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

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.

Nowadays customers are understandably unwilling to sign a major purchase order unless they are entirely convinced that the system or equipment on offer will perform entirely to specification. Hence the rapid emergence in recent years of in-house test plants.

Here we outline the test plant services available from 15 leading engineering firms and equipment suppliers, all but one of which are located in Europe.

Van Beek BV, the Netherlands

Areas of specialisation: Conveying, mixing and dosing by means of screw conveyors.
What is available: see details of sister company Celsius (below)
Terms of use: see Celsius.
Location: Drunen, the Netherlands.
Contact: see Celsius.

British Rema Processing Ltd, UK

British Rema's Chesterfield toll processing facility.

Areas of specialisation: Particle size reduction and particle size control
What is available: British Rema is one of the UK's longest-established businesses specialising in powder processing equipment and toll processing. It is recognised internationally for its expertise in particle size reduction and particle size control. The company's test facilities provide a full range of powder size-reduction equipment (including jet mills, impact mills and ball mills) as well as air classifiers and sieving equipment, with plant suitable for R&D tests through to high-volume trials.

The company has experience of handling a wide range of materials and customers appreciate being able to run small samples, often treating British Rema as an extension to their own R&D facilities while being able to benefit from the expert advice of the company's technical staff. Regular customers include global suppliers to highly regulated industries such as aerospace and nuclear reprocessing, so the company is accustomed to undergoing detailed supplier audits.

The British Rema laboratory provides particle size analysis facilities and is used extensively by both its contract processing and equipment sales divisions, as well as providing analytical services directly to customers who do not have their own equipment. It also plays a key role in the specification of new equipment, where the appropriate equipment parameters and sizing can only be properly determined through careful trialling, using customers' actual material.

The laboratory is equipped with a Malvern Mastersizer 2000 and a Coulter Multisizer II, as well as air-jet sieving equipment. Together these provide the full range of standard analytical techniques relevant to the determination of particle size distributions in most industries.

British Rema's customer base is international, with specialist products being delivered for testing from North America, Asia and mainland Europe.
Terms of use: Available internationally to all customers and potential customers.
Location: Chesterfield, UK
Contact: David Bugler (david.bugler@britishrema.com; tel +44 1246 269955).

Celsius BV, the Netherlands

The recently enlarged Drunen test plant of Celsius which is shared with sister company Van Beek.

Areas of specialisation: Drying, heating and cooling by means of screw-type heat exchangers.
What is available: The Celsius test centre is shared with sister company Van Beek (see above). The facility, with a surface area of more than 500m^2, offers a wide range of equipment to simulate applications on a small scale and to define product variables. There is sufficient measuring equipment to determine test values. At the end of last year the company completed an extension to the test plant to allow a wider range of materials to be subjected to small-scale simulation testing. The test space can be used by customers to carry out trials, either independently or with the support of Celsius/Van Beek staff. After tests have been completed the company can propose a specific design of screw conveyor or screw type heat exchanger, with a formal warranty, for the required conveying, cooling, heating or drying application. The test facility is used by both national and international customers.
Terms of use: Available to all potential customers at a charge of €1500 per day.
Location: Drunen, the Netherlands
Contact: Marco Geradts (geradts@van-beek.nl; tel +31 416 375225)

Coperion GmbH, Germany

View inside Coperion's state-of-the-art Niederbiegen test plant where certain equipment combinations cannot be matched by any other test facility in the world.

Areas of specialisation: Pneumatic and hydraulic conveying, blending and mixing, dedusting and heating/cooling.
What is available: With regard to pneumatic conveying, there is a choice of pressure or vacuum systems, dilute and dense phase, rotary valves and pressure vessels. There are pipeline lengths up to 2000m and up to 200mm diameter, offering capacities up to

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

Air classifying
- Sweco

Briquetting / compaction
- Köppern

Classifying
- Poittemill
- Rotex Europe

Dedusting
- Coperion

Dosing / feeding
- Dasag
- Dietrich Engineering Consultants
- Reimelt Henschel (Zeppelin)

Emptying (bags, bulk bags, containers, etc)
- Dasag
- Dietrich Engineering Consultants

Explosion protection
- Fike

Extruding
- Reimelt Henschel (Zeppelin)

Filling (bags, bulk bags, containers, etc)
- Dietrich Engineering Consultants
- Statec-Binder

Fluidised-bed systems
- Reimelt Henschel (Zeppelin)

Heat exchanging
- Celsius
- Coperion

Hydraulic conveying
- Coperion
- Zeppelin

Micronisation
- Poittemill

Milling / fine grinding & crushing
- British Rema
- Köppern
- Poittemill

Mixing & blending
- Van Beek
- Coperion
- Dietrich Engineering Consultants
- Dynamic Air
- J-Tec Material Handling
- Reimelt Henschel (Zeppelin)

Palletising
- Statec-Binder

Particle size reduction / control
- British Rema

Pneumatic conveying
- Coperion
- Dasag
- Dynamic Air
- J-Tec Material Handling
- Zeppelin

Pressure relief
- Fike

Scalping / lump removal
- Rotex Europe

Screening / sieving
- Rotex Europe
- Sweco

Screw conveying
- Van Beek

Silo technology
- Zeppelin

200t/h. There is a hydraulic conveying facility offering a pipe length up to 100m, a maximum pipe diameter of 65mm and capacities up to 30t/h.

Mixing facilities include gravity silo blenders for pellets and powders. For dedusting trials there is a counterflow elutriator for pellet cleaning with capacities up to 10t/h as well as a filter test unit.

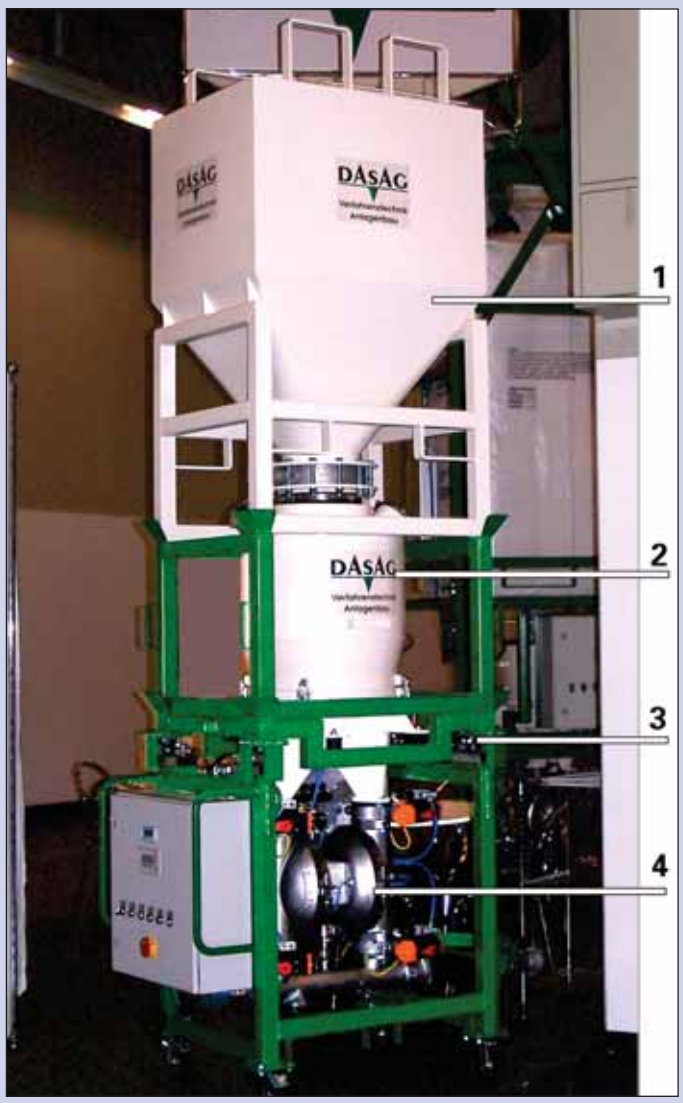
Other test systems include a bulk material heat exchanger for heating/cooling of free flowing pellets and powders. There is also a wear test unit for investigating abrasiveness of different bulk materials and resistance of different types of wear protection system. These facilities are backed up by a bulk solids laboratory equipped with instrumentation for measuring the main mechanical and thermo dynamic parameters of powder and pellets. The scope of services provided is said to be unique and the combination of different equipment and range of capacities cannot be found at other locations. This test plant is used by customers from all over the world, especially from Europe, USA, Asia and Arab countries.

Terms of use: The test facilities are available to all existing and potential customers, to research institutes and to suppliers. Customers use the plant for their own product development and for consultation purposes with their own customers. Only direct costs are charged. In the event of a system or item of plant being ordered, the payment is compensated. Customers receive a detailed test report including the results.

Location: Niederbiegen, near Weingarten, Germany. This is the main bulk materials handling test plant within the Coperion Group. A small facility for pneumatic conveying also exists in Ramsey, NJ, USA, at Coperion Corp.

Contact: Carsten Packeiser (carsten.packeiser@coperion.com: tel +49 751 408619).

DASAG GmbH Verfahrenstechnik-Anlagenbau, Germany



DASAG's highly versatile test rig, sufficiently compact to be transported to customers' sites, showing: (1) feeding hopper or receiving hopper with filter or bulk bag, (2) adapter for container or bulk bag or sack, (3) load cells, and (4) powder pump ready for use.

Areas of specialisation: Container emptying (bags, bulk bags, rigid containers, hoppers, etc), pneumatic conveying, dosing.

What is available: With regard to bulk materials handling, the following are some of the main objectives that can be verified in the test plant: continuous discharge of any type of bag or container; steady metering; dustfree handling within a closed system; adjustable flow volume with any bulk material; gentle conveying of sensitive products; part emptying of bulk bags with the possibility of feeding back excess material into the bulk bag; flexible and autarkic design with self-contained controls.

Within the test plant all hoppers and adapters are replaceable by other equipment, depending on the intended test. Only the lower frame (dimensions approximately 1200 x 1200 x 4000mm) with the powder pump and the load cells forms a constant part of the equipment. The company's test system is centred around the advantages of the powder pump, such as the suction effect of the pump, the permanent pressure monitoring, the optimal material load with absolutely low pressure in the line, the low air volume in the conveying flow, and the possibility of operation with inert gas. These and other special functions can be accurately adjusted to suit the characteristics of the bulk material.

The company points out that customers are sometimes hesitant about ordering a new item of plant unless they are totally convinced of its efficiency, especially in the case of poorly flowing, bridging, cohesive, fibrous or blocking materials. Its mobile or stationary test plant provides an excellent means of convincing customers that equipment will perform according to specification. It is unique with its 'three-in-one' function of emptying, dosing and conveying.

Terms of use: It is recommended that trials take place at the test plant but they can also be carried out at the premises of the customer. However, because of the dimensions of the mobile test rig and transport costs, these normally only take place in Germany and neighbouring countries. The facilities are available to everybody and there is no time limit, although one week is the normal maximum period. In general a charge of €1000 will apply which can be partly or fully refunded when an item of plant is purchased. Supply of the material to be tested is at the customer's risk and expense. Test results are confidential unless the customer gives consent for general use.

Location: Nordhausen, Germany

Contact: Niels Böer (info@dasag-verfahrenstechnik.de; tel +49 3631 460830).

Dietrich Engineering Consultants SA, Switzerland

Test equipment at Dietrich Engineering Consultants' Ecublens/Lausanne plant includes a batch mixer (left) and Drum Containment System (DCS) for safe transfer of highly toxic powders.

Areas of specialisation: Powder transfer, loading and discharge to and from receptacles and bags.

What is available: Dec offers the possibility to arrange tests in its generously sized and well appointed in-house test plant. Customers are welcome to undertake trials using the company's technologies with their own product or with a test product. Tests are prepared and carried out by Dec's specialist engineers and the customer is invited to participate in the tests.

The company provides testing in the field of powder handling (especially powder transfer), charging of equipment or packaging such as drums or bulk bags and discharge of equipment or industrial packaging (including sacks), mixing and dosing.

It is also possible to hire test equipment if trials have to be carried out at the customer's site, especially where these are long-term or where a toxic product is being handled. In such circumstances assistance of Dec's specialist staff can be provided.

Terms of use: A fee is charged for testing services, part of which can be refunded when customers buy equipment, each project being individually assessed in this respect. Dec guarantees absolute confidentiality regarding test results and customers often sign agreements to this effect.

Location: Ecublens/Lausanne, Switzerland.

Contact: info@dec-sa.ch; tel +41 21 694 20 40.

Dynamic Air Ltd, UK

Areas of specialisation: Pneumatic conveying, mixing, blending

What is available: Full pneumatic conveying testing as well as blending, mixing, agglomerating, cooling, drying, coating, lump breaking, bin discharging, dust collection, vibratory feeding and conveying. 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 12 dense phase 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.

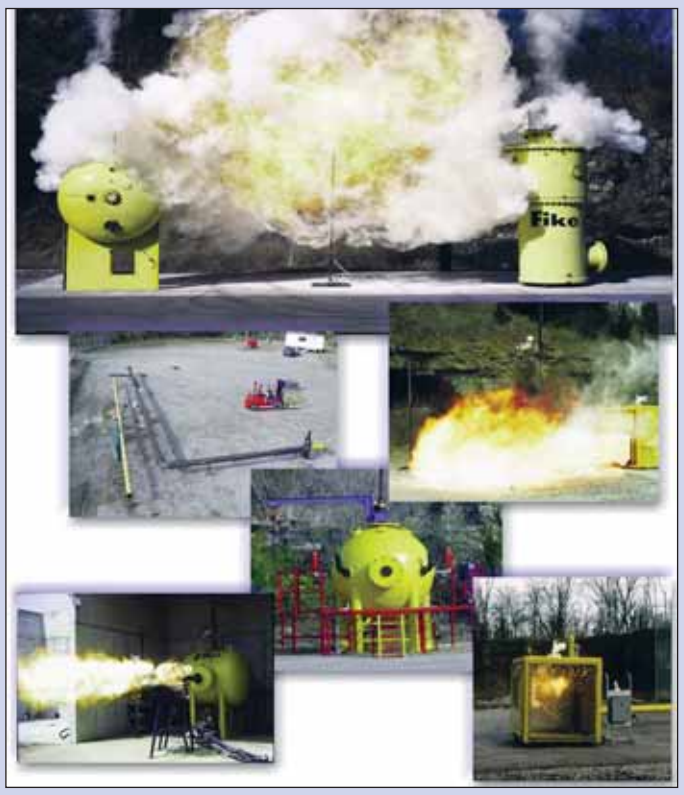
Terms of use: Testing is available to everybody. The company does charge for use of the test plant but does not impose a time limit on the duration of the trials. All test results are confidential.

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).

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

Fike Corporation, USA



Fike's US full-scale explosion test site allows a wide range of potentially dangerous trials including flame propagation and isolation, explosion suppression and explosion venting to be carried out under safe conditions.

Areas of specialisation: A wide range of pressure relief and explosion protection testing.

What is available: Pressure relief testing facilities include an ASME flow laboratory for quantifying the performance of bursting disc devices, bursting disc/relief valve combinations, and any other device whose flow capacity and/or resistance to flow must be determined. Testing opportunities include: product development, flow resistance and capacity tests, certification tests and production audits, flow capacity measurements, combination capacity tests of bursting discs coupled with pressure relief valves.

There is also a metallurgy laboratory which is employed to increase the understanding of the behaviour of materials used in manufacturing, which is vital to the design and engineering of Fike products. Tests which are available include: analysis of bursting discs, plates, bars, pipes, etc for all sizes, structures and conditions; microscopic measurement, image archiving and electronic reporting; effects of heat treatment and corrosion on discs and disc materials, and also pressure vessels; busting/explosion disc score depth and shape consistency.

In addition to the above-mentioned pressure relief testing facilities, Fike provides explosion protection testing facilities. These include an explosion test laboratory, providing a comprehensive 3000ft^2 combustion and research testing facility. Testing capabilities include: dust cloud explosibility parameters and ignition limits (Kst, Pmax, LOC, MEC), auto-ignition temperature (MAIT), minimum ignition energy (MIE), dust layer ignition temperature (MIT), gas explosibility parameters (Kmax, Pmax, LFL, UFL, LOC), liquid auto-ignition temperature, burning velocity and burning number.

As part of the explosion protection testing facilities there is a full-scale explosion test site. This unique 26,000ft^2 remote test facility is used for large-scale research, product development and industrial application tests. Noise is no issue and release of flame can be done safely. A wide range of tests are available,

including flame propagation and isolation, explosion suppression, explosion venting and combinations.

The main test plants are at Fike Corporation headquarters, Blue Springs, MO, USA. Other smaller satellite facilities are located in Europe and Japan.

Terms of use: Available to existing and future customers and inter-company for all Fike subsidiaries; also available for fellow research institutes and standardisation organisations and committees

Location: Both the pressure relief testing facilities and the explosion protection testing facilities are at Blue Springs, MO, USA

Contact: (USA), Jonathan Britt (jon.britt@fike.com; tel 816 655 4770)
(Europe) Jef Snoeys (jef.snoeys@fike.com; tel +32 14 849476).

J-Tec Material Handling, Belgium

A vacuum batch mixer at J-Tec's Kapellen, Belgium, test facility.

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

What is available: The test room offers a multitude of testing possibilities. These include 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, air drier and vacuum pumps are available. For certain products (for example, those of very high density or for those that block easily) an overflow system with bypass can be installed in a very low velocity dense phase conveying system.

There is provision 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 1.7t/h and a final dust content of no more than 50 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 and cooling are possible. Powder ratios up to 80% can be reached with this system. It can be used for solids stored in all kinds of receptacle: bags, bulk bags, silos, etc. For batch mixing tests the company provides a vacuum batch mixer. This test plant is used internationally.

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

Location: Kapellen, Belgium.

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

Köppern Aufbereitungstechnik GmbH

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

What is available: The company was established about 110 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 Europe the company maintains two sites offering test with roller presses, both in Germany, at Freiberg and Othfresen.

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 and cement clinker. In addition high-pressure grinding facilities are located in Australia, South Africa and Canada 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 and Othfresen, Germany.

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

Cold/hot briquetting and compacting presses at Köppern's Freiberg test plant.

Groupe Poittemill Ingénierie, France

Poittemill's Béthune, France, test centre offers an extensive range of fine grinding and classifying technologies.

Areas of specialisation: Fine grinding, classifying, micronisation.

What is available: The test facilities cover every type of fine grinding and classifying technology, allowing for the testing of virtually all products (minerals, building materials, solid fuels, foodstuffs, chemicals, polymers, pharmaceuticals, etc). The company has more than 7000 test references. All process combinations can be offered, with drying, cooling, inerting and cryogenic processing. The test plant includes a fully equipped laboratory for particle size analysis under wet or dry conditions.

The following equipment is available:

Fine grinding equipment list:

Several grinding procedures are available: compression, impact, attrition, friction and combination of these:

- Pendulum roller mill PM0 – 22kW – capacity: up to 2t/h
- High-pressure roller press (patented) – 22kW – capacity: up to 3t/h
- Air-classifier mill PAS300 – 30kW – capacity: up to 1t/h
- Air-classifier mill PAS300 (with SEALMAX and OPTICYCLE) patents – 30kW – capacity: up to 1t/h
- Attrition mill ATM8 – 11kW – capacity: up to 300kg/h
- Air jet mill BLF200 – capacity: up to 50kg/h
- 3 x universal mills – 3 to 11kW – capacity: up to 500kg/h
- High-efficiency pulveriser PHR 25 – 22kW capacity: up to 800kg/h
- Hammer mill MA4/2 – 11kW – capacity: up to 2t/h

Classifying equipment list:

- High-efficiency classifier SHR350 (patented) – 7.5kW – capacity: up to 500kg/h
- Double Whizzer classifier DYNAIR – 11kW capacity: up to 2000kg/h
- Micro-classifier MICRODYN400 – 7.5kW – capacity: up to 100kg/h
- Micro-classifier MICRODYN700 – 15kW capacity: up to 500kg/h
- Micro-classifier SEALMAX700 (patented) – 15kW capacity: up to 500kg/h

Lump breaker list:

- ELX10 – 1.1kW – capacity: up to 100kg/h
- EHX 22 – 2.2kW – capacity: up to 300kg/h

Other equipment: Several rotating sieves, screening equipment and cylinder mills, hot gas generator, air compressors, etc.

Laboratory equipments list:

- Particle size analyzers (dry and wet types): MALVERN INSTRUMENTS, SYMPATEC, COUNTER COULTER, air suction sieves, Blaine instrument
- Laboratory mills: F00, Hardgrove mill
- Weighing instrumentation
- Moisture instrumentation.

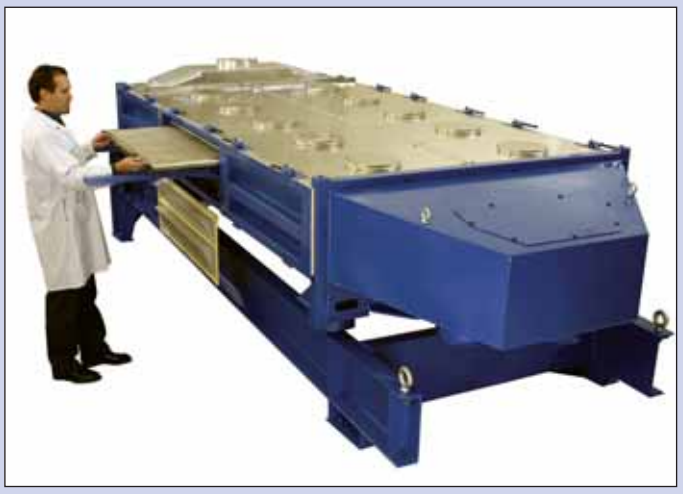
The test plant is used by companies throughout the world.

Terms of use: The test facilities are available for everybody. Normally there is a charge for testing, but it is refundable in the event of an order being placed arising from the tested technology. Some testing is not charged if it is considered as belonging to an R&D programme in association with a customer, universities or institutions. There is no time limit. Customers are invited to participate in trials and the results are usually kept confidential for the use of the customer and for internal use.

Location: Béthune, France

Contact: Olivier Nguyen (onguyen@poittemill.com; tel +33 3 21 57 29 87).

Rotex Europe, Belgium & UK



An Apex screener forms the key element of Rotex Europe's new Wavre, Belgium, facility which operates in close conjunction with the company's longer established Runcorn, UK, test plant.

Areas of specialisation: fine grading/sizing of dry bulk products, scalping (lump removal) of dry bulk products.

What is available: In all its test laboratories the company employs full-scale production machines which are able to deliver the same results during tests as can be achieved by customers' machines. Rotex points out that selecting the best screening equipment for any specific application requires careful evaluation of many variables such as feed rate, speed of the machine, screen mesh size, capacity, accuracy of separation, material characteristics and many more. During testing all these variables are taken into consideration and Rotex application engineers deliver at the end of every test a complete report outlining all the issues they have observed and containing proposed solutions to achieving optimum performance.

In this way several tests can be performed for the same customer and the same product until, by modifying the variables, the best performance is achieved to meet the exact requirements of the customer.

The key item of equipment at the company's Wavre, Belgium, test plant is an Apex screener with 0.8m^2 surface and two decks. At its Runcorn, UK, facility there is a Rotex screener offering 0.8m^2 surface and two decks as well as a Direct Drive screener with 0.8m^2 surface and a single deck.

Machine capacity depends on the application and the material to be screened, from just several hundred kg/h (for very specific and very fine sizing) up to 30-40t/h. The company's US test plant offers higher-capacity machines (Rotex screener and Mineral Separator screener).

The two European test laboratories complement each other (depending on the material tested and the screening machine required by the customer).

Terms of use: Material testing services are available free of charge. The company encourages customers to visit during test trials so that they can learn at first hand how their material is screened under varying operating conditions. No limits are imposed on these tests and results are absolutely confidential.

Location: Wavre, Belgium, and Runcorn, UK; outside Europe at Cincinnati, OH, USA
Contact: Karim Benioucef (kbenioucef@rotex.com; tel +32 104 35049) or Laurent De Wit (ldewit@rotex.com; tel +32 104 35044).

Statec Binder GmbH, Austria

Statec Binder offers customers the opportunity to experiment with a combination of open-mouth bagging and FFS technology provided by the Certopac-COMBI at its Gleisdorf, Austria, plant.

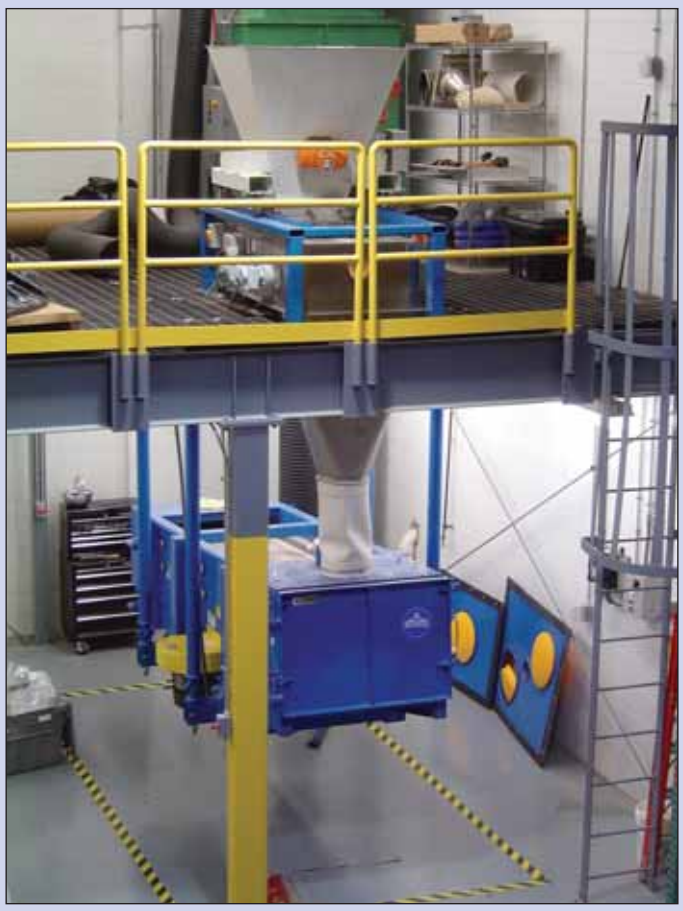
Areas of specialisation: combined open-mouth/FFS bag filling, PP-woven bag conversion and filling, robot palletizing.
What is available: Trials can be conducted with the high-speed COMBI bagging line, which combines the advantages of open-mouth bagging with the speed and versatility of FFS (form-fill-seal) bagging. This multi-purpose plant consists of an open-mouth bagging line with attached FFS-module. Customers can use PE-bags from the reel, but also all types of pre-made bags out of the magazine. This COMBI line is said to provide the best solution for contract packers or manufacturers with a wide range of bagging requirements.

System-R is said to be the first high-capacity bagging system which combines direct production of bags made of endless tubular woven PP/HDPE cloth with approved Statec Binder bagging systems. Advantages of System-R include: reduction of bag costs by up to 50%, reduction of manpower costs by more than 50%, enhanced handling and logistics, high productivity and reliability, reduced bag thickness with no loss of strength, and high availability by applying approved systems.

PRINCIPAL-R is a new generation of articulated robots specifically designed for bag palletising. It is capable of up to 1600 cycles/hour and provides up to 330-degree rotation, allowing it to perform flexible and high-speed palletising with minimal use of space.
Terms of use: Internationally available to everybody.
Location: Gleisdorf, Austria.
Contact: Josef Lorger (office@statec-binder.com; tel +43 32112 38580-0).

Sweco Europe, Belgium (also Austria & Spain)

Areas of specialisation: vibratory separation, gyratory separation, fine and ultra-fine air classification.
What is available: The Sweco Technology Centers around the globe have been set up to provide comprehensive separation and grinding test analysis of most materials. With the use of its wide range of test machines, the company can determine process feasibility and provide detailed sieve analysis and particle size analysis of the materials before and after processing. With its "scaling" capabilities, Sweco can also determine capacities with regard to different machine sizes.



Sweco test plant showing GyraMax 300 gyratory sifter.

The pilot plants can handle wet or dry test samples of nearly any size or volume. The test objective of each pilot plant is to determine the feasibility, mesh sizes, capacity, efficiency, optimal settings and machine size. The available equipment for testing includes vibratory separators, centrifuges, ultra-fine air classifiers and vibratory grinding mills.

The testing facility in Belgium has the capability to test on LS18 and LS30 round separators, an LP30 low-profile round separator, MM4 and UM3 rectangular separators, a GyraMax gyratory sifter and a TS18 turbo-screen air classifier. For processes that require finer particle separation, the company carries various ultrasonic technologies to perform fine mesh screening. All mesh sizes are available in the test facility to determine the optimum screen size for each customer's process. Finally, M18-5 and DM4 grinding mills are available for size reduction testing. Using various grinding media, Sweco can perform a complete grind analysis of most materials suitable for grinding, reducing particles down to the sub-micron range.

The company has test facilities in several parts of the world to serve its local customers, but testing can be done in any laboratory for any customer around the world.
Terms of use: The test facilities are available to everyone (customers and potential customers). Quite often the first day of testing is free of charge, after which there is a nominal fee per day. However, the fee will often be credited towards any purchase of equipment. No time limit is imposed and test results are confidential to the customer.
Location: Nivelles, Belgium; Barcelona, Spain; Enns, Austria; outside Europe at Florence, KY, USA, and at Kolkata, India.
Contact: (Belgium) Yann Luyckfasseel (yluyckfasseel@sweco.com; tel: +32 67 893469).
(USA) Dave Abner (dave.abner@sweco.com; tel +1 859 283 8428)

Zeppelin Silos & Systems GmbH, Germany

Areas of specialisation: Pneumatic and hydraulic conveying, silo technology, gas/solid separation.
What is available: The Zeppelin Test Center is used for performing conveying tests with bulk solids used 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 2-9in, with conveying distances up to 460m and at capacities up to 80t/h. All related components such as pressure vessel conveyors, rotary feeders, suction hopper loaders, dosing 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 testing and for filter testing are installed. All relevant process data such as pressures, temperatures, weights, flow, etc are collected in a data acquisition system and can be evaluated.

For testing in the field of silo technology there is available a variety of gravity blenders and fluidized bed blenders with volumes ranging from $3m^3$ to $35m^3$ for powders and pellets, a degassing system including the capability to heat or cool the bulk solids, and silos equipped with a range of discharge aids.

The laboratory offers the means of determining all relevant bulk solids properties for the materials handling and system design, such as bulk density, flow properties, particle size distribution, etc. Basic equipment includes translational and ring shear testers for measuring the flow properties, lambdameter, 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: Following Zeppelin's acquisition earlier this year of Reimelt Henschel, two further test plants have now become available at Rödermark and Kassel.

The test facility at Rödermark specialises in materials handling for the food industry and is equipped with several conveying systems, fluidised bed systems, feeding and dosing units and other equipment. A laboratory is available for analysis of special material properties.

The test plant at Kassel specialises in mixing systems and compound extruders. Here the complete product programme of Reimelt Henschel mixers can be tested to select and optimise the correct mixer and to demonstrate mixing and processing performance.
Location: Friedrichshafen, Germany; Rödermark and Kassel, Germany (Reimelt Henschel); outside Europe, at Sao Paulo, Brazil (JMB Zeppelin) there is a facility for conveying and component tests.
Contact: Hans Schneider (hans.schneider@zeppelin.com; tel:+49 7541 202-127).

Zeppelin's Friedrichshafen Test Center by night: here at least one world first in pneumatic conveying technology has been pioneered.