Ultra-Brag: Building the tower of Basel
Nuh’un: No.1 in Turkey’s pasta market
Technology: Wet grinding for photovoltaic technology
Seizing opportunities

Dear Readers

The world economy is currently anything but homogeneous. Some corners of the globe are exposed to harsh winds, whereas other countries and industries are enjoying a business boom. This heterogeneous market situation is a great challenge for us all. But basically, this situation also presents us numerous opportunities that we must now seize. For Buhler, this quite simply means that we must maintain our flexibility in order to remain strong and to ensure that we can act as required. Flexibility is also needed when it comes to identifying our customers‘ new requirements. But first and foremost, we must never stop thinking and acting creatively and innovatively. We are taking this duty seriously, a fact borne out by the articles in this Diagram issue describing exemplary projects in Turkey, Australia, Finland, Switzerland, Brazil, Russia, and Portugal. In addition, we invite you to read about new process technologies designed to help you cope with your specific challenges and seize your opportunities.

We wish you much pleasure!

Calvin Grieder, CEO
At the site where Ultra-Brag AG up to now unloaded ships and warehoused goods in the Rhine port of Basel, Novartis plans to realize its campus idea. As a replacement for its existing installations, Ultra-Brag has therefore moved to the port of Kleinhüningen, where it has constructed an 83-meter-tall bulk storage elevator, and to the Muttenzer Auhafen port, where it has built a huge flat store. Buhler supplied the equipment inside these new facilities.

For two years now, the Swiss logistics and inland navigation company Ultra-Brag AG has been undergoing a rigorous renewal process as far as its building structures are concerned. By the end of 2009, the traditional Basel-based Rhine navigation, logistics, and warehousing company will have moved out of one of its present three storage and handling locations in the Rhine port of St. Johann.

Port makes way for the new Novartis campus

This largest construction and relocation project in the long history of Ultra-Brag was triggered by a large-scale project launched by the international pharmaceutical corporation Novartis: Novartis is building a “Campus of Knowledge, Innovation, and Community” on a large lot of land in the immediate vicinity of the St. Johann port. The urban development concept also makes provision for the wide opening and landscaping of the terrain down to the banks of the Rhine. The consequence: By the end of 2009 at the latest, Ultra-Brag AG as the sole operator of the St. Johann port had to clear its site on the left bank of the Rhine.

This forced Ultra-Brag AG to relocate its Rhine port with all of its bulk storage facilities, cranes, and berths to some other place. This was no easy undertaking considering the tight space conditions that already exist in the ports of the City of Basel. But working closely with the local authorities and Novartis, a solution was found which satisfies all the parties concerned: The construction of a new bulk storage elevator with a new ship unloading system in Harbor Basin II in Kleinhüningen in addition to a large new flat store in the Auhafen port of Muttenz. “The construction of these two new installations was an enormous challenge for us,” admits Beat Heydrich, the CEO of Ultra-Brag AG. He adds: “But the construction and relocation project also generated new impetus for us and provided us with numerous new, state-of-the-art, and efficient facilities. This gave us the opportunity to improve our processes and to enhance our efficiency.”

An 83-meter-tall tower

The new bulk storage terminal that Ultra-Brag AG operates in the Rhine port of Kleinhüningen is an impressive structure. With its overall height of 83 meters, it clearly dominates the Basel port skyline. This height required a number of special measures: The structure has to be earthquake-proof, it must be resilient enough to absorb wind loads, and its immense weight must be reliably supported by its relatively small footprint of 27 by 40 meters. The concrete structure, which was built by the slip-forming method in three stages, therefore stands on a large number of piles with a thickness of up to 1.2 meters and a length of 28 meters. The bulk storage section of the new Ultra-Brag landmark has a height of about 70 meters. It houses 32 round storage bins plus 15 interstice bins, which hold more than 40,000 cubic meters of material. Most of the Buhler-supplied equipment is installed in the headhouse of the elevator building, which is attached on the waterside to the block of bins and rises another four building levels beyond the bins. But the core systems of the entire installation are the two 87-meter-tall belt-and-bucket elevator legs which elevate the material from the ship or rail receiving sections to the top of the terminal.

Ultra-Brag AG has trusted the proven bulk storage and conveying technology of Buhler for decades. Therefore the company again entrusted the supply, installation supervision, and start-up of the complex materials handling and control systems for the new bulk storage facility to the grain handling specialists from Uzwil.

A special project

“With its height of 83 meters and its very small footprint of merely about 1,000 square meters, the new storage elevator tower of Ultra-Brag AG is a very special case,” explains Marco Ceressa, the Buhler man in charge of coordinating the project. “In addition, some of the storage bins are vertically split in order to increase the total number of bins. An active explosion protection
system and explosion pressure relief through the bin ceilings are part of an overall ATEX explosion control concept."

The bulk storage technology applied reflects the state of the art. Numerous chain conveyors and elevator legs move the bulk commodities from the ship unloading point to the storage bins. Special receiving and cleaning systems ensure proper cleaning of the grain prior to storage. The bulk material bins are exhausted through centralized as well as decentralized dust collection filters. Buhler also installed the equipment required for loading road and rail vehicles for onward transportation. The fully automated materials handling systems in conjunction with the new, highly efficient “kangaroo crane” are capable of handling as much as 600 cubic meters of material per hour. This is five times the capacity of the old location.

**Twin-level flat store**

The second new building structure built for Ultra-Brag AG in the Auhafen port of Muttenz, a suburb of Basel, differs in many respects from the tall bulk storage terminal this twin-level flat storage facility with a footprint of 42 by 120 meters holds a total of 27,000 cubic meters of bulk animal feeds and of 6,600 cubic meters of fertilizer. The modified design supplied by Buhler – with chain conveyors installed above the flat store roof for introducing the material into the feed storage section instead of belt conveyors inside the building – increased the customer’s total storage capacity by more than 60 percent with given building dimensions. The formulated feeds and the fertilizers are stored and handled on two completely separated building levels. Flat stores are basically designed for the intermediate storage of such bulk materials because they are unsuitable for storage in conventional storage silos due to their special flow characteristics. The top level of the flat store is reserved for animal feeds. Its 25 compartments are filled by separate roof-top conveying systems. Fertilizer is stored on the ground floor. The 16 compartments there – which are completely separated from the feed handling installations – are fed directly from the ship berthing point. As the new flat store is not located on the waterfront, a high-capacity, dust-free conveying system had to be constructed from the grab crane to the new shed across the railroad tracks and the road. According to Ultra-Brag, the proportion of animal feeds and derivatives supplied in containers has continuously increased over the past few years. A niche market has emerged for container transportation of bulk materials on selected shipping routes and for special products. Even today, Buhler provides solutions for loading and unloading cereal grains, animal feeds, and derivatives into and from containers. New, modern installations are being increasingly equipped with this “container option.” This is an additional variant within the grain terminal beside the ship, rail, and road unloading and loading systems. But even if the significance of this materials transportation method is rising steadily, the total share of “container grain” ultimately remains fairly low. This is because of the volatile freight rates and the occasional lack of availability of free containers on such transport routes. Currently, the global share of grain shipped by container is said to amount to only about one or two percent. In the flat store of the Auhafen port, Buhler installed a container tipping platform with an integrated intake pit. This allows automatic discharge of containers using a programmable logic control system. The container crane installed at the customer’s site deposits the containers directly on the dumping platform. Discharge can start as soon as the container doors have been opened.

**Not only for storing**

Beside being used for storing bulk and bagged fertilizers, the ground level of the flat store also houses a processing system for blending and mixing different components plus two installations for bagging fertilizers in 50-kilogram bags and Big Bags. The fertilizers are always shipped in standard-size bags or Big Bags. Another bagging line packs animal feeds. As in the new building structure in Kleinhüningen, the technical equipment installed in the new Ultra-Brag flat store in the Auhafen port was also supplied by Buhler. Its grain handling specialists designed and installed all the materials handling systems in the feed storage section and in the weighing tower, as well as the feed intake equipment and the installations for loading road and rail vehicles. Buhler also configured and built the complex control system of the plant. Construction of the new building structures for Ultra-Brag AG lasted from the start of construction in the spring of 2008 to commissioning in the autumn of 2009, a little less than one year and a half. This allowed the opening ceremony to be held at the end of October 2009.

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Ultra-Brag

Ultra-Brag AG was set up in 1925. Privately owned, it is an international Swiss forwarding and inland navigation company with headquarters in Basel. The portfolio of Ultra-Brag AG includes inland navigation, rail and road transportation, collection and distribution services in the Upper Rhine region; container services; logistics; industrial packing; insurance brokerage; customs clearance; plus storage and handling of goods of all kinds. For clients from industry and commerce, Ultra-Brag AG manages materials handling in the Rhine ports of Basel Kleinhüningen, Birsfelden, and Muttenz Auhafen. Ultra-Brag AG has some 160 employees and operates inland navigation vessels on all European waterways and canals. In addition, it operates installations allowing weather-independent materials handling; crane systems for mass commodities, general loads, containers, and heavy units up to 600 metric tons; storage and staging halls; warehouses for general cargo; and systems for cleaning, drying, and cooling agricultural commodities.
Sibylle Schmidt is in charge of the agricultural market field at Dow Jones News GmbH.

**Ms. Schmidt, what activity does Dow Jones exactly engage in?**

Sibylle Schmidt: The international Dow Jones & Company is the world’s leading provider of news, business information, and information services. Dow Jones News GmbH is one of its companies. Headquartered in Frankfurt am Main, Dow Jones News GmbH is a leading provider of stock, financial, and business news in Germany. Its range of products includes news services in various formats such as real-time solutions, databases, business newsletters, and magazines. Dow Jones offers independent and competent reports on the German and international markets.

**What are the contents of these services?**

Sibylle Schmidt: We provide economically relevant information on the raw-materials-intensive industries in Germany, Austria, and Switzerland — that is, the Germany-speaking countries of Europe. The focus of our information is on the agricultural, energy, steel, and non-ferrous metal segments. In addition to its editorial reporting, Dow Jones also organizes specialist conferences and intensive seminars on the focal issues of agriculture, metals, energy, purchasing, plus Europe & Finance. We offer the same services also in other languages for additional countries.

**You work at the Frankfurt Dow Jones offices as a senior reporter for the agricultural sector. What are the contents of your market reports and newsletters?**

Sibylle Schmidt: The agricultural Dow Jones market reports provides up-to-date daily market news on grain, animal feeds, and oilseeds plus spot market prices from the markets in Hamburg, Rostock, Rotterdam, and others, in addition to stock prices at all relevant stock exchanges.

**How are these reports and newsletters created?**

Sibylle Schmidt: Primarily, we gather information, news, figures, and facts, which we report neutrally. In addition, we selectively interview numerous specialists in order to supplement our basic information. Each of our daily market reports is an information biotope in which the voices of producers, traders, and consumers are objectively reproduced.

**Does this mean that Dow Jones GmbH’s market reports “only” provide news and facts – or do you also make evaluations and comment upon what is happening in the world?**

Sibylle Schmidt: We primarily spread news and facts. In addition, we ask internal and external experts for their opinions. In our market reports, we cite these as interpretations and viewpoints on what is happening in the markets.

**Do you also identify trends and make forecasts?**

Sibylle Schmidt: For some time now, we have also determined current trends in order to derive forecasts. To date, we have been doing this in the non-ferrous metal and steel segments. For the energy and agricultural sectors, we are establishing a separate research unit for these forecasts which is independent of the panel of editors.

**Who are the subscribers to the market reports and newsletters of Dow Jones?**

Sibylle Schmidt: In the agroindustry, they are the decision-makers in large and mid-size companies, for example global trading firms, grain milling companies, brokers, purchasers, food producers, and food retailers in Germany, Austria, and Switzerland. In the case of metals and energy, they are predominantly representatives of the processing industries plus purchasers.

**What benefits do the subscribers of these market reports and newsletters enjoy?**

Sibylle Schmidt: The individual benefits depend on how our clients process and interpret the information we provide, what conclusions they draw for themselves and their businesses. It is up to them to adapt this information to their own specific companies and markets. We supply the basic information in order to offer our clients a better basis for making their purchasing and selling decisions.

**What are the most important influencing factors?**

Sibylle Schmidt: This field is very vast. Basically, global market prices react at short notice to de-
mand and supply also in the agricultural sector. But in addition, also the price of crude oil and the exchange rate of the US dollar or the euro play a certain role. Another important factor is the weather with its unpredictability and the resulting forecasts on future harvests. These are almost more important than the current quantities harvested. But emerging changes in eating habits and the development of the world’s population also have a long-term influence on the global market prices of grain, animal feeds, and oilseeds.

What role does speculation play?

Sibylle Schmidt: As in any other market, speculation is an important factor in ensuring the functioning of a liquid and meaningful pricing system. We cannot do without speculation.

As a layman, I see a high price volatility in the grain, animal feed, and oilseed markets. Has that always been so, or have you determined market changes over the past decades?

Sibylle Schmidt: The higher the volatility of a given market, the higher also the uncertainty of the market players. Moreover, the liquidity of a market determines the efficiency of pricing: The higher the liquidity of a market, the lower its volatility. Raw materials markets listed on the stock exchanges are not particularly liquid – with the exception of crude oil –, but much more complex than other markets such as the bond market. Therefore, it is quite natural for them to have a higher volatility. If we consider the raw materials markets as a whole, agricultural prices are in the center field. They are less volatile than natural gas prices, but more volatile than the market listings of precious metals. Today, the agricultural markets have ceased to be as volatile as they were from 2002 to the end of 2008. But neither have we returned to the levels of the eighties and nineties.

If you had to make a forecast: How will the global markets for grain, animal feeds, and oilseeds develop over the coming twelve months?

Sibylle Schmidt: In the medium term, our research people expect further price cuts for corn (maize) and especially cereal grains. We are much more optimistic as far as the soybean market is concerned, where it appears that a physical scarcity is emerging.

Interview: Herbert Bosshart

Dow Jones & Company

Dow Jones & Company is a globally leading provider of business news and information services. Dow Jones & Company is one of the numerous affiliated companies of Rupert Murdoch’s News Corporation media group and itself also has several subsidiaries. It also includes such well-known media as the Wall Street Journal, Barron’s, MarketWatch, and the Far East Economic Review, which are united in the Consumer Media Group. In the Enterprise Media Group of Dow Jones & Company, seven business units gather and spread business information for the financial industry, the world of business and the media, plus governments and public administrations. One of these seven units is Dow Jones Indexes, which – among other things – also determines the important Dow Jones Industrial Average.

Dow Jones & Company was set up in 1882 by Charles Dow, Edward Jones, and Charles Bergstresser. Today, it has over 7000 employees worldwide, about 2000 of them in the field of business and financial news.

www.dowjones.com / www.newscorp.com
For more than 60 years, the Turkish pasta producer Nuh’un Ankara has put its trust in systems made by Buhler. With two new production lines, Nuh’un Ankara has now consolidated its leading market position in Turkey.

Up to the middle of the twentieth century, pasta did not appear, or only rarely, on the menu of Turkish families. In 1950, however, pasta started its victory march in Turkey as well. Today, every Turkish citizen eats 6.2 kg pasta each year on average. Thus, per capita consumption has reached the European average.

The road to market leadership
The victory march of pasta in Turkey is closely linked with the name Nuh. Nuh’un Ankara Makarnasi Sanayi ve Ticaret A.S. has its origin in the grocery founded by Nuh Eskiyapan, Ahmet Eskiyapan and Kemal Yurtbilir in Ankara in 1946. In those days, the range of products already comprised imported pasta. As demand began to grow slowly, the business partners built their first own pasta production with a daily output of six tons. Thus, Nuh’un was already the market leader in Turkey.

Over the past decades, Nuh’un Ankara defended this position thanks to its constant growth. One milestone in the history of the largest Turkish pasta producer was the new construction of a pasta factory in 1996 in the industrial park Sincan near Ankara. Nuh’un Ankara moved its production lines from downtown Ankara to the suburbs. The largest pasta factory in Turkey was established on 64,000 square meters. At the same location, Nuh’un Ankara built a mill facility with a total capacity of 21,000 tons of durum wheat a month.

Quality leads to premium product
Today, Nuh’un Ankara achieves a total capacity of 660 tons of pasta per day in two factories in Ankara and Cankiri. The total capacity of Nuh’un Ankara is 220,000 metric tons of pasta, from the brands Ankara Markarna, Veronelli and Elif. The quality of the premium pasta made by Nuh’un Ankara is comparable to that of Italian pasta. Only durum wheat is processed. Production is governed by strict quality standards. About 80 percent of total production are sold on the Turkish market. Thus, Nuh’un Ankara’s market share in Turkey is more than 28 percent. The rest of production is exported to Japan, Germany and the Netherlands.

The Nuh group, which today comprises factories in other sectors of the economy, has been family-owned since its foundation. Today’s stock corporation Nuh’un Ankara Makarnasi Sanayi ve Ticaret A.S. has been family-owned since it was set up in 1946.

With Buhler to success
The unstoppable rise of Nuh’un Ankara has been accompanied over all these years by the Buhler Technology Group. The Pasta and Grain Milling business units, which specialize in pasta and grain milling systems, have been involved in all extensions of Nuh’un Ankara’s production capacities from the beginnings of the company in 1946. Horst Galli, responsible in Buhler’s Pasta business unit for the Turkish market, looks back with pride.

“Up to today, Nuh’un Ankara has purchased a total of 16 pasta lines from us – 12 short-goods lines with a total capacity of 26,000 kilograms per hour and 4 long goods lines with a total capacity of 6,200 kilograms per hour.” Twelve of these 16 pasta lines are still in operation – nine in the main factory in Ankara and three in the Cankiri plant.

“We have been working together with Buhler since we started our own production,” says Feridun Haboglu, member of the Directorate-General at Nuh’un Ankara, responsible for pasta production. “We have chosen Buhler...
because of their performance and the quality of their solutions. We have never regretted this decision and therefore still count on Buhler today as our technology partner."

**Latest joint step**

Nuh'un Ankara and Buhler have taken the latest step forward together. Two years ago, the persons in charge at Nuh'un Ankara approached Buhler with plans to further expand their production capacities. Their goal: to increase the market share to 40 percent and to expand the export to industrial countries with strong markets for top-rate quality pasta. After thorough analysis and discussion, the concept for the next expansion step was ready: expansion of the production of standard short goods and a highly specialized facility for the production of soup pasta products. An agreement for the construction of a short-goods line with a capacity of 6,000 kilograms per hour and a special line for soup pasta shapes with an hourly output of 3,600 kilograms was signed.

Both production lines are new for Nuh'un Ankara – equipped with Polymatik presses. Horst Galli: “The Polymatik presses, especially of the soup pasta line, enable us to process a slightly moister dough. The result is better cut surface and substantially less dust. Ultimately, Polymatik presses are easier and faster to clean.”

**Efficiency increase through innovation**

Both new pasta lines at Nuh’un Ankara are equipped with dryers of the latest generation. The new 2.5 meter wide dryer in the soup-goods facility consists of a shaker plus a drum and a belt dryer. Thanks to this combination, we were able to reduce the length of the line to about 50 meters. We have also followed new paths in designing the new short-goods line (6,000 kilograms per hour). Dough is produced in the twin-screw Polymatik presses TPXZ with a capacity of 3,000 kilograms per hour each per screw/thead. This is the largest twin-screw press so far made by Buhler. Thanks to its compact design, it is only 60 meters long and includes dryers of the latest generation with a width of 2.5 meters. Horst Galli: “The new facility at Nuh’un Ankara features a high output with long drying time and requires only a minimum of space.”

**Top-class pasta – success in the marketplace**

Thanks to excellent on-site support and on-schedule completion of the new production hall, both new Nuh’un Ankara pasta lines went into operation in record time. Only eleven months after signing of the contract, the two lines for short goods and soup pasta were handed over to the customer. Since then, they have been operating around the clock to the customer’s fullest satisfaction. “By opting for the Polymatik presses, we have ventured into new territory,” says Feridun Haboglu. “The products which we now hold in our hands justify our decision. Their color has been improved considerably, which is very important in Turkey. We are fully satisfied.” With their two new production lines, Nuh’un Ankara now has sufficient capacity to keep production running for 24 hours and 365 days and to carry out the required maintenance and regular servicing work at the same time.

**New durum mill**

Planning means looking ahead: In order to increase the production capacity in the pasta factory, Nuh’un Ankara ordered a new durum mill as far back as in 2007 with a capacity of 300 tons per 24 hours. This means that Nuh’un Ankara has now already ordered its third durum mill from Buhler within ten years. The delivery of the new production line comprises the cleaning, grinding and finished product storage and handling sections, including a bran pelleting system (12 tons per hour). The highlight of the new Nuh’un Ankara durum mill is its new cleaning concept, consisting of a Sortex optical color sorter, a Gravomat and a Light Peeling system.

The new Nuh’un Ankara durum mill has been in operation for more than one year. Plant manager Feridun Haboglu is happy to see that his “high expectations regarding particle size, quality and yield have been fulfilled to his fullest satisfaction. In addition, the specific energy requirement of the new mill is significantly lower.” For this reason, Nuh’un Ankara is presently looking into possibilities to upgrade its two existing durum mills (200 tons per 24 hours each) by adding a Sortex optical color sorter and a Light Peeling system.

**Buhler is for us the best possible partner. We have been working together with Buhler for more than 60 years. Cooperation has always been smooth, even after completion of the facility. The spare parts service is very efficient and reliable.**

Feridun Haboglu
Production Manager at Nuh’un Ankara
Member of the Directorate-General
Belgorod is the capital of the region with the same name in the southwestern part of the Russian Federation. It is located on the upper reaches of the Sewerski Donez river some 700 kilometers south of Moscow, bordering on Ukraine. With a population of about 350,000, Belgorod is one of the mid-size cities in Russia.

The Belgorod region is known for its rich iron ore, bauxite, and lime deposits. In addition to its heavy manufacturing industry, agriculture with 2,000 farms and production facilities is another important branch. The Belgorod region is also an important traffic hub in the Russian Federation. In the surroundings of Belgorod, major international railroad lines and truck roads link Moscow with the south of the country, Ukraine, and Transcaucasia. The significance of agriculture and the good traffic links make the Belgorod region highly attractive for large-scale agribusiness companies.

**Pork production is increasing**

When RusAgro’s board of directors decided in 2004 to expand into pork production, the Belgorod region suggested itself as a site for hog farms precisely because of its agricultural tradition and its excellent rail and road links. Within just a few years, several such farms were set up in the region, reaching an important role in the market.

RusAgro is excellently positioned to enter the pig breeding business. The Russian Federal State Statistics Service (Rosstat) reports that pork production in the country increased by 18% in 2007 and by another 8% in 2008, to just under 2 million metric tons. For the year 2012, Rosstat expects nationwide pork production to reach 3.5 million tons.

**Far-sighted planning**

As a consequence of establishing its own hog fattening farms, RusAgro decided to also build its own feed manufacturing plant in the Belgorod area for supplying the fattening farms united in the Belgorod Bacon company. Upon the recommendation of a nutritionist who was consulted as an advisor, RusAgro entrusted Buhler in 2006 with designing and constructing a complete feed production plant – from intake to onward transport. Only the bulk storage facility and the links with the rail and road networks were provided by the customer.

The Buhler engineers tackled the task of designing a feed production facility on the restricted available space which would not only cover the current needs of Belgorod Bacon, but also its future requirements. The engineer-
of the pigs reared by Belgorod Bacon. In additional, this would guarantee compliance with the legal feed production requirements. Last, not least, the consultancy provided a production manager whose one-year on-site presence after the feed factory had gone on stream ensured that the facility would exploit its full potential.

**Engineering – Attention down to the last detail**

Careful attention to the specific needs of Belgorod Bacon is apparent down to the last detail. The design of the intake section is such that the raw material can be received in both small and big bags. This will enable Belgorod Bacon in the future to also purchase large volumes of raw materials from large-scale agricultural operations. Furthermore, the receiving section has been essentially automated in order to minimize its manpower requirement. The entire plant and the cleaning section have been equipped with cutting-edge Buhler machinery in order to satisfy the high sanitation requirements.

Grain grinding and feed compounding have been united in a single plant section. This combination of grinding and formulating in a single line reduces the risk of cross-contamination, saves space, and thus increases the overall efficiency of the plant.

A specially matched liquids system with weighing equipment allows accurate metering of water, fat, molasses, and various other liquid ingredients into the Speed Mixer for obtaining homogeneous mixes. This enables vitamins and minerals to be added to the feed blend in a liquid form. Solid vitamins and minerals are more expensive than liquid ones – another way for the customer to reduce their costs.

**Top sanitation standards**

The “star” in the new Belgorod Bacon feed mill is the pellet mill. In order to protect the health of the pigs reared, it is necessary to produce top-grade feed satisfying the most stringent hygiene standards. Since its launch, the Buhler HYSYS system has set the hygiene standard in the feed manufacturing industry. The application of the HYSYS system allows the nutritional safety of the feeds produced to be guaranteed. The quality of the HYSYS system is based on a number of factors: the systematic use of stainless steel as an engineering material; the application of the “first-in, first-out” principle, which ensures a uniform retention time for each product batch; and the heating of the product up to 95 degrees Celsius, which destroys microorganisms and salmonella.

Buhler’s detail engineering efforts also covered the onward transportation of the compound feeds to the breeding farms. Exact requirements were specified for the purchase of the trucks in order to enhance the convenience and efficiency of materials handling.

**Fully automated**

The new Belgorod Bacon feed mill is controlled from a centralized location and fully automated. The automation system supplied by Buhler optimizes production and ensures a high level of flexibility throughout the factory. The entire production facility is operated, managed, and monitored from a control center. The systematic registration of all material streams and the confidence in Buhler quality enables raw material and finished product inventories to be minimized. The transmission of all production data allows timely and targeted purchasing of the raw materials. Thanks to complete automation of the plant, it is possible to permanently monitor the production process and thus to ensure a consistently high product quality. The Buhler control system also ensures that all processes are recorded.

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**RusAgro**

The RusAgro Group Limited Liability Company is one of the largest agribusiness holding companies in Russia. The Group is headquartered in Moscow. The RusAgro Group includes six food processing companies, 38 agricultural operations, and eight regional sales organizations. RusAgro was established in 1995 with the purpose of supplying large Russian confectionary producers with raw sugar and refined sugar. After RusAgro had gained almost 20 percent of the Russian sugar market in 1999, it expanded into additional agricultural sectors such as vegetable oil and fat production. The decision to enter the pig breeding business was made in 2004.
Top-quality chocolate thanks to ChocoStar™

The South American chocolate specialist Arcor has upgraded two of its five factories by equipping them with new ChocoStar™ molding lines with SeedMaster® TWIN tempering systems. The result of this capital investment: higher productivity at lower cost plus higher product quality.

Investing in production
Arcor is aware of this challenge and is continuously busy innovating to meet it. A step along this road is the addition of two molding lines of type ChocoStar™ from Buhler Binder in its two chocolate factories in the Argentine city of Córdoba and in Bragança Paulista in Brazil. “The molding line of Buhler Binder possesses exactly the characteristics that we require in terms of quality, flexibility, and productivity,” says Gerardo Bertone, head of the chocolate division at Arcor Argentina, giving the reason for the company’s decision. “In addition, we relied on Buhler’s vast know-how and on the well-known support that the Buhler chocolate specialists provide before, during, and also after installation of the systems they supply.”

The lines were ordered in December of 2006. A mere 15 months later, in March 2008, the two systems were already turning out marketable products. The two molding lines have been operating successfully ever since to the entire satisfaction of Arcor.

Better products, lower costs
The two Buhler Binder ChocoStar™ molding lines installed in the facility of Arcor are multifunctional and highly efficient. “When the two state-of-the-art lines went into service, this enabled Arcor to appreciably enhance the quality of selected products of its chocolate range. In Argentina, the equipment turns out products such as Tofi, Cofler, and Block. In Brazil, it is applied for making chocolates such as Tortuguitas, Didon, and Twister,” says Juan Carlos Marque, who is in charge of caring for the Chocolate customers of Buhler Argentina.

The capacity of about 1200 kilograms per hour and the speed at which production can be switched over, which reduces the cost of downtimes, are but two benefits offered by these lines. “The new Buhler Binder systems with their cutting-edge process technology allow us to increase our production accuracy,” explains Gerardo Bertone. “And in some cases, the new lines also cut expenses directly, for example by allowing the filling quantity of the chocolate bars to be proportioned with very high accuracy.”

Neatly molded and glossy end products, carefully aligned on their way to the packaging line.

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The new molding lines
The two new molding lines installed in the Arcor factories in Córdoba and Bragança Paulista are virtually identical. The shell lines of type ChocoStar™ each consist of a complete circulation system (mold size: 620 mm × 275 mm) for making solid chocolate products with or without ingredients (chopped or whole hazelnuts, peanuts, almonds, or pieces of biscuit) and filled articles with cream or caramel filling plus one Buhler SeedMaster® TWIN tempering system. These are the first two SeedMaster® units to be applied in South America. Good contraction and improved gloss of the end products are two among numerous other reasons why the customer opted for this new process. The lines have been designed and specified on the basis of state-of-the-art engineering and process technological considerations in order...
Arcor

The Arcor Group is one of the world’s largest confectionery producers. In Argentina, Brazil, and Chile, Arcor is the market leader.

In addition to chocolate, ice cream, and sweet bakery goods, the Arcor Group also produces canned fruit and vegetables, corn (maize) products, and packaging materials.

Arcor was set up in 1951 by a group of young entrepreneurs in the Argentine provincial city of Arroyito (Córdoba) by founding a sugar factory. The driving force behind this was Fulvio Salvador Pagani, the son of a baker named Amos Pagani who emigrated in 1924 from Italy to Argentina. The Pagani family still dominate the Arcor Group to this day.

With the declared goal of conquering the world’s markets from its base in Argentina, the Arcor Group grew steadily. Permanent investments and targeted company acquisitions enabled Arcor to emerge as a major player in the global confectionery market.

Today, Arcor operates 41 factories with a total of more than 20,000 employees. Thirty facilities are located in Argentina, five in Brazil, four in Chile, and one each in Mexico and Peru. In 12 other countries worldwide, Arcor operates sales branches. The Arcor Group generated sales revenues of 1.85 billion U.S. dollars in 2007. Of this, exports to 120 countries accounted for about 310 million U.S. dollars.

The factories of the Arcor Group turn out more than 1500 different products. Every year, 100 new ones are added. Day in, day out, the 41 production facilities make three million kilograms of foods. In addition, the company’s own refinery in La Providencia (Tucuman, Argentina) produces over 130,000 metric tons of sugar annually.

The Arcor Foundation, set up almost 20 years ago, supports over one million young people in Argentina in almost 1500 training projects.

Service and consulting

The new molding lines offer Arcor genuine added value: The high flexibility of their thoroughly thought-out design allows a large number of applications. Moreover, Arcor praises Buhler for its careful and professional project handling, to which also the local Buhler organizations in Argentina and Brazil contributed.

Buhler did more than just supply the lines: It was also present on site during start-up of the equipment. Start-up went off without a glitch, thanks to the support provided by Buhler. "The technical support provided by Buhler was key to ensuring successful commissioning," says Gerardo Bertone in retrospect. "The Buhler technicians transferred their entire knowledge to our own people. This made it easy for my team to understand the process and the new technologies involved. Our communications with the Buhler team were excellent before as well as after the lines went into service. The Buhler technicians were always very helpful and prepared to find the best solution for the project."
Supplied from a single source

The bakeries of the Fazer group are gradually being equipped with new storage and holding installations. The Fazer bakery in Vantaa, Finland, is the fifth bread factory to be equipped with the new system. The result: improved logistics and better bread quality.

The Finnish Fazer Bakeries Ltd is the leading large-scale bakery in the Baltic Sea region. In Finland, Sweden and the Baltic countries of Estonia, Lithuania and Latvia, Fazer Bakeries operates 16 industrial bakeries which produce the “daily bread” for a market of 140 million people. The group-owned mill where flours and flour mixes are produced for the Fazer bakeries is located in Lahti, Finland.

Central storage and holding plant
Some time ago, Fazer Bakeries began to redesign the storage and holding system for raw materials for making bread. A central storage and holding plant for each bread factory had to replace the former single systems, which served one or two bread baking lines. With this innovation, Fazer aimed to further improve its bread quality, production control and explosion protection. Buhler was entrusted with designing and constructing the new storage and holding systems. Today, five Fazer plants are equipped with the new materials handling system: St. Petersburg, Lahti, Moscow, Lidköping and Vantaa. Recently, Fazer commissioned Buhler with a sixth project: the renovation of its plant in Eskilstuna, Sweden.

Fazer Group
Fazer Bakeries Ltd with 4,600 employees and sales of 365 million euros (2008) is only one part of the Fazer Group. Today, “oy Karl Fazer Ab,” established in 1891 by the Swiss immigrant Karl Fazer with the opening of a French Russian pastry shop in Helsinki, includes the group divisions of Fazer Amica, Fazer Confectionery and Fazer Russia, in addition to the bakery branch.

7,800 Fazer Amica employees serve some 400,000 guests every day in about 1,500 restaurants in six countries, generating revenues of 570 million euros. In the Nordic countries, Fazer Confectionery is the market leader for packaged confectionery products. This division generates an annual revenue of 290 million euros with 950 employees. The bakery activities in Russia are combined in Fazer Russia. 3,700 employees in four bakeries in St. Petersburg and Moscow generate sales of 225 million euros. (bos)

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One system instead of four
The latest project has been realized in the Fazer bakery in Vantaa. Vantaa is a city with about 200,000 inhabitants in the greater Helsinki area. The large-scale bakery in Vantaa operates nine baking lines, baking 15 metric tons of fresh bread per hour.

So far, four autonomous systems have ensured the supply of the kneaders, the first unit in the bread baking lines, with raw materials in the Fazer bakery in Vantaa. These four single systems have now been replaced by a single, central storage and holding system.

Fazer constructed a new building for the new central bins. The new storage bins replace the older units at the bread lines. As a result, more space is now available in the halls and production halls.

From 30 tons to 250 kilograms
The new storage and holding system of the Fazer bakery in Vantaa consists of the following parts: the material intake section, the storage bins, the scales and the holding bins. The flours and premixes are delivered from the Fazer mill in Lahti by 20-ton trucks. From the goods intake area, the flours are delivered directly to the main bins. The bins for the various flour
types hold 30 tons each. The so-called medium components (premixes) are stored in small bins holding 1.5 tons. Small bins with 250 kilogram capacity were set up for the various micro-ingredients. From the storage bins, the raw materials are delivered to the eight central scales, where the desired quantity of flours, premixes and ingredients are made available computer-controlled, as required by the recipe. These batches are then transported to eleven kneading units. Each kneading station is supplied with brine and, if needed, with further liquid ingredients by a separate liquid metering unit. The system for handling the fluids was supplied by the Swedish partner company Vantec.

**Changes carried out during operation**

Installation of the central storage and holding plant in the Fazer bakery in Vantaa began in the summer of 2008. Part of the storage section was assembled out-doors because the new storage hall had not yet been completed. “However, this did not cause any major problems,” says Hansjörg Haldner, Buhler project manager, in retrospect. “After completion of the new intake and storage units as well as the central weighing section, we were able to connect one bread line after the other to the new system and to shut down the old systems.” The transition from the old feed system to the new one was carried out with ongoing operation, which means that the bread-making process did not have to be interrupted at any time. In the autumn of 2009, the last of the new bread lines was connected to the new system and the final work was completed.

With the commissioning of the new, centrally controlled storage and holding system, Fazer now operates a state-of-the-art installation in the bakery in Vantaa, which contributes substantially to achieving higher efficiency, improving logistics and ultimately stabilizing the high quality of Fazer breads.

**Newest technologies for tried and true equipment**

The Customer Service department of the Buhler Grain Processing division offers innovative upgrading packages enabling customers to optimize the safety, productivity, availability, and sanitation of their existing range of equipment. These so-called retrofits result from the close collaboration between the development department of the Grain Milling business unit and the product management of Customer Service Grain Processing. This enables existing equipment to be provided with the newest-generation machine technologies. The latest example of such a retrofit is the “Belt Drive,” with which Buhler customers can improve the power transmissions of their older roller mill models (Airtronic and Newtronic) by incorporating the latest engineering solution that the cutting-edge Antares series boasts. The application of this retrofit kit allows customers to maximize the sanitation of their production process and to reduce their maintenance requirements appreciably. The contacts for this retrofit are Erwin Hohermuth (left) and Matthias Klos.

**Buhler Sortex welcomes Princess Royal**

Great honors for Buhler Sortex: On July 8, 2009, Her Royal Highness Princess Anne paid a visit to the new headquarters of Buhler Sortex at Beckton in East London, which they moved to in 2007. With her visit, the Princess Royal in her capacity as President of the British Olympic Association acknowledged the efforts of Buhler to move out of its previous location at Pudding Mill Lane in the East of London to accommodate the development of the Olympic Park, the centerpiece of the 2012 Olympics. During her tour, Princess Anne was shown all aspects of the manufacturing process and was given an overview of the research, marketing, and administrative functions of Buhler Sortex. During her visit, Her Royal Highness engaged in spontaneous discussions with employees. Accompanied by Sortex Managing Director Bruno Kilshaw, she made an entry in the guest book of Buhler Sortex.

**“Grain-O-Mat” for grain terminal**

SiloWil AG, a grain terminal company located near the Buhler headquarters in Switzerland, recently updated the control system of its entire bulk storage system with over 220 bins by installing the Buhler WinCosS2 automation system. The control system of the grain terminal has now been restored to the state of the art in terms of traceability and safety. As an “exclusivity,” the new automation system also allows “self-service.” The “Grain-O-Mat,” which functions in much the same way as an automatic teller machine, enables grain to be withdrawn whenever needed. Truck drivers simply enter their registration and order number, and they automatically receive the grain quantity ordered for loading their vehicles. This allows grain to be loaded also outside regular terminal opening times.
**New standards set**

Allied Mills is one of Australia’s three large milling groups. Despite the fact that the 60:40 joint venture between GrainCorp and Cargill Australia was “only” founded back in 2002, it has some 200-plus years’ experience in handling grain, thanks to the history of a number of its own milling plants that belong to the group. The Allied Mills group combines the international milling industry experience of Cargill and the expertise of GrainCorp, both in growing as well as in storing and handling grain. The numerous companies within the Allied Mills group are engaged in the business of milling, grain handling and production and distribution of baking mixes. The customers of Allied Mills include all kinds of four processors – from small family bakeries through to large international food corporations. The Allied Mills group produces over one million metric tons of grain products each year. In this, they cooperate very closely with Australian farmers and are an integral part within the overall supply chain – from harvesting, handling and storage, grinding and blending to delivery to their customers.

**Heading out of the city**

One of the largest mills of Allied Mills group is located – or rather was located – in Summer Hill, a district of Sydney with a population of 3.7 million, Australia’s largest city. Founded in 1788, the capital city of the federal state of New South Wales hosted the Olympic Games in 2000. The location of Allied Mills in the district of Summer Hill would have made the planned extension and modernization at the old site unnecessarily difficult and also more expensive. What is more, being located in an urban area also imposed additional regulations that pushed up costs. “For this reason, we decided to relocate our mill away from the city to a greenfield site,” explains David Ambrose, the National Technical Manager of Allied Mills. “This gave us the opportunity to construct an entirely new three-in-one mill complex featuring state-of-the-art milling technology. Besides reducing our operating costs, the new mill also allows us to decommission two aging facilities.” The location chosen for building the new mill complex was a large site in Picton, an outer suburb situated to the southwest of Sydney, in the immediate vicinity of the Sydney-Canberra railroad line and next to the southwest freeway.

**Buhler as a partner**

Planning of the new three-in-one-mill complex with an investment volume of around 90 million Swiss francs got underway in 2004. As the supplier of the entire mechanical equipment for the three new mills, including wheat storage facilities, the flour silo, the blending plant and the bulk outloading station, Allied Mills also opted for technology co-operation with Buhler. “The partnership between Cargill and Buhler has been proven worldwide,” says David Ambrose, justifying the choice of Buhler as its technology partner. “What is more, we know Buhler as a supplier of milling equipment and entire milling plants in Australia. And finally, by working together with Buhler, we were also looking to receive particularly energy-efficient solutions.”

**Moment of shock**

The building constructors experienced a moment of shock in the planning phase. During the mandatory archaeological inspection of the building site, a number of Aboriginal artifacts of historical significance were found. This meant having to move the entire mill complex some 30 meters. However, this did not prevent the local planning and construction firms from completing the preliminary work on schedule.

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Greenfield project: The new state-of-the-art three-in-one mill of Allied Mills in Picton, a suburb of Sydney.
Various special features

Extra consideration was given in the design to the layout of the new three-in-one-mill complex with a number of special energy efficiency features. In addition to the efficient layout, the pneumatic conveyor fans of all three mills are equipped with frequency converters and self-optimizing controls, which help achieve additional significant energy savings.

Last, not least, inside the corn mill, the Buhler Sortex color sorter sorts the corn grits before the actual grinding process. The wheat is also cleaned with the aid of a Buhler Sortex unit prior to grinding in the mill. Downstream of the milling section, the various types of flour enter the 18 large flour silos. This stage is finally followed by the flour discharge station and continuous blending with various additives depending on the particular recipe. Immediately before the bulk outloading station, a final control sifting stage is also carried out.

Grand opening on March 31, 2009

Just ten months after the start of installation, Mill A was commissioned in mid-November 2008. Mills B and C followed shortly afterwards and were completed before Christmas. Since then, the three mills have all been running reliably and to the complete satisfaction of the customer. “Our expectations regarding energy savings have also been fully realized,” confirms David Ambrose.

On March 31, 2009, the grand opening of the new three-in-one mill complex took place in Picton, attended by Phil Costa, Minister for Regional Development in the federal state of New South Wales. As Joe Di Leo, Managing Director of Allied Mills, highlighted in his opening speech, the new mill in Picton enables Allied Mills “to realize significant improvements in the efficiency of its production and – thanks to the connection to the railroad and its links to interstate – supply our customers in the Greater Sydney area.” What’s more, he is proud of having set new standards for the milling industry in New South Wales and across the whole of Australia, not only by choosing the slip-form construction method, but also by using state-of-the-art milling technology.
Over the past two years, part of the die casting facilities of the Schmidt Light Metal Group’s foundry in Oliveira de Azeméis in Portugal were thoroughly overhauled by the retrofit specialists of Bühler AG and Brescia Presse S.r.l. The result: completely reconditioned die casting systems restored to the state of the art of production engineering.

The Schmitt Light Metal Group (SLM) specializes in the manufacture of die cast aluminum components for the automotive industry. The aluminum die casting foundry located in Oliveira de Azeméis, which was set up in 1989, originally produced blanks for the European car-making industry. Today, it is a competent partner in the product development and manufacture of complex die cast aluminum components and thus an important pillar of the SLM Group. Its customers include the world’s best-known car manufacturers. In Oliveira de Azeméis near Porto in the northwestern part of the country, the SLM Group employs over 245 persons. Fifteen die casting machines with locking forces up to 1400 tons produce top-quality castings. Every year, the foundry processes some 4500 metric tons of aluminum into more than five million parts. The development department of the SLM Group provides services ranging from product and process development to die design, consulting, and project management in the prototyping and pilot production phases. The SLM Group also operates a state-of-the-art facility for making die casting and trimming dies in addition to a department fully automated for machining and assembling light-alloy components.

Retrofit program for increasing uptime

Years of multi-shift production have left their marks on the die casting systems of SLM. “In addition, we increasingly suffered from the tight space conditions in our manufacturing halls,” explains Antonio Aguiar, who in his capacity as the technical director is in charge of the manufac-

turing systems and production processes at SLM. “We therefore decided to relocate part of our die casting installations to a new hall in order to gain more space for further automating our die casting cells. This was the suitable occasion for subjecting our die casting machines to an extensive reconditioning program. To us, an overhaul by experienced specialists appeared to be the best approach in the long term to maintain a high machine uptime and to extend the life expectancy of our equipment.”

The SLM Group entrusted Bühler Druckguss AG with the reconditioning of the machines. “We have been a Buhler customer since the beginning,” says Antonio Aguiar, explaining the Group’s choice. “It was clear to us that we would recondition our production systems with Buhler because we know about the expertise, reliability, and quality of Buhler.”

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Partnership with Brescia Presse

Bühler Druckguss AG and Brescia Presse S.r.l. have been collaborating closely in the field of die casting machine and system retrofits since December 2005. Brescia Presse, a company headquartered in Brescia (Italy), is known far beyond the country’s borders for the high quality of its die casting machine overhauls. Cooperation between the two companies unites vast experience in the reconditioning business with competencies and know-how in the design and construction of die casting systems. The interaction between practical experience in the reconditioning business and the availability of product expertise open up entirely new prospects in the overhauling of die casting installations.

Following the retrofit program: More space and entirely reconditioned die casting systems.

Restored to the state of the art
To carry out those jobs which place very stringent demands on manufacturing and assembly precision, for example the remachining of bores or the milling of sliding and clamping surfaces. Other simpler and less extensive work on the shot units and on the drive assemblies of the machines were performed by the local Buhler service people directly in the factory in Oliveira de Azeméis. Moreover, staggering of the various jobs ensured that SLM would at all times have the required production capacities available.

Transparency breeds trust
The reconditioning work carried out in the factory of Brescia Presse included the complete overhauling of all core components. The machine units were taken apart, and all the components were subjected to a detailed inspection to determine their condition and whether they could be reused. If necessary, appropriate repairs were made. Wear parts and components beyond repair were replaced. Special attention was paid to the compatibility of the components in order to ensure the long-term exchangeability of spare parts. Safety aspects were also taken into account during the overhauls.

“We were offered the opportunity to assess one completely dismantled machine in the factory of Brescia Presse. This strengthened our confidence in the procedure and the excellent workmanship of Buhler and Brescia Presse. We greatly appreciated this transparency and openness," says Antonio Aguiar.

As good as new
Of the total of 15 die casting machines of the SLM Group, five systems with locking forces ranging from 600 to 900 tons were reconditioned. The entire program lasted two years. The retrofit program was completed in the spring of 2009. Some of the reconditioned die casting machines were moved to a new production hall. This created the space needed for the further automation of production activities.

The retrofit jobs were completed as required. “The result of our joint efforts are die casting installations that reflect the state of the art of production engineering and that will continue to provide reliable service for many years to come. Our retrofit warranty guarantees this,” says Federico Prados, who as the representative of Buhler Madrid was in charge of the overhauls and of restarting production at the customer’s site. The customer’s satisfaction is the reward for the joint commitment of Brescia Presse and Bühler Druckguss AG. “The result of the reconditioning job done confirms the soundness of our decision. And other units will be retrofitted in the future,” says Antonio Aguiar.

JRMA tested SORTEX Z+
Buhler Sortex commissioned the independent Japan Rice Mills Association (JRMA) to thoroughly test its SORTEX Z+ color sorter. In a total of nine tests, the performance of this optical color sorter was tested for the removal of foreign matter (white and colored glass, pebbles, grass seeds, plastic fragments, and discolored grains) plus the sorting of feed rice and chalky rice grains. The result of the tests is overwhelming: The SORTEX Z+ accomplished the three tasks with a success rate of 99.97 percent.

Energy Symposium of Buhler Die Casting
In cooperation with the local sales force, the Buhler Die Casting business unit organized a special Energy Symposium in June, which was held in the EU Congress Center in Brdo in Slovenia. The continuing discussions about climate protection and rising energy costs gave the symposium a high significance. The papers and discussions revolved around existing possibilities to cut energy costs and how to achieve optimal casting with a reduced capacity utilization. The roughly 40 attendees (figure) were Buhler foundry customers plus foundry association members from Slovenia. Ueli Jordi, head of Consulting Services, drew the seminar participants’ attention to unnecessary cost generators and gave them a few tricks and tips for conserving energy. In group assignments, solutions were proposed for enhancing profitability. Identical seminars were later held in Harzgerode (Germany) and in Korea. The Die Casting business unit supports customers’ efforts to save energy and trim costs with its consulting and after-sales services.

Change in the Advanced Materials division
Effective September 1, 2009, a change took place in the top management of the Buhler Grinding & Dispersion business unit. Markus Hofer (left), who has been with Buhler since 1995 and has headed the business unit since 2006, will take charge as head of New Technologies in the new Advanced Materials division. In this capacity, he will be in charge of identifying and evaluating strategic growth options. His position as head of the Grinding & Dispersion business unit will be filled by Samuel Schär (right). Schär has been in charge of developing the Buhler Nanotechnology business field since 2002. In addition to heading the Grinding & Dispersion business unit, he will continue to also manage the Nanotechnology business field (Partec GmbH).

Roll exchange program
The Buhler Chocolate and Cocoa business unit has put together a new service product. Its new roll exchange program offers customers complete roll exchanges as a package for a flat fee. The package comprises the following services: set of rolls in the accustomed quality, organization of delivery at the agreed point of time, exchange of the rolls, provision of the spare and wear parts required for the roll exchange, putting the refiner back into service, and all-inclusive roll insurance. For information, please contact Harry Bilshlinger (T +41 71 955 14 50 / harry.bilshlinger@buhlergroup.com).
Breading is applied in numerous foods, and its consumption is on a steady rise. In the quest for efficient processes for producing it, the existing traditional method is now being challenged by an innovative process which offers promising benefits and opportunities for making a wide variety of products.

Products covered by a layer of breading or bread crumbs are extremely popular worldwide. The range of possible breaded products is all but unlimited. The art of breading is even applied to confectionery goods – the latest trend in the United States is “deep-fried bars” – deep-fried chocolate bars covered with breading. But thanks to its outstanding swelling properties, breading can serve not only as a crunchy coating, but is also excellently suited as a filler and binder, for example for making filled pasta such as tortellini.

**High quality requirements**

In order to offer consumers a visually appealing product, bread crumbs must satisfy stringent requirements in terms of their quality features. Besides their organoleptic characteristics such as shape, color, and texture, other parameters such as bulk density and product moisture also have a crucial influence on the usability of breading, depending on the specific requirements of the end product involved. In the preparation of a breaded-coated product in the pan or deep fryer, the browning rate and oil absorption rate are important criteria. For deep-frozen products, a low water absorption rate of the panada is equally important, since the bread crumbs are not supposed to become soaked and soft during preparation, but should remain crisp.

If breading is used in fillings, as a binder, or for increasing the viscosity of a food, its swelling and water absorption capacities are especially important.

**Alternative process technology**

The production of bread crumbs by the traditional method is a well-known process: A specific type of bread is baked, dried, and then ground and screened.

The increase in demand for breadings is also steadily boosting demand for new, more flexible, time-saving, and continuous processes. Extrusion technology is a suitable alternative to the conventional production method. As a leading provider of extrusion technology, Buhler offers an ideal solution. What especially distinguishes this continuous process from the traditional production method are the energy savings of 30 to 50 percent and the reduction of the process times by 80 to 90 percent. In addition, the extruder takes up 30 to 50 percent less space than a conventional breading production system. Following mixing, the ingredients are kneaded into a dough by the extruder’s two co-rotating screws. The input of mechanical and thermal energy and the temperature and pressure conditions inside the extruder modify the starch particles in the dough. Finally, the product undergoes expansion when it is discharged from the die. Unlike the traditional production process, this means that extrusion combines kneading and baking in a single process operation, with the dough fermentation phase (floor time) being completely eliminated. The extruded product is dried in the same way as in conventional bread crumb production to the required final moisture content and then ground and screened.

**Made of a wide variety of raw materials**

Extrusion technology enables breadings to be made on the basis of a wide variety of raw materials. Whereas the traditional production method requires high-protein flours for creating the gluten framework, any starch-containing products can basically be used in the extrusion process. Dough rise is achieved on the one hand through expansion at the die, and on the other hand by adding chemical or physical dough raising agents. Fluctuations in the raw materials quality are easier to smoothen out in the extrusion process. In the quest for an energy-efficient process, extrusion will also be found to be an ideal solution, for the low water content of the product formulation reduces the time and energy requirements during drying.
In order to meet the brisk global demand for energy while at the same time reducing the carbon emissions produced by burning fossil fuels, more renewable energy sources must be utilized in the future, for example solar power. Photovoltaic technology is expected to play a central role in this connection.

Suspensions as components
The production of virtually all types of solar cells requires some form of suspensions or pastes. They consist of solid particles in the micrometer to nanometer range which are finely dispersed in a liquid. The particles give the components a large specific surface area and improved optical properties in order to enhance the efficiency of the solar cells. Another significant benefit of using suspensions as components for manufacturing solar cells lies in the processing of the substances. Unlike vacuum coating processes, suspensions can be cost-effectively applied at ambient pressure and temperature to a wide variety of substrates. For this purpose, it is possible for example to use conventional printing processes, which additionally allow continuous processing (roller-to-roller process).

Broad range of dispersed substance systems
A broad range of different materials can be used as suspensions in manufacturing solar cells. For example, electrically conductive silver and aluminum pastes are applied for producing the contact points for discharging the photo-generated free charge carriers on the front and rear of the cells to the load. The dye required in dye-sensitized solar cells (“dye cells”) is adsorbed on a nanoporous semiconductor material. For producing this layer, titanium dioxide pastes are typically applied. But other semiconductors such as zinc and tin oxides are also available as alternatives. The photoactive layers in QGS (copper-indium-gallium-diselenide/disulfide) thin-film cells can also be applied by printing. For this purpose, nanoparticles of the required elements are homogeneously dispersed in a liquid in the desired proportions.

Buhler solutions
The industrial manufacture of particulate solar cell components with specific properties poses a number of challenges. For example, in order to generate a high specific surface area in a particulate layer, the particle size should be in the nanometer to micrometer range and have a narrow particle size distribution. This demands high-energy-input grinding processes in order to satisfy the stringent product requirements. Another important criterion in the processing of photovoltaic components, in particular semiconductor materials, is the prevention of product contamination by abraded particles. The grinding equipment must therefore be made of wear-resistant and corrosion-resistant materials such as ceramic. In addition, temperature-sensitive materials require efficient cooling and temperature control during grinding.

For meeting these specific requirements, Buhler provides a wide range of wet-grinding solutions for processing fluid and pasty materials. The machine designs range from laboratory and pilot mills to high-capacity production systems. These comprise mills based on both horizontal and vertical configurations. They also include machines designed for continuous large-scale operation as well as smaller user-friendly solutions for customers with frequent product changes. What is more, special cooling concepts allow the processing of temperature-sensitive products.

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Photovoltaic installation.
Electric power from sunlight

Photovoltaic technology, which utilizes the photoelectric effect, allows the direct conversion of light into electric energy. In a classic solar cell based on semiconductor materials (see Figure 1), free charge carriers are produced in the photoactive layer by the energy of the incident sunlight. They generate an electrical current, which can be used for powering an external load.

Conventional solar cells and modules, which are manufactured from crystalline silicon, achieve efficiencies of over 20 percent and currently account for about 90 percent of the total photovoltaic market. But the significance of so-called thin-film technologies, which account for the balance of 10 percent, is rising steadily.

The engineering materials and manufacturing processes applied in making them allow these cells to be produced in a particularly cost-effective way, and they are therefore attractive despite their lower efficiency.

Dye-sensitized solar cells are an exception among the solar cells with regard to their operating principle (see Figure 2). The processes taking place in these “Grätzel cells” – named after their inventor – have amazing analogies with the photosynthesis of green plants. In this design, a photosensitive dye emits electrons when exposed to the action of the sunlight, which generate the electric current of the cell. The dye cell can be made transparent and be applied on top of flexible surfaces. This makes it a particularly suitable option for use in photovoltaic systems that can be integrated in building structures.

From MicroMedia® to Trias®

If particles in the nanometer range are demanded, the MicroMedia® Perl Mill® will be found to be the ideal solution for achieving gentle dispersion of shear-sensitive or hard photovoltaic materials. High-resistance metallic engineering materials and extremely small grinding media with sizes ranging from 300 microns down to 20 microns ensure contamination-free material grinding down to the nanometer range. This fineness is especially made possible by the efficient shearing processes taking place between the grinding beads. The rotor and stator of the MicroMedia® Perl Mill® are also available as ceramic versions, which are ideal for metal-free grinding processes.

The grinding of different photovoltaic material systems requires the use of wear-resistant and corrosion-resistant equipment. The grinding chamber of the Centex® Perl Mill® for example can be made of DraisResist® (hardened steel), DraisElast® (polyurethane), and different types of ceramic. The special design of this mill increases the number of grinding-effective collisions between the material particles and the grinding beads. This reduces the specific energy requirements for achieving the desired particle size distribution. For processing pasty materials such as metal pastes, the Bühler three-roller mills are the preferred technology. The new Trias® three-roller mill allows optimal control over the product quality. The design version equipped with ceramic rolls and allowing oil-free operation is excellently suited for clean-room applications and thus satisfies the most stringent sanitation and quality standards. Moreover, the VIVA® technology allows a variable roll pressure and a uniform product quality across the entire roll length.

Depending on the product formulation, it is possible to vary the viscosity of suspensions across a very wide range in the manufacture of solar cell components. The conical bead mills (K Series) allow the grinding of materials across a wide range of viscosities and offer a high level of flexibility in terms of grinding formulation quality.

(psp/ok)
New training center in Johannesburg

Bühler recently opened its state-of-the-art Training Centre in Johannesburg. This investment was triggered by the scarcity of trained workers in South Africa and in general on the African continent. The concept of the Training Centre rests on two pillars. On the one hand, Bühler trains apprentices for the metalworking industry. For this purpose, the Training Centre is equipped with eight workplaces. On the other hand, the center offers short practical courses for the operating personnel of Buhler customers. This develops skills on a broad basis which are in high demand in the South African wheat, maize (corn), and feed manufacturing industries. Numerous guest speakers praised the project as being exemplary for South Africa. From left to right: Dewet Boshoff from the AFMA company; Jannie de Villiers from the South African Chamber of Milling; Kokodi Morobe as member of the board of Bühler (Pty) Ltd; Calvin Grieder as CEO of Bühler AG; Marcel Brühwiler as head of Buhler Johannesburg; and Ken Duncan from the Swiss South African Cooperation Initiative.

New head of Buhler Bindler

Christian Walter took charge of Buhler Bindler in Bergneustadt effective June 1, 2009. Christian Walter is a graduate engineer and has accumulated broad international industry and leadership experience. He has successfully filled a number of expert and management functions in the past, last heading a German company with 2,000 employees.

Chocolate & Cocoa: Plant Doctor on tour

The Plant Doctors of the Buhler Chocolate & Cocoa business unit have been on assignment for a number of months now. These seasoned technical field staff members support customers in technical, process engineering, and technological issues. When they visit a customer’s site, the Plant Doctors inspect the complete Buhler plant. In agreement with the customer, they fine-tune the production parameters. In addition, the Plant Doctor offers recommendations on maintenance and servicing as well as on possible or necessary updating measures in order to ensure a high plant uptime also in the future. Regular visits can also be agreed on the basis of a service contract. Harry Blöchlinger will be pleased to give you more information (T +41 71 955 14 50 / harry.bloechlinger@buhlergroup.com).

New OLFB flaker rolled out

At the Oils & Fats 2009 trade show, Bühler presented its innovative OLFB flaking roller mill. This high-capacity flaker has been developed for flaking cracked soybeans and soft seeds such as sunflower seeds, rape seeds, and corn (maize). Needless to say that it is also possible to process other seeds and a wide selection of different materials. The cutting-edge technology and innovative design of this flaking roller mill form the basis for space and energy savings, low vibration, and perfectly low-noise operation. The top-class rolls with their patented seals reduce abrasion and oil residues in the extraction meal by 15 percent.

Diagram No. 19

The 19th issue of the Buhler customer magazine was published in October 1957. Six of the total of 16 pages are dedicated to the subject of “ship unloading systems.” Embellished with numerous sketches and photos, the article describes the wide variety of possible ship unloader design versions. The advantages of mechanical ship unloading by Buhler SKT marine leg (a special type of chain conveyor) are reported to reside especially in their low energy consumption. On the other hand, the pneumatic unloading systems are said to offer particular benefits in terms of high versatility of the suction pipes and the possibility of applying standardized designs.

With obvious pride, Bühler presents the new MPAD drawer-type sifter in Diagram No. 19. It is said that “new findings from the field and other research results from our laboratories” had shown the engineers the direction in this further development. The machine design is reported to have been adapted to existing “needs” and to differ fundamentally from that of conventional sifters. The term “drawer-sifter” refers to the basic difference from the existing plussiften with sieve stacks and sieve frame inserts. After the sifter door has been opened, this machine allows all the sieves and sieve trays to be individually withdrawn, like the drawers of a cabinet. The drawer-type sifter is therefore the predecessor of today’s SIRIUS.

Finally, Diagram No. 19 includes a letter in which the Nicolini brothers express their thanks to Bühler for constructing their new 300-ton flour mill in Lima, Peru: “To date, it has been working smoothly and to our entire satisfaction!”

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