



Journal

A PUBLICATION BY THE KAHL GROUP





Dear Readers,

The world around us is constantly changing – be it through political decisions, new technologies, available resources or the pollution of the environment.

We face these challenges by questioning our procedures, by improving processes and machines, and by continuously investing in the modernization of our production sites. In order to be able to support our customers even better in the future, we have founded the company NEOMONTEC which specializes in assembly and services.

We hope you will enjoy reading this Journal and look forward to shaping the future together with you.

Yours

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KAHL GROUP PRODUCTS AND PROCESSES

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DEVEK pilot extraction plant



DEVEK pilot evaporation plant

DEVEK Native Liquid Freeze Drying. Gentle Drying Without Use of Additives

The demand for plant extract powder or fruit concentrate powder free of drying additives (e.g. carbohydrate mixtures – hydrolysed starch from glucose, etc.) is constantly increasing.

In view of the high demand for high-quality, 100 % pure natural products, the development of a suitable drying process has become a real challenge for DEVEK. The DEVEK specialists for drying processes have succeeded in solving the problem of drying without drying additives. Now, the customers benefit from a sophisticated, economical and safe drying process in the DEVEK test centre.

The product pre-treated in the feed bin is conveyed into the deep vacuum in the freeze drier via a specially developed feed system. The vacuum level ranges from 0.4 to 4 mbar abs., the sublimation point lies between -30 and -6 °C. DEVEK native liquid freeze drying works continuously.

There is virtually no loss of aroma and active ingredients in the dry final product which possesses excellent instant properties.

DEVEK native liquid freeze drying is the first choice when it comes to drying valuable liquid products such as plant extracts, pharmaceutical ingredients, food additives, fruit and vegetable juice concentrates.



The DEVEX specialists for drying processes have succeeded in presenting an economical and safe drying process.



Recently, the second expansion stage of the test centre has been completed. The already existing drying processes, such as the pilot extraction and evaporation plant, liquid gas extraction and further downstream equipment, are used to produce plant extracts, herbal medicinal products, herbal substances, herbal cosmetics, essential oils, natural colourants, food additives, fruit and vegetable juice concentrates, concentrated coffee and tea extracts, proteins and oils from animal raw materials, etc. —



KAHL Expander Technology for Processing Tea and Herb Dust

The processing of tea and herbs produces dust. Fine cutting of hibiscus flowers, for example, produces a reddish, very dusty powder. The produced quantity of dust can be up to 6%. It has a particle size of 100% < 400 µm. It may also contain fibre components.

The above-mentioned parameters are subject to both natural and origin-related variations. Typically, hibiscus flowers are dried in the countries of origin by spreading them on the ground. The hibiscus powder produced during batch-wise processing is not suited for use in tea bags due to its particle size. It would remain in the cup as unwanted sediment.

The use of AMANDUS KAHL expander technology ensures the agglomeration of the fine particles. By means of subsequent granulation of the agglomerates, the desired particle size is determined.

When hibiscus powder is processed using a crown expander OEK, the process can be carried out in line with the cutting process. The powder produced during cutting is immediately agglomerated. The use of this KAHL technology ensures the complete recovery of the produced tea and herb dust. —

Intermediate product
downstream of OEK

Finished product
downstream
of crumbler and
screening



Raw material
(hibiscus dust)



The advantages are:

- Hygienisation of the product by means of short-term heating (mechanical energy input)
- No bagging and short-term intermediate storage
- No subsequent pelleting of the hibiscus powder
- No composition of new batches (the batches must remain clearly identifiable), the fine cut from the cutting process is mixed with the agglomerates from the crown expander line.

The Optimum Process for Flavour Encapsulation

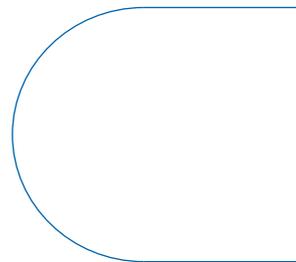
The main purpose of flavour encapsulation is to protect the flavours. The encapsulation protects the highly volatile ingredients from oxidation and thus also from changes in taste. At present, spray drying is the most frequently used process for flavour encapsulation. However, especially spray-drying agglomeration in the fluidised bed offers a number of advantages.

For encapsulation, the flavours are emulsified in a matrix formulation which may consist of maltodextrin and various starches, for example. In the dry matter, the matrix acts as a barrier for the molecules of the flavouring.

The spray drying process usually produces fine powders which, however, do not possess optimum application properties with regard to solubility, flowability and durability and which are prone to agglutinate.

By means of fluidised-bed spray-drying agglomeration, by contrast, the product is not only dried but at the same time it is formed into agglomerates.

The emulsion does not dry in the free space as is the case in the spray tower process, but is sprayed onto already existing particles. The particles grow and their structure, moisture and size can be changed depending on the variation of the process parameters. Their surface is smaller, thus only a small part of the flavouring is exposed to atmospheric oxygen. The resulting product provides improved application properties, whether it is to be redispersed in liquids or used as a compressed solid. Moreover, unlike many spray-dried powders, the agglomerated product is dust-free and free flowing.





The advantages are:

- Extended shelf life due to retardation of oxidation
- Fast, good and complete solubility, because the product is easier to wet
- Lower thermal stress – more gentle on the product
- Very high powder yield
- Good flowability thanks to the powder morphology

Last but not least, the space requirement is also an important feature: a Conti FB fluidised bed plant for flavour encapsulation has a much smaller footprint and a much lower overall height than a spray tower. —

Innovations: Made by NEUHAUS NEOTEC. Access from Above Facilitates Filter Removal

Fluidised bed systems can be rather large. Thus, the compact design and easy accessibility represent an advantage in terms of personnel costs and safety that cannot be overestimated. NEUHAUS NEOTEC offers a high degree of flexibility in the configuration of the plants that ensure easy access from above for the removal of internal product filters.



The fluidised bed element can be tilted thus allowing access to the screen bottom



The required size of a plant depends on the process and on the product to be processed. Product quantities from 10 kg up to several tons per hour can be processed.

Fluidised bed systems by NEUHAUS NEOTEC are modular systems built according to a standardized size grid. They offer an economic construction for almost every application and space situation. NEUHAUS NEOTEC can design continuous fluidised bed systems with a width of only 20 cm up to practically any reasonable dimension. The system can be customized for the desired application and the required function. Various options can also be installed later in order to efficiently meet future demands. The compact plant design allows excellent accessibility even in limited space conditions.

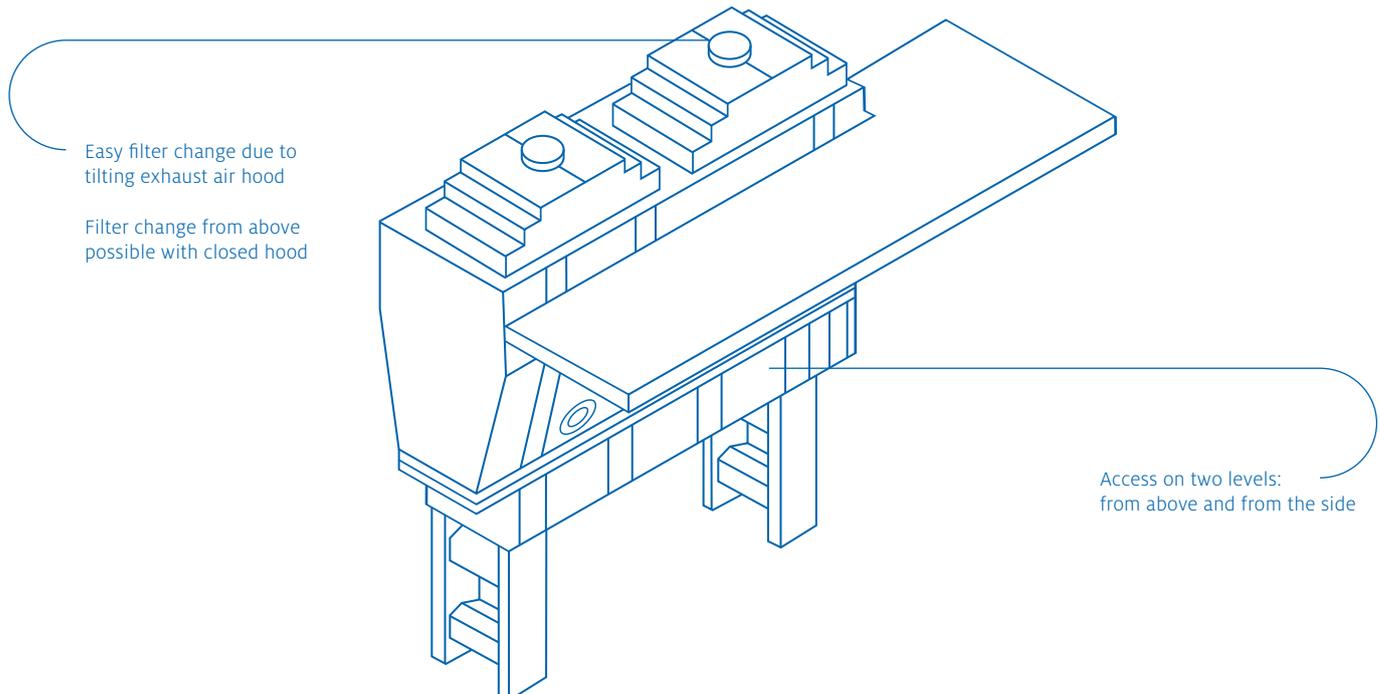
NEUHAUS NEOTEC Conti FB fluidised bed plants are available in different versions for the removal of internal product filters. In the classic version, the exhaust air hood is tilted slantwise in order to ensure easy access to both the air distribution plate and to the filters. Access is possible only if the system has been completely emptied beforehand.

In another version, which is particularly suitable for bottom spray systems, the inlet air part is tilted while the hood remains fixed. This allows the nozzle lances to be easily pulled from the rear and the filters to be removed directly from the bottom of the production chamber.



Access on two levels facilitates filter change, for example

With a new variant, the entire plant can remain closed and it does not have to be emptied. The filters are directly pulled upwards from a second level after opening of the upper cover. This has the advantage that the product can remain in the device and the device can be started without a new start-up routine after the filters have been changed. Unlike other variants, this system can be upgraded by means of an optional "safe change system" to a version ensuring filter removal with low dust emission which almost meets containment requirements. A plastic bag is put over the filter wrapping it up during removal. The bag is tied at the bottom so that the filter is carried without dust release to the cleaning area where the containment is finally broken. Allergenic or toxic substances can thus be safely contained in the plant. —





Adjustable roll speed and gap



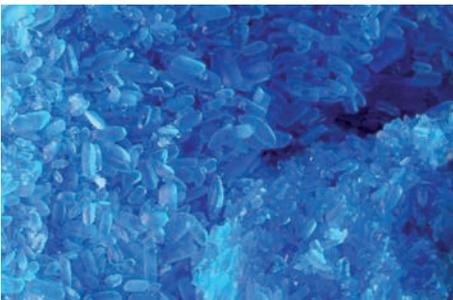
Easy to operate via touch screen

Mechanical Process: Crushing

NEUHAUS NEOTEC roll grinders crush solids by using continuous shear forces in combination with balanced compression forces.

The hardened roll surfaces are provided with special corrugations of different contours and sizes. These rolls rotate at different speeds in opposite directions to each other. The resulting differential speeds generate shear forces which crush the product step by step.

Precise adjusting devices and lowest tolerances ensure exact and stable grinding gap settings of both rolls. The input product passes through the grinder from top to bottom by means of gravity. The grinders are available as single-stage and multi-stage machines. All machines are designed for low-noise operation. —



Copper sulphate

The test centre equipment in Ganderkesee:

Laboratory grinder

- Roll diameter 200 mm, 2 stages
- Corrugations from smooth to coarse
- Independently adjustable circumferential speed
- Pilot roll mill (upon prior agreement)
- Dust-free grinding
- Special particle size distribution possible
- Compaction of the ground product in a separate unit
- Grinding under inert gas

Examples of products

- Urea, SAP, coffee, silicon, carbon and many more

Laboratory equipment

- Laser particle analysis
- Moisture measurement
- Bulk density



Pharmaceutically compatible design
NEUHAUS NEOTEC designs all plants on the basis
of the customer's individual requirements



Pull-out nozzles
The spray lances can be removed also during operation
and installed at different heights

Particle Technology: Flexible Fluidised Bed Processes

Our new modular plant design offers more options for fluidised bed processes on a laboratory scale.

The separation of process and air supply components enhances the range of applications and enables individual plant configurations. With the new fluidised bed laboratory plant LFB Batch, all processes can be carried out as fluidised bed processes, such as agglomeration, spray granulation, micro-encapsulation or coating.

With a new design

The unit features two process modules for air volumes of up to 300 m³/h or 600 m³/h and bin sizes of 5 l/10 l or 20 l/30 l. In addition to the batch fluidised bed process modules, the plant can be extended by modules for continuous processes or for spray drying applications. This increases the performance range of a single plant significantly. The new laboratory centre is ideal for the development of new recipes and for increasing the production quantities of different batch sizes. The process

module of the LFB Batch can be designed for any process of the fluidised bed technology.

All process parameters such as temperature, spray rate and air volume can be varied within wide setting ranges. The processes can be carried out both as top-spray and as bottom-spray processes.

In the laboratory plant, even product quantities of 500 g can be transferred reliably to production scale. With bin sizes from 5 l to 30 l and product quantities of up to 18 kg, a very big batch size range is available. For continuous processes, very flexible variants of up to 10 kg/h are available. —

The NEOGRIND Family is Complete

The modern grinder NEOGRIND is especially suited for the production of coffee specialties. It convinces with its outstanding performance and its state-of-the-art design. The grinder features three passages and was developed for the production of capsules and pads, for filter coffee and for fine grinding.

The individual motor drive in combination with the wider rolls ensures a higher flexibility and an individual particle size distribution. Other features are the IE3 motors for maximum energy efficiency and a lightweight, completely bolted, corrosion resistant frame.

The grinding gap is adjusted via servomotors, that is without compressed air. Another advantage is the ease of handling of the NEOGRIND. The rolls can be changed rapidly and the completely accessible grinding chamber ensures easy cleaning. The closed housing is characterized by a low noise emission.

Thus, three grinders equipped with the latest technology are available for any requirement and performance. The grinders are controlled via an intuitive touch screen. As a matter of course, they can be integrated into any plant control system. —





The fluidised bed provides optimum conditions for effective mass transfer and heat exchange

Conti FB – Fluidised Bed Systems

The designation Conti FB stands for continuous fluidised bed plants (FB = Fluid Bed) by NEUHAUS NEOTEC. They are mainly used for fully automated processes in the large-scale production of goods for price-sensitive markets that require a particularly efficient production.

Conti FB plants are of modular design and have separate zones for the inlet and exhaust air. The continuous process is fully automatic, reproducible at any time and requires only a small number of staff.

- Processes: Drying / cooling, agglomeration, spray granulation, encapsulation
- Division into zones for process control with individual temperature profiles
- Top or bottom spray
- Internal or external filtration
- Vibrating or static systems
- Nozzles in every zone, height adjustable
- Compact plant design
- Through-the-wall installation:
Separation of technical and production area

With the Conti FB system, not only large product quantities can be processed under profitable conditions. Also for the production of smaller capacities of around 10 kg/h, for example in the pharmaceutical industry, the continuous process is an interesting alternative to conventional processes. —



Batch processing in a Batch FB plant is particularly efficient in the case of frequent product changes

Batch FB – Fluidised Bed Systems

Batch FB (FB = Fluid Bed) is the term for fluidised bed units for batch processing, which is frequently used in the pharmaceutical industry or by manufacturers with campaign production or frequently changing formulations.

The individual process steps can be precisely controlled in the Batch FB units. This makes a Batch FB fluidised bed system very flexible in the adjustment of parameters, for example in the production of complex product formulations.

The planning of a fluidised bed plant requires a lot of special knowledge. The more flexible and efficient the process is to be, the more important the holistic concept is – from the process technology to the selection of the optimum peripheral equipment.

- Processes: Drying, agglomeration, spray granulation, encapsulation, coating
- Execution according to GMP guidelines
- Pressure shock resistant design up to 12 bar
- Top and bottom spray
- Wurster coating / spouted bed coating
- Various options for product feeding and discharge



The pilot plants of NEUHAUS NEOTEC allow process parameters to be tested on a large scale prior to production

Conti FB Pilot

For processes from 5 to 50 kg/h, NEUHAUS NEOTEC has developed the Conti FB Pilot systems as test plants for testing new formulations and for laboratory applications.

Thanks to the flexible plant design, the test quantities can be reliably scaled up to larger production quantities.

With the compact system almost any product can be processed and any fluid bed process can be carried out. Like the "big ones", the Conti FB Pilot also has numerous special design features.

- Processes: Drying / cooling, agglomeration, spray granulation, encapsulation, coating
- Execution according to GMP guidelines
- Nozzles in every zone, height adjustable
- Removable nozzles, also during the process
- Division into zones for process control with individual temperature profiles
- Top or bottom spray
- Vibration for fluidisation of sticky products
- Humidification / dehumidification of the inlet air

NEUHAUS NEOTEC also offers fluidised bed plants in various sizes for batch processes on a laboratory scale. —

About us.

AMANDUS KAHL is a medium-sized family-owned company managed by its proprietors and was founded in 1876 as a manufacturer of mills and presses.

140

More than 140 years of experience have made us one of the world's most competent partners in the area of plant and mechanical engineering.

THE ANNULAR GAP EXPANDER AND THE FLAT-DIE PELLETING PRESS ARE THE BEST KNOWN PRODUCTS OF THE COMPANY KAHL



900

With more than 900 employees, a worldwide network of agencies, service technicians, subsidiaries and sales offices, we provide support to our customers every day, around the globe.

5000

In the KAHL pilot plant more than 5000 products have been pelleted successfully.



80

We support our customers in more than 80 countries.

Oats – an Increasingly Popular Grain

Oats are used both in animal and human nutrition. On account of its composition with ingredients such as vitamins, minerals, protein, fat and fibres, oat occupies an exceptional position among the different cereals. As is generally known, oat protein has the highest biological value among the grain proteins as well as a cholesterol-lowering effect. The particular wholesomeness and easy digestibility of the protein and the fat also play a major role.

Contrary to the other cereals, the fat is distributed over the whole grain and the fat content is much higher. So oats differ in composition from usual bread cereals. This makes the production of oat products "more difficult", since the durability is limited due to the activity of lipolytic enzymes which are ready for oxidation. However, this can be compensated by a hydrothermal treatment with inactivation of the enzyme activity.

Oats cannot be generally considered to be gluten-free, but at least they contain significantly less gluten than other cereals, e.g. wheat. The composition of the proteins in oats differs from that in wheat. The oat-specific protein avenin is regarded as less likely to cause intolerances than the wheat-specific protein gliadin. However, if the designation "gluten-free" is given on oat product packaging, this presupposes appropriate measures for cultivation, harvesting, storage and processing which reduce or prevent the mixing of oats with other gluten-containing cereals.

The popularity of oat products in human nutrition is growing steadily. Preferably oat flakes as a mono-component are on the shelves, be it in the form of jumbo flakes made of whole grain or baby flakes made of cut grain. However, oats are also included in flake mixtures, muesli bars, breakfast cereals, sports foods, pastries, bread, crispbread, instant products, porridge mixtures and oat drinks.

Oat processing requires a multitude of process steps for an optimum and efficient treatment and production of high-quality products.

Fig. 1: Impact huller, type FKS-C





In the cleaning section, the oat impurities which remain after pre-cleaning are separated. For this purpose screening machines, aspiration channels, magnets, dry stoners, indented cylinders and, if required, colour sorting machines are used. To prepare hulling, the oats are de-awned and possible double grains are dissolved. Subsequently, the de-awned raw oats are classified by means of sorting cylinders into at least two to three sizes. This also contributes to a more effective hulling and yield.

At the Interpack trade fair in Düsseldorf in May 2017, the newly developed impact huller type FKS-C was presented to a broad public for the first time (Fig. 1). The modular system includes various variants. In addition to an automatic height adjustment, the impact ring is also available in a manually adjustable version. Besides, two impact ring heights are available.

In order to keep the downtime during an impact ring change as short as possible, a specially designed impact ring holder allowing a change without tools within a few minutes has been developed. In combination with the centrifugal wheel, which includes special centrifugation channels, as well as the continuously adjustable speeds, the highest possible hulling efficiency is reached. The centrifugation channels are elementary in order to allow the oats to hit the impact ring first with the longitudinally aligned tip.

After hulling, the hulled mixture is fed to a high-capacity closed circuit husk separator type HUS. The HUS works according to the circulation air principle and therefore does

not require a downstream separator or filter. The required circulating air is generated by an integrated fan. Discharge screws feed the separated products into the downstream piping system.

After separation of the hulls, the heavy product (the unhulled and hulled oats) is fed to an awner. This process step is used to remove the hairs, also called fluff, on the surface of the hulled oat grain.

The oats subsequently enter the process step of the classification. This step consists of a pre-sorter and a re-sorter. The first table separator is used as a pre-sorter. The patented table separator (Fig. 2), one of the earlier inventions of company founder Friedrich Hermann Schule, is used to separate and sort out hulled oats from unhulled oats.

Fig. 2: Table separator, type TH3





Fig. 3: Kiln, type LKD

The basis for this mechanical separation process is the fact that bodies of approximately the same shape vary considerably in their specific weight and impact behaviour. The hulled grains with a higher specific weight tend towards the outlet on the lower side. The unhulled grains with a lower specific weight are transported by the impact to the outlet on the high side. The accepted fraction, coming from the pre-sorter, is directly fed to the next table separator (re-sorter). There, the product is checked for remaining unhulled oats. In order to reach the highest possible separation quality, the individual adjustability of the pre-sorter and re-sorter is elementary. Experience has shown that this can only be achieved with two separate process steps. The unhulled oats, coming from the table separators, are returned to the centrifugal section.

Depending on requirements, the oats can be subsequently stabilized and flavoured with the aid of a kiln (Fig. 3). The aim is to inactivate the lipases and thereby achieve favourable taste effects such as the nutty-roasted aroma as a function of the retention time.

The kiln-drying process can take place either before the hulling process in a crude oat kiln or after hulling in a grain kiln. Without stabilisation, the hulled oats will not have a sufficiently long storage capability due to oxidation processes of the fats.

By means of a colour sorting machine, discoloured grains, foreign grains (e.g. barley) and, if required, further gluten-containing ingredients are removed so that a perfect oat quality is available for flaking.

In order to produce baby flakes, the hulled and possibly kiln-dried oats must first be cut accordingly. For this process step, the drum groat cutter, type TGS, is used (Fig. 4).

Fig. 4: Drum groat cutter, type TGS



Due to the newly developed precision knife basket without shims, the service and maintenance times are significantly reduced. Furthermore, the new geometry, the use of special metals and the adjustable knife basket significantly increase the service lives of the main wear parts. The use of exclusively detectable components is inevitable or mandatory in some oat mills. Finally, the precision knife basket and the enlarged function unit ensure a significantly higher capacity per drum as well as a uniform, high cutting quality and thus a significantly increased yield of cut grains per cycle compared to other machines available on the market. Therefore, the machine occupies a leading position worldwide in terms of space-performance ratio.

In human nutrition, different sizes of baby flakes are produced from groats. These are both consumed as mono-components and used in muesli mixtures, muesli bars and in the bakery industry for the production of bread, rolls and biscuits.

In order to produce flakes, the oats must be brought into a plastically deformable state. For this purpose, they are uniformly heated by means of direct steam addition via steamer, which automatically increases the moisture content. Depending on the product size and pre-treatment, the oats remain in a downstream hydrothermal bin.

Coming from the retention bin, the oat kernels or groats are distributed uniformly over the entire roller width of the flaking roller mill by means of the feed roller (Fig. 5).

When flaking the products it should be noted that the roller diameter is sufficiently dimensioned. This is essential to achieve an easy drawing-in and to produce stable rolled flakes. We recommend a diameter of at least 600 mm. By means of the automatic gap adjustment and the roller contact pressure, flakes of different thicknesses can be produced.

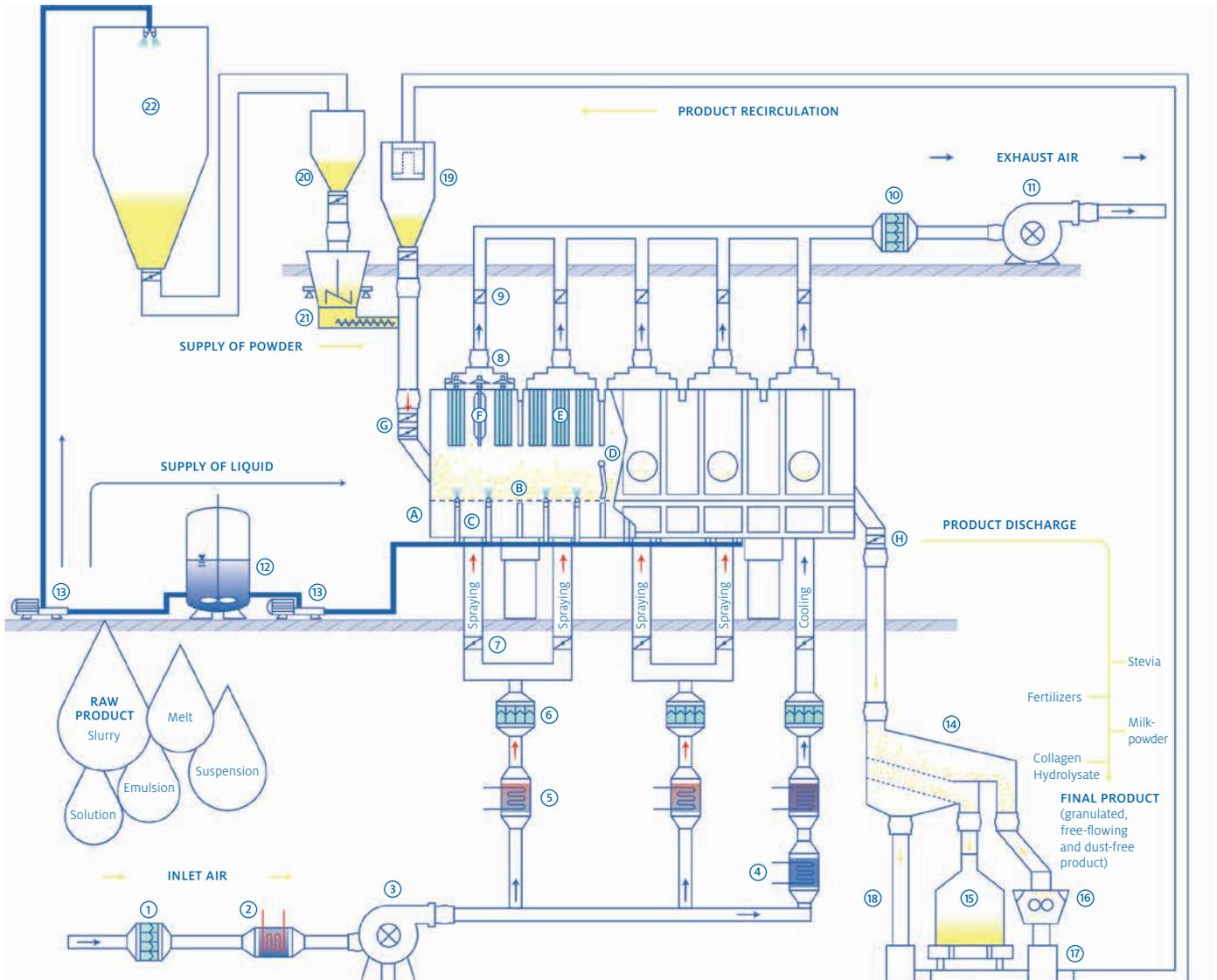
The fact that both the loose and the fixed flaking roller are driven individually favours the process and the flaking performance. Depending on the product to be processed, the flaking roller mill can be equipped with a roller tempering unit or in combination with a roller cooling unit. Product scrapers prevent the flakes from wrapping around the rollers so that a clean roller surface is always available during flake production.

The moist warm flakes reach the drier/cooler in the subsequent process step. The flakes are then passed over a control screen in order to remove possible fine particles and double flakes before they are transported, for example, into the finished product silos.

The different varieties of oat flakes take an eminent position in many areas of nutrition, with steadily increasing popularity with consumers. —

Fig. 5: Flaking roller mill, type FWS





Fluidised bed plant

- Ⓐ Infeed air distributor
- Ⓑ Screen bottom
- Ⓒ Bottom spray nozzles
- Ⓓ Product weir
- Ⓔ Product filter cartridges
- Ⓕ Filter cleaning system
- Ⓖ Double flap (product supply)
- Ⓗ Flap for product discharge

Air handling unit

- ① Inlet air filter
- ② Antifreeze heat exchanger
- ③ Inlet air fan
- ④ Air cooler / dehumidifier
- ⑤ Heat exchanger
- ⑥ Inlet air filter
- ⑦ Inlet air flaps
- ⑧ Compensator
- ⑨ Exhaust air flaps
- ⑩ Exhaust air filter
- ⑪ Exhaust air fan

Product flow

- ⑫ Liquid bin
- ⑬ Liquid pump
- ⑭ Screening machine
- ⑮ Big-bag (final product)
- ⑯ Grinding of oversize particles
- ⑰ Recirculation of oversize particles
- ⑱ Recirculation of undersize particles
- ⑲ Vacuum conveyor with buffer bin
- ⑳ Buffer bin downstream of the spray tower
- ㉑ Gravimetric proportioning weigher
- ㉒ Upstream spray tower

Product Improvement and Performance Increase

Spray dryers are used in numerous sectors of the food, chemical, animal feed and related industries to dry liquids containing solids to powders. However, the possibilities of a spray drying system are often limited when it comes to producing particles larger than 200 µm. With an additional step – fluidised bed agglomeration – not only the product quality can be improved.

Spray dryers are built in various designs to change particle size, final moisture content and application behaviour of liquid input products in a defined way. The process is used, for example, for the production of agrochemicals, biotechnical products, ceramics, dairy products, detergents, enzymes, micro-organisms and proteins. However, the particle size of up to 150 µm achieved in spray drying is not always ideal for further processing of the powders. Particle sizes of more than 200 µm are desirable for the production of compressed solids such as tablets or if the powders are to have a particularly good dissolving behaviour in liquids. Agglomerates with the desired particle sizes can be produced in a continuous fluidised bed process in a downstream Conti FB plant. Other advantages can also be achieved.

The spray powder is dosed directly into the agglomerator where the same slurry is added as in the spray tower. Instead of only drying in the spray tower, the slurry now additionally dries directly on the dosed powder and can be changed in its structure in a defined way. Depending on the type of process parameters selected, particle size, structure and bulk density of the product can be largely modified as required. For example, fluidised bed agglomeration can significantly improve the solubility of dairy products.

Alongside this product optimisation, the capacity can also be increased. The output capacity of the spray tower can be increased by an average of 20 to 40%. In the case of a spray tower with a nominal output capacity of e.g. 1,000 kg/h, this means not only improved product properties but also an increase in output to up to 1,350 kg/h (DM 50% of the slurry).

A Conti FB system can also be the most efficient solution in terms of capital expenditure: Instead of investing in a new spray tower, product quality and capacity increase can be achieved with a Conti FB system. The required extra space for installation is negligible because the fluidised bed plants of NEUHAUS NEOTEC are among the most compact systems on the market. —

The New Pelleting Press Type 65-1500

The first pelleting press 65-1500 for wood pelleting was installed in the plant of a large wood pellet producer in the USA who already owned a number of the type 60-1250 presses. The pelleting press 65-1500 has been designed in particular for higher capacities.

The 65-1500 is Kahl's answer to the permanent challenge of reducing the investment costs per ton of produced wood pellets and of further reducing the total operating costs. Whereas the presses of type 60-1250 achieve an average output of 6 t/h, the press 65-1500 achieves an output of 9 t/h – 10 t/h with a pellet durability of (PDI) > 98.5%.

AMANDUS KAHL has always given top priority to the development of the press 65-1500. Though the press type 60-1500 has already proved itself in other industries such as crushing of waste tires, compaction of domestic and industrial waste, the engineers of AMANDUS KAHL have built a machine with special features for the production of wood pellets. For example, the machine is provided with 6 pan grinder rollers which press the product through the die, all bearings are reinforced and the main drive shaft is thicker than 12 inches. After several months of operation, the pellet producer was able to reach an output of 10 t/h according to his own statements. It could be observed that the service life of the dies increased disproportionately due to the larger die and the larger open perforated surface; the extraordinary running stability may have also contributed considerably to this phenomenon.

AMANDUS KAHL has broken new ground in the economical production of wood pellets with the 65-1500 flat die pellet press. Before its market introduction, the pelleting press 65-1500 has been thoroughly tested and verified in the KAHL pilot plant. —





Wood pelleting plant in Russia

Market Leaders Rely on KAHL Flat-Die Pelleting Presses

These presses are used for a worldwide production of 6 million tons per year, and the trend is still rising.

Properties:

- Minimum operating costs
- Maximum operating safety and operating hours of up to 8000 h/year and counting
- Only 4 pelleting presses for 200,000 t per year
- Leading in wood pelleting up to 8–12 t/h per press



Wood pelleting plant in Brazil



KAHL GROUP WORLDWIDE

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Opening and Extension of the DEVEX Test Centre in Ganderkesee

The worldwide demand for gentle drying processes for the food and pharmaceutical industries is greater than ever before.

The worldwide demand for gentle drying processes for the food and pharmaceutical industries is greater than ever before. A new test centre of DEVEX Verfahrenstechnik GmbH in Ganderkesee has been set up to present the latest developments in DEVEX vacuum and freeze drying technology to the customers and to successfully dry even the most "difficult" products. With the multi-flexible continuous DEVEX vacuum and freeze driers installed in the test centre, drying tests are carried out for customers from all over the world in order to determine the required process parameters for industrial production plants. —



DEVEX IS ONE OF TOP GLOBAL MANUFACTURERS IN THE FIELD OF VACUUM AND FREEZE DRYING PLANTS.





32 Spiral Systems on 2 Floors

HEINEN FREEZING is the European market leader in the field of industrial pasteurizing, proofing, cooling and freezing systems for the food industry.

With more than 90 employees at the company's headquarters in Varel, HEINEN FREEZING has been the partner of the major players of the food processing industries for more than 35 years and serves a worldwide growing market. Development and design, production and sales, assembly and service – all from a single source.

In 2015, the largest Swiss bakery, COOP, implemented a mammoth project in Schafisheim. The building of the bakery has a total area of 48,000 sqm, is 54 m high and consists of 15 floors, eight of which are below ground level. Approximately 650 employees convert around 40,000 t of flour into 600 different types of baked goods on 26 lines in 24/7 operation every year.

For cooling and freezing, the largest Swiss bakery relied on a specialist from Germany: HEINEN – the "freezing people" from Varel.

The building of the bakery has a total area of 48,000 sqm, is 54 m high and consists of 15 floors.

32

HEINEN installed a total of 32 spiral systems in Schafisheim.



HEINEN installed a total of 32 spiral systems in Schafisheim:

Today, 12 acticool.® active spiral coolers are in operation in the bakery (2nd floor) which cool bread loaves and other bakery products after baking and transport them to the 1st floor. There they are deep-frozen by means of 12 spiral freezers, type arctic.

In the pastry shop on the 1st floor, baked goods such as puff pastry, pizza dough, flat cakes or sponge cakes are cooled by means of 5 acticool.® active spiral coolers and 1 arctic. spiral freezer.

An additional new process line was put into operation in June 2018. In this line, fresh doughs are fermented or cooled using a proofline.® spiral fermenter and an acticool.® active spiral cooler. In this mammoth project HEINEN was able to prevail against five other suppliers.

Simon Oeschger, Head of the Technology Department, COOP Bakery Department, says about the project that HEINEN and COOP were open to new ideas so that a standard product could be turned into a customer-oriented solution. In addition to that, HEINEN was able to get the most out of the products with its technology. —



Market Leader in Taiwan: KAHL Expanders at DaChan Great Wall Group

Just in time for Christmas 2017, another 3 KAHL expanders type OE 30.1 were put into operation at DaChan Great Wall Group in Taiwan. Thus, DaChan Great Wall has a total 12 KAHL expanders in operation in its factories in Taiwan.



Conclusion of the deal for the last 3 expanders for DaChan Great Wall at Victam Bangkok in 2017



Great Wall DaChan is the leading manufacturer of concentrate in Taiwan with an annual output of over one million tons in several factories in Taiwan. The DaChan Great Wall Group operates further concentrate factories in Vietnam and in China.

From the very beginning, the KAHL expanders fully met the high demands in terms of feed value improvement, hygiene, pellet quality and pellet press performance. Together we developed special solutions at the request of DaChan Great Wall, such as the positioning system for the outlet cone for faster start-up of the expander and the integration and control of local machines and processes in the KAHL expander control system.

The KAHL expanders are used in combination with annular die presses of various manufacturers, mainly for the production of broiler and duck feed. DaChan Great Wall achieves significantly better pellet qualities at higher press capacities with the KAHL expanders. With regard to feeding, the previously expanded feed excels with significantly better feed conversion rates than conventionally conditioned feeds. A very high operational safety and availability of the expanders, ensured by the KAHL online shop, online remote maintenance and regular after-sales visits, complete the positive overall picture. —

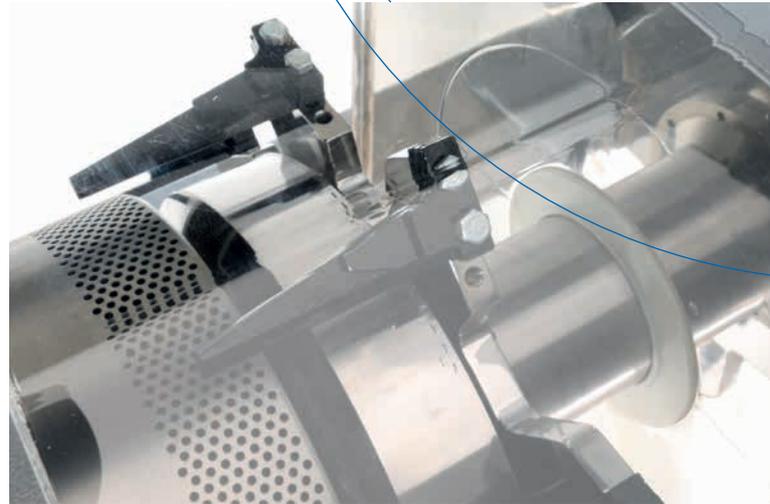
Crown Expander for Component Treatment in Far East

The individual treatment of feed components such as full-fat soya and maize requires optimally adapted processes for reproducible results at the highest level.

Variable treatment parameters are also desirable for process adjustment in the case of fluctuating raw material qualities and for frequently requested processing of various individual components on one line.

Modern animal nutrition has concrete ideas and wishes regarding the treatment goals: For dairy cows the focus is on a high bypass protein value, for the use of full-fat soya for poultry and piglet feed a constant low value for trypsin with high protein solubility is expected and for piglet feed certain starch modifications in maize and wheat are desired. Users also want an increased digestibility of raw fibres and the stabilisation of fatty materials such as rice bran.

The crown expander technology of AMANDUS KAHL has successfully established itself on the market in recent years for the treatment of individual components and is used by many leading manufacturers. In addition to the European markets, the Asian market in particular has developed very positively recently. In Japan, a crown expander for the treatment of soybean extraction meal for increasing the bypass protein was put into operation. In China, a 2nd line with crown expander for the treatment of maize, full-fat soya and soya extraction meal for piglet feed has recently been put into operation. In the Philippines, the technology is used to stabilise rice bran and increase the fibre digestibility in copra in two crown expander lines.



The advantages of the crown expander with the movable cone in the crown are obvious. The energy input for the pressure treatment can be conveniently set to the optimum value via the control system by simply positioning the cone in the crown. Under- or over-treatment can thus be avoided – a very decisive advantage over conventional extruders with a fixed die.

The lines with crown expanders are completed by application-oriented conditioning and process control and cooler technology with and without hot-air addition.

The complete crown expander technology is available to interested parties for tests in the KAHL pilot plant. Many of our customers made use of this possibility before purchasing the line and processed their raw materials together with the KAHL application engineers so that they could familiarize themselves directly with the many advantages of the technology. —

The Polish Compound Feed Factories are Looking at the Pioneer of Protein Carrier Treatment.

This year Agrolok has put into operation one of the largest NON-GMO soya and rape processing plants in Osiek, Poland. The company currently processes 220,000 tons of soya and rape per year.



Agrolok manufactures various feed components on the plant. The machine technology was supplied by AMANDUS KAHL. In cooperation with a North German oil press manufacturer, a process was developed which presses the hydrothermally pre-treated products in the oil mill and/or subsequently treats the press cake hydrothermally. In addition to legumes, full-fat soya and press cakes made from rapeseed and soya, oils are also produced.

There are several processing options in the plant between the individual process steps. There are two main processes: expansion at 15 t/h and oil extraction at 15 t/h. The hydrothermal treatment process of AMANDUS KAHL includes crushing with a crushing roller mill and hulling. By hulling, the proteins are concentrated and a high-protein feed is produced. This feed component called Protina and Amirap has not been available on the Polish market so far.

The hulls are pelleted by means of a flat-die pelleting press and then fed to cattle as roughage. The hulled seeds are conditioned and flow into a hydrothermal reactor, where the seeds are treated at approx. 100 °C for a retention time of approx. 15 minutes. The pre-treated seeds are then mechanically and thermally conditioned with an expander according to the HTST principle (High Temperature Short Time). The connection of these process steps is necessary in order to achieve a gentle reduction of the antinutritive factors and a high digestibility of the proteins without chemical additives. This process replaces the previous protein-damaging processes such as dry extrusion or roasting.

In addition, a so-called bypass protein or UDP feed is produced, which is advantageous for feeding dairy cattle. By encapsulating the proteins, it is made rumen-proof and is only digested into milk in the cow's abomasum. —

Annular gap expander®



Crushing roller mill



NEW: Innovation Centre of the KAHL GROUP in Ganderkesee

In July 2017, a test centre was opened at NEUHAUS NEOTEC in Ganderkesee which completed the innovation centre of the KAHL GROUP: a Devex drying centre with a multi-flexible drying unit, a freeze drying unit (up to -45°C), a chiller (2°C) and a vacuum drying unit (up to -45°C).

Examples of products: plant extracts, fruit juice concentrates, malt beverages, pharmaceutical products, hydrolysed vegetable proteins (HVP), instant coffee.

At the end of 2018, an extraction centre was opened consisting of an evaporation plant which is suitable for the following products: herbal extracts, medicinal plants, coffee, tea, instant concentrates, fruit and vegetable concentrates, flavours and colourants.

The extraction plant for coffee, tea, leaves, roots, barks, spices, fruit, seeds, herbs and medicinal plants constitutes the second part of the centre.

DEVEX has vast experience in the design, manufacture and installation of extraction plants and the equipment for continuous and batch recovery of essential oils, oleoresins, aromas, natural extracts and proteins.

Easy raw material discharge and fast cleanability ensure ease of operation of the plant as well as an easy and rapid product change.

DEVEX products





Headquarters in Ganderkesee: State-of-the-art equipment and great expertise in process technology

Application of extraction plants:

- Standard extractors, vacuum-proof up to 0.5 barg or 3 barg
- High pressure extractors up to 40 barg
- Extractor sizes 20 l to 10 m³
- Single and multi-stage extraction
- ATEX / non-ATEX
- Pilot extraction plants
- Customized designs

— **Extraction processes:**

- Liquid-solid extraction
- Liquid-liquid extraction
- Liquid-gas extraction
- Steam distillation
- Incl. the option of vacuum stripping

Extraction of various products: The DEVEX Process & Product Development is available to customers for tests in the field of extraction processes with their various options. —

Successful Completion of a DEVEX Extraction Centre in Vietnam

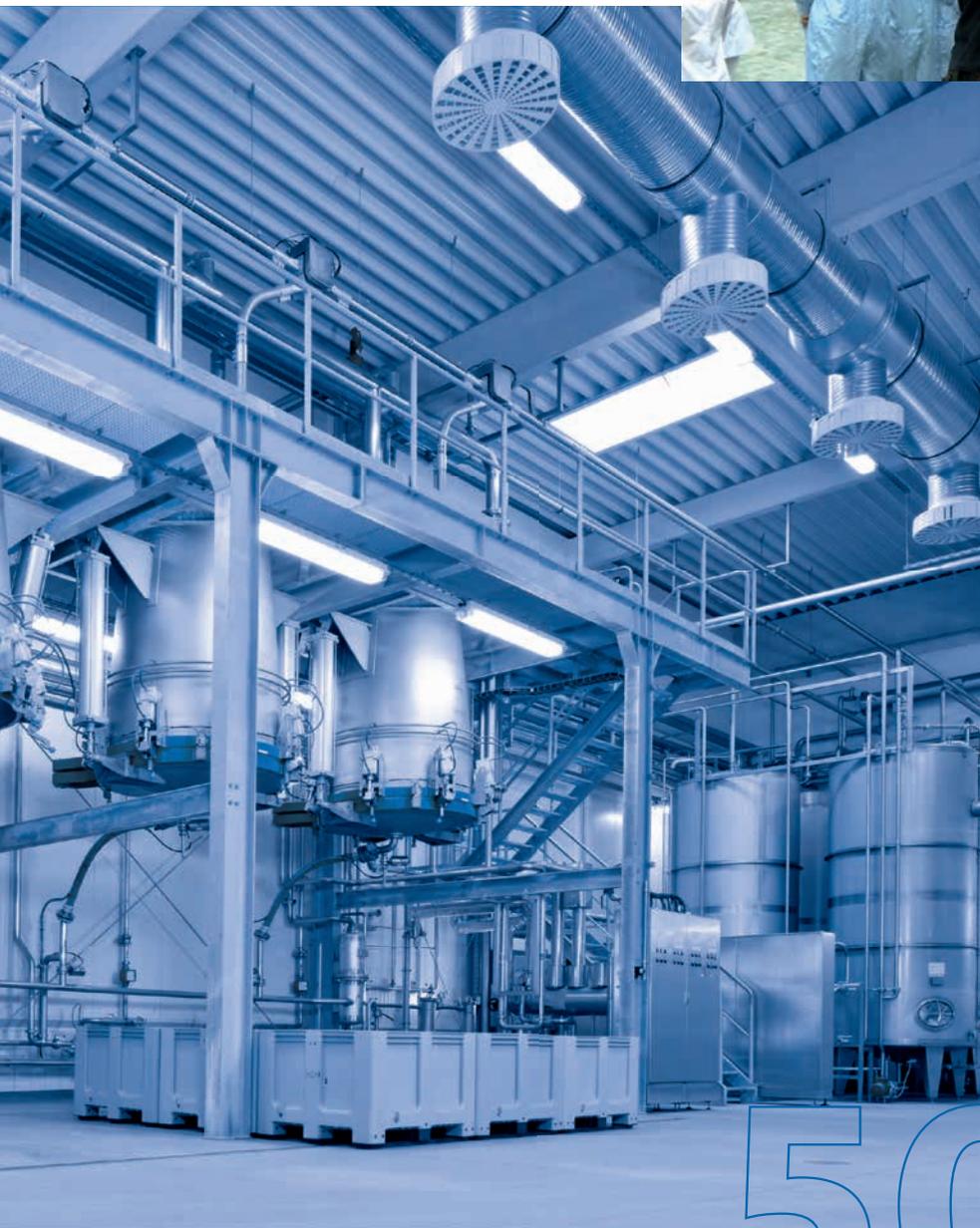
An extraction plant for herbal active substances was supplied to ANVY, a company based in Vietnam.

After a planning and construction period of around one year, the plant was officially handed over on 10 May 2018 during a handover ceremony in the presence of Sven Wildförster (Managing Director DEVEX Verfahrenstechnik GmbH), To Hong Thai (Managing Director ANVY) as well as technicians and engineers, local politicians and the press.

To Hong Thai firmly believes that with the commissioning of the plant designed and supplied by DEVEX, ANVY will make a breakthrough in the national and international market, since the production now meets European standards. To Hong Thai thanks the German experts for their cooperation and points out that ANVY's goal is to continue and intensify the cooperation with DEVEX in order to expand further in the foreseeable future.

During the handover ceremony, the first batch of plant extracts with a total weight of 500 kg of dry matter was produced by Sven Wildförster and the DEVEX Team in cooperation with the customer's technicians and engineers. —





500

During the handover ceremony, the first batch of plant extracts with a total weight of 500 kg of dry matter was produced.

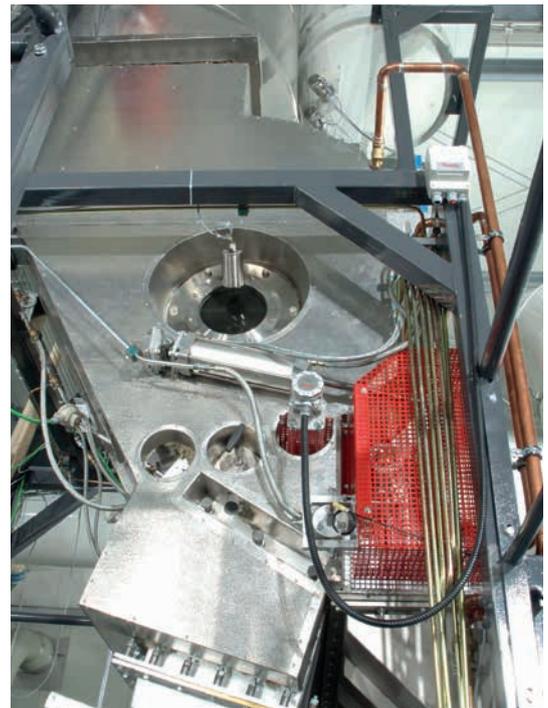
Coffee Technology

As part of the innovation centre, a separate pilot plant for roasting, crushing and refining coffee is available on the premises of NEUHAUS NEOTEC for testing all possible roasting and grinding processes available for the coffee market. Here you can meet representatives of large roasting plants, mainstream roasters, speciality roasters, as well as owners of coffee shops.

Roasting of coffee

Special features and applications of the proven rotating fluidised bed:

- Temperatures between 100 and 400 °C
 - Drying, kiln-drying, roasting, cooling
 - Circulating air and fresh air with heat recovery
 - Wide setting range for hot air speed
 - Heat and mass transfer variable in many areas
 - Product temperature measurement directly in the product bed, minor deviation of 1.5 °C
 - Very short response time on account of minimal heat storage
 - Wide range of unique profiles
 - Very short retention time (< 5 sec.)
 - Separate cooling in a rotating fluidised bed
- Very low breakage rate, for example about 1% for coffee



Filter coffee, ground



Profile roasting

Unique possibilities for the composition of roasting profiles. The profile process control ensures special management of the roasting process: the product temperature can be controlled within a wide range during the entire drying and roasting process.

These roasting profiles open up new possibilities of aroma development in the coffee bean. Thanks to the RFB process with its short response time and direct bean temperature measurement, a wide variety of profiles can be created.

Copy roasting

The patented copy roast ensures the automatic reproduction of a given time profile, even with random variations of the input variables, such as moisture, batch weight, etc.

For this purpose, an intelligent algorithm has been developed which autonomously detects deviations from the ideal roasting profile and automatically controls the required temperature and air quantity adjustments.

Development of Fish Feed Plants Using the Example of the African Market

Fish farming in aquacultures is known to be booming worldwide. One of the markets that has grown strongly in recent years is on the African continent. Aquaculture production there has increased by almost 50% since 2010, to currently 2.3 million t/a.

In order to ensure the adequate provision of fish feed, more fish feed plants have been installed in individual African countries in recent years. Due to many years of experience in this field and good industry contacts, KAHL has been able to implement a total of 10 production plants in Egypt, Tunisia, Sudan and Nigeria in the last few years. Customers include compound feed companies that already produce poultry and cattle feed and have expanded their range to include fish feed. But also larger fish farming companies belong to KAHL's group of customers, who, by deciding to produce their own fish feed, have freed themselves from expensive imports.

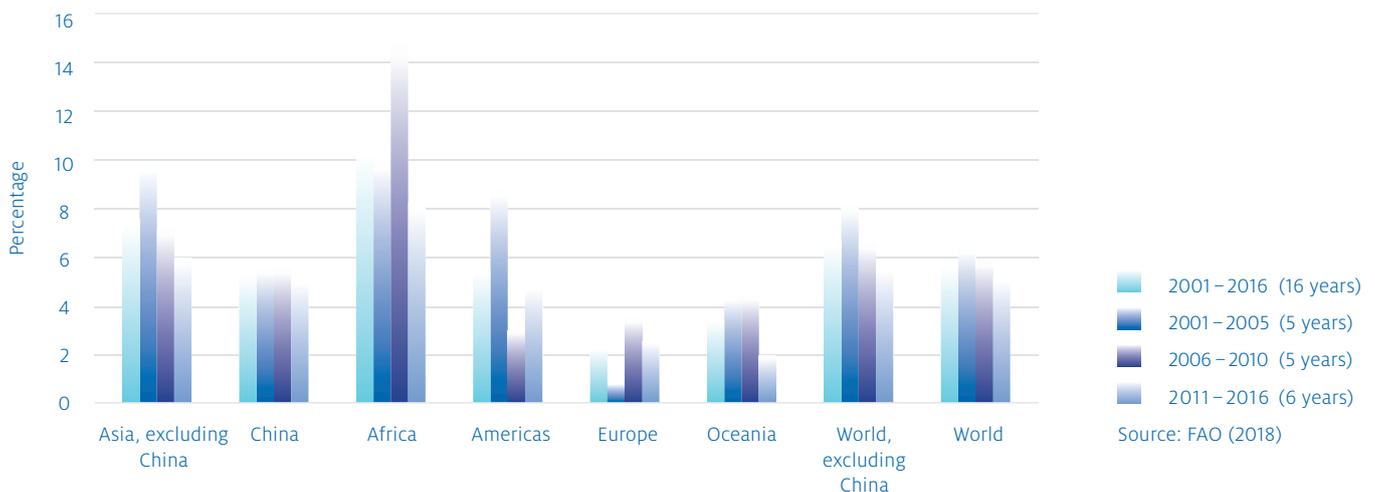
The process technology of a fish feed plant usually includes the process steps of weighing, fine grinding, mixing, extrusion, drying, vacuum coating, cooling and packaging.

The plants produce both sinking fish feed primarily for maritime aquacultures and floating fish feed primarily for aquacultures in inland waters. The market development is so dynamic that already one year after commissioning of the first plant, the extension by a second line was ordered from KAHL. —



KAHL extruder with conditioning unit MK

Aquaculture: Average annual growth by volume





The Most Advanced Wood Pelleting Plant in Europe – Made by AMANDUS KAHL

ULK is one of the leading wood processing companies in Western Russia and operates one of the largest and most advanced sawmills in Europe at the Kosteljevo / Oktjaberskji, Arkhangelsk Oblast site with an area of 90 ha and a processing capacity of 700,000 cubic metres p. a.

For ULK, sustainability, waste avoidance and environmentally friendly use of resources are part of the company philosophy. ULK operates its own tree nursery, with a capacity of approx. 9 million pine and spruce seedlings p. a., and uses the thermal heat of the city of Oktjaberskji in biomass boiler plants to generate the process heat for the sawmill.

In 2016, KAHL received an order from ULK to supply a complete plant for the production of wood pellets with an annual capacity of 150,000 t. For the selection of KAHL as supplier it was decisive that KAHL as a mechanical engineering company develops and produces all core machines for wood pelletizing itself and is responsible for the entire process.

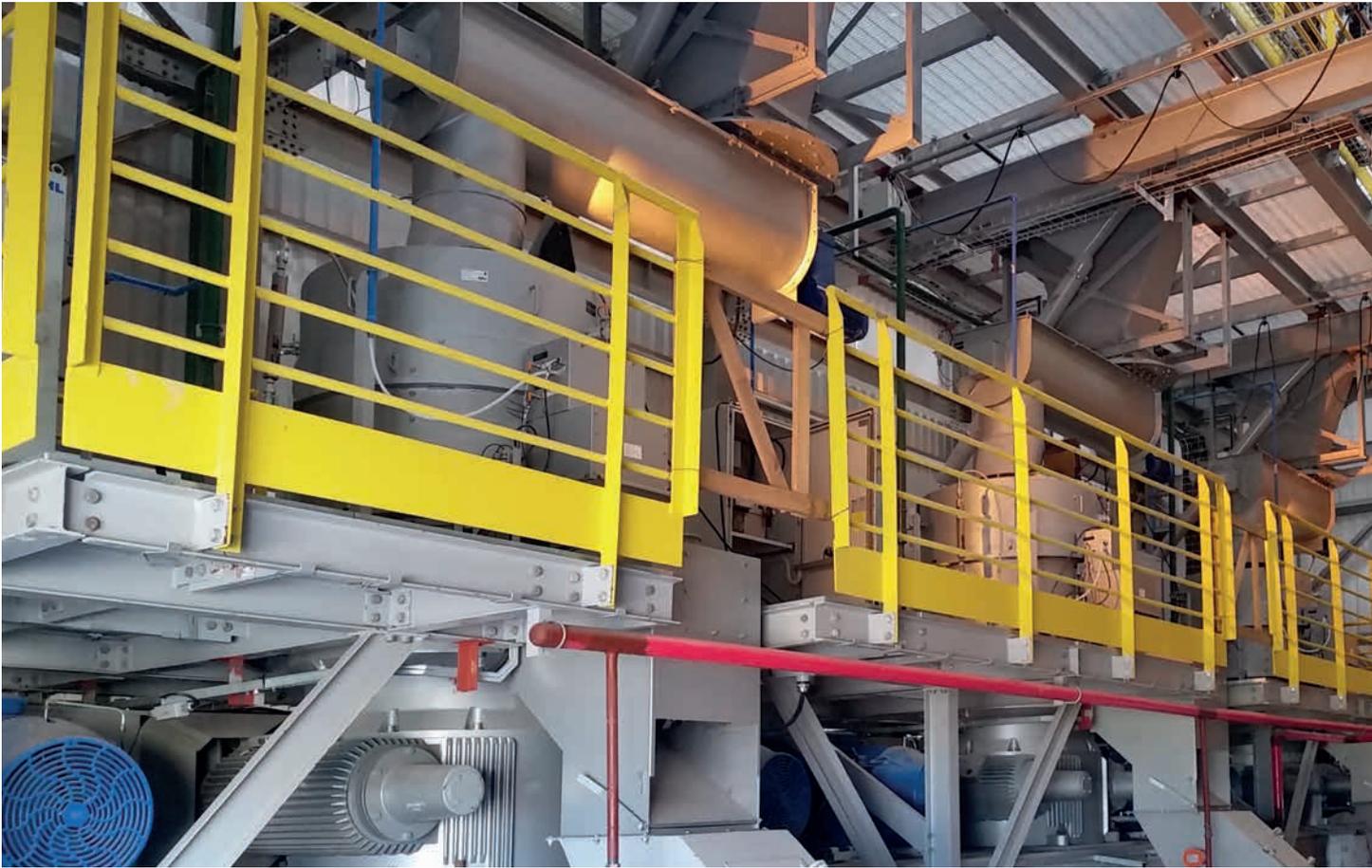


ULK
=
USTIANSKIY
TIMBER COMPLEX –
RUSSIA



- **The characteristic data of the plant are:**
- Raw material conditioning and wet grinding with the KAHL pan grinder mill
- Drying with 2 KAHL fabric belt driers GBT 6010-12
- Concrete silo for dried chips
- Pelleting with 5 KAHL flat die presses 60-1250
- Silo plant for pellets with 4 silos of 2,500 m³ volume each
- Plant for finished products with loading facilities in standard 40" containers, big bags as well as fully automatic packaging in 15 kg PE bags

After commissioning the plant in the second quarter of 2018, ULK has produced exclusively pellets of the premium quality EN A1/ DIN Plus for export and also for the market in Russia. —



Flat die pelleting presses



Hammer mills



Brazil: Largest Wood Pelleting Plant in Latin America

In the context of climate policy and the general need to reduce CO₂ emissions, coal-fired power plants in Europe are gradually being converted to more climate-friendly fuels. The sustainable and CO₂-neutral conversion to biomass is the preferred strategy.

For reasons of handling and logistics, wood pellets are used. Due to the quantities required, these mainly come from overseas. The main producers continue to be the USA, Canada and Russia, which have high stocks of usable plantation timber. In most cases, entire pine trunks are transformed into pellets in an energy-intensive process.

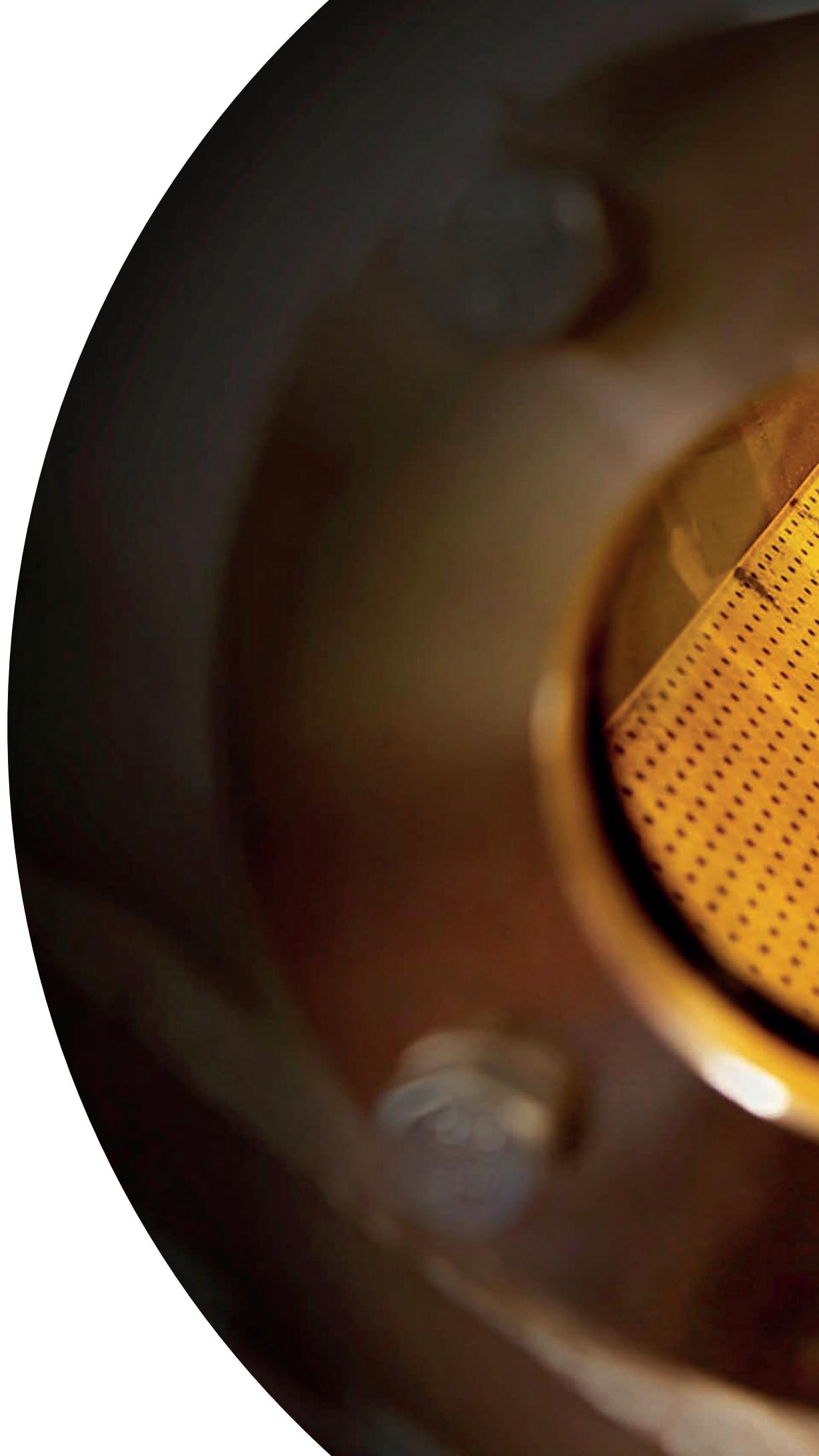
Brazil also has high stocks of plantation woods, but predominantly fast-growing woods with a multiple of the comparable yield per hectare. Now the world's first large-scale industrial plant for acacia wood has been put into operation in Brazil. The annual output of the plant is 350,000 t and the pellets already set new quality standards on the European power plant market.

In cooperation with Brazilian companies, KAHL has delivered the first plant of this type to Tanac S.A. and successfully commissioned it. The focus was on a resource- and energy-saving process that ensures a high quality standard of the end product. The high-quality bark of the Acacia Mangium tree is used for tannin extraction.

The remaining, debarked wood is processed into chips, which are then processed into higher quality pellets.

The plant relies on the proven pan grinder mill in combination with a hammer mill for post-grinding and the cost-saving flat die pelleting press technology. Especially with fibrous, light products, it unfolds its design strengths of low circumferential speed in combination with natural shear forces and operation in the free fall.

Further plants for the energetic utilisation of fast-growing, high-yielding woods based on the flat die pelleting technology are already under construction and will soon go into production in Asia and Latin America. The combination of high-yield, resource-conserving wood with the highest yield per hectare worldwide and the resource-conserving and energy-saving KAHL pelleting technology with the lowest operating costs worldwide represents an economic and ecological revolution in the value chain. It will encourage more power stations to convert their power stations and reduce greenhouse gases, which is so important for mankind. —



KAHL GROUP INTERNAL NEWS

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We Manufacture According to ISO 9001:2015

Below you will find an overview of the revision and history of ISO 9001:2015. In short, the new standard, in addition to the previous content, now also requires strategic aspects, process orientation and responsibility of the company management.

Why was the standard changed?

The aim was to respond to the changing requirements of the markets, such as

- increasing globalization and complexity,
- changed requirements (laws, regulations),
- other risks and opportunities,
- increased expectations (customers, society),
- more efficient control of processes.



What is ISO 9001 actually?

DIN EN ISO 9001 defines the minimum requirements for a quality management system (QM system) that a company should meet in order to provide products and services that fulfil customer expectations and official requirements. At the same time, the management system should be subject to a continuous improvement process.

The introduction of a quality management system is a strategic decision for a company. DIN EN ISO 9001 provides a certifiable framework to promote the continuous improvement of the management system and the associated economic benefits.

The process-oriented approach is based on the main processes of an organisation: Management processes – value-adding processes – supporting processes. The standard considers these processes and compares the target values with the actual values. In the event of deviations, improvements and changes are defined and planned. Thus the circle of Plan – Do – Check – Act, also called PDCA cycle, closes.

New in ISO 9001:2015 are the following terms:

- **Context of the organisation.** These are internal and external factors within which the organisation acts or which can influence it.
- The previous concept of customer is extended to that of **interested parties**.
- The **process-oriented approach** and a systematic process management.
- **Risks and opportunities** must be determined. The aim is to avoid undesirable effects or to reinforce desirable effects.
- **Knowledge of the organisation** is regarded as an independent resource in DIN EN ISO 9001:2015. It is important that companies regulate how knowledge is passed on within the organisation.

About us.



4,250

With a press brake, sheets up to a length of 4,250 mm can be bent with a pressure force of 1,700 kN.

As a family-owned, medium-sized company, our actions have always taken a long-term view. This is particularly true in relation to our employees.

WITH PRIDE WE CAN SAY THAT ALL OUR MAIN PRODUCTS ARE MADE IN GERMANY.

07

Our seven companies offer sophisticated solutions for process engineering, machine and plant construction as well as the erection of complete factories for many industries.

700

Our customers operate more than 700 expanders worldwide.

In Germany, we are the leading manufacturer of machines for the compound feed industry



10,000

Approx. 10,000 m of squared lumber, 300 m³ of wood for boxes and approx. 600,000 nails are consumed annually in the shipping department.

The GIMOKA Group Invests in Second Roaster RFB 400

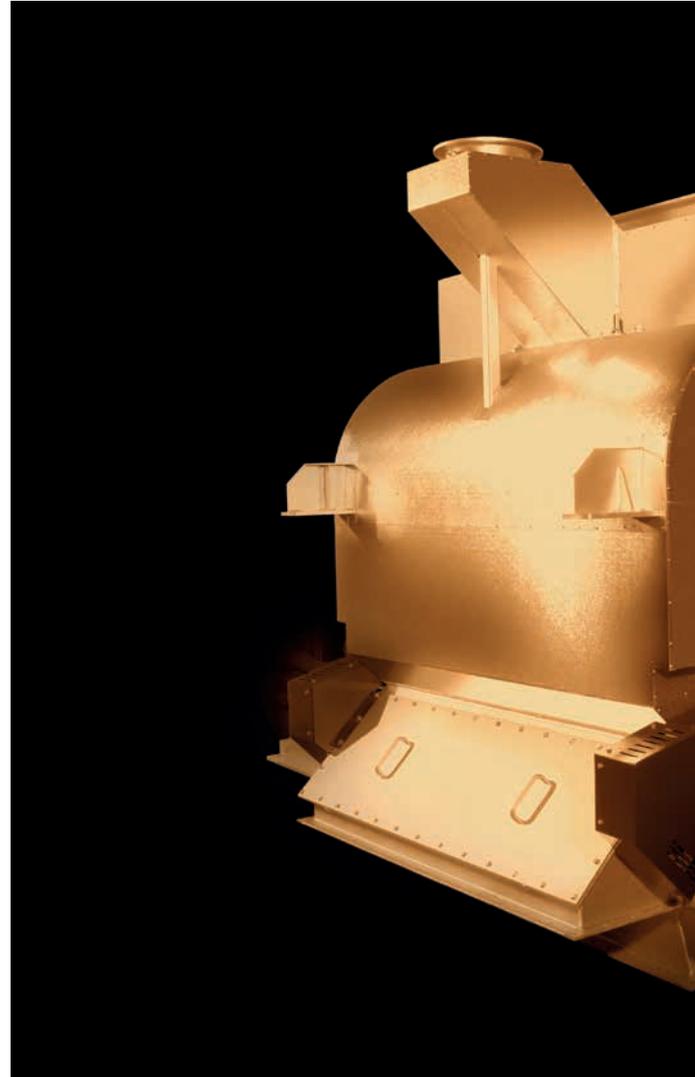
In recent years, the Italian coffee manufacturer has developed from a small family business to one of the leading Italian roasters.

The GIMOKA Group has now purchased another NEUHAUS NEOTEC roaster for the necessary expansion of its roasting capacities. Ivan Padelli – President and shareholder of the Gimoka Group – announced that a second RFB 400 will be installed at the Andalo Valtellino factory in northern Italy.

Since 2014, the first RFB 400 has been running in three-shift operation (24/7) with a capacity of 5,000 kg/h. Due to the excellent growth and the rapid development of the market share achieved by the Gimoka Group in recent years, the capacities in the field of hot air profile roasting will be doubled by another 5,000 kg/h.

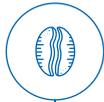
True to the company slogan "GIMOKA – Coffee Instinct", the aromatic properties of coffee are emphasized in all GIMOKA products. In addition, the company is a trustworthy partner who is able to successfully manage private label projects thanks to its experience gained from working with many local and international customers. "The innovative NEUHAUS NEOTEC RFB roasting processes are the best solutions to meet these product and brand requirements," says Ivan Padelli.

Both RFB roasters ensure increased production. At the same time, the RFB roasting process ensures the highest product quality, highest availability and low energy consumption. In order to reduce the CO₂ footprint of the roasting processes, the roaster is supplied with a preheating system. This system uses the clean residual heat from the roasting of one batch to preheat the following batch without affecting the roasting quality. A catalyst system is installed for emission treatment. Both processes show the environmentally conscious procedure in the production of the GIMOKA GROUP.



5000

In the field of hot air profile roasting, capacities are doubled by another 5,000 kg/h.



The RFB technology of NEUHAUS NEOTEC is unique in its flexibility. No other roasting process has such a wide range of roasting profiles. The RFB is the only roasting system without mechanical agitators that ensures optimum and uniform roasting and maximum reproducibility. In both chambers, the beans are kept in motion only by the air flow. In addition, the unique geometry of the chamber generates a rotation of the coffee batch, which ensures gentle and homogeneous mixing with maximum uniformity of the roasting conditions. The heat transfer from the air flow to each individual bean is optimised, allowing the widest range of roasting profiles to be achieved: from short to long roasting times.

NEUHAUS NEOTEC as a leading manufacturer of coffee roasting and processing plants is proud to support the expansion and growth of the Gimoka Group in Italy and abroad with its innovative technology. —



The RFB plant control



The view into the roasting chamber allows the observation of the roasting batch



Investment in the Future

Over the last two years, the Hamburg roasting company J.J. Darboven has invested about seven million euros in the site and the production plant of Burkhof Kaffee in Sauerlach, Bavaria. In November 2017, the heart of the modernized production plant was put into operation – an RFB 300 by NEUHAUS NEOTEC.



The heart of a roasting plant – the RFB

With the new RFB roaster, the roast masters of the Darboven subsidiary Burkhof Kaffee will now be able to produce very dark to very light roasts in different batch sizes while ensuring a gentle and sustainable process and meeting the high quality standards of J.J.Darboven.

"The coffee manufacturer Burkhof in Sauerlach is our specialist for small and medium batch sizes as well as for innovative coffee recipes", explained Albert Darboven during the official inauguration of the new profile roasting plant. And, Darboven adds: "The Bavarian coffee culture is rich in nuances; the craftsmanship of our roast masters and their sense of flavours combined with the modern technology of the RFB roaster are the ideal basis for the future of our Bavarian coffee manufacturer." In addition to the technology, the structure and organization on site were adapted so that the factory can work a two-shift system, now. At the Sauerlach site, 26 employees work in production and technology. Thanks to the investments, a total of 8,000 t of coffee a year can now be produced in different batch sizes and with different flavours.

Since September 2017, the new roasting plant has been running in test operation. The RFB's special profile roasting process enabled the roast masters to develop almost 80 different recipes aiming at the optimum in terms of body, aroma and acidity for the different coffee roasts. —

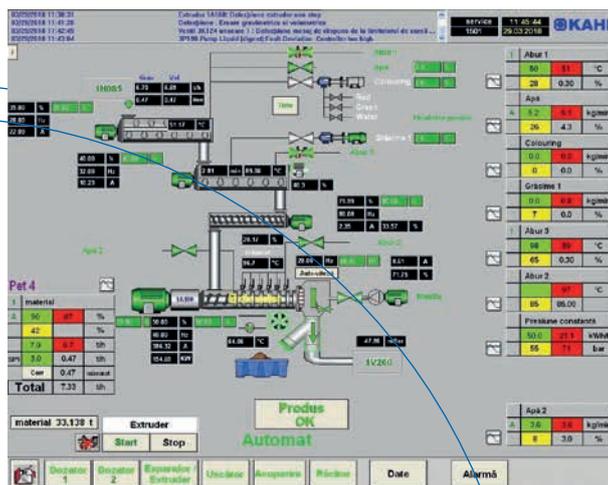
Remote Maintenance Solution for More Service in Grinding and Pelleting

Any company that sells machines and plants on international markets needs instruments for an efficient service. The KAHL GROUP, which offers plants and production facilities for processing, conditioning and pelleting, relies on a remote maintenance solution.

Remote maintenance logs all connections worldwide

AMANDUS KAHL has been relying on remote maintenance for many years in order to ensure optimum service for its many international customers: "We mainly use the eWon and Talk2M solutions for remote access to the plants we build," explains Michael Lantz who is responsible for electrical design at the company's headquarters in Reinbek near Hamburg.

The service technician uses the service portal for access to the remote plant. A certified and consistent security concept creates trust. The industrial, cloud-based solution with its globally distributed computing centres not only ensures the availability of remote maintenance, but also logs all connections. This allows each access to be tracked by automatically generated connection reports. The exchanged information is transmitted encrypted and only authenticated users can connect to the router.





"We want to make our plants
fit for Industry 4.0"

Via remote access to predictive maintenance

Remote maintenance is very important for anyone servicing as many plants as AMANDUS KAHL. For this reason, the company uses the paid variant with the corresponding availability guarantee. It also provides advanced management for managing a larger number of users and devices. AMANDUS KAHL also provided remote maintenance before – from analogue modems and teleservice adapters to its own VPN router, KAHL had already tried out a lot over the decades.

Customers also sometimes use other systems, which is not always easy: "Many of these systems block each other – sometimes we have several virtual operating systems on one computer and as soon as the customer changes the IT configuration on site, nothing may work anymore," says Lantz. That is why he also campaigns for the use of a state-of-the-art system among AMANDUS KAHL customers: "Here we have a sophisticated user management system so that the end customer can also benefit from the advantages of remote access. We can grant him defined access rights and do not have to worry that someone will change any parameters. Our service staff have an overview of all plants and can provide advice and assistance even from home, when they are on standby."

"We want to make our plants fit for Industry 4.0," says the electrical engineer. This means that remote maintenance is no longer only used in the event of a problem, but will in future be used to offer the customer additional added value. "By incorporating more sensors and analysing the collected data, we want to optimise the processes sustainably," says Lantz. —

Professional Implementation of Product Ideas

The KAHL GROUP helps customers to steadily optimise their products and processes. Comprehensive test databases with more than 2,000 products from our international customers and prospective buyers are available at 2 locations.

Bespoke tests can be carried out with a few kilograms or several tons of product in our laboratory and pilot plant – according to the particular requirements and demands. Comprehensive process know-how, machines and plants as well as modern analysis instruments for quality assurance are at the customer's disposal. The KAHL GROUP co-operates closely with renowned institutes and universities. On the basis of the obtained results, plant designs and offers can be prepared individually.

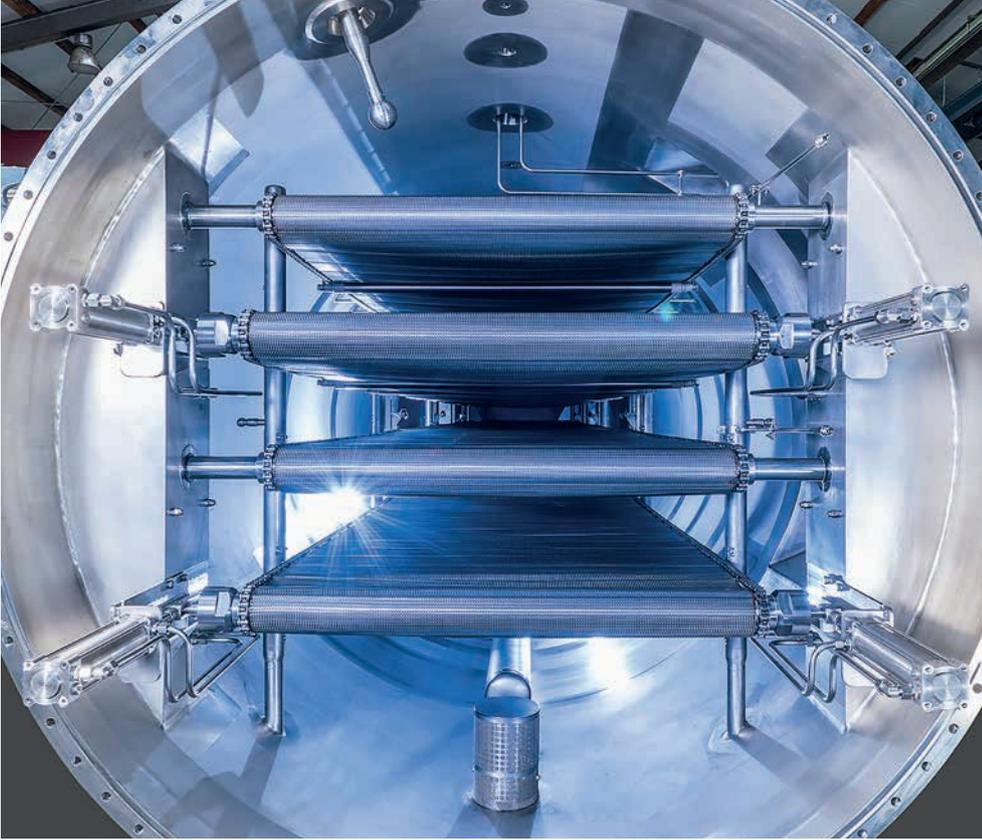
As a matter of course, we ensure utmost confidentiality towards our customers and prospective buyers.

The extensive tests include:

- Intensive preparation by means of product questionnaires and discussions with our customers
- Realisation of the tests by our test engineers
- Assistance by sales staff
- Laboratory analyses
- Final discussion of the tests with the customer
- Detailed test report



Flat-die pelleting press type 14-175 for laboratory use or small-scale production



HEINEN vacuum drier

Summary of the central process technology of the KAHL GROUP:

- Extraction plants for the recovery of essential oils, oleoresins, aromas, natural extracts and proteins
- Evaporation plants for the concentration of extracts
- Drying technology for vacuum and freeze drying
- Coffee technology for instant coffee powder and freeze-dried coffee granules
- Green coffee centres
- Coffee roasters
- Silo plants for bulk products
- Mechanical and pneumatic conveying plants
- Crushing plants
- Fluidised bed plants for the pharmaceutical industry, chemical industry, food and luxury foodstuff industry
- Rice mills
- Parboiling plants
- Oat plants (breakfast cereals)
- Sunflower seeds processing plants
- Pelleting and conditioning plants for the animal feed industry, sugar industry, chemical / pharmaceutical industry, disposal and recycling industry, food and nutrient industry



DEVEX extraction plant



NEUHAUS NEOTEC Mobatch particle engineering

The KAHL Pilot Plant – Together We are Successful

The KAHL pilot plant at our headquarters in Reinbek is the heart of our technological departments and an important basis for our sales activities. In the past, well over 5,000 tests have been carried out and systematically evaluated – the result is a unique, comprehensive knowledge and database to ensure the future success of AMANDUS KAHL and our customers.

The central task of the pilot plant is the development and further development of our own processes, machines and products in addition to the trial-based solution of the most diverse problems of our customers. The possibility to test ideas and new developments in-house under real conditions is an important aspect of goal-oriented development work and ensures the smoothest possible market launch of new products. Of course, the supervision and implementation of student projects and theses in cooperation with universities and external partners also plays an important role in our pilot plant. A consistently high demand and the resulting high utilization of our test capacities underline the importance of the pilot plant – for AMANDUS KAHL and for our customers.

The machinery used comprises almost all machines available in the current product portfolio on a laboratory and pilot plant scale. These include various grinding plants, mixers and conditioners, pelleting presses, expanders, extruders, coolers and driers. The machines can be flexibly combined and used in continuous test operation. This results in far-reaching possibilities for processing products from the feed and food, biomass, recycling, chemical and many other sectors. Through systematic test planning and execution, reliable basic data are generated for subsequent scale-up. The state-of-the-art laboratory enables the test accompanying analysis of the manufactured

products and contributes significantly to efficient development work. Thanks to the close cooperation with renowned research institutes and laboratories, further analyses can also be carried out. From small-scale tentative tests and feasibility studies based on a few kilograms of product via the production of product samples for further evaluation by our customers to the performance of large-scale tests with batch sizes of 10 t and more – we are the right contact for providing solutions to your individual challenges!

In addition to the extensive database and the modern technical equipment of the pilot plant, our experienced, excellently trained and highly motivated test personnel make a significant contribution to our success. The working method is characterized by a strong customer orientation – products, processes and recipes are developed, tested and optimised together with the customer. Customer training courses are carried out directly on the respective machines in an application-oriented manner. Our goal is to be successful – hand in hand with our customers. —

In the past more
than 5000 tests have
been carried out



View into the pilot plant with the laboratory press 14-175 (on the right) and the press 33-390 for smaller productions

Machine Tools for Optimising Machining Processes in Mechanical Manufacturing



Machine 1: Lathe DMG Mori CTX beta 800



Machine 1: Interior of the lathe



Machine 2: Lathe Weiler E70-3000

Machine 1 (DMG Mori CTX beta 800)

With this machine, small, complex components are to be completely manufactured. The machine is equipped with a counter spindle for this purpose. This means that within the machine the parts are automatically transferred to a 2nd spindle, the counter spindle, and clamped. Immediately afterwards, the second side of the component is machined. In the machine, a turning/milling spindle designed as a motor spindle is arranged on the cross slide. With this unit, different tools can be exchanged via a tool changing system with 24 tool places in order to carry out the complete machining required.

Machine 2 (Weiler E70-3000)

In the future, large and long shafts will be produced on the new lathe (type Weiler E70-3000). The machine is equipped with driven tools so that, in addition to the pure turning process, light milling and drilling operations can also be carried out. This allows complete machining of a workpiece on this machine.

Crumbling rollers delivered for reworking will in future be turned on this machine before they are corrugated on the in-house corrugating machine.

3D printer in the training workshop

On the initiative of Mr. Joachim Behrmann, a 3D printer was purchased for our training workshop. The aim of this investment is to enable our trainees to acquaint themselves and to gain their first experience with this new and future-oriented production technology.

Among experts, this printer is known as a filament printer, as it is equipped with the so-called FFF technology (Fused Filament Fabrication). During printing, a 1.75 mm thick plastic filament is fed from a spool to a heated print head, where it is melted and applied in layers. With our model German RepRap X400 PRO V3 Dual Extruder (Fig. 1) components up to a volume of 390 mm × 390 mm × 320 mm can be printed. All CAD files can be processed as input parameters in STL format.

The existing printer enjoys increasing popularity and is meanwhile used for many applications. For example, a prototype of a grinder was produced for NEUHAUS NEOTEC on a scale of 1:5 with this printer. Furthermore, the training workshop printed our press 60-1250, also on a scale of 1:5 (Fig. 2), providing this product as a trade fair exhibit. —

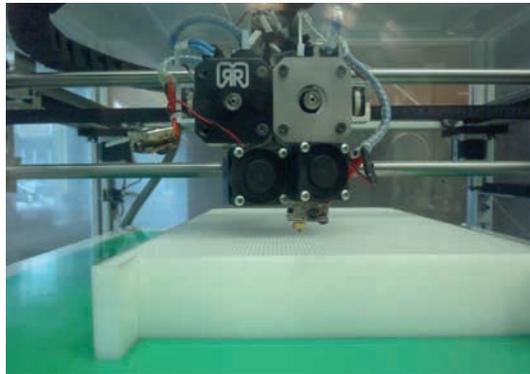


Fig. 1: 3D printer in use



Fig. 2: Model of a pelleting press

Infrastructure on the Company Premises Modernised



Replacement of the nitrogen plant

Replacement of the existing nitrogen plant

At AMANDUS KAHL, nitrogen is mainly used in the hardening shop and laser processing. The order volume in the above-mentioned areas has steadily increased at AMANDUS KAHL in recent years, so that it has become necessary to refuel the nitrogen tank at ever shorter intervals. With the new plant, which can store three times the tank volume (13,300 m³), these intervals could be significantly extended.

The new nitrogen tank meets the latest technical standards and is easy to handle, including, for example, an automatic radio-controlled level detection system.

During the conversion work, all delivery points were supplied by a mobile nitrogen plant and production could be continued without restriction.

New Recooling Plant Put into Operation

From the company's point of view, it was necessary to replace the existing plant, as on the one hand the function of the plant was to be expanded and on the other hand energy consumption was to be significantly reduced with a new plant.

The cooling plant at AMANDUS KAHL mainly cools the in-house hardening plants. In addition, the new plant will be used to temper cooling lubricants, hydraulic units and switch cabinets for machine tools in die and roller production.

The result is impressive: A highly efficient cooling plant has been installed which, with its modern and redundant pump and control technology, not only ensures production reliability but also consumes at least 50 % less energy.



Recooling plants



Extension and reconstruction of the existing social building

Immediately after the building permit had been issued by the city, the construction work began.

With this building project the existing social building is extended by 10 m and thus enlarged by approx. 120 m² per floor. On the ground floor, new WC, shower and washrooms for our employees are built in the adjoining area. Furthermore, separate changing rooms for ladies and guests are provided on the ground floor. On the upper floor not only the space is extended, but also the kitchen and food serving areas are rebuilt and designed according to the latest guidelines.

New hall floor in the dispatch hall

In the dispatch hall, the hall floor was renewed on an area of approx. 300 m². The restoration was justified by the fact that the hand-guided electric floor conveyors had to be repaired very often due to the defective and uneven ground. Furthermore, this measure contributes to an improvement of occupational safety in the company, as the risk of tripping has been minimised. Now, there are no more holes and offsets in the hall floor in this area.

First, the defective hall floor was dismantled; loose concrete parts were removed, the surface milled, blasted and primed. The new floor was then installed. In the final step, the surface of the hall floor was sealed. —



Renewal of the hall floor in the dispatch hall

Survey of Trade Fairs of the KAHL GROUP

TRADE FAIR	PLACE	COUNTRY
AgraME	Dubai	VAE
Agrena	Cairo	EG
AgriTek	Astana	KZ
Agro Animal Show	Kiev	UA
AgroExpo Sibiria	Barnaul / Altai	RU
Agroprod mash	Moscow	RU
AgroWorld	Tashkent	UZB
AgroWorld KZ	Almaty	KZ
Anuga Food Tec	Cologne	DE
Biomass Pellets	Tokyo	JP
Biomass Summit	London	UK
Biomass Summit	Singapore	SG
Bois Energie	Rennes	FR
Cfia	Rennes	FR
Cibio	Curitiba	BR
EE+RES	Sofia	BG
EuroTier	Hannover	DE
Expobiomasa	Valladolid	ES
Expocorma	Conception	CL
Exposolidos	Barcelona	ES
FIMMA	Bento Goncalves	BR
Fine Food	Shanghai	CN
Fitecma	Buenos Aires	AR
Forum Abisolo	Campinas	BR
FruitLogistica	Berlin	DE
GBC	Rotterdam	NL
Gulfood Manuf.	Dubai	VAE
HOST	Milano	IT
IAOM	Denver, CO	US
IFAT	Munich	DE

TRADE FAIR	PLACE	COUNTRY
IBIE	Las Vegas, NV	US
IDMA	Istanbul	TR
IFFA	Frankfurt	DE
Interpack	Duesseldorf	DE
IPPE	Atlanta, GA	US
K	Duesseldorf	DE
KazAgro	Astana	KZ
Ligna	Hannover	DE
Lignum	Curitiba	BR
MICE	Melbourne	AU
Mixed Feed	Moscow	RU
NutriFair	Fredericia	DK
Polagra-Tech	Posen	PL
Poleko	Poznan	PL
Powtech	Nuremberg	DE
PPMA	Birmingham	UK
SCA	Boston, MA	US
SCE	Berlin	DE
Saudi Agriculture	Riyadh	SA
Seafood	Bruxelles	BE
Siamap	Tunis	TN
Sipsa	Algier	DZ
Sommet d'Élevage	Cournon	FR
Südback	Stuttgart	DE
V.I.V. Asia	Bangkok	TH
V.I.V. ME	Abu Dhabi	VAE
V.I.V. Turkey	Istanbul	TR
Victam	Cologne	DE
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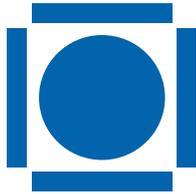
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