**Diagram 153**

*Customer magazine*

**Group:** New laboratory

**World Innovation:** Additive for coatings

**Premix:** First plant in Kenya
We are generating new momentum

Dear Readers

The world economy’s engine is spluttering. But still we are achieving growth in some units, while business in other areas is slowing down. Buhler’s clear advantage is that we are broadly diversified and can exchange capacities between different business fields. Furthermore, we have enhanced our internal flexibility and are well equipped to absorb market fluctuations. The current situation does not mean we will now pause. We will continue without interruption to roll out innovations and to expand our range of services. For example, we have opened a new Central Laboratory designed to support customers in developing new applications. In addition, we are launching new products and processes. From the SORTEX E sorter to the world first launched by Partec, Buhler is generating new momentum in the marketplace and creating potential for the future. We invite you to read more about this in the present Diagram!

We wish you much pleasure!

Calvin Grieder, CEO
Buhler has reorganized its former Engineered Products and Die Casting divisions. The basis for this regrouping is provided by the long-term strategic goals. The reorganization will create the best possible conditions for boosting the development of the Group’s food and nonfood activities. Buhler customers will also benefit from the new set-up by profiting from the existing potential in the development of innovative processes and technologies across the boundaries of individual units.

Over the past years, Buhler has selectively developed its activities in three focal areas: Grain Processing, Food Processing, and Advanced Materials. As part of this development process, new business fields such as Nanotechnology have been ventured into and targeted acquisitions have been made (Binder, Frisse, Barth, Prince, Aeroglide). By reorganizing the Engineered Products and Die Casting divisions, Buhler is reflecting this development also in its corporate organization.

Advanced Materials
To date, Die Casting was an autonomous division within the Buhler organization. In order to better utilize the existing potential of all nonfood units, the Grinding & Dispersion (printing inks and paints), Thermal Processes (PET processing), and Nanotechnology business units have now been removed from the former Engineered Products division and merged with Die Casting. Together, they form the new Advanced Materials division, which is headed by Achim Klotz. The new head of the Die Casting business unit is Bernhard Fritsche. The new organization has been set up to better utilize new technology potential in the future.

The former Engineered Products division has been renamed Food Processing. At the same time, the Nutrition Solutions business unit has been integrated in it. The goal of the new Food Processing division is to selectively develop the business fields in food markets, to build new segments, and to expand the freshly acquired companies worldwide. The Food Processing division is now headed by Stefan Scheiber, who up to now was the manager of the global Sales and Service organization of Buhler. He succeeds Edwin A. Frei, who left Buhler in the spring of 2009. CEO Calvin Grieder will head the Sales and Service organization in the interim.

Grain Processing unchanged
The Grain Processing division has not been affected by the reorganization. It includes the five business units Grain Milling, Feed & Biomass, Sortex & Rice, Grain Handling, and Malting – activities which are centered on the safe, efficient, and environmentally sustainable processing of cereal grain and rice. The Grain Processing division is headed by Bruno Mendler.

CEO Calvin Grieder explains that the “Group Management are convinced that this reorganization will create the best possible basis for boosting the development of the Buhler Group’s food and nonfood activities.” The three Buhler divisions Grain Processing – Food Processing – Advanced Materials are designed to provide the long-term pillars of Buhler.
Since the end of 2008, Buhler has had a new, state-of-the-art, and flexible Analytical Laboratory. This new center of competence is headed by Béatrice Conde-Petit.

Shedding its self-understanding of being a pure mechanical engineering company and shifting toward a process engineering philosophy, the Buhler Technology Group has been undergoing constant change for years. One expression of this change is its new Analytical Laboratory, which was inaugurated at the end of 2008. Over 2.5 million Swiss francs have been spent at the Group’s headquarters in Uzwil on this lab designed on the basis of the latest findings in the field of laboratory engineering and equipped with cutting-edge analytical instruments and laboratory devices.

“My strength is starch”
The new Analytical Laboratory of Buhler was built under the direction of Béatrice Conde-Petit. A food scientist with a doctorate and qualified as a university lecturer, she switched in early 2008 from research and teaching at the Swiss Federal Institute of Technology (ETH) in Zurich to Buhler. “My strength is starch,” says multilingual Béatrice Conde, who was born in Chile and grew up in India and Bolivia. “Since my studies, I have been concerned with the structure of vegetable foods and their secrets. Among other things, I have investigated all the aspects of starch. Thus the subject of starch has become my actual strength.”

Her move to Buhler was predestined. “During my research activities at the ETH, I concerned myself intensely with grain from the raw material to the finished products. Time and again, this gave rise to points of contact with Buhler. When I was offered the opportunity to join Buhler, I did not hesitate for long. The interface between basic research and practical applications has always interested me. The opportunity to apply scientific food science insights to practice attracted me.”

First assignment: design the lab
When she joined Buhler, Béatrice Conde immediately received her first assignment – to design and build the new Analytical Laboratory. Her starting point was the equipment and the staff of the existing in-house Buhler lab. “This assignment was a big opportunity for me. Within the scope of the budget, I had all the latitude I needed,” says Béatrice Conde-Petit in retrospect.

In a record time of nine months, the laboratory crammed with cutting-edge equipment and analytical instruments was created as a new part of the research and development wing on the Buhler premises. “We are now equipped to handle all types of analyses,” explains the new laboratory head. “Today also a biotechnology laboratory has been added.”

Additions were also made to the existing laboratory team. It now includes 18 specialists in the disciplines of chemistry, physics, grain analysis, particle analysis, microscopy, food technology, and biotechnology plus the administration.

Analytical center of competence
The new Buhler Analytical Laboratory understands its role as being an analytical center of competence for investigating foods and engineering materials at all processing stages. “We act as service providers who offer analytical services for all Buhler processes – from the raw material to the finished products,” says Béatrice Conde-Petit, summarizing the services offered by her lab. The lab’s wide range of analytical methods paired with its state-of-the-art analytical infrastructure provide the key for understanding the transformation of organic and synthetic materials in upgrading processes. “Our analyses support the Buhler engineers and their customers in designing production plants and processes. In the field of research, we are currently working on the scientific foundations required for developing tomorrow’s technologies.”

The new central Analytical Laboratory of Buhler offers a wide portfolio of analytical services: chemical and physical analyses; flour quality checks; particle analyses and bulk solids con-
sulting; microscopic techniques for structural analyses; application of biotechnological processes; food technology consulting. These services are available for various product groups: cereal grains, flours, and starch; animal feeds, oilseeds and biomass; chocolate, cocoa, and sugar; pasta and extruded products; printing inks, paints, and chemicals; plastics and biopolymers.

Business units as clients
Most clients of the new Analytical Laboratory are the Buhler business units. “About 50 percent of the jobs we handle are routine assignments that we receive from our business units,” explains the head of the lab. “They involve either analyses for the Buhler engineers themselves or for customer projects.” In addition, Béatrice Conde’s team also develops its own methods. “When new issues crop up, we are challenged to develop new methods,” continues Dr. Conde-Petit. For example, her specialists investigate the transformation of wheat in the pasta production process in all its discrete stages in order to find out what exactly happens. This is so although one might legitimately assume that Buhler already knows this process down to the very last detail. Béatrice Conde: “Though a lot of empirically developed processes exist in the field of food science of which we have model ideas, we have not yet proven everything that is ultimately going on.” The aim of various research assignments carried out in the Buhler Analytical Laboratory is to find explanations and fundamental principles for insights gained empirically by the engineers and thus to determine new approaches to processing.

Tailor-made products
“The development of innovations frequently starts with the understanding of the traditional process,” says Béatrice Conde-Petit of one of her basic experiences. “As a consequence, our research efforts have a concrete goal: To research the basics in order to invent new processes and products together with our developers and engineers.”

At the start of the innovation chain is the product that a Buhler customer wishes to make. Béatrice Conde: “At first, our focus is on the customer’s needs or the market requirements for a product, for example in terms of texture, color, particle size, or digestibility. This produces the requirements for the structures of the new product. It is then our task in the laboratory to investigate the relations between the product characteristics and the process conditions. This requires a targeted analysis of the structure, from the molecular composition to the microstructure and the macroscopic properties. Once we have managed to link the required product properties with a process, the step to the process is no longer far away.” The end of these analysis and development efforts are products tailored to customers’ requirements and made on Buhler equipment using Buhler processes.

Third-party assignments
In order to improve the capacity utilization of the lab’s highly specialized equipment, Béatrice Conde-Petit’s team also handles analysis assignments for third parties. “We have a wide range of equipment for conducting very diverse analyses and know numerous special methods. To better utilize the capacity of our equipment and of our staff, we also handle third-party assignments.” In concrete terms, the services offered to third parties include analyses of cereal grains, cocoa, oilseeds, plastics, and engineering materials at all processing stages. A detailed catalog is available which provides information on the individual analyses and the prices.

Patrick Leibbrand uses the most advanced equipment in his job in the new Analytical Laboratory of Buhler.

Dr. sc. tech. Béatrice Conde-Petit
Béatrice Petit was born in Chile in 1961 as the daughter of a South American mother of German origin and a businessman from the French-speaking part of Switzerland. She grew up in India and Bolivia. As a Swiss citizen, she moved to Switzerland in 1980, which for her was a foreign country. She graduated from the Swiss Federal Institute of Technology (ETH) in Zurich in food science and obtained her doctorate in 1992 with a thesis on “Interaction of starch and emulsifiers in foods.” Following her doctorate, Béatrice Conde-Petit remained as a researcher and lecturer at the ETH in Zurich and obtained her qualifications as a university teacher with a treatise on the properties of starch, using concepts taken from polymer physics and materials science. Béatrice Conde-Petit has lived in Zurich since 1988; she is married to a Portuguese and has two children.
Ms. Kleinschmit von Lengefeld, what actually does UNISTOCK do?
Jaana Kleinschmit: We are the proponents at the EU in Brussels of the Agribulk sea ports headquartered in the EU countries. The term “Agribulk” refers to the loading and unloading and the storage of bulk commodities. In the EU countries, the national associations safeguard the interests of the port terminal operators. These associations are united under the umbrella of UNISTOCK. This means that we are the organization which looks after the interests of the individual members in Brussels.

How was UNISTOCK created?
Jaana Kleinschmit: UNISTOCK was set up in 1969. The association was created out of the will of a small group of professional storage companies in the then EEC to further the interests of the industry toward the authorities.

EU countries, an association uniting associations and sea port companies? Does that mean an individual port terminal company not domiciled in an EU country and not based in a sea port cannot become a member?
Jaana Kleinschmit: Yes and no, our terms of admission are basically not that strict. What we want is to unite the large terminal operators in Europe in our association. We speak of sea port companies because business in our industry is very import- and export-oriented. The big players in this industry are all present in the sea ports. The “EU countries” restriction means that we mainly advance our interests toward the EU administration in Brussels. As for being an association of associations, we accept associations as well as individual companies. Our bylaws provide for both. The status of “extraordinary members” also exists for companies which do not fulfill the criteria but in some sense belong to our industry.

So, also operators of large-scale bulk storage facilities in a non-EU country or suppliers of plant and equipment for storing bulk agricultural commodities can become members of UNISTOCK?
Jaana Kleinschmit: That is very well possible. Our membership policy is governed by the interests of our industry. Basically, we are always receptive to talks. We also have members from landlocked EU countries such as Hungary and contacts with a large-scale storage site in Basel in Switzerland. One of our members with the status “extraordinary” is for example the Buhler Group, which in its capacity as a supplier of ship loaders and unloaders and of port terminals is closely associated with our industry. Basically, it is the members who decide whether to admit new members or not during the annual general meeting.

How many members does UNISTOCK have today?
Jaana Kleinschmit: At present, we have full members from 13 EU countries. The individual national associations in turn have up to 20 members. Then, as I have said, we also have the extraordinary members such as Buhler.

How does UNISTOCK further its interests in Brussels?
Jaana Kleinschmit: We lobby! Chantal Fauth, the head of our branch office in Brussels, and her team are in continuous contact with the people in the EU Commission and the European Parliament who are important to us. Our mission in Brussels is to design or even to block the creation and passing of legislation and regulations if they are contrary to our interests. We achieve this by making it clear to our talking partners what the impact of a decision may be on our industry.

How successful is the lobbying of UNISTOCK in Brussels?
Jaana Kleinschmit: We are established and recognized as representatives of our industry in Brussels. Our efforts are appreciated and respected. We fall on sympathetic ears with our concerns, not least because we are prepared to talk and are cooperative. Lobbying relies on personal relationships. And our network of relationships is indeed outstanding.

What are the internal functions of UNISTOCK?
Jaana Kleinschmit: When a new law is passed, it is our task to draw our members’ attention to the consequences of the new legislation. In addition, we ensure a continuous exchange of information between our members.

Have the tasks of UNISTOCK changed since it was set up?
Jaana Kleinschmit: Day-to-day operations in the bulk storage industry have become increasingly complex over the past few years. This has also enhanced the political significance of an international association such as UNISTOCK. Moreover, some things have changed fundamentally over the years in terms of the bulk agricultural commodities that our members handle. Whereas cereal grains used to be the main commodity some 30 years ago, the share of animal feeds has increased steadily. Lastly, our members have a growing need to exchange opinions and experiences on health-related and environmental issues.

In your capacity as president, you also represent UNISTOCK in COCERAL, the European association of grain traders. Why?
Jaana Kleinschmit: COCERAL unites the grain traders, which are our largest client group. Being a member of COCERAL, UNISTOCK is in permanent close contact with traders and can benefit from contacts with the companies which mainly use the services of the bulk storage facilities of UNISTOCK members. As president of UNISTOCK, I am automatically a member of the board of COCERAL. In addition, the members of UNISTOCK are also represented in the “Markets” and “Food/Feed Safety and Environment” trading sections of COCERAL.

Do storage silo operators and grain traders sit in the same boat?
Jaana Kleinschmit: In a certain sense they do. Both are affected in the same way by new legislation.

With the “Code of Good Practice,” UNISTOCK has established guidelines for handling feed and food raw materials for its members. What are the core items of this code?
Jaana Kleinschmit: In the individual countries of the EU, EU directives stipulate obligations that all market players must fulfill along the entire value-adding chain. Different additional guidelines and national regulations also exist. A large number of these directives regulate the requirements regarding safety, sanitation, noise, emissions, the application of toxic agents, liability, and genetic engineering. With our Code of Good Practice, we have responded to these requirements and satisfied them by defining and fulfilling the minimum requirements that they stipulate. The code cannot be more than a set of guidelines, as demanded in the directive. On the basis of an HACCP system plus traceability and general sanitation requirements, an industry standard has been defined in addition to all the other regulations which sets forth the general responsibility of the industry.

How is compliance with these guidelines monitored?
Jaana Kleinschmit: In the medium term, we plan to introduce certification for our members. But at present, no possibility exists to check compliance with the code. Observation of the guidelines is voluntary, but we assume that our members fully comply with them.

Does UNISTOCK also collaborate with plant suppliers?
Jaana Kleinschmit: Of course. It is important to us to conduct a permanent dialog with the plant and equipment suppliers so as to define our concerns. Today, we are exposed to ever-changing conditions. Take the discussions on sustainability and the related reduction of CO₂ emissions. We are continuously making every effort to apply plant and equipment that meets these requirements. This means that we can transfer the responsibility for reducing CO₂ levels or significantly cutting energy consumption or general costs directly to the suppliers of our facilities. In conventions, seminars, and symposiums, we engage in an intense exchange of ideas with the industry. Furthermore, the representatives of the plant manufacturers have the possibility of further deepening contacts with UNISTOCK on the basis of extraordinary membership.

The grain markets have undergone quite some change over the past years. How do port terminal operators experience these changes?
Jaana Kleinschmit: Port terminal operators have always had to assert themselves in the volatile environment of our clients. In the past years, intervention has all but stopped. With the reduction of intervention stocks, the export of bulk agricultural commodities through the free markets has prevailed. The capacity utilization rate of materials handling companies depends greatly on the commercial activities of international and national trading companies, country traders, and cooperatives. When traders actively import or export commodities, the sea ports with their transhipment facilities stand to profit.

Interview: Herbert Bosshart

Jaana Karola Kleinschmit von Lengefeld
Jaana Karola Kleinschmit von Lengefeld was born in Nordhessen in Germany on July 12, 1962. She completed her first studies at the University of Hohenheim, graduating in agricultural engineering. She continued her education at the University of Massachusetts in Amherst, where she obtained a degree as Master of Science in Resource Economics. Today, Jaana Kleinschmit is a member of the board of ADM Hamburg Aktiengesellschaft. The ADM Group’s main activities focus on seed processing, including the storage and handling business, and on the further processing of oils and fats. Ms. Kleinschmit von Lengefeld is the managing director of Neuhof-Handelsgesellschaft m.b.H. and Silo P. Kruse Betriebs-GmbH & Co. KG, two companies which are part of the ADM Group.

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Information on UNISTOCK: www.unistock.be
Environmentally friendly and energy-efficient

A new, fully automatic Buhler pelleting system enables the Polish company Stelmet S.A. to utilize the wood remainders from its production process in an environmentally friendly and energy-efficient way.

The Polish Stelmet company is one of Europe’s largest producers of garden architecture items made of pinewood and spruce. The term “garden architecture” refers to wood products for fencing, installing, and decorating gardens, garden plots, terraces, balconies, parks, and recreational areas. Such products include lattices, noise-abatement walls, pergola constructions, flower boxes, platforms, and entire garden sheds. They are retailed through do-it-yourself specialty stores and shopping malls under the trading chains’ own brand names or under the “Stelmet” brand. Stelmet holds a strong position in the markets of the EU member countries, especially France, Germany, Holland, the United Kingdom, Norway, and Turkey. The activities of Stelmet comprise all the processing stages from wood purchasing to packing of the finished wood products.

Keen environmental awareness

One of the priorities of the company Stelmet S.A. is being an environmentally aware company. Stelmet is dedicated to sustainable use of forest resources, protection of nature and respecting the rights of the people associated with the forest areas. In the Stelmet factories, the only raw material processed is therefore wood with the certification “Forest Stewardship Council FSC.” The FSC label guarantees that the wood comes from forests which are managed on the basis of precisely defined principles. The Forest Stewardship Council was established in 1993. It is committed to environmentally beneficial, socially responsible, and commercially sustainable forest management and promotes the marketing of wood that has been produced in an ecological and socially correct manner. The FSC label is subject to rigorous checks and also covers the processing chain. But the Stelmet factories do more than just process FSC-certified wood. Special attention is also paid to the direct environment by using chemical wood impregnation agents in a closed circuit.

Utilization of wood remainders

Stelmet S.A. made another step in its long-term development strategy in 2008, when it started up a completely new wood factory for processing garden wood and construction timber in the industrial park of Zielona Gora, a mid-size city in the western part of Poland. Stelmet S.A. invested some 35 million euros in the new factory, which at the same time became the company’s new headquarters. With its new factory, Stelmet is now capable of processing almost 150,000 cubic meters of wood in Zielona Gora.

Concurrently with its investment in the new production facility, Stelmet S.A. spent another 20 million euros on a pellet manufacturing plant. “With this, we are pursuing two goals,” says founder and managing director Stanisław Bienkowski. “On the one hand, our goal is to utilize the wood remainders obtained during the production process in an environmentally friendly and energy-efficient way. Beside that, we of course also hope to generate a commercial benefit by creating a new business with the sale of pellets for heating and for industrial energy production.” The Stelmet boss is convinced that the new product will be a success.

Tight project schedule

Stelmet chose Buhler as a partner for constructing its new wood pellet factory. “We opted for Buhler because we wanted a partner for this novel technology that is thoroughly familiar with the processes involved and capable of developing adjustments on its own should the need arise,” explains deputy general manager Przemysław Bienkowski. “In addition,
the Buhler engineering team guaranteed that the turnkey plant project would be completed within a tight schedule.”

The Buhler team started plant engineering work in July 2007. Despite the winter time that slowed down the construction of the new building, the plant was ready in March 2008. On May 12, 2008, start-up began. Everything was ready by the end of May 2008, when the first pellets were produced. Günter Lorenz, who coached the project as the area manager in charge for Buhler, remembers: “The project was a true challenge for us especially because of the tight schedule. But thanks to the good partnership with Stelmet and two partner companies we managed to meet all the defined deadlines.” Since the final commissioning of the plant in November 2008, pellet production has been humming smoothly and with a very high quality.

Energy from the cogeneration plant

The new wood pellet factory was built adjacent to the new production plant of Zielona Gora. The fully automated pellet production plant is generously sized so that a subsequent expansion will be easily possible. The new facility is linked through a modern, dust-free conveying system directly with the main factory. This conveying system moves the wood remainders continuously from the production plant to the pellet factory.

The new pellet factory of Stelmet S.A. is made up of a number of individual systems. The conveying system transfers the moist wood chips into large intermediate storage bins. Then the wood chips are screened and coarsely ground in order to efficiently utilize the state-of-the-art downstream drying technology. The material is dried on a low-temperature belt-type dryer, which ensures a reliable and energy-efficient process. The required drying energy, which is a significant cost factor in other such factories, is a “byproduct” from the new bark-fired cogeneration plant of the factory of Stelmet S.A. This system provides most of the electric power used in the pellet factory and thus decisively improves the total energy efficiency of the facility.

18 tons of pellets per hour

The heart of the new pellet factory of Stelmet S.A. is its dry fine-grinding system and pelleting plant. The dry wood chips are finely ground on large Buhler hammer mills. Special-purpose pellet mills then transform this “wood mash” into the finished wood pellets.

In the core unit of its new pellet factory, Stelmet S.A. can produce 18 metric tons of high-grade wood pellets an hour. For deliveries to households and for export, the pellets are packed into bags on a fully automatic bagging line. The bags are then also automatically palleted. Large customers are supplied in bulk with pellets shipped by special “tankers” and kippers.

The entire Stelmet pellet factory is controlled from a centralized location. The application of programmable logic controllers in conjunction with centralized monitoring enables the factory to be operated with little manpower.

The pellet mills constitute the heart of the new facility.
Small size, big impact

A world first has been rolled out by the Buhler affiliate PARTEC: Oxylink™ improves the chemical resistance and barrier strength of water-based coatings while at the same time reducing the drying time. This ultimately also reduces the processing times – whether the product formula has been designed for wood or furniture, for metals or plastics, for industrial maintenance or for machinery. This highly effective and broadly applicable additive technology is based on ZnO nanoparticle dispersions.

Environmentally friendly and cost-saving water-based coating technology is a modern trend. But the possible applications of water-based coatings appear to be limited because many of their properties are often unable to reach the same quality level as solvent-based alternatives. Chemicals in the household or in industrial applications destroy the protective layer. During cleaning or polishing, the surface may be damaged and moisture will enter the substrate.

Protection from the inside
The Oxylink™ additive for water-based coatings developed by the specialists of the Buhler affiliate PARTEC acts from within the coating, improves curing of the polymer, and is virtually solvent-free. Based on ZnO nanoparticles, it imparts significantly better application characteristics to water-based coatings and can even be used in clear high-performance and high-gloss coatings. Of course, Oxylink™ is also water-based so that no additional emissions or obnoxious odors are created.

Nanoparticles impart new features
Additives based on nanoparticles are distinguished more by their unique property profile than by any single characteristic. Nanoparticles possess the inherent properties of the material from which they are made, for example hardness, refraction index, UV absorption, or catalytic activity. These functionalities can be incorporated in products such as coatings and thus produce a sustainable improvement of the product characteristics. This is especially beneficial in combination with the most typical feature of nanoparticles: Sufficently small particle will produce transparent materials, since light scattering decreases with the particle size.

The two sides of nanoparticle properties
Of special interest are those properties of nanoparticles which depend solely on their size. The two sides of nanoparticles properties depend greatly on these “dimensional characteristics”: Powders consisting of small particles have an incredibly high specific surface area. In product formulas, the surface of the interface between the particles and the formula is transformed. More interfaces generate more interactions between the matrix and the particles and thus influence the material. These interactions in turn influence functionalities such as toughness and strength as well as viscosity, transparency, and homogeneity of the product. Therefore, targeted control of the interface between the particles and the medium on the basis of sophisticated process parameters is crucial for successful product development. Oxylink™ enables the beneficial interactions of inorganic metal oxides on water-based coatings, and unique chemico-mechanical processing by Buhler ensures easy application.

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Furniture and walls as here in the entrance area of the new Buhler Customer Center are an ideal field of application for the new additive launched by PARTEC.
Upgrading recycled PET

Solid State Polycondensation (SSP) of PET flakes allows the molecular weight of recycled PET to be efficiently increased. At the same time, the PET flakes are purified so that they can be used in applications where the material will be in direct contact with foods. The largest advantage offered by the process is its high reaction and cleaning rate.

Recycled bottle-grade flakes of polyethylene terephthalate (PET) are used in numerous applications and are considered as a valuable raw material. Alone in Europe, 740,000 metric tons of PET flakes were processed into new fibers, yarns, bottles, film, and other products in 2007. Modern recycling systems supply high-quality PET flakes by sorting, grinding, and washing collected post-consumer PET bottles.

Preparation prior to recycling

However, these flakes are often not yet suitable for being used in the intended end products. Depending on the final application, residual solid particles still have to be removed in order to satisfy the visual and mechanical requirements. Migration substances must be eliminated to fulfill food laws, and the molecular weight has to be increased in order to meet mechanical and process-related requirements.

In such direct applications, the migration substances should be removed from and the molecular weight increased directly in the PET flakes. Both are accomplished by Solid State Polycondensation (SSP) of PET flakes. Even if no increase in the molecular weight is required, a solids cleaning treatment is still crucial for achieving a PET flake quality that is suitable for applications with direct food contact.

Adjustments made

In contrast to the established SSP process for PET pellets, a number of differences must be taken into account in designing an SSP process for PET flakes. Buhler as a leading supplier of SSP systems for virgin PET pellets has made the necessary adjustments. Today, Buhler offers compact flake SSP units for 1 t/h and 2 t/h as well as larger ones, depending on the customer specifications. Thanks to their modular design, smaller flake SSP plants can be integrated in existing buildings – with an outside reactor and material silo.

The process is based on a crystallization and preheating stage in a multi-chamber fluid bed, followed by continuous thermal treatment in a tower reactor. The crystallizer ensures uniform heating of all particles, crystallization without a risk of agglomeration, and removal of the residual PET dust. The preheated flakes pass continuously through the reactor in a nitrogen countercurrent in order eliminate reaction products and contaminants.

The nitrogen from the reactor is first applied as an exchange gas in the crystallizer and then flows through a gas purification system and a dryer before reentering the reactor. By adjusting the residual water content in the process gas to a dew point between –30 °C and +10 °C, it is possible to limit the molecular weight increase while maintaining the same high cleaning efficiency. The finished flakes can be rapidly cooled in a fluid-bed cooler or be directly led to a molding process.

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The new flour mill of United Millers Ltd. in Kisumu in Kenya allows commercial-scale production of flour blends for the company’s own bakery and for export to the countries surrounding Lake Victoria, thus enabling the company to expand its business.

United Millers Ltd. in Kisumu
United Millers Limited was incorporated in 1974 and commenced its activities in Kisumu, Kenya. United Millers Ltd. was founded by the late N.P. Shah together with his two sons Sunil N. Shah and Kamal N. Shah, who have continued to operate, advance and grow the company. Both are directors and main shareholders of the company. The company’s principal industrial activities are maize (corn) milling, wheat milling, rice milling, grain handling & storage, animal feed manufacturing, large-scale bread bakeries, edible oil refining and laundry soap production, commodity trading and real estate. Even if Kisumu no longer has the same significance as a trading and transportation center as in the middle of the twentieth century, this provincial capital is still an important hub in the economic area around Lake Victoria. Kisumu is the trading center for all agricultural produce grown in the greater region. In addition, it is the home of the food processing industry. Apart from the mills of the Shah’s brothers, fishing companies, sugar producers, and the textile industry are other important employers of the local population.

Products with higher value added
United Millers Ltd. used to produce its high-quality wheat and maize flours, bakery products, animal feeds, and oils and soaps solely for the Kenyan market. But planning for the future, Sunil and Kamal Shah started seeking ways and means to export their products. The geographical location of Kisumu and its good traffic links offer an excellent basis for expanding the company’s market territory to the neighboring East African countries of Uganda, Burundi, Rwanda, and Tanzania. In addition, the Shahs set themselves the medium-term goal of producing not only conventional flours and feeds, but also of increasingly making grain-based products with higher value added to satisfy new customer needs, such as ready mixes, pasta, and snack foods.

Objective: generate higher value

“The new African flour milling industry, the increase in the population is giving rise not only to a quantitative, but also a qualitative development of the flour market.” These are the words of Heiko Jopke, head of the Buhler office in Nairobi, describing the situation of the flour milling industry in East Africa in 2007. His assessment at that time was based on the development of a group of mill operators who a few years ago had started taking a modern, forward-looking approach in their businesses. The goal of this modernization effort was to generate higher value by producing better flour grades and to expand activities vertically to the downstream production stages such as making bread, fine baked products, or pasta. Mill operators were thus responding to changes in demand and to the opening of the borders with neighboring countries for export.

United Millers Ltd. used to produce its high-quality wheat and maize flours, bakery products, animal feeds, and oils and soaps solely for the Kenyan market. But planning for the future, Sunil and Kamal Shah started seeking ways and means to export their products. The geographical location of Kisumu and its good traffic links offer an excellent basis for expanding the company’s market territory to the neighboring East African countries of Uganda, Burundi, Rwanda, and Tanzania. In addition, the Shahs set themselves the medium-term goal of producing not only conventional flours and feeds, but also of increasingly making grain-based products with higher value added to satisfy new customer needs, such as ready mixes, pasta, and snack foods.

The owners of United Millers Ltd. made an initial step in 2006 to put their progressive plans into practice when they ordered a state-of-the-art 240/24h flour mill from Buhler. The contract with Buhler also included the supply of a premix plant for producing flour blends. United Millers Ltd. has been a Buhler customer since the seventies of the last century. At that time, the father of Sunil and Kamal Shah entrusted the design and construction of the wheat and maize mills as well as the feed manufacturing plant to Buhler. Sunil Shah: “The track record of our Buhler mills has been good throughout. The engineering know-how, process technology, and mechanical equipment are top-notch, and collaboration with Buhler has always been a delight. The Buhler brand has consistently ensured that our quantitative and qualitative targets are fulfilled. It was therefore clear to us right from the outset that we would partner with Buhler to expand our group’s facilities.”

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Overall complex in the industrial area
The new flour mill of United Millers was built adjacent to the United Millers commercial bakery in the industrial area of Kisumu. This allows flour blends of consistent quality to be supplied directly to the bread production facility. Plant engineering on the 240/24h flour mill started in the autumn of 2006. Because of the location of the construction site near the airport, planning of the buildings had to comply with stringent regulations, especially in terms of the height of the production buildings and of the grain storage silo. Social unrest caused by political tensions around Lake Victoria caused delays during the installation phase. But in October 2008, the moment had at last come when United Millers could commission its new flour mill with its flour blending section. The plant has been up and
United Millers project

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Kamal N. Shah (left), Owner & Director of United Millers Ltd., with Technical & Installation Manager Pieter Uys at the new premix system.

Carefully thought-out plant
The new mill of United Millers Ltd. is made up of a series of carefully matched systems equipped with cutting-edge Buhler technology. In the large bulk storage system with its integrated intensive cleaning section, a total of 26,700 metric tons of grain can be cleaned and binned. The existing storage capacities allow tempering times to be matched to the requirements of the different wheat varieties, which has a positive effect on the quality of the end products.

In the flour mill proper, advanced four- and eight-roller mills and the latest purifiers and sifters ensure top flour quality and – thanks to their high sanitation standard – outstanding hygiene. This provides the basis for making products with higher added value. The finished flours made from a given grain variety are stored in flour bins. The storage capacity selected allows optimal ten-day aging of the bakery flours. In the premix system, production of the different new flour blends is automatically controlled on the basis of the specific formulas. The finished flour blends are pneumatically conveyed through stainless piping directly to the in-house bakery or to the bagging line for household flours, bakery flours, ready mixes, bran, and mill feed.

Unique for Kenya
With its high automation level, excellent sanitation, and its possibility of producing ready mixes on a commercial scale, the new facility of United Millers Ltd. is unique in Kenya. Thanks to its top-precision microfeeders and its high-speed mixing system, it is capable of making homogeneous finished products exactly according to the formula even when micro-ingredients are included. Its computer-controlled, high-precision product feeding and blending system enables it to produce instant mixes of top quality on a commercial scale, thanks to the avoidance of human errors.

The new mill with its premix system allows the company to supply its own industrial bakery with top-quality flour blends and to market ready mixes to other bakeries and households both in Kenya and in the neighboring countries. Moreover, the mill is ready for allowing United Millers Ltd. to additionally expand into pasta and snack food production.

Kisumu
With a population of over 320,000, Kisumu is Kenya’s third-largest city and the capital of the Province of Nyanza. It is located in the northwest of the country on the shores of Lake Victoria at an altitude of over 1100 meters above sea level. Kisumu is the home of the Luo tribe, the third-largest ethnic group of the country. Kisumu was founded in 1901 under the name of Port Florence as the terminal station of the Uganda Railway line from Mombasa on the Indian Ocean to Lake Victoria. There, goods were transferred to ships and transported onward to Uganda. When the railway line was continued into Uganda, Kisumu lost its significance as a trading and transshipping hub. But it is still the trading and processing center for agricultural produce in the greater region. What is also important for the region is its airport.
Ecoline – the new machine series

With Ecoline, the Buhler Die Casting business unit has rolled out a third machine type after the Carat and Evolution. Ecoline has been designed with the medium market in mind and is distinguished by its ruggedness and reliability.

Buhler has been manufacturing top-quality die casting systems since 1927. With its Carat and Evolution machine series, Buhler has up to now offered a range of equipment that catered especially to the manufacturers of cast components meeting elevated requirements in terms of quality, complexity, and flexibility.

All the quality features

With Ecoline, Buhler is launching a machine type of straightforward design which boasts all the quality features of a Buhler machine: rugged, reliable, economical, energy-saving, durable, and easy to operate, or – in two words: Swiss quality. "Our new Ecoline machine has been designed with the medium market in mind," explains Marcello Fabbroni, head of product management at Bühler Druckguss AG. "In this market segment, far more than 1000 new die casting machines go into service every year. Ecoline is therefore addressed in this environment to foundries which manufacture mainly components of small size and relatively low complexity. Nonetheless, the quality of the cast components must be right. Ecoline satisfies these requirements. The machine is so to speak the starter model for entering the field of high-quality die casting with Buhler."

Long service life, easy operation

As a "genuine" Buhler machine, Ecoline has all the capabilities expected of a state-of-the-art die casting machine for aluminum or magnesium. Ecoline is distinguished by its rugged and reliable engineering. "When it came to selecting the engineering materials and the manufacturing process, we were uncompromising," says development project manager Kurt Rüdisühli. Ecoline is characterized by its high casting capacity with optimized energy consumption. The shot unit is matched precisely to the needs of the medium market and blends smoothly with the existing product portfolio of Buhler.

Much attention was also paid to easy operation. A clearly structured and easy-to-understand operating philosophy allows fast production starts with a low training requirement. A high uptime is achieved through the use of proven components. The optimized design of the hydraulic system and the targeted reduction of the number of components minimizes the maintenance and training requirements for maintenance crews.

Short delivery times, competent service

According to Fabbroni, the initial launch in Asia has already been completed, and the first machines are being manufactured. The Ecoline is available as a standard machine, but can be equipped with additional options. The locking forces range from 340, 530, and 660 to 840 tons. The delivery times for the machines are extremely short. Fast start-up by local technicians minimizes costs and ensures rapid commissioning of the casting cells.

Buhler maintains a global customer service network and local spare parts stores. Locally stationed specialist service technicians ensure fast responses whenever the need should arise. Ecoline, just as Evolution and Carat, stands for renowned Buhler quality, but with a more straightforward scope of functions and performance at an attractive price.

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Ecoline – the Buhler Die Casting starter model.

For Innovation
Harald and Bühler – a success story

Harald is a Brazilian chocolate producer that continuously invests in new technologies in order to maintain its leadership in wholesaling and the food industry. Working closely together with the Bühler Chocolate & Cocoa business unit, Harald has evolved over the past five years from a compound producer to a solution provider for industrial chocolate.

In Brazil, the Neugebauer name is synonymous with industrial chocolate. The Harald chocolate factory, which was set up in 1982 by the young Ernesto Neugebauer in Porto Alegre, supplied its goods to large-scale bakeries and ice cream producers. When the entire production facility was moved from Porto Alegre to São Paulo in the year 2002, this also changed the goals of Ernesto Neugebauer. “We wanted to add to our range of products and services and move upward by gradually entering foreign markets,” says the Harald boss of the company’s objectives. Up to that time, Harald had primarily made so-called compound products for industrial use as ingredients, coatings, or fillings. Unlike “proper” chocolate, compound “chocolate” uses extraneous fat instead of cocoa butter. But the relocation to São Paulo triggered a gradual evolution of Harald as a compound producer to a maker of “real” chocolate and an industrial solution provider for chocolate specialties.

The second goal of Ernesto Neugebauer was to enter foreign markets. From its base in Brazil, he intended to first develop the export markets in the neighboring countries and then to proceed to remoter regions.

For executing his quality strategy, Ernesto Neugebauer sought a suitable technology partner. “In chocolate production, high quality is generated by the combination of high-grade raw materials, excellent equipment, top process technology, time, and suitable product recipes,” says Ernesto Neugebauer, summarizing the criteria for quality chocolate. In South America, top-grade raw materials grow so to speak on the doorstep. Bühler was chosen as a partner for the other ingredients of the success formula. After all, the value offered by Bühler solutions with their high-quality production systems and process expertise was precisely what the up-and-coming entrepreneur Neugebauer was looking for. “As a chocolate producer of many years, I of course knew Bühler as a top-notch system provider,” says the Harald managing director. “We had always wanted Bühler machines in the plant of Harald. Ever since our company was established in 1982, we knew that we would set our focus on end product quality and that one of the ways we could achieve it was by relying on Bühler solutions. We ultimately entered into a close partnership with Bühler because its solutions allow high value to be generated.”

Bühler as part of the success formula

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Step by step

With Bühler as a partner at its side, the Harald chocolate company was to be rebuilt step by step and to be oriented toward making high-quality products. The joint success story of Harald and Bühler started in 2003, when the first contract was signed. In that year, the company ordered its first chocolate production line and first bar molding system. The plant essentially consists of a mixer (SMKN-1850), a two-roll pre-refiner (PreFiner-1300), a five-roll refiner (Finer-1800), a conche (ELK), and a bar molding system (CMB-620). This initial Bühler chocolate line went into service at Harald in 2004.

It did not take long before market success set in. Harald rapidly found customers for its new chocolate products. And so, the very next year, an additional fully automatic five-roll chocolate refiner with a product film thickness controller was added to the production facility. Spurred on by this success, Harald decided in 2007 to continue its capital spending by adding a second chocolate line to its factory. In its first stage, the expansion comprised two five-roll refiners, a conche, a depositor (PowerShot-1200) for the existing bar molding system, and a second CMB-620 molding line. At the same time, Harald also upgraded its laboratory by installing two laboratory conches (Elkolino, DUC) and a laboratory three-roll mill (SDX-600). Then, in 2008, two additional five-roll refiners and a conche were added to complete the plant.

Today, the Harald chocolate factory boasts two state-of-the-art chocolate lines. One line – equipped with a mixer, a two-roll pre-refiner, four five-roll refiners, and three conches – makes the “new” chocolate products. The second – provided with existing older Bühler machines in conjunction with the two new five-roll refiners – produces compound chocolate mass.

The output and sales revenue of the Harald chocolate factory have been on a steady rise since the new factory went into operation in 2002. But Harald made a real leap when it started up its first Bühler chocolate line. In 2008, Harald produced some 56,000 metric tonnes of chocolate. Today, the Harald chocolate factory carries through the year 200,000 metric tonnes of chocolate.
plans to export 500 metric tons of chocolate to the Arabic countries. “We are currently negotiating with prospective customers in Saudi Arabia, Egypt, Lebanon, Qatar, and Oman. We believe that the entire Middle East is a highly attractive and promising market.”

Over the past years, Harald has invested about 50 million real. Ernesto Neugebauer has thus set new standards in the South American market. European business people frequently tour his facilities. “We have a business and therefore also an end product that are second to none other of their kind anywhere in the world,” says the proud owner of the Harald chocolate factory.

**Success story continues**

In order to maintain its competitive edge, Harald is continuing its partnership with Buhler. “Our collaboration will continue. We will receive technical support from Buhler. Moreover, the people from Buhler Brazil look after our plant and equipment and offer us top-class and fast service. Last, not least, we are also relying on Buhler to develop new products,” says Ernesto Neugebauer, expressing his belief in Buhler and describing the benefits that Buhler offers as a partner.

**Aiming at a share of exports of 15% in the medium term**

Harald has developed into a “secret” giant of the South American chocolate industry over the past years. “Our efforts to attain top quality and to diversify our product range have been very readily honored by the market,” says Ernesto Neugebauer. “Our output has grown year by year at a rate above the national average. We have achieved our strategic goals. And with its technology and process expertise, Buhler was instrumental in enabling us to accomplish what we wanted.”

Harald has also achieved its second strategic goal. “With our top-quality products, we have gradually gained a foothold in the markets of Chile, Peru, and the U.S.,” says 51-year-old Ernesto Neugebauer. As much as four percent of Harald’s total output is exported today. “In the medium term, we plan to reach an export share of 15 percent,” says Neugebauer. This effort will be supported also by the latest project: In 2009, Harald plans to export 500 metric tons of chocolate to the Arabic countries. “We are currently negotiating with prospective customers in Saudi Arabia, Egypt, Lebanon, Qatar, and Oman. We believe that the entire Middle East is a highly attractive and promising market.”

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**Long chocolate tradition**

Today’s Harald chocolate company was set up in Porto Alegre in the Brazilian federal state of Rio Grande do Sul in 1982. It is based on the Neugebauer family’s long tradition in the chocolate business. Brothers Max and Franz Neugebauer emigrated from Dresden (Germany) to Brazil in 1891. In Porto Alegre, they embarked on chocolate production, filled with visions, hopes, and their know-how that they had accumulated in Dresden. In 1893, their brother Ernest followed them, taking a number of modern machines along with him. The following Neugebauer generations continued this business successfully.

The great-grandson Ernesto Neugebauer, the current owner and managing director of the Harald chocolate factory, has inherited this passion for chocolate. He started his career as a seventeen-year-old in the cocoa roasting laboratory of the family’s business. Beside his regular occupation, he graduated in business administration and then worked in a bank. In 1981, he decided to become an entrepreneur. A year later, he set up the Harald chocolate factory. He chose the name “Harald” in commemoration of his father Ernest Harald Neugebauer. In 2002, the company moved with all its plant and equipment plus its administration from Porto Alegre to São Paulo, the country’s business and finance center. Ernesto Neugebauer has invested in the expansion of his company ever since.
Grain Milling Symposium in Tehran

Success for the second Buhler Wheat-Flour-Bread Symposium held in Tehran at the end of May 2009: The one-day event was organized by Buhler Iran in the Milad Sky Tower Conference Center. It was attended by some 1000 producers and management staff from the food and other industries plus representatives of various ministries, banks, authorities, and foreign embassies. In papers and an exhibition, the Buhler representatives – first and foremost CEO Calvin Grieder and the head of the Grain Milling business unit Martin Schlauri – presented the latest developments, trends, and technologies in the fields of flour milling, bulk storage technology, and industrial bakeries. During the symposium, Darius Kermanshahani (right) transferred the management responsibilities for the Buhler affiliate in Tehran to Sharif Nezam-Mafi (left).

Opening ceremony of the new Buhler site in Wuxi

March 7, 2009 was a happy day in Wuxi in China, for that was when the second-largest Buhler production site was officially opened. Careful planning and a fast implementation pace enabled the sites of Buhler Wuxi and Buhler China to be relocated within a very short time. The opening ceremony was attended by numerous guests from politics and business as well as some 400 customers. The opening address by the Mayor of Wuxi was followed by speeches by the Swiss ambassador to China, Urs Bühler, Calvin Grieder, and representatives of the Grain Office of Wuxi and Nanjing. Then the guests were invited to tour the new factory and to inspect the latest products especially developed for the Chinese market. The new factory in Wuxi covers a surface area of about 55,000 square meters, which makes it the second-largest manufacturing site of Buhler and exemplifies the important Buhler principle of “in the region – for the region.” Development and production activities are tailored to the needs of customers in China and are locally performed.

Achema – subdued atmosphere

The Buhler Grinding & Dispersion business unit rolled out two new products at the ADHEMA, which was held in Frankfurt am Main in mid-May: the oil-free Trias three-roll mill and the revised Centex disk mill. These Buhler innovations were intensely discussed by the numerous visitors to the booth. Especially the Trias mill for processing high-performance materials – for example for electronic or dental applications – met with very positive response. The basic atmosphere at the trade show was subdued. Many projects are being delayed due to a lack of demand. Compared with earlier events, the number of overseas visitors was appreciably lower, whereas a very high number of suppliers and universities were registered.

Success at the IPACK-IMA in Milan

Over the past years, the IPACK-IMA in Milan has evolved into the world’s most important trade show for grain millers and pasta producers. This year’s event attracted some 2000 exhibitors and 54,000 visitors. With its booth of about 400 square meters, Buhler appeared under the motto “Passion from Grain to Pasta” as a solution provider along the entire value-adding chain from grain to finished pasta. The individual process stages were exemplified by the Sortex Z sorter, the Antares roller mill, the Polaris purifier, and the Polymatik® TPKZ pasta press. For the Polaris and the Polymatik TPKZ, the IPACK-IMA served as a platform for their first appearance. In addition, visitors were offered the opportunity to see how extrusion technology enables additional value to be generated from milled products, for example by producing breakfast cereals from wheat bran. During the five days of the fair, some 400 guests were welcomed to the booth. Of these, some 50 % were accounted for by Pasta, 34 % by Grain Milling and Sortex, 11 % by Extrusion, and 4 % by Customer Service and Automation.

Large-scale order received from Mexico

La Moderna is Mexico’s largest pasta producer and durum wheat miler. Every year, the company produces over 200,000 metric tons of pasta, which translates into about 75 % of total pasta consumption in Mexico. In addition, La Moderna’s six grain mills process some 800 tons of durum wheat and 900 tons of bread and soft wheat daily. La Moderna also produces cookies (biscuits) and rice flour for instant cake mixes. In January 2009, La Moderna entrusted Buhler with the supply of a completely new durum mill plus one short-goods and one long-goods pasta line. For Buhler, this contract represents a historical milestone, for up to now La Moderna collaborated with a competitor.

New head of Buhler Benelux

Effective March 1, 2009, Robert Egi – who heads the Buhler affiliate in London – has additionally taken charge of Buhler Benelux. He succeeds Hans-Jörg Ill, who in the past two years and a half headed the Buhler organization in the Benelux countries in the interim.
The finer, the better

The new production plant for sheet-fed offset printing inks of Epple Druckfarben AG in Germany has been up and running since August 2008. The facility, designed and constructed by the Buhler Grinding & Dispersion business unit, is considered by the industry to be an exemplary installation which sets the trend in advanced printing inks manufacture.

The Epple Druckfarben company is acknowledged internationally as a seasoned specialist producer of high-grade sheet-fed offset printing inks. The company, based in Germany, employs some 200 persons. Its steadily growing share of exports go mainly to other European countries. But also Asia and America are markets of appreciable importance. Sheet-fed offset printing inks from the Epple company are applied for printing high-quality matter such as magazines, catalogs, brochures, calendars, and refined art prints with the finest pigmentation. In addition, Epple also manufactures special odorless and low-migration inks for printing food packaging materials.

From manual to fully automatic

To date, production at Epple Druckfarben AG was only automated to a certain extent. But today, batch processes using mixers, three-roll mills, and large ink tubs is only suitable for making certain product groups. This is because production volumes are growing while the market expects steadily rising requirements to be satisfied in terms of supply service, flexibility, and economy. The Epple management therefore decided in 2004 to thoroughly update its production facilities. Executive board member Dr. Wolfgang Josten, who is in charge of production at Epple, says: “By building the new plant, we were pursuing three goals: We wanted to increase our efficiency, further enhance the quality of our products, and maintain this quality at a very constant level.” Last, not least, output was also to be increased to several ten thousand metric tons of printing inks annually. Two or three operators were to be sufficient for running the plant.

In order to achieve these goals, a fully automatic production plant was to be constructed for the four offset ink colors black, blue (cyan), red (magenta), and yellow. These four production lines were to be housed in a new building behind the existing production halls on a surface area of about 1500 square meters. The fully automatic plant would be operated from a raised control center overlooking the factory.

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Bead mill and three-roll mill – the heart of the dispersion process.
In two stages

The company management of Epple Druckfarben AG entrusted Buhler with designing and constructing the new plant for manufacturing sheet-fed offset printing inks. This would continue a long and proven customer relationship which dates back to the year 1919. Wolfgang Josten: “For decades, Buhler has established an outstanding track record with our company as a reliable partner and provider of top-notch dispersion technology.”

The Buhler plant designers and engineers started working on the project at the end of 2004. In the spring of 2006, the first two ink lines (black and cyan) went on stream. One year later, installation of the two other lines (magenta and yellow) started. In November 2008, the complete plant of Epple Druckfarben AG was commissioned and ready for regular production.

The result of this four-year engineering and construction period is an exemplary, state-of-the-art overall plant for manufacturing offset printing inks. “Our expectations were clearly exceeded,” says Epple speaker Joachim Erlach, praising the job done by Buhler. “The plant is running to our entire satisfaction. What Buhler has built for us sets the trends in our industry in terms of plant and product quality.” Mark Traber, who as an area manager is in charge of the German market, confirms that the new production facility of Epple Druckfarben AG serves Buhler as a showcase plant. “At Epple, we have built a four-color plant in a tightly dimensioned space whose systematic automation and high-grade ink manufacturing processes are exemplary.”

From the raw material bins to the finished-product tanks

The production plant consists of four identical lines set up in a parallel configuration. Each line starts with the bins holding the ink pigments, which are supplied by the chemical industry. In the first stage, a batch mixer mixes the pigments with special oils as a vehicle or carrier fluid. This mixture is transferred to an intermediate tank which continuously feeds the dispersion section.

Actual dispersion is carried out in an intermediate stage in a K240 bead mill. Here the pigment particles are uniformly reduced at a temperature of about 100 degrees Celsius. The ink concentrate then obtains its gloss properties in a three-roll mill (type SDVE-1300), where the ink is additionally cooled to 50 °C and deaerated. In the last stage, the ink concentrate is directed to the finished-ink tank, from where it flows to the dilution system and the installation for filling it into cartridges or other containers. In this operation, it is additionally possible to make customer-specific adjustments.

Improved dispersion

Industrially manufactured ink pigments are a very expensive raw material. Their purchase price accounts for the largest share of the raw material costs incurred in the production of high-grade offset printing inks. Therefore, the degree of fineness achieved in the dispersion process is a direct benchmark for the customer value of a new plant for industrial production of offset inks. “The finer the pigments are ground in the bead mill, the larger the resulting particle surface area,” explains Epple production manager Wolfgang Josten. “Or, in other words: The finer the grinding action, the better the pigment quality and utilization rate. Thus, Buhler is helping us with its advanced technology and process mastery to maximize the efficiency of our production activities.”
The new SORTEX E sorter of Buhler Sortex uses space-age technology to remove foreign matter with unmatched efficiency during packaging of frozen fruit and vegetables. The SORTEX E is an innovative and cost-effective machine which minimizes the rejection of accept product and reliably detects foreign material.

For frozen food processors, the packing line is the last opportunity to eliminate foreign matter. Traditional technologies have long been used to remove foreign material that was missed in the primary process. But these technologies do not offer absolute safety. For example, they find it hard to distinguish light wood from potato or cauliflower, cardboard from carrot, or some clear or coloured plastics from vegetable mixes. The list of hazards seems endless: cigarette filters, for example, are exceptionally hard to detect in mushrooms. In an increasingly litigious world, the price of inadequate product screening is heavy.

InGaAs technology
With the launch of its SORTEX E sorter, Buhler Sortex now offers processors an elegant solution that enables them to overcome these problems. It combines proven technology of outstanding reliability with advanced applications. The secret of the new SORTEX E sorter’s success lies in the Indium Gallium Arsenide (InGaAs) technology that it uses.

InGaAs technology was developed originally for the space programme to distinguish between cultivated and uncultivated fields. It was quickly adopted for military use as it enables an easy distinction to be made between foliage cover and other material such as camouflage. Seizing on this capability, Buhler Sortex applied InGaAs technology to the cameras it designs and places at the heart of the SORTEX E.

Short-wave infrared region
InGaAs technology takes advantage of the fact that vegetation absorbs energy in the short-wave infrared (SWIR) spectral region whereas other material reflects it. Sensors in InGaAs cameras can detect energy in the SWIR region while conventional sorters use cameras based on silicon technology that can detect energy only in the visible and near infrared (NIR) ranges.

The enhanced InGaAs technology used in the SORTEX E makes use of the fact that at certain wavelengths vegetables reflect very little energy while common packaging materials such as plastic, wood and cardboard reflect it very well. Foreign material is highlighted as clearly as under a spotlight.

The new SORTEX E of Buhler Sortex has been matched to the capacity of traditional packaging lines. Its design is so compact that it fits onto a small surface area with little loss of headroom. It is capable of sorting up to seven metric tonnes of frozen fruit or vegetables an hour.

Productivity and profitability
In designing the SORTEX E, a balance was struck between perfection and the cost of achieving it. Because of the high throughput capacity made possible by InGaAs technology, processors are now able to identify and remove foreign material at the vital packing stage. They can thus increase their profitability by minimizing the wasteful and costly rejection of accept product. The consequences of foreign material contamination may be serious for processors. Once consumer confidence is shaken, it is expensive and labour-intensive to restore it. The SORTEX E sorter with its enhanced InGaAs technology creates an entirely new level of security that is vital in the prevention of foreign material contamination. It is not only the product itself that is at risk, but the reputation of the whole brand.
The features of the SORTEX E

The new SORTEX E sorts a wide range of frozen fruit and vegetables with only one mode. No changes to the machine are required when changing product. The features of the SORTEX E include:

- **Cameras in the visible region:** The cameras and lenses discriminate more effectively between subtle colours, achieve better blemish detection and reject less accept product.
- **InGaAs cameras:** Unmatched efficiency in detecting foreign material. Packing material is removed from complex mixes with minimal yield loss.
- **Stable operation:** Calibration is required only once a week. More consistent sorting performance is delivered without operator intervention.
- **Enhanced shape recognition:** Product separation technology reduces unintentional rejection of products. Up to 80% higher capacity is possible with lower yield loss.
- **Multiple defect classes:** They allow separate sensitivity and defect sizes to be specified for different defect types, resulting in better control over blemish removal.
- **Sorting set-up software:** This allows easy specification of the colours of defective material. Each defect colour has its own control for the operator to adjust sensitivity.
- **Pre-set modes:** The sorter ships with pre-set modes for a range of products that provide a base for fine-tuning. It also offers a full range of tools for easy set-up of new products.
- **USB port:** An external USB port is available for data exchange, diagnostics, frame grabs or operating modes.
- **Open construction:** The open construction facilitates cleaning of food contact areas.
- **Power consumption:** Economical operation with 1 kW. No additional water chiller is required in the packaging line.
- **Inbuilt reject conveyor:** This carries reject product to either side of the sorter for collection, greatly simplifying sorter installation.

Sales impact prior to launch

Buhrer Sortex launched its new SORTEX E sorter officially at the Anuga FoodTec in March 2009. But pre-launch tests produced such dramatic results that over 20 machines were sold even before the official roll-out.

The purchaser was the Spanish Virto Group, which carried out intensive pre-launch trials at its headquarters in Azagra (Navarra). Virto tested the SORTEX E under the most rigorous conditions and found that it was possible to remove all types of foreign material and extraneous vegetable matter both from frozen single vegetable varieties and complex vegetable mixes, even with added proteins. Hourly capacities of 4 to 6 metric tonnes were achieved.

In all, Virto found that the new technology outperformed the existing sorters it was using. The company placed an order for both the SORTEX E and the new SORTEX KBR. The SORTEX KBR sorter is a sophisticated further development of the established SORTEX K that incorporates the revolutionary InGaAs technology. This machine is capable of sorting at capacities of up to 10 tonnes per hour.

Top: Contaminated frozen vegetables in the visible wavelength region.

Bottom: Photographed with the shortwave infrared camera, wood, cardboard, and plastic fragments reflect energy and appear light.
Positive atmosphere at the IAOM

The representatives of the American grain milling industry meet at the end of April every year to attend a conference and exhibition that is organized by the International Association of Operative Millers (IAOM). This year, the event was held in Grand Rapids, Michigan. The focus was on the increasingly rigorous purity requirements that finished products are expected to satisfy today. With the presentation of its latest Sortex color sorter, its Polaris purifier, and its MYRB online measurement unit, Buhler was exactly at the center of this focus. Despite the tense economic situation, the basic atmosphere at the IAOM was positive and constructive. It appears that many Buhler customers are perceiving the crisis as an opportunity to invest in their future together with Buhler.

Buhler remains family-owned

Urs Bühler, the sole owner of the Buhler Technology Group, has planned the ownership succession together with his three daughters and thus created the basis for retaining the Group in the hands of the Bühler family. In order to implement this settlement, the non-operative and part of the operative properties will be transferred to the private ownership of the family. This change will neither affect the Group’s employees nor its operating activities.

Buhler site in Bangalore enlarged

Buhler officially opened its new facilities at its site in Bangalore in a ceremony and presented them to its customers from the southern part of India. New installations at this site include an applications pilot plant for cleaning, grading, and sorting granular raw materials; a roll reconditioning station; a control cabinet production shop; and a staff restaurant. The pilot plant was inaugurated by Anil Mittal, Chairman of KRBL Ltd. and a devoted Buhler customer. In his address, Anil Mittal expressed KRBL’s esteem for Buhler and emphasized the important role that Buhler was playing in the updating of India’s grain processing industry.