using the Centre's equipment, under supervision, or to provide samples to allow the Centre to carry out the testing on their behalf. If these projects are confidential, the work does not need to be published and we have a sensible approach to intellectual property ownership. A charge is made on a daily rate or per test method used – a proposal will be provided prior to starting

the test work.

The facilities are available to companies throughout the world, in all areas of the bulk solids industry. For example the Wolfson Centre has helped and advised with trials from pharmaceutical companies, food processors, producers of household goods, renewable energy industries, as well as mining companies and those specialising in plastics, pet foods, aggregates and minerals, as well as machinery manufacturing companies wanting to perfect their designs.

Location: Chatham, Kent, UK.

Contact: Professor Mike Bradley or Richard Farnish (wolfson-enquiries@gre.ac.uk; tel +44 20 8331 8646)

www.bulksolids.com



Pilot processing plant at the Wolfson Centre.

Zeppelin Systems GmbH (Plastics, Chemicals, Rubber and Carbon Black Division), Germany

Area of specialisation: Pneumatic and hydraulic conveying, silo technology, dedusting, degassing and heating/cooling.

What is available: The Zeppelin Test Plant in Friedrichshafen is part of the Zeppelin Technical Center Network and is used for performing conveying tests with bulk solids that are processed in most industries. Pneumatic conveying tests, either dense phase or dilute phase and with or without additional bypass systems, can be carried out with conveying pipe diameters between 2in to 9in, with conveying distances up to 460m and at capacities up to 150t/h.

All related components, such as pressure vessel conveyors, rotary feeders, suction hopper loaders, metering units, diverter valves, filters, elutriators or screeners are available in different sizes and can be tested. In addition, special test set-ups for hydraulic conveying, for fines generation tests and for filter tests are installed. All relevant process data, such as pressure, temperature, weight, flow, etc. are collected in a data acquisition system and can be evaluated. For tests in the field of silo technology, there is a variety of gravity blenders and fluidised bed blenders with volumes ranging from 3m³ to 35m³ for powders and pellets, silos equipped with a range of discharge aids as well as a degassing system including the capability to heat or cool the

bulk solids. The laboratory offers the means for determining all relevant bulk solids properties for the materials handling and system design, such as bulk density, flow properties, particle size distribution, etc. The basic equipment includes translational and ring shear testers for measuring the flow properties, lambda-meter, sieve machine and optical system for particle size analysis, fluidisation test rig, moisture analyzer and wet washing unit for measuring the fines content in polymer pellets and similar.

The test plant is used by companies from all over the world and customers are invited to participate in the tests.

Terms of use: The test plant is available to everybody. Standardised test procedures are available. Alternatively, the facility can be booked for a full day's use of the complete installed equipment. Charges for use are quoted individually according to the customer's needs. Time schedules are prepared prior to testing and discussed during testing. Non-disclosure of the test results can be agreed, if required.

Additional test facilities: Technological leadership is based on extensive research and development. Zeppelin states that its activities in the world's largest network for bulk material handling ensure the customer's success.

In addition to the test facility in Friedrichshafen with the focus on plastics, chemicals, rubber and tyre industries, there is the test plant in Kassel for the mixing and compounding process. For the food industry, there is a highly advanced technology center in Rödermark (Germany). Tests for the plastics, minerals and cement industry can be carried out in the pilot plant in Sao Paulo (Brazil).

The test plant in Kassel is specialised in mixing systems and compound extruders. Here the complete product programme of mixers can be tested to select and optimise the correct mixer and to demonstrate mixing and processing performance.

Location and Contact:

Friedrichshafen (Germany): Guido Winkhardt (guido.winkhardt@zeppelin.com; tel +49 7541 202 1471)

Rödermark (Germany): Andreas Hofmann (andreas.hofmann@zeppelin.com; tel +49 6074 691 2154)

Kassel (Germany): Henning Kreis (henning.kreis@zeppelin.com; tel+49 561 801 5882)

www.zeppelin-systems.com



Zeppelin's Friedrichshafen test centre by night; here at least one world first in pneumatic conveying technology is reported to have been pioneered.

Zeppelin Systems GmbH (Food Division), Germany

Area of specialisation: Pneumatic conveying, mixing, heating/cooling, dough and liquids processing

What is available: The Food Technology Center in Rödermark is part of the Zeppelin Technical Center Network and is used for performing conveying tests with bulk solids, liquids and dough for the international food industry.

Whilst every effort has been made to verify the information contained in this Test Plant Supplement, the publishers do not accept responsibility for the accuracy of its content.

The modular concept of this Technology Center allows almost the complete production line to be tested.

Starting with bag and bulk bag unloading into hoppers, several possibilities are provided for metering a batch recipe.

As metering devices, there is the possibility to test screw conveyors and rotary valves with or without pneumatic conveying.

For cross-contamination-free metering there is a container handling system with screw metering as well as Kokeisl metering systems that combines high capacity with high accuracy metering, incomparable with any other metering system.

After batching, several types of mixers - vertical and horizontal mixers as well as container mixers - are available to find out the optimum blend, agglomeration or coating. On the different pneumatic lines there is the capability to test and minimise the effect of segregation and abrasion of the products.

Pneumatic conveying tests for dilute and dense phase can be carried out on indoor pneumatic lines in pipes ranging from 2in to 4in and a maximum conveying length of about 240m.

For customers in the bakery sector, there is the availability of a complete mobile CODOS® system for

continuous dough production for up to 3t/h.

The inline rotary sifter, the horizontal mixer and the CODOS® test plant are mobile systems and can be tested directly at the customer's premises either offline or even inline for real production tests on the system.

All relevant process data, such as pressure, temperature, weight, flow, etc. are collected in a data acquisition system and can be evaluated. The laboratory offers the means of determining all relevant bulk solids properties for the material handling and system design.

Terms of use: The test facility is open to all companies worldwide that want to test or develop their products with Zeppelin's equipment. The test facility can be booked for a full day's use of the complete installed equipment. Non-disclosure of the test results can be agreed, if required.

Additional test facilities: In addition to the Food Technology Center in Rödermark (30km from Frankfurt airport), there is also a test plant with the focus on plastics, chemicals, rubber and carbon black industry in Zeppelin's head office in Friedrichshafen and the test plant for the mixing and compounding process in Kassel. Tests for the plastics, minerals and cement industry can be carried out in the pilot plant in Sao Paulo (Brazil).

Location and contact: Friedrichshafen (Germany): Guido Winkhardt (guido.winkhardt@zeppelin.com; tel+49 7541 202 1471)

Rödermark (Germany): Andreas Hofmann (andreas.hofmann@zeppelin.com; tel +49 6074 691 2154)

Kassel (Germany): Henning Kreis (henning.kreis@zeppelin.com; tel+49 561 801 5882)

www.zeppelin-systems.com



Part of Zeppelin's Food Technology Center in Rödermark, Germany.

Main areas of specialisation provided by leading in-house test plants and laboratories

Abrasive wear testing

- Wolfson Centre

Agglomeration

- MTI

Air filtration/dedusting

- NEU PROCESS
- Zeppelin (Friedrichshafen)

Bag production machinery

- Starlinger

Briquetting/compaction

- Köppern
- Wolfson Centre

Bulk bag testing

- Starlinger

CIP (wet/dry)

- Matcon

Coating

- Eirich
- MTI

Compaction

- Köppern

Dispersing

- Eirich

Dosing

- KREYENBORG
- NEU PROCESS

Drying

- AVA-Huep
- Eirich
- EKATO SYSTEMS
- KREYENBORG
- Lindor
- MIX
- MTI
- Wolfson Centre

Electronic instrumentation

- NEU PROCESS

Emptying (bags, bulk bags, containers, etc)

- FPE Global
- Spiroflow
- UniTrak Powderflight

Feeding

- Wolfson Centre

Filling (bags, bulk bags, containers, etc)

- FPE Global
- Spiroflow
- UniTrak Powderflight

Flowability testing (solids)

- J-Tec
- Wolfson Centre

Germ protection

- KREYENBORG

Granulating

- Eirich
- MIX
- MTI
- Wolfson Centre

Grinding

- Eirich
- Köppern

Heat exchanging

- Lindor
- MTI
- PROMIXON
- Zeppelin (Friedrichshafen)
- Zeppelin (Rödermark)

Hoppers & silos

- Wolfson Centre

Hydraulic conveying

- Zeppelin (Friedrichshafen)

IBC blending

- Matcon

Kneading

- Eirich

Liquid injection

- Lindor

Mechanical conveying

- FPE Global
- Spiroflow
- UniTrak Powderflight
- Wolfson Centre

Milling

- Köppern

Mixing/blending

- AVA-Huep
- Dynamic Air
- Eirich
- EKATO SYSTEMS
- J-Tec
- KREYENBORG
- Lindor
- MIX
- Nol-Tec
- PROMIXON
- Spiroflow
- Winkworth
- Wolfson Centre
- Zeppelin (Rödermark)

Packing (powders)

- Matcon

Pastes, handling/processing

- Zeppelin (Rödermark)

Pneumatic conveying

- Dynamic Air
- FPE Global
- J-Tec
- NEU PROCESS
- Nol-Tec
- Spiroflow
- Wolfson Centre
- Zeppelin (Friedrichshafen)
- Zeppelin (Rödermark)

Product formulation

- Matcon

Reactors

- AVA-Huep
- EKATO SYSTEMS
- MIX

Roasting

- KREYENBORG

Silo technology

- Zeppelin (Friedrichshafen)

Suspending

- Eirich

Vibratory feeding/conveying

- Dynamic Air

Weighing/load cells

- NEU PROCESS