



Our business

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Our targets

What we strive for and why we exist.

Every day, billions of people come into contact with Bühler technologies to cover their basic needs for food and mobility. With our industrial process technologies and solutions, we contribute significantly to feeding the world's population, setting the focus on food security and safety. Global producers and processors of wheat, corn, rice, pasta, chocolate, and breakfast cereals rely heavily on us. We are also a leader in the area of animal feed. Furthermore, Bühler is a leading solution provider of die-casting and surface-coating technologies in high-volume application areas, such as automotive, optics, and inks. As a globally active Swiss family-owned business, we are particularly committed to sustainability.

Why we are here

- We want our customers to be successful.
- We want every human being to have access to healthy food.
- We want to protect the climate with energy-efficient cars, buildings, and machinery.
- We want to build safe and attractive workplaces.
- We want to remain independent as a company by achieving sustainable success.

What we do: our core

- We develop the best food and feed processing solutions – focusing on security, safety, and nutrition.
- We develop the best material processing solutions, focusing on energy efficiency and best quality products.
- We provide knowledge and services to enable our employees and customers to be successful.
- We engineer customer success.

How we do business: our priorities

- We develop sustainable solutions offering maximum performance and best return on investment.
- We as a global Swiss family enterprise are dedicated to top quality.
- We are always close to our customers, operating “in the region for the region”. We are a lifetime partner.
- We collaborate closely with our partners from the worlds of science, industry, and the public sector to create the solutions of tomorrow.

Our values

Our core values define
how we behave.

Our values act as an inner compass for our activities. They define who we are and how we behave. The five Bühler values help all employees take the right decisions and act in line with the Bühler Way:

- Trust
- Respect
- Recognition
- Involvement
- Passion

We strive to be trustworthy and trust in the contribution of others. We are proud of our own contribution and recognize the contribution of others. We show high involvement and commitment to what we are doing and are always ready to go the extra mile. We are passionate about our work and about our company and its purpose.



Working for a cause: Partners in Food Solutions

Bühler supports the nonprofit organization Partners in Food Solutions with its vision to improve food security and nutrition to enrich lives around the world, together with some of the world's largest food and agricultural companies. As of today, Partners in Food Solutions have helped strengthen the capacity of more than 600 food companies in Kenya, Zambia, Tanzania, Malawi, and Ethiopia, impacting nearly 829,000 local smallholder farmers who support an estimated 4.9 million family members. Bühler is proud to contribute to this great cause with financial support and skilled volunteers.

Our future

Core topics for our markets, customers, and the way we do business.

50% more proteins

By 2050, we will need 265 million tonnes of protein to feed the world's population. Bühler solutions make an important contribution.

By 2050, there will be nine billion people on this planet. How can we provide them with healthy and safe food? Fewer carbon emissions, stiffer competition, new technologies: The global automotive industry faces numerous challenges. For Bühler, these trends mean new business opportunities. The company has identified five core topics that are decisive for this transformation: nutrition, food and feed safety, sustainability, the Internet of Things, and mobility.

Nutrition

Hunger, micronutrient deficiencies, and overweight are the major issues we face when discussing the question of food. An estimated 840 million people suffer from hunger, and one third of the developing world's population suffers from micronutrient deficiencies. At the same time, overweight remains a key issue for industrialized nations and is also becoming a serious problem for the developing world. On top of that, there are indications of a huge protein shortage. In fact, calculations have shown that to feed the world's growing population, an additional 265 million tonnes of protein are required by 2050: an increase of around 50%.

There are already solutions for the protein gap: Pulses are gluten-free, satiate, and are high in proteins, dietary fibers, and micronutrients. In the medium to long term, however, the use of new raw materials that are not in competition for arable land is inevitable. Insects and algae especially stand out as high-grade and sustainable sources of protein. For this reason, Bühler is working on using the potential of these alternative protein sources on an industrial scale to make food and feed.





Food and feed safety

Food safety is the game changer for food manufacturers. Hardly a day passes without news on food that is contaminated, adulterated or has made people ill. We at Bühler have taken up the food safety challenge and are committed to innovations for safe feed and food processing across the value chain. The strong focus on food safety is driven by growing global trade and increasing industrial food production. Also, progress in the detection of all sorts of contaminants leads to reassessment of food safety risks. Meanwhile, consumers' trust in the agro-food industry is shaken by food safety alerts that sometimes go viral on social media.

Bühler's approach to addressing food and feed safety issues starts with the safe handling of raw materials and includes innovative solutions for hygienic design and the elimination of harmful bacteria.

25% of  **the grain crop contaminated**

A quarter of the grain crop is contaminated with dangerous mycotoxins. Sorting solutions from Bühler are a remedy for this problem.



Sustainability

Bühler is setting ambitious targets to reduce energy, water, and resource consumption. By 2020, Bühler wants to reduce energy consumption and waste at customer sites by 30%.

Higher energy efficiency isn't just sustainable; it also makes economic sense. In the processing industries, energy accounts for up to 10% of total cost. So, any saving translates directly into higher margins. For example, the latest generation of the pasta-drying solution Ecothermatik reduces energy costs by up to 40%. And the potential is by no means exhausted, as the majority of the energy consumption in the processing industry is caused by process heat.

Increased sustainability is also a top priority for animal feed: in aquaculture, for instance, currently the fastest growing section of the feed industry. Fish farms are often criticized because they use fish meal produced from fish caught in the wild as the basis for their feed. But with the use of Bühler's extrusion technology, it is easy and efficient to give vegetable raw materials the necessary properties to simulate the consistency of fish. In the not too distant future, alternative protein sources such as algae or insects will become more important as feedstuffs for fish and poultry.

30% less energy

 Bühler aims to reduce energy consumption by 30% by 2020. With this target, one smaller thermal power plant is saved every six to eight years.

Efficiency (the Internet of Things)

The Internet of Things heralds a major innovative thrust and is clearly a focus area that is transforming the food industry. Networked sensors create enormous amounts of data and lead to new levels of process control and transparency. The unique combination of connectivity, cheap storage capacity, and high-performance computing power opens up new horizons.

Bühler's vision is to enable the food industry to derive maximum benefit from all these technological developments for the customers. One possible use is predictive maintenance for machines. Thanks to continuous monitoring of vital operating parameters, it will be possible to predict the failure of a component or wearing part in advance and trigger the delivery of a spare part in a timely manner.

Bühler is laying the foundations for this today. We are creating added value for our customers with innovative, data-driven services. For example, we already offer sensors that continuously check for color, granulation, and specks during flour production. Other sensors measure moisture content together with ash or protein content and enable optimization of production in real time. Another example is Anyware-Pro from Bühler Sortex: This remote monitoring application enables Bühler experts to support customers from anywhere in the world. Thanks to the integrated analysis of operating data, wheat processors can also increase their productivity.





Mobility

Mobility is a basic need of today's society. The increase in population and prosperity in emerging countries is boosting demand for cars. But the sharp growth of the automobile industry is also associated with challenges. Transport accounts for 13% of all greenhouse gas emissions and 75% of this can be attributed to road traffic. As car production increases, so does the need for efficient and clean mobility. The key to cutting fuel consumption – and thereby also carbon emissions – is lightweight car design.

Bühler is a leading global provider of die-casting technology for the automotive industry. Lightweight design of engine blocks and structural components such as shock towers or cross-members is key to cutting fuel consumption and carbon emissions. Oil pans or transmission housing components are also being made of light alloys such as aluminum.

Another long-term mobility trend is electric vehicles: The International Energy Agency (IEA) estimates that of the 120 million new cars sold in 2030, every other one will be powered partly or fully by an electric motor. Hybrid or electric vehicles require a battery as an internal energy storage device. Bühler has developed an innovative solution for producing electrode slurries. Their quality has a direct impact on the performance of batteries. In 2016, Bühler received multiple orders for electrode slurry production lines on an industrial scale.

13% GHG emissions from cars

The transport sector is responsible for 13% of all greenhouse gas (GHG) emissions. Road traffic is responsible for 75% of that. Bühler's lightweight construction contributes towards clean mobility.

60 million electric vehicles



By 2030, one in every two new vehicles will be powered partly or fully by an electric motor, that means 60 millions. The electrode slurries from Bühler are contributing significantly to this.

Our businesses

Grains & Food

By 2050, the world population is projected to rise to nine billion. How can they all be provided with safe, healthy, and sustainable food? Technologies from Bühler business Grains & Food substantially contribute to supplying a growing global population with food staples based on corn, rice, or wheat and it is also a leader in pasta and chocolate production. In addition, Bühler is investing into new solutions for feed.

Grains & Food is outstandingly positioned in the food industry. For example, 65% of all wheat is milled using technology that is supplied by Bühler. Bühler also makes an essential contribution to corn and rice processing. With its rice processing solutions, the company covers over 30% of all global rice production. And in the grain processing industry, volumes are stupendous: About 2,500 million tonnes of corn, rice, and wheat are harvested and processed every year. For four billion people, wheat is the most important staple food. Another three billion live primarily on rice. Sorting wheat and corn is also becoming more and more important in order to ensure highest quality and avoid contamination. Also here, Bühler provides the latest technology.

Bühler is a global player not only in the field of such basic foods. Its market share in other applications is also impressive: More than 70% of the world's beer is brewed with malt that is manufactured on Bühler equipment. Over one third of all breakfast cereals and industrially produced pasta are made on Bühler plants and equipment. Last but not least, Bühler processing lines produce 60% of all chocolate goods.

Thanks to its worldwide service capacities and application centers, in which local solutions are produced, Bühler is highly appreciated as a partner of the food industry. The company is also strongly positioned in important growth markets such as aquafeed or processing of pulses. Insects are also becoming increasingly important for the feed industry. Bühler is excellently positioned to grasp these opportunities, based on technology, skills, and its global network.

Grains & Food
at a glance

#1

in rice processing
in wheat processing
in cereal processing
in chocolate processing
in malt processing

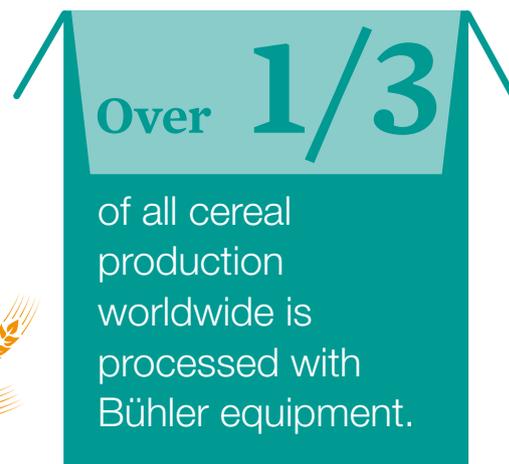


> **1/3** 

less energy used with the latest pasta
drying solution Ecothermatik.

The majority

of all wheat worldwide is
processed with Bühler equipment.



**265m tonnes
of protein**

To feed nine billion
people by 2050, we
need 50% more protein.

**30% of food
is wasted**

From the field to the fork,
a whopping 30% of food
is wasted.

140,000 grains per second

A standard wheat mill processes more than 20 tonnes of
wheat per hour and sorts around 140,000 grains per
second for highest quality with Bühler optical sorters.

Our businesses

Advanced Materials

Lower carbon emissions, fiercer competition, new technologies: The global automotive industry faces numerous challenges. For Bühler, these trends mean new business opportunities.

The increase in population and prosperity in emerging countries is boosting demand for cars. Aluminum engine blocks, gearboxes, oil pans, and structural components, head and tail light reflectors, electrode slurries for lithium-ion batteries, paints and protective lacquers, shaded windows, chrome-plated interior parts, and cameras for driver-assistance systems: Advanced Materials is a relevant equipment provider to the world's automotive industry, offering innovative technologies with an optimized carbon footprint for ensuring safe and comfortable mobility.

The key to cutting fuel consumption – and thereby also carbon emissions – is lightweight car design. Engine blocks, structural components such as shock towers or cross-members, as well as oil pans or transmission housing components are increasingly being made of light alloys such as aluminum instead of steel or cast iron. Bühler is a leading global provider of die-casting technology for the automotive industry. 25% of all engine blocks are manufactured on Bühler die-casting machines. Bühler is the sole provider with production capacities in all three major markets of the global car-making industry.

Another long-term mobility trend is electric vehicles. Hybrid or electric vehicles require a battery as an internal energy storage device. Over the next few years, we expect to see a massive expansion of global production capacities for lithium-ion batteries. This is a growth market for Bühler: On the basis of the proven extrusion process technology, the Group has developed a solution for producing electrode slurries. Slurry quality has a direct impact on the performance of the storage cells. In 2016, Bühler received multiple orders for electrode paste production lines on an industrial scale. Market studies confirm the high market growth in battery production, creating promising business opportunities.

Bühler has also achieved a leading position in inks for packaging, and has advanced into various high-tech applications such as color filters for LCD flat screens and metallic or ceramic pastes for electronic applications. The company is a world leader in coating systems for optical precision components such as high-precision filters, lenses, and beam splitters. Bühler also uses these abilities in coating systems for architectural glass and in barrier coating systems for packaging films.

Advanced Materials at a glance

#1

in die casting
for offset inks
for reflector coatings
in process innovation
for electrode pastes



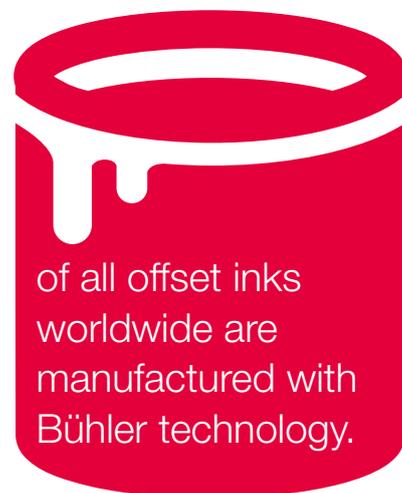
Half

of new cars worldwide have die-cast components produced with Bühler technology.

Unique

Bühler's continuous process to produce electrode slurries for lithium-ion batteries.

About
60%



of all offset inks worldwide are manufactured with Bühler technology.

GHG challenge

The transport sector is responsible for 13% of all greenhouse gases (GHG). 75% of that is due to traffic.

50% new electric cars

By 2030, 50% of new vehicles will be partly or completely driven by an electric motor.

88 million cars

In 2015, 88 million vehicles were produced worldwide. In 2021, that number is likely to increase to around 113 million cars.

20% growth

The market of advanced driver assistance systems is expected to grow 20% per year in this decade.

Innovation

Innovative solutions are at the core of our success.



30 innovations

Presented at the Bühler Networking Days 2016.

Bühler relies on innovation and research and development like no other solutions provider in the food industry. The company continuously works with clients, scientists, industry partners, start-ups, and trainees on new innovations, and it nurtures a culture of innovation and entrepreneurship with its employees. The company invested CHF 109 million in 2016, again a substantial sum in research and development (previous year: CHF 102 million), which is equivalent to 4.4% of turnover.

Open innovation

Bühler brought together 750 participants at the Bühler Networking Days 2016, underlining its role as an important enabler of industry collaboration. Customers, scientists, industry partners, start-ups, and trainees came together to discuss how pressing challenges can be transformed into new business opportunities. The Networking Days are part of Bühler's open innovation model that is focused on cooperation. The company cooperates with many institutions around the world, including the ETH Zurich, the Ecole Polytechnic Federal de Lausanne, the University of St. Gallen, the UC London, Imperial College London, the Jiangnan University (Wuxi, China), the UNITECH university network, the Kansas State University, the University of Toronto, the University of Minnesota, the Canadian International Grain Institute, the University of Applied Sciences HTWG Konstanz, and the INM – Leibniz Institute for New Materials. Bühler operates an innovation satellite at the EPFL, and is a founding partner of the Swiss operations of one of the most important innovation and start-up accelerators in the world, MassChallenge. Through externally organized, internally carried out "Innovation Challenges," Bühler involves its own employees as well as students at leading universities in its innovation process.



Customer proximity is essential for innovations for a better world.



Tubo is the first and only tubular conveying system that uses individual pusher elements.

Innovations for – and with – customers

Bühler opens its application centers for customers in order to develop and test new process concepts, recipes, and end products together. In China, for instance, Bühler is supporting local chocolate producers with a special laboratory. Here more than 30 local experts help with developing country-specific confectionery and the production plants necessary for this. In the new food laboratory in Minnesota, US, clients are able to try out new food production methods and carry out tests on a complete processing line.

Only qualified staff can get the most out of the high-tech plants. That is why the Bühler training and education portfolio is crucial. Bühler is the main driving force behind the Swiss Milling School, which has already trained thousands of millers. In addition, the Group founded the African Milling School in 2015: In this technical milling school in Kenya, African millers are thoroughly trained based on the highest quality standards. The first-year group graduated from the technical school in 2016.



CHF 109 million for R&D

Bühler invested CHF 109 million in research and development. This is equivalent to 4.4% of the company's turnover.



Bühler's Bakery Innovation Center.

New products and solutions launched in 2016

Bühler proved its innovative capacity in 2016 with many new features and innovations. These include the following highlights:

Innovative conveying system Tubo: The new conveying system won the customer prize at the Bühler Networking Days. It is the first tubular conveying system in the world, the only one that continually feeds using individual push elements. It uses considerably less space than other mechanical feeding techniques and offers a high degree of flexibility for the plant layout.

High-precision scale Tubex: The innovative high-precision scale reduces energy costs by more than 90%. It maximizes food safety and its operation is user-friendly.

CombiMill process with more flexibility: The new Combi-Mill process allows the production of whole-wheat flour for flatbreads as well as dark and white flours with the same milling system. Clients benefit from the increase in production flexibility.

Energy-efficient pasta dryer Ecothermatik: The newest model of the pasta drying solution reduces energy consumption by up to 40%.

Innovative operating system Wincos: The innovative Wincos plant control system enables significant gains in efficiency and quality, with a new design, intuitive user guidance, and display on mobile devices.

More productivity with Ecoline S: Bühler completed its portfolio of die-casting cells with a solution for small foundries, which offers high productivity and reliability and is very easy to use. Its operation is intuitive thanks to a touch screen.

Energy-efficient MacroMedia: Applying Bühler's latest MacroMedia technology in the predispersing process allows the direct usage of microbeads in the fine-grinding process. As a result, the overall process is around 30% more productive and energy savings of about 50% can be achieved.

Barrier coatings for food packaging film: With the latest Leybold Optics Pak T+, up to 1,500 kg film per hour can be coated with aluminum, with a width of 3.7 meters. The solution can also process transparent barrier coatings (aluminum-oxide).

The opportunities of digitalization

Great innovations in our core markets are on the horizon, particularly thanks to the Internet of Things. The availability of low-cost sensors and the possibility of storing large amounts of data in the Cloud and evaluating it in real time opens up opportunities for significant gains in efficiency in the food industry. For example, the important production parameters such as product moisture, temperature, or composition can be continually monitored and the production processes can be optimized in real time. In the future this will not only improve the productivity – the seamless transparency throughout the whole value chain also increases the food safety and contributes significantly towards reducing losses. That is all the more important, as when worldwide food losses are considered together, they are the third largest CO₂ emission in the world.

In order to make Bühler's components and plants even better equipped with sensor technology, the company signed an agreement in September to expand the existing research and development partnership with Bosch. After a successful two-year research project, the companies want to commercialize MEMS sensors (micro-electro-mechanical systems) in food technologies from Bühler.

In 2016, Bühler launched its customer portal MyBühler, which features 24/7 access, current information, and a simple online ordering process for customers.

Process expertise is essential

Bühler has more than 150 years of experience in processing valuable resources into high-quality end products. Along the way the company continually refined the process, and was thus instrumental in helping to shape the technological developments. The key technologies are in the field of mechanic and thermal process technology and include things such as feeding, cleaning, sorting, mixing, roasting, drying, and shaping for processing grain and other resources. Process technology from Bühler is also used in the production and processing of technical materials and for die casting.



4,000 employees

More than a third of the workforce took part in the Bühler Innovation Challenge.



The Bühler Ecothermatik pasta dryer uses 40% less thermal energy.

