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

In addition to providing invaluable R&D facilities for plant and equipment manufacturers developing new prototype machines, in-house test centres have become an essential element within the marketing strategy of most successful manufacturers of bulk handling and processing systems, including companies making allied components and instrumentation.

In the first instance they help to kindle a mutually trusting relationship between a supplier and 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 absolutely to specification. This is a major reason for the rapid growth of in-house test plants during the first years of the 21st Century. Materials handling engineering firms which have not yet invested in modern test facilities, are finding it increasingly difficult to compete at the highest level – a problem which will almost certainly only worsen unless remedial action, usually involving significant cost investment, is taken. Normally, price is no longer the principal criterion by which major contracts are decided. Engineering firms and equipment suppliers aiming to compete successfully within the European arena or globally, ignore this simple fact at their peril.

Here, in our fourth annual supplement covering this important subject, we outline latest laboratory services available from the cream of materials handling/processing engineering firms and equipment suppliers, all of which have advanced in-house test plants located in Europe.

Air-Tec system srl, Italy

Area of specialisation: Dense phase pneumatic conveying.
What is available: Full dense phase pneumatic conveying testing includes a 43m and a 3m path as well a laboratory facilities for verifying transport data (air consumption, pressure, speed and carrying capacity, yield coefficient, friction angle, angle of repose, bulk density, fragility of the materials, and further information on request). The laboratory has a materials database covering more than 2000 samples to compare the results. The minimum amount of material needed for each test is 0.6m^3.

The Air-Tec system test plant at Calderara di Reno, near Bologna, offers comprehensive facilities for conducting dense phase pneumatic conveying trials.

View inside amixon's Paderborn test plant.

The 43m long plant offers the following equipment and instrumentation: load cells, digital mass flowmeter, pressure transducer, advanced data acquisition system, air injection systems, and a sight glass to allow material to be viewed in transit. The conveying path includes a 4m vertical section.

Air-Tec system offers an engineering design service and customer support in making the correct choice of conveying system, depending on the length of the route and physical characteristics as well as volume of the material being handled.

Terms of use: Testing is available to everybody and there is no time limit. It is possible to perform a series of tests lasting two to three days for specific requests. The company charges for use of the test plant. In the event of systems being ordered, the payment is compensated. Results are confidential unless the customer gives consent for publication. It is available to companies from all over the world.

Location: Calderara di Reno, Bologna, Italy.
Contact: Ruggero Erani (erani@air-tec.it; tel +39 051 725128).

amixon GmbH, Germany (also Japan, USA, Thailand and India)

Area of specialisation: mixers, mixer driers, mixer reactors, granulators, dispersers.
What is available: In order to carry out test trials, which can be very demanding and comprehensive, amixon® GmbH established an excellently equipped laboratory at Paderborn. The company manufactures vertical mixers that are popular for a wide range of applications in chemical,

Ammag's test plant in Gunskirchen, Austria, offers advanced facilities for pneumatic conveying (dense and dilute phase), mixing and fluidised bed spray granulating trials.

pharmaceutical and food industries, and also in the powder metallurgy, ceramics, fine chemicals and plastics industries.

The machines are made in Germany in amixon's own manufacturing plant. The laboratory provides for mixing trials and all associated procedures including:

- granulating
- deagglomeration and dispersing
- drying
- reaction

In the laboratory, vessels can be loaded in a virtually dustfree manner by means of an ergonomically designed feed hopper. Discharge occurs at the underside of the device via a bottom valve with no dead space. Bags, cartons, bulk bags or drums can be used, depending on requirements.

Depending on the task, the laboratory offers a wide range of dosing options: pumps, pressure vessels, dosing lances, special nozzles. Due to wide range of experience with many different recipes, homogeneous distribution and dispersion of all types of liquid in the company's mixers can be guaranteed.

The alloy and Hastelloy drying equipment in the laboratory forms part of this manufacturer's standard equipment. This offers a major advantage to all existing and future customers interested in experimental trials: all products can be tested in their true state and there is no need to use a dummy product. On the basis of the large number of trials that have already been carried out, and of the extremely positive feedback and data available from mixers and driers that are in operation, the design and upscaling of production apparatus is guaranteed, ensuring maximum customer satisfaction.

Terms of use: The company's test centres are available to every interested company: customers as well as potential customers. amixon normally charges a fee for the use of the test centre. Special discounts are offered to customers from abroad or if other hurdles have to be overcome. There is no limit to the duration of trials. The test results are confidential in each case as they are often a part of a new process/ product development.

People from around the world make use of these facilities, which include over 30 test mixers offering capacities from 10 up to 3000 litres. There are also driers, granulators, reactors and many other items of test equipment.

Location: Worldwide there are five amixon test centres: Paderborn, Germany (located at the company's manufacturing plant for mixers and reactors); Osaka, Japan; Memphis, TN, USA; Bangkok, Thailand, and Satara, India.

Contact:
Germany: Matthias Böning (mboening@amixon.de; tel +49 5251 688888 331)
Japan: Kouichi Fukushi (fukushi@toyohi.co.jp; tel +81 6 6312 4171)
USA: Russell Nadicksbernd (russelln@azo.com; tel +1 901 531 6019)
Thailand: Jan-Wilko Helms (hja@azo.de; tel +66 2541 519 (2-7))
India: Ashish Bangar (amixon@vedicsystems.com; tel +91 20 26114504).

Ammag GesmbH, Austria

Area of specialisation: Dense/ dilute phase pneumatic conveying, mixing, fluidised bed spray granulating.

What is available: This is Austria`s only test plant of its type, where often fragile products, produced in a fluidised bed granulator and the appropriate conveying system can be tested and optimised under the same roof: no loss of information because of too many interfaces and process reliability for the whole process is the result. Nearly all processes offered by Ammag can be tested in the state of the art test plant:

- Full dense phase pneumatic conveying with a 40 m long test plant. Loading of the plant by bags or bulk bags.
- Test plant for dilute phase pneumatic conveying in positive or negative pressure mode.
- Pilot – and lab scale test plant for fluidised bed spray granulating and coating processes. Batch volumes from 1 to 60kg.
- Mixing is done by a very gentle, one shaft counter-current mixer with a net volume of 250 litres.
- Mechanical conveying by screw conveyors, bulk bag handling, screening and different types of discharging equipment (e.g. vibrating bottom, stirring type discharge equipment, fluidised bottoms) completes Ammag's portfolio of test plant systems.

Laboratory equipment helps to analyse material properties like bulk density, angle of repose, flowability, drying properties, etc as well as to expand the company's materials database. This database in connection with Ammag`s more than 60 years of experience in bulk materials handling and spray granulating, gives customers confidence in choosing the right process. Some equipment is also available on a rental basis. According to this unique and modular service concept for Ammag particle systems, customers are able to receive support from the first product idea through to industrial implementation.

Terms of use: All test results are provided in a standardised test report and are fully confidential if an NDA exists. Trials are available to companies around the world and fees will be compensated in the event of an order being placed. Trials normally last from one to three days, but there is no time limit. Tests can also lead to toll manufacturing.

Location: Dalienstrasse 11, A-4623 Gunskirchen, Austria

Contact: Dr Hans Groenewold (h.groenewold@ammag.com; tel +43 7246 6408 24).

Batchmixer test equipment for powder blending at the Dec Group test plant in Ecublens, Switzerland, and (left) SMEPAC-compliant cabin for containment testing.

Coperion GmbH, Germany (also USA)

Area 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 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.

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.

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

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)

Dec Group, Switzerland

Area of specialisation: Powder handling and process containment systems including transferring, filling, discharging, dosing, blending, micronising and containment.
What is available: As an essential element of dedication to quality, Dec (Dietrich Engineering Consultants SA) provides customers with the ability to test their products in the Ecublens powder handling laboratories, where services include powder characterisation to SMEPAC testing and particle size analyses. Dec has a full range of facilities and equipment as well as skilled technicians to support customers' needs. For long-term testing or where a toxic product is being handled, test equipment and expertise can be made available at reasonable cost. Dec also provides consultancy for process/system development including R&D as well as front end engineering design.
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, Switzerland
Contact: info@dec-group.ch; tel +41 21 694 20 40

Dynamic Air Ltd, UK

(also USA and Brazil)

Area of specialisation: Pneumatic conveying, vibratory feeding and 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 vibratory 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 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).

Flexicon Europe, UK

(also USA, Australia and South Africa)

Area of specialisation: Efficient, dustfree transfer of free-flowing and non-free-flowing bulk foods, pharmaceuticals, chemicals, minerals and other materials using: mechanical conveyors, pneumatic conveying systems; bulk bag conditioners, dischargers and fillers; bag dump stations; drum/box/container tippers; weigh batching systems; and integrated/automated plant-wide systems.
What is available: Flexicon manufacturing facilities in the UK, USA, Australia and South Africa maintain state-of-the-art test laboratories equipped with a broad range of full size bulk handling equipment. Using customer-supplied bulk materials, engineers and laboratory technicians can verify system performance prior to final equipment design and fabrication, and demonstrate newly constructed equipment for visiting customers prior to shipment. Flexicon engineers also utilise the laboratories to study the performance of new designs.

The array of equipment with interchangeable accessories in a virtually unlimited combination of system configurations can establish repeatable performance ranges for entire systems, taking the risk and guesswork out of purchasing customised bulk handling equipment.

The laboratories contain both mechanical equipment that transports, receives or discharges material by means of mechanical conveyors or gravity, and equipment that transports, receives or discharges material through pneumatic conveying lines.

The range of stationary and mobile equipment encompasses:
- Flexible screw conveyors in a wide range of diameters and screw geometries
- Pneumatic conveying systems equipped with blowers, vacuum pumps, filter receivers, cyclone separators, inlet/discharge adapters, rotary airlock valves and tubing in a range of diameters
- Bulk bag conditioners that loosen material solidified in bulk bags
- Bulk bag dischargers in a wide choice of configurations for basic to fully automated unloading
- Bulk bag fillers with numerous performance options for low- to ultra-high-capacity applications
- Manual dumping stations with self-cleaning dust collection systems and bag compactors
- Drum/box/container tippers
- Automated weigh batching systems including load cells and programmable controls.

Terms of use: The test laboratory is freely available to companies having a potential application for Flexicon bulk handling equipment. Customers are asked to cover the cost of transporting material to and from the nearest Flexicon facility. All results are treated in strict confidence.
Location: Herne, Kent, UK
Contact: Alan Walton (alan.walton@flexicon.co.uk; tel +44 1227 374710).

Flexicon test laboratories are divided between equipment that transports, receives or discharges material by means of mechanical conveyors or gravity (pictured), and equipment that transports, receives or discharges through pneumatic conveying lines.

Gericke Holding AG, Switzerland

(also UK and France)

Area of specialisation: Pneumatic conveying, mixing, feeding.
What is available:
- All different pneumatic conveying technologies can be tested such as positive, vacuum, dilute and dense phase conveying systems. Different sizes of pressure vessels and rotary valves can be tested with different sizes of pipe bores with maximum conveying distances up to 230m. Conveying trials can be performed with or without an additional external bypass system. During the conveying trials all relevant process data (such as conveying pressures, weights, flow, etc) are measured online and collected in a data acquisition system.
- In the bulk solids laboratory all necessary product properties such as bulk density, particle size distribution and flow behaviour, etc will be collected and used for the interpretation of the test results and system design.
- Both batch mixing (single and twin shaft) and continuous mixing trials (with up to four feeders at the same time) are possible.
- Volumetric and gravimetric feeding trials can be performed with a wide selection choice of different sizes of feeders and equipment. Also here the feeding accuracy and consistency is measured online and collected in a data acquisition system.
- In addition size reduction, sieving and discharging trials can be performed.
- After completion of the trials a detailed test report is distributed to the client.

Terms of use: The test centre is available to everybody and a fee will be charged. Prior to the trials, the set up will be discussed with the customer in depth and a time limit will be proposed depending on the

Gericke's highly advanced Regensdorf, Switzerland, test plant is used by international clients, mainly from Europe.

complexity of the trials. Test results are kept confidential for the use of the customer. The test centre is used by international clients mostly from Europe.
Location: Gericke's main test centre is situated in Regensdorf, Switzerland. In addition, test centres are also available in Manchester, UK, and in Paris, France
Contact: Ernst Leeger (e.leeger@gericke.net; tel +41 44 871 36 46).

Haver & Boecker OHG, Germany

(also Brazil, USA and India)

Area of specialisation: valve bag filling, FFS bag filling, open mouth-bag filling (bulk materials), IBCs, drums, canisters, buckets and bag filling (for liquid and pasty products), lab equipment for bulk materials, screening machines, washing systems and pelletising discs.
What is available: Haver & Boecker has had experience with the filling of different bulk materials since the foundation of the machinery division in 1925. Today the Research & Development Centre at the headquarters in Oelde has a team of 15 specialists, technicians and engineers working at a 600m² test facility in the interest of customers. The equipment used corresponds to the latest available technical standards in packaging and has largely been developed in-house. Over the past 20 years Haver & Boecker carried out analysis on more than 20,000 different kinds of bulk materials. The R & D Centre is equipped with 10 different types of valve bag filling machines (eg vertical and horizontal impeller, air packer, auger and pump packer). In addition there are also five different types of FFS machines for granulated as well as powdery products. All analysis and filling trials are used for basic development and to custom design equipment needs. New developments and prototype assembling are done in a separate testing area of 1200m² also located in Oelde.

Whenever the customers have new requirements, wish to launch new products to the market or want to change the existing packaging equipment necessary tests and trials are performed by the R & D Centre. When thinking about the most suitable packaging system not only the bulk material but also the bag material has to be considered. Based on lab reports and filling trials Haver & Boecker's customer get the best solution for their processes, the right filling system, the optimum machine components and a suitable control system.

Analysis and trials with wet and dry sieving are done at the Haver & Boecker technical centre in Münster. This test centre is mainly used by the screening experts Haver & Tyler.

Also a technical centre for mining technology (an affiliated Institute of the Technical University Bergakademie Freiberg) is available and located in Meißen. The specialists develop new agglomeration processes for different categories of material.

In addition to the test facilities for dry, solid products a test centre for pasty and liquid materials is available. At Feige Filling, a subsidiary of Haver & Boecker in Bad Oldesloe, pasty and liquid materials are analysed and tested.

Worldwide Haver & Boecker offers a nearly similar service for product tests and analysis in Brazil (Haver & Boecker Latinoamericana, Campinas) in India (HAVER IBAU INDIA, Vadodara) and in the USA (HAVER FILLING SYSTEMS, Conyers). A new technical centre is planned for China.

All over the world approximately 70 customer-orientated employees, combined with the company's innovation management specialists, are working on product analyses, filling trials and prototype assemblies.
Terms of use: The test facilities are available to everyone (customers and potential customers). The fee will often be credited towards any purchase of equipment.
Location: Oelde, Münster, Bad Oldesloe, Meißen (Germany), Campinas (Brazil), Conyers (USA), Vadodara (India).
Contact: Haver & Boecker OHG (t. hilling@haverboecker.com; tel + 49 2522 300)

View inside the Haver & Boecker Oelde R&D centre.

Part of J-Tec's Kapellen, Belgium, test facility where different gauges of pneumatic conveying pipework can be seen on the right.

J-Tec Materials Handling, Belgium

Area 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).

Lindor Products BV, the Netherlands

Area of specialisation: Mixing of sensitive powders and granulate, liquid injection (1 phase, 2 phase, ultrasonic), steam injection, drying (double jacket water or 8 bar steam), heating and cooling.
What is available: Spacious testing facilities are provided. Here mixing tests with typical product formulations are conducted to customer requirements. During these 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 net product volume), L70 and L100, L750 and L1000 with double jacket for hot water or steam. The L10 is provided with a transparent drum, the L100 can be equipped with on line camera inside the mixing drum.

Instrumentation and process add-ons include temperature monitor, humidity sensor, camera, halogen moisture tester, liquid injection, hot/cold air, micro dosing during mixing, etc. After conducting in-house tests,

A product formulation being loaded into one of the five different Lindor mixers available for customer trials at the company's Dordrecht facility; here information about mixing effects and final properties of the mixed product can be calibrated.

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, the company has a food grade testing facility at NIZO Food Research Institute in Ede, the Netherlands. Furthermore tests can be conducted in Malaysia, Japan and India.

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

Matcon Ltd, UK

(also USA, China, Japan and Australia)

Area of specialisation: Product formulation, IBC blending, B2B packing of powders, CIP (wet/dry).

What is available: Matcon is a market leading organisation specialising in providing solutions for handling of powders, granules and tablets using intermediate bulk container (IBC) technology. The state-of-the-art test plant boasts a full scale production facility where operating conditions reflect 'lean' manufacturing practices. Matcon standard products are assembled in "process modules" so that testing can be performed in "real" working configurations. The key modules available for testing are:

- Batch formulation (micro and minor ingredients)
- Bulk bag to IBC transfer
- Sack tip to IBC transfer with sieving and weighing
- IBC mixing with optional shear
- Premix preparation - liquid/solid
- IBC cone valve dosing and bag filling (optional sieving)
- Auger filling of bags
- IBC washing (wet and dry)
- Various "clean off place" washing solutions

In 2013, its test facility will boast a 'track and trace' Manufacturing Execution System (MES), enabling clients to benefit from increased productivity and improved product quality.

Matcon encourages clients to be present during the trials to observe and comment on the equipment in line with their requirements, with minimum risk.

Mettler Toledo test device with 50t direct load capacity for compression weigh modules. A lever test device for 100t is available too.

Matcon's UK test plant showing one of the company's IBC blenders and two of its different packing modules which are capable of catering for any pack weights and include sieving as well as metal detection capabilities.

On completion of a test, a detailed test report is prepared outlining testing settings, protocol and results.

Terms of use: The UK test facility is internationally available to clients. Prior to any trials, feasibility work is undertaken to assure the system will work with the customer's unique product and remove any unnecessary risk. At the time of testing, the business case is verified based on batches per hour, clean-down time, etc. The UK test facility is also used as a pilot plant for live production, fulfilling clients' often stringent quality and hygiene standards.

Dates are required to be scheduled dependent upon availability. The associated cost of shipping the product to and from the site is covered by the prospective client. MSDs are required to be reviewed by Matcon prior to testing.

Location: The main test centre is at the headquarters in Evesham, Worcestershire, UK. In addition, test centres are also available in Sewell, New Jersey, USA; Shanghai, China; Fujimino-shi, Japan; and Sydney, Australia.

Contact:
Evesham, UK - Hans Pettersson (hpettersson@matcon.se; tel +46 455 616 070)
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Fujimino-shi, Japan – Takashi Okada (okadata@mail.ni-net.co.jp; tel +81 49 264 3347
Sydney, Australia – David Newell (dnewell@matcon.com.au; tel +61 2 9892 4822)

Mettler Toledo AG, Switzerland

(also USA and China)

Area of specialisation: Electronic instruments, load cells, weigh modules and vehicle scales.

What is available: Mettler Toledo is a leading global manufacturer of precision instruments. The company is the world's largest manufacturer and supplier of weighing instruments and components for use in laboratory, industrial and food retailing applications. The plants offer all internationally relevant mechanical and electrical tests according to EN/IEC standards for electronic equipment including transportation and protection in harsh environment like ingress of water and dust. The plants are ISO17025: 2005 accredited. This stipulates that the plants are qualified to produce technically valid data and results.

The plants maintain load testers for load cells up to 100t. These devices are used to check accuracy, temperature behaviour and time related values. Other devices are available for dynamic testing and to confirm calculated design values.

A test device is available for vehicle weighing platforms. It can perform life time stress tests including overload until destruction.

Terms of use: Testing is available to everybody. The company does charge for use of the test plant. All test results are confidential.

Location: Nänikon Switzerland; Columbus, Ohio, USA; ChangZhou, China.

Contact: Eugen Schibli (eugen.schibli@mt.com)

Payper SA, Spain (subsidiaries in Mexico, Brazil and India)

Area of specialisation: Payper is a company located in Lleida, Spain, dedicated to design and manufacturing of all types of bagging scales, bagging and palletising systems. Despite its extensive experience gained from having installed more than 4000 bagging machines over almost 40 years, very often the company needs to test new bulk solid products, new bag types or new machines because the market

A Payper ASSAC M10 FFS bagging system is among the items of equipment available for trials at the company's test plant.

View inside one of Rotex's test plants.

requirements change continuously and moreover these differ in different parts of the world. Payper exports to more than 70 countries.

What is available: For the reasons stated above, Payper's test plant facility is a very important part of its overall production plant. The well equipped test facility covers a surface area of 100m² where the following tests can be carried out:
– free flowing products with high speed scale
– all types of products with tubular FFS bagging machine
– automatic bagging machines for open mouth bags
– air flow packer for powders and fine products
– sticky and not free flowing products
– very aerated (very fine) powders
– bag sealing
– product settling into bags
– bulk density analysis for products.

Terms of use: Available to all customers as well as for the company's own internal testing.

Location: Lleida, 160km west of Barcelona, Spain.

Contact: Albert Garros (albert.garros@ payper.com; tel +34 973 216 040).

Rotex Europe, Belgium and UK (also USA)

Area 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 with 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 0.8m² surface and two decks. At its Runcorn, UK, facility there is a Rotex screener offering 0.8m² surface and two decks as well as a Direct Drive screener with 0.8m² 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:
Within Europe: Wavre, Belgium, and Runcorn, UK;
Outside Europe at Cincinnati, OH, USA

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Schenck Process GmbH, Germany, UK, Austria and Czech Republic

(also USA, Brazil and Australia)

Area of specialisation: Weighing and feeding, screening, pneumatic conveying and injection, air filtration.

What is available: The test facilities of the Schenck Process Group are widely recognised as among the most extensive and technically advanced in the industry for the core processes of weighing, feeding, pneumatic conveying, screening and air filtration. One of the test laboratories can even simulate different environments such as high humidity or hot climatic conditions.

The test centres are in strategic locations worldwide and can precisely test the handling of bulk materials from bulk storage, filling feeders with bulk bags, pneumatic conveying and injection, complete cycle feeding, screening of materials and testing customers' dry bulk solid materials in volumetric, gravimetric, vibratory and sanitary feeding configurations. Demonstrations are possible using feed devices which include pressure vessels, standard airlocks, and high pressure airlocks. Sight glasses provide visual observation of the conveying techniques.

The range of equipment available to customers includes volumetric and gravimetric screw feeders, loss-in-weight feeders, dry material flow meters, bulk bag discharging systems, belt scales, weighbelts and vibratory feeders. For pneumatic conveying Schenck Process has negative and positive pressure test rigs for dilute, medium and dense phase systems of up to 500m in length with up to 31 bends of various radii. Continuous process injection systems are also available using rotary feeder and rotary screw equipment. The test facilities demonstrate feeding devices including pressure vessels, standard airlocks, and high pressure airlocks.

For air filtration there is particle emissions testing equipment that records and graphs air flow and velocity, air-to-cloth ratios, pressure differentials, inlet loading and outlet mass emissions. The testing capabilities include vertical and horizontal cartridge pulse jet filters and medium pressure/high-volume filtration equipment.

Many of the test centres have viewing rooms which allow customers to witness live tests in a dust and noise free environment which have computer screens to monitor the test results and trending in real time.

Terms of use: All test centres are available to existing and potential customers on a worldwide basis. The testing of materials needs to be arranged by appointment in liaison with the project handling team based on an agreed testing methodology. The costs of the testing are incorporated into the project proposal which includes the creation of a confidential test report for the customer. Materials received from the customer need to have a full analysis certificate to identify any hazardous properties and the disposal method of the material after completion of the tests. This needs to be agreed upon prior to the start of the testing.

Location: Schenck Process has several test plants located in Europe, Brazil and the USA which are available to all 33 companies of the group and their customers:
• Darmstadt, Germany, for screening, weighing and feeding
• Braunau, Austria, for weighing and feeding
• Prague, Czech Republic, for alternative fuels conveying
• Sao Paulo, Brazil, for screening
• Doncaster, England, for pneumatic conveying
• Kansas City, USA, for pneumatic conveying
• Sabetha, USA, for air filtration
• Houston, USA, for petrochemicals and plastics
• Whitewater, USA, for weighing, feeding, bulk bag discharging and pneumatic conveying
• Perth and Melbourne, Australia, for screening.

Contact:
For Darmstadt, Germany – contact Thomas Kamp (t.kamp@ schenckprocess.com; tel + 49 6151 1531 2748).
For Doncaster, England – contact Martin Chisholm (mchisholm@ schenckprocess.co.uk; tel +44 1302 321313).
For Whitewater, USA – contact Justin Robertson, test lab manager (Justin.robertson@sarinc.com; tel +1 262 473 2441).
For Kansas, Sabetha or Houston, USA, test centres – contact Justin Montgomery, test lab manager (montgomeryj@macprocessinc.com; tel+1 816 891 9300).
For all other test plant locations contact Thomas Kamp (t.kamp@ schenckprocess.com; tel +49 6151 1531 2748).

Statec Binder GmbH, Austria

Area of specialisation: combined open-mouth/FFS bag filling, PP-woven bag conversion and filling, robot palletising.

What is available: Trials can be conducted with the high-speed

One of the 10 Schenck Process Group worldwide test plants available for customer trials.

Among a wide range of bagging and palletising systems available for customer trials at Statec Binder's Gleisdorf test plant is the PRINCIPAC, the world's fastest – single spout – open mouth bagging machine.

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 recently introduced 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 3112 38580-0).

WAMGROUP SpA, Italy

Area of specialisation: Mechanical and pneumatic conveying, bulk bag filling and discharge, dust filtration, bulk solids discharging, level and pressure monitoring – silo safety, promoting material flow, waste water and sludge treatment, mixing, conditioning, agglomerating and granulating.

What is available: The test Plant includes most WAMGROUP® products which are integrated in a system that enables simulation of real operating conditions. The system is connected to software which controls, detects and registers performance data of all the equipment (silo demo centre).

To enable WAMGROUP subsidiaries from all over the world to carry out remote tests a webcam monitoring system has been installed.

Following this principle, the test plant helps WAMGROUP design engineers to test the performance and resilience of new machines and equipment in real working conditions and to analyse how that equipment operates inside a plant.

Several types of tests can be performed:
- Throughput rates of screw conveyors and feeders, as well as pneumatic conveyors;
- Filtration efficiency and clogging behaviour of filter elements;
- Comparative performance of pressure relief valves and silo safety equipment;
- Application of mortar mixers and dust conditioners;
- Durability of components (intercepting and diverter valves);
- Testing of prototypes and innovative concepts.

In close association with the outdoor plant, the company's research and test laboratory today is Italy's foremost private centre specialising in both pure and applied research concerning powdery and granular materials, as well as the development of bulk solids handling and processing equipment.

WAMGROUP R&D has participated at a number of international research programmes in close cooperation with national and international universities and institutes.

Several types of studies can be carried out in the laboratory:
- Studies regarding the behaviour of granular materials when being conveyed or mixed;
- Interaction of bulk solids with container and conveyor casing materials;
- Studies regarding innovative construction materials for the manufacture of equipment components for screw conveyors, dust filters, industrial mixers, feeders, flow intercepting valves, and others;
- Studies regarding new technologies and production processes for the manufacture of screw conveyors, dust filters, industrial mixers, feeders, flow intercepting valves, and others.

A cutting edge webcam system takes customers and researchers from all over the world inside the laboratory so they can follow tests from their own computer at home.

Terms of use: The test facilities are available to all existing and potential customers. WAMGROUP does not charge customers for testing if the deal ends with a sale. Test results are kept confidential for the use of the customer and for internal use. The test centre is used by international clients.
Location: Ponte Motta di Cavezzo, Italy.
Contact: Matteo Reggiani (matteo.reggiani@wamgroup.com; tel +39 0535 618111).

Windmöller & Hölscher, Germany

Area of specialisation: Supply of bagging machines for free flowing and non free-flowing bulk goods using the FFS process.

What is available: The W&H FFS test facility comprises a detached area of approx. 200m² and is permanently equipped with a range of 3 to 4 FFS bagging lines of different configuration, each machine complete with silo, scale, product refeed and dust removal system. It is able to simulate complete bagging environments, in order to create and collect critical process knowledge and to exclude potential risks prior to important investment decisions.

The bagging lines in the lab serve to test a wide range of pelletised, granular and even powdery bulk products regarding their suitability for the FFS process, analyse bagging performance and determine or optimise bag sizes subject to product properties. The lab features a separate section which is certified to do testing under explosion-proof conditions.

Closely related to bagging tests, the lab machines also run sealing tests in order to analyse the sealing properties of different packaging film grades, constructions and thicknesses. These tests also serve to optimise converting parameters for specific film recipes and/or operation conditions. Finally the lab is also equipped to do drop tests as well as storage tests of filled bags.

Terms of use: The test laboratory is available to clients and prospects, interested in using W&H bagging lines. It is also being used for operation and maintenance training of client crews. Customers usually bring their own packaging film and bear the transportation cost of product to and from the facility. Testing is charged on the basis of a case-by-case lump sum according to expenditure and covers machine set-up and cleaning as well. Testing costs will however be refunded in case of a sales contract.

Customers are invited to witness the test. All results are treated in strict confidence. The laboratory is open to customers from all around the world.
Location: Lengerich, Germany
Contact: info@wuh-group.com; tel +49 5481 14-0

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

Part of WAMGROUP's indoor test facility at Ponte Motta di Cavezzo; there is also an extensive outdoor test area at the same location.

The Lengerich FFS (form-fill-seal) bagging test plant of Windmöller & Hölscher.

- 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:

A) 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.

B) 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.

C) 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 there is 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)

This 2013 Supplement on In-house Test Centres can also be accessed at www.eurobulksystems.com where it will remain throughout 2013

Pneumatic conveying rig at the Wolfson Centre for Bulk Solids Handling Technology.

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

Agglomerating
- WAMGROUP

Air filtration/dedusting
- Coperion
- Schenck Process
- WAMGROUP

Bagging
- Haver & Boecker
- Payper
- Statec Binder
- Windmoeller & Hoelscher

Briquetting/compaction
- Wolfson Centre

CIP (wet/dry)
- Matcon

Dispersing
- amixon

Dosing
- Dec Group
- Gericke

Drying
- amixon
- Lindor
- Wolfson Centre

Electronic instrumentation
- Mettler Toledo

Emptying (bags, bulk bags, containers, etc)
- Dec Group
- Flexicon
- WAMGROUP

Feeding
- Gericke
- Schenck Process
- Wolfson Centre

Filling (bags, bulk bags, containers, etc)
- Dec Group
- Flexicon
- Haver & Boecker
- Payper
- Statec Binder
- WAMGROUP
- Windmoeller & Hoelscher

Flowability testing (solids)
- Wolfson Centre

Granulating
- amixon
- Ammag
- WAMGROUP
- Wolfson Centre

Heat exchanging
- Coperion
- Lindor

High containment
- Dec Group

Hoppers & silos
- WAMGROUP
- Wolfson Centre

Hydraulic conveying
- Coperion

IBC blending
- Matcon

Level/pressure monitoring
- WAMGROUP

Mechanical conveying
- Flexicon
- WAMGROUP
- Wolfson Centre

Micronising
- Dec Group

Mixing/blending
- amixon
- Ammag
- Coperion
- Dec Group
- Dynamic Air
- Gericke
- J-Tec
- WAMGROUP
- Wolfson Centre

Packing (powders)
- Matcon

Palletising
- Payper
- Statec Binder

Pelletising
- Haver & Boecker

Pneumatic conveying
- Air-Tec system
- Ammag
- Coperion
- Dynamic Air
- Flexicon
- Gericke
- J-Tec
- Schenck Process
- WAMGROUP
- Wolfson Centre

Product formulation
- Matcon

Reactors
- amixon

Scalping/lump removal
- Rotex

Screening/sizing
- Haver & Boecker
- Rotex
- Schenck Process

Vibratory feeding/conveying
- Dynamic Air

Washing systems
- Haver & Boecker

Weighing/load cells
- Flexicon
- Mettler Toledo
- Payper
- Schenck Process