Bühler in Rice.
In partnership with processors and an integral part of the rice processing industry.

Welcome to the latest edition of Bühler’s Rice Publication – Oryza Sativa. In this issue we focus on sustainable rice processing; ensuring rice is available, affordable and safe to eat. We share details of our latest innovations in products, processes, plant engineering and design. These innovations have been achieved by close collaboration with, and the understanding of, our customers’ requirements.

The world’s rice market continues to grow. Approximately 50% of the global population is dependent on rice as a staple food. It is predicted that the global population will increase from seven to nine billion by 2050 and as a result the demand for rice is expected to increase by approximately 100 million tonnes per year, by 2030.

Available land for growing rice is decreasing, energy costs are rising and currently post-harvest losses stand at approximately 40%. It is therefore essential that every kilogram of paddy is converted in the most efficient and cost effective manner, delivering high quality products and by-products. Therefore, this is a high priority for Bühler’s technology experts and development teams.

Bühler has a presence in over 140 countries worldwide and has centres of competence in every major rice producing region. With local offices we provide an unparalleled level of service and expertise specific to each country’s needs. At our competence centres, applications mills provide customers with the ability to trial their products and undertake appropriate training. Rice research and development work is also conducted here, focusing on product development and process improvements thus facilitating sustainability.
Bühler is the global technology partner of choice for rice processing, with a presence in all major rice geographies and in over 140 countries worldwide. As an integral part of the rice industry, Bühler has the process knowledge and expertise to maximise value from every grain. Here, four senior executives from Bühler’s rice processing division share their thoughts on the current trends and issues in the industry and Bühler’s role in rice.

As the global leader in rice processing, our outlook for 2015 and beyond is promising. We have continued to strengthen our leading position through significant investment in new technologies and customer partnerships. We have signed notable contracts with the world’s largest processors in Thailand, China, India and Bangladesh, which have helped to increase demand for our processing equipment and grow our installed mill footprint and brand reputation. Our technology road map also remains strong and we have launched new processing machines including medium capacity polishers and whiteners and on-line measurement systems. We will continue to serve strong customer demand where significant growth opportunities and large mill projects across Asia and Africa are expected.

The region Middle East and Africa regions are areas of great promise and opportunity for Bühler in rice processing. We are developing low capacity milling equipment, including the introduction of a container rice mill solution to help the processing needs and requirement of new businesses, particularly in western Africa. We are also strengthening our customer service network, through our sales and service offices, to ensure our customers receive the best local service, tailored to their needs, with the assurance that they have the backing of a global supply chain. As this region grows from strength to strength, Bühler is well positioned to take advantage of the growth opportunities and respond quickly to customer demand for our latest high and low capacity rice processing equipment.
Food safety and sustainability is important to securing success in the future of rice processing. With Asia’s economy and living standards growing at a rapid pace, consumers are fast becoming more conscious of quality and are demanding safer food products. With a history of unfortunate food scams, rice millers now appoint external inspection agencies to meet strict food export requirements on quality and safety. However, a well designed rice mill plant and efficient rice processing machine can help rice millers achieve a HACCP and meet food safety standards.

Bühler is committed to rice processors. Following our global engineering principles, our rice machines are designed to operate sustainably, efficiently and hygienically. With a strong presence in South East Asia, through local Bühler offices, we work together with rice millers offering tailor made solutions, adapting to local requirements and ensuring success!

Innovation is the key to future success. Although we have reached great heights in the development of rice mill plant designs and machines, breakthrough improvements are always, still possible. In Bühler, we achieve this by investing 4-5 % of our turnover, back into research and development. Pushing the boundaries, our goal is to develop an ‘ideal rice mill’. Delivering technological, cutting-edge advanced solutions to maximise yield and support our customers’ success.

Bühler is now working to enhance processes for the plant operator. Developing a ground breaking intelligent system that self-regulates, the system measures the yield performance and in case of deviations, sends the operator an alert so that necessary steps to correct it can be taken. We believe, that along with the recent launch of UltraLine rice processing solutions, Bühler’s leading role in the development of future innovations will be a giant leap forward in intelligent rice processing solutions.
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Bühler Competence Centre - Bangalore, India
Bühler rice research and application centre.

Strengthening our commitment to rice processors
Regional Operation Centres provide local support, training, spare parts and applications centres locally.

Microscopic look at rice through a lens
In-depth images of rice as paddy, then hulled, whitened and polished.

Maximising product value through deep processing
A Bühler breakthrough in innovative solutions to maximise yields through by-product processing.
The Rice Association (RA) is the representative voice for the rice sector in the UK. Member companies include rice millers, importers and those associated with the rice trade. The main work of the Association is centred around legislative affairs and rice market trends.

In more detail, our activities include helping to ensure that rice sold on the UK market is genuine and safe. The RA undertakes regular market surveys to check the authenticity of rice on sale, and engages with Her Majesty’s Revenue and Customs, government agencies at a national level, such as with the Food Standards Agency and Department for Environment Food & Rural Affairs (DEFRA) and with local trading standards officers.

Over the last ten years there has been a steady improvement in the situation; it is now very rare to find rice packed in the UK that is anything other than genuine.

Also, in recent years there have been changes to European (and hence UK) legislation in a number of technical areas. Reformulation of the regulations on pesticides and their residues has been an important issue for the rice sector as it has meant that European legislation is increasingly different from that in the countries where rice is grown.

This is especially the case because rice is a relatively minor crop in the European Union (EU), meaning that pesticide manufacturers often do not want the expense of submitting data packages for approval by EU regulators. If no data package is submitted, the regulatory limit defaults to the level of detection. This can mean that a pesticide used perfectly legally and complying with the rules in the country of origin may leave a residue that technically breaches EU regulations when rice is imported.

The Rice Association works very closely with the Federation of European Rice Millers (FERM) – which takes the lead on rice matters in the EU to try to resolve problems by engaging with regulators in Europe and through discussions with suppliers to try to minimise the impact of such legislative issues.

There are similar issues resulting from legislation to establish or adjust limits for the presence of heavy metals (such as Arsenic, Lead or Cadmium), and mycotoxins.

The Rice Association plays its part in representing the views of members and collecting test results to inform authorities in the UK and Europe on levels being found. The aim of this work is both to ensure that limits are set at achievable levels which will protect consumer health, and to reassure customers and consumers that the sector is complying with the rules.

In conclusion, there are long term issues for the sector to address; these include trying to minimise the environmental impact of rice production, especially in relation to water management and greenhouse gas emissions; improving the storage and delivery chains so that there is less wastage; developing new products which appeal to traditional and non-traditional rice consumers alike; making better use of the varying nutritional profiles of different rice types and most importantly, ensuring food safety.

KEYNOTE SPEAKER - ALEX WAUGH.
Director UK Rice Association.

On legislative and rice market trends in the UK and Europe.
Alex Waugh, Director UK Rice Association
CENTRE OF COMPETENCE, INDIA.
A state-of-the-art facility for rice research, product and application trials.

32,000 SQUARE METRES ACROSS 7 FLOORS.
Bühler facility for rice research, product and application trials.

Bühler Competence Centre - a state-of-the-art facility for rice research, product and application trials leading to newer applications and innovations.

Opened in 2013, the Bühler Competence Centre in Bangalore, India covers an impressive space of 32,000 square metres across 7 floors. The location was aptly chosen as the Centre of Competence for rice as India is not only one of the largest producers, but also consumers of rice. The strategic location also means that regional customers and prospects seeking to trial or conduct an application need not have far to travel.

This facility is modern in design, includes a customer centre with comfortable meeting rooms available on each floor, a telepresence facility and an auditorium that can accommodate large conferences.

The centre also houses some of the world’s best experts in rice, researching on rice programs and on new technologies leading to innovations that benefit the future of rice processing.

Also, vital to this centre is the application centre. It is equipped with our complete rice milling portfolio which includes, pre-cleaners, cleaners, hullers, separators, whiteners, polishers, graders, optical sorters, right through to bagging and packing. The set-up not only allows researchers, product designers and engineers easier access to test new innovations and conduct trials on new products, but customers can now come, to see first hand, the performance of a piece of equipment before committing to purchase - an integrated application centre, providing hands-on working, operating and research to understand commercial scale intake, conveying, cleaning, weighing, grading and milling of paddy.

The centre is also a dedicated training hub, providing courses suitable for all levels, including mill proprietors, managers and operators. Customers can enhance their skills, acquire new operating techniques, without the need for expensive travelling costs.
1. Reception, Bühler Competence Centre, Bangalore India.
2. Bühler’s Competence Centre building.
3. The application centre - equipped with the complete portfolio of rice processing solutions.
4. A section of the milling equipment.
5. Supporting equipment for processing by-products of rice; grinders for flour.
STRENGTHENING OUR COMMITMENT TO RICE PROCESSORS WITH LOCAL PRESENCE.

Bühler develops and manufactures sophisticated rice processing solutions, focused on technical excellence in six main countries, with six other locations serving as dedicated research, service and regional centres.

Along with our worldwide affiliates and branch offices, our presence in 140 countries makes Bühler the partner of choice for many rice processors. We are committed to maintaining the same stringent quality standards along the entire supply chain.

Also, our added advantage of being in the region, closer to customers, means we understand local culture as well as business and ecological needs.
Bühler Manufacturing facility in Wuxi, China.
1. Buhler SORTEX applications and training centre in Stockton, USA.
2. Service team in Bühler Jakarta, Indonesia
With rice being the staple diet of 40 - 50% of the world's population, there already exists a strong imperative to gain maximum yield from every hectare of paddy.

Moreover, given that the world's population is predicted to increase by a further 2 billion by 2050, largely within those countries where rice is the main diet, that imperative will be even greater in the coming years. This has implications for rice growers, especially with agricultural land likely to diminish alongside a growing population that needs to be housed.

However, the pressure is arguably even greater on rice processors, charged with delivering a consistent quality of product to an ever growing, ever more demanding market place.

Processors need to become more efficient, in terms of returning maximum head rice yields from paddy grain, but also in terms of energy efficiency. This is because rice processors, in common with all factories, also face the challenge of increasing energy prices (and a potential shortage of energy supplies) all in a context of political pressure to process their supplies in the most sustainable, hygienic and safe manner; maximizing yield, improving quality and reducing their use of energy and other resources.

ENERGY ECONOMICS

Reducing the energy costs and environmental impacts of rice milling are major drivers of change in the industry. Smaller millers, operating at 2 tonnes per hour (tph), generally on outdated equipment, are inevitably operating at low energy efficiency and are unable to meet the quality/quantity demands of non-local markets.

The challenge then is to maximise the value from every kilo of raw material, via the introduction of increasingly efficient and effective production processes, the
New Bühler high capacity, energy-efficient solutions contribute to sustainable processing.
elimination of losses and efficient resource utilization of energy, water and air.

Extensive analysis, carried out at Bühler’s Competence Centre for rice research and development, indicated that economies of scale are important in improving energy efficiency. This analysis led Bühler to develop UltraLine, a high capacity paddy to rice conversion system, focusing on energy saving and high end product quality.

ACHIEVING MAXIMUM YIELDS
Of course, for energy savings to be truly significant, the yield of end product must also increase. Rice is notoriously a difficult commodity to process. If rice is over-processed, perhaps because it is handled too harshly or too often, it breaks.

Yet the process must be rigorous enough to achieve the required quality output, after whitening and polishing and, of course, to reject inherent defects in the colour, size or shape of grains, as well as to eliminate foreign materials and signs of disease.

Again, the specific challenges that face different processors are different. The quality and variety of incoming rice is a factor, so too the quality standards expected by the processor’s customers.

However, whatever the constraints imposed, all processors can benefit from recent innovations that allow processors to define the exact quality level for their rice and to optimise their production processes to deliver significantly higher yields.

NEW GENERATION
In the paddy to rice conversion process, the whitening and polishing stages consume the maximum energy and are instrumental in determining the finish of the end product. Hence, Bühler has introduced the UltraWhite™ whitener and UltraPoly™ polisher as flagship products of UltraLine. Both incorporate multiple patented technologies, unique to Bühler.

UltraWhite™ includes a shaftless milling, which permits air to pass freely around rice kernels for uniform and gentle whitening, while UltraPoly™ features innovative sieve geometries that improve quality, increase capacity and reduces energy use.

The UltraLine range also includes the SORTEX S UltraVision™ optical sorter. Featuring advanced technologies such as intelligent computing, Textured LED Lighting™ and camera optics, this intelligent optical sorter delivers in capacity, yield and accuracy - with control over each defect, whilst reducing the energy burden.

From the perspective of IT, for example, this new generation of optical sorter incorporates integrated
Bühler’s latest optical sorting innovation - SORTEX S UltraVision™
intelligence, allowing it to make decisions about which grain is good and which should be rejected. Consistency of sorting performance is further enhanced with Intelligent Automation, which essentially describes the ability of the machine to self-learn as the product changes, allowing the sorter to adjust itself automatically, according to the quality of the raw material, removing the need for costly manual intervention.

Light emitting diodes (LED) have revolutionized lighting in many areas of life, being more stable, more controllable and more energy efficient. So, too, within the SORTEX S UltraVision™. Along with improved camera optics, Textured LED Lighting™ provides an illumination environment in which the most subtle colour defects can be detected, individually and simultaneously. This includes varying degrees of purples, greys, yellows, streaks, pecks, black tips, spots, chalky and immature or rotten grains.

However, detection is nothing without precise ejection of the unacceptable grain, and innovations in this area also mean that this new generation of sorters can target just the right amount of air at the grain that needs to be removed, thereby removing fewer of the good grains with the reject.

These ground-breaking technologies give processors unprecedented control over their output, as they can define the exact “accept” levels necessary to meet their customers’ requirements, which helps to eliminate waste and boost profits.

COLLECTIVE IMPROVEMENTS

Individually, each of the innovations described above (and others not mentioned) bring an appreciable improvement to yield and process performance. Taken together, installed in plants designed for maximum food safety and worker protection, these technological advances represent a major leap forward in high capacity, energy-efficient rice processing.

For individual processors, these advances represent the best chance of profitability in a highly competitive market. For the industry as a whole, they represent the best chance of meeting a growing demand for rice, in an era of rising energy prices and a need for sustainability.

Bühler’s UltraWhite™ whitener, UltraPoly™ polisher and SORTEX S UltraVision™ optical sorter are designed to deliver high-capacity with lower processing costs per tonne in a smaller machine footprint.
1. Whitened rice on UltraWhite™ DRWA
2. Polished rice on UltraPoly™ DRPG
MARKET DEVELOPMENT.
Putting food safety at the heart of rice processing.

Bühler puts food safety at the heart of rice processing
Coupled with the ever-present need for greater capacity, efficiency and profitability, food safety has become the linchpin of successful operations in the increasingly competitive rice market.

This interview with Bühler’s Food Safety Initiative team reveals how designing safety into every aspect of rice production is vital for each player in the supply chain.

What contaminants can affect rice safety?
Answer - Béatrice Conde-Petit
Contaminants that can enter rice include agricultural or processing chemicals, ranging from insecticides to factory lubricants; foreign materials, such as glass, metal, sticks and unwanted grains; and also insects, molds, mycotoxins or bacteria.

What can be done to address these concerns?
Answer - Rustom Mistry
Critically, beautiful shiny rice does not guarantee food safety: careful attention is needed at every step of production in order to assess and eliminate risks at each stage.

For rice processors, a formal Food Safety Management System, supported by a HACCP (Hazard Analysis and Critical Control Point) programme, is fundamental to ensuring food safety.

What does HACCP involve?
Answer - Rustom Mistry
HACCP involves a hazard analysis to assess the contamination potential for each step of the production process and identify measures to prevent or reduce the contamination or ‘hazard’. Processing points where there is significant risk of contamination are determined as Critical Control Points (CCP).

Limits need to be established for CCPs, together with the corrective actions required to eliminate or control the hazard/contamination, if it arises.

Verification procedures must be put in place to allow processors to monitor that their HACCP system is working well.

How else can processors achieve greater safety and hygiene?
Answer - Rustom Mistry
The design of a plant and its equipment plays a fundamental role in preventing potential contamination.

If designed with clear zoning and space for operation, maintenance and the movement of personnel, a plant will already be one step ahead. A plant’s structure, as
A Bühler Automation system in a plant.
well as the conduits for its utility supplies, need to be constructed with sanitation in mind and, critically, today’s plants must operate ‘dust free’ at all times, as areas where dust or rice particles can collect represent areas with significant potential for contamination.

Ease and speed of cleaning is vital, coupled with the avoidance of any crevices or hard edges that can allow dust to accumulate. Bühler equipment features easily removable machine covers and screens that are simple and quick to change; and sealing systems that prevent any dust leaking out into the plant.

The plant should be designed to have an ‘airlock entry’, to avoid dust coming into the plant, sealed and rounded off where it meets the walls, to avoid crevices where dust can build-up. Critically, a well-designed aspiration system must be built into every modern plant to meet today’s stringent standards of quality, sanitation and hygiene.

**What advantages does Bühler equipment bring?**

**Answer - Rustom Mistry**

Bühler’s rice processing solutions are designed for continuous and trouble-free operation. Every element of design is tailored to the highest international safety and hygiene standards.

**Answer - Raymond Herbert**

Peace of mind is a crucial element. All our solutions meet and invariably exceed the European Union’s Machinery Directive, which dictates that all processing machinery is safe and contributes to the prevention of contamination. We provide certification for all our machines, to help rice processors achieve their own compliance and HACCP fulfilment.

Each and every piece of Bühler equipment, which is supplied with full instructions and advice on cleaning methods and materials, cleaning intervals and maintenance, inherently encompasses the strict use of plastics and stainless steel components, along with designs that prevent entrapment of product in recesses or voids. Bühler can also provide rice processors with a validated report, to illustrate the minute levels of dust produced around its machines when sorting grain.

**Answer - Rustom Mistry**

Automation delivers less down time and more effective production up-time, while higher yields and lower power consumption become possible, thanks to Bühler’s extensive engineering expertise. Excellent design and good automation ensures immediate start-up with no choking in plant. Pneumatic slide gates automatically close for power cuts, preventing the machine from crushing product during restart. Ultimately, Bühler understands and embraces the sanitation requirements of a modern, dust free plant that meets the need of international standards and offers the flexibility for future development.

**What does the future hold?**

**Answer - Rustom Mistry**

In future, rice processing plants will inevitably move from manual operation to industrialized and automated plants, based on both single and multi-level floor concepts, capable of processing multiple different rice varieties. They will feature the ultimate in product safety and hygiene tracking product, which is currently critical to exporters, but will also affect domestic producers, in the longer term. Bühler, with its international expertise and global presence, combined with its understanding of local markets, is ready to help the industry process rice safely and hygienically.
RICE THROUGH A LENS.
In-depth images of rice as paddy, then hulled, whitened and polished.

The above are scanned microscopic images of a basmati rice kernel through the different processing stages of hulling, whitening and polishing.

The process: Rice kernels were defatted and dried at room temperature. Cross sections were then produced by cutting the kernels transversely with a razor blade. The samples were then mounted on Scanning Electron Microscope (SEM) object holders with conductive carbon content and, prior to the examination with SEM, sputtered with gold. The images were subsequently coloured using an image editor software.

1. Microscopic view of paddy.
2. Microscopic view of brown rice (hulled removed).
3. Microscopic view of after 1st pass of whitening.
4. Microscopic view of after 4th pass of whitening.
5. Microscopic view of after polishing.

- Hull
- Pericarp
- Cell walls aleurone cells
- Cell contents aleurone cells
- Endosperm
- Rice polishing
CUSTOMER FOCUS.
Sri Krishna Metcom, Ranchi, India.

This single line mill sets a new industry standard in producing parboiled rice, maximising yield and minimizing product breakage, and delivering consistent product quality.
About 60% of the total production of paddy in India is parboiled and worldwide, close to 30%. Advantages of parboiling the paddy are manifold. It reduces grain breakage during milling, greatly improves the vitamins content and other nutrients in the polished rice grain and increases the oil content in the bran. Parboiled rice is further characterized by its low stickiness and high resistance to cooking - properties that are preferred by the region.

The company Sri Krishna Metcom Ltd. started out as rice traders and later entered the production business with two Bühler lines, with a capacity of eight metric tonnes per hour each. Therefore they know exactly what consumers want. They asked Bühler to construct a new rice mill in the shortest possible time with a capacity of 16 metric tonnes per hour in a single line, to deliver super silky finish rice which should set a new quality benchmark in the market. The new mill had to be built in the Eastern region of India, in the middle of paddy fields, with no industrial development in the vicinity, which added to the challenges. The result is a rice mill equipped with state of the art processing technology that is engineered to perfection to maximise yield of rice, minimise product breakage and deliver consistent product quality.

Commercial rice production started in November 2013 and super silky rice output from this plant will further consolidate Sri Krishna's leadership positioning in the market.
1. After cleaning and parboiling, the paddy is gently husked on TopHusk™ dehullers and graded on a Rotosort drum grader and then fed to a UltraWhite™ rice whitener. The UltraPoly™ then polishes the white rice giving it a high silky finish.

2. New standard for plant sanitation resulting in less cleaning and longer maintenance intervals.
CUSTOMER FOCUS.
Siam Indica Co. Ltd. Bangkok, Thailand.
Siam Indica Co. Limited, Thailand’s largest rice exporter, has sourced over 100 units of Bühler rice processing equipment, including 22 optical sorters.

The contract underlines Bühler’s continuing expansion in Asia and enhances its reputation as a technology-led solutions provider to the rice industry. Increasing global demand for Bühler solutions has made the company a first choice partner for the largest rice processors in Thailand and South East Asia.

Since its formation in 2004, Siam Indica has invested in the most advanced technology, as it aims to become the premier player in its region. An extensive factory upgrade will see Bühler work in tandem with a local contractor in implementing the agreement that involved close co-operation between senior executives of Bühler and Siam Indica.

Khun Sorawit Chansakulporn, Siam Indica’s director of production engineering, noted that, “The close working relationship we developed with the Bühler team and their willingness to share their process knowledge ensured our factory upgrade, layout configurations and delivery timescale exceeded all our expectations. We believe these upgrades will enhance our name in the international market and would like to recognise this in our future branding. We expect this will be the start of long lasting co-operation with Bühler to support further development of new projects and contribute to the growth of our company.”
1. The latest in optical sorting technology; SORTEX S UltraVision™ at Siam Indica.
2. Cleaning section at Siam Indica, removing both heavy and light impurities from rice.
CUSTOMER FOCUS.
Hangzhou Wahaha Group. Haining, China.

EACH MACHINE IS FITTED WITH AN ASPIRATION SYSTEM THAT EXTRACTS DUST AND DIRT PARTICLES TO CREATE A HYGIENIC WORKING ENVIRONMENT THAT ALSO REDUCES THE RISK OF FUNGAL GROWTH.

HANGZHOU WAHAHA GROUP.
The completion of a turnkey installation at the Hangzhou Wahaha Group’s eight porridge production plants in Haining has allowed one of China’s largest and most prestigious food and beverage manufacturers to make dramatic improvements to the quality of its end product and reduce its costs.

Wahaha’s eight treasure porridge is a popular favourite in China, made with pulses, such as red beans, cranberry beans, myotonin (Chinese barley) and oats, as well as sticky rice and black glutinous rice.

Replacing the existing, largely manual cleaning and sorting process, the new Bühler cleaning and grading plant includes two compact and advanced lines, each of which can clean and grade the various raw materials.

Each line incorporates Bühler’s de-stoners, sifters, metal detection equipment and optical sorting machines. Currently, one line is dedicated to rice and the other to beans and pulses.

Bühler’s SORTEX optical sorters eliminate contaminants such as glass, stones, wood, sticks and soil blocks, as well as deformed or discoloured beans, and discoloured or unwanted varieties of rice; while the metal detector magnetically removes any residual pieces of metal.

“Our investment in Bühler’s advanced technology and custom-designed solutions has surpassed our expectations. It has drastically reduced our customer complaints about foreign body contamination; reduced our operating costs dramatically; and ensured us consistent quality,” said a spokesperson from Hangzhou Wahaha. “We trusted the Bühler team to deliver and the resulting solution fits our requirements exactly.”

Bühler’s installation of this successful turnkey solution for Hangzhou Wahaha substantially reinforces the company’s leading position and influence in delivering innovative, customised technology projects in China and underpins its reputation for technology expertise and quality.
A compact cleaning and grading line at Hangzhou Wahaha Group, China.
INNOVATION.
UltraLine.
High capacity, energy-efficient rice processing for the 21\textsuperscript{st} century.

Introducing Bühler UltraLine rice processing solutions. A technological triumph of modern rice processing for today’s mills.

Driven by Bühler’s commitment to encouraging sustainable rice milling, the UltraLine portfolio ushers in a revolution in high capacity energy-efficient processing.

With three new machine innovations featuring all-new multiple international patents – SORTEX S UltraVision\textsuperscript{TM}, UltraWhite\textsuperscript{TM} and UltraPoly\textsuperscript{TM}, UltraLine has been industry-proven to deliver unprecedented levels of processing capacity (up to 16 tonnes per hour) and premium product quality rice whilst driving down the processing cost per ton. Next generation rice milling has arrived.

Welcome to the future of sustainable rice processing.
UltraWhite™ DRWA Whitener

The UltraWhite™ delivers high capacity with low energy consumption and lower processing costs per tonne to deliver uniformed whitening process whilst adhering to high hygienic processing requirements to deliver a premium quality rice finish.

- Sets new standards in rice whitening with Bühler’s highest ever capacity and lowest energy consumption
- Delivers exceptional performance, superior yields and maximum profitability

UltraPoly™ DRPG Polisher

Delivers new levels of rice polishing performance - the UltraPoly™ offers processors a high capacity, energy-efficient and productive machine performance to deliver premium rice with a silky and smooth finish.

- A new benchmark in rice polishing delivering uniformed consistency and superior polishing performance especially during high capacity processing
- Designed and engineered for low energy consumption, maintenance and hygienic processing

SORTEX S UltraVision™ Optical Sorter

A first from Bühler - up to six module intelligent optical sorter featuring individual defect detection, Textured LED Lighting™ and Crosshair Targeting™ technology to provide the ultimate in sorting performance. All-new SORTEX ProSort™ software helps processors to deliver export quality rice in three simple steps.

- Ultimate sorting performance with Bühler’s highest ever capacity
- Outstanding productivity
- Superior ease of use and machine serviceability

WinCoS® Plant Control System

WinCoS® integrates automation and process technologies to intelligently deliver a flexible and user-friendly plant control solution. This system ensures processing plants operate efficiently whilst maintaining the highest standards of production and food safety. Features include; traceability, remote access, alarm and management systems. WinCoS® lowers production costs, maximises yields and improves consistency of product quality.
INNOVATION.
Maximising product value through deep processing.

A Bühler breakthrough in innovative solutions to maximise yields through by-product processing.

To meet the needs of growing population and increasing food safety requirements, rice – for human consumption has to evolve. Bühler’s research and development programs, located in the heart of Asia and in facilities throughout Europe, houses some of the world’s experts - the objective was to deliver technological solutions and develop a complete range of equipment for processing by-products such as broken rice to improve nutrition and prevent autoxidation in bran.

This proven research resulted in a range of equipment for the processing of various rice by-products, delivering significant returns on investment for processors.

Rice flour
Bühler’s solutions for rice grinding bring high value additions to broken rice by significantly improving return on investment for processors. Our research into this process has enabled us to offer a complete processing system which includes equipment, plants, processes and automation engineering, to provide consistent product quality whilst maintaining maximum hygiene.

Bran Stabilization
The preservation of rice bran for longer shelf life is achieved through heat or hydrothermal treatment. This process inactivates the enzymes and prevents the decomposition of free fatty acids. Bühler delivers a full range of equipment and solutions to support this process. Our solution not only makes bran and germs taste better but extends the shelf life from three to six months – double the expectancy.

Reconstituted and Fortified rice
Processing broken rice into grains to include specific product characteristics requires the know-how and state-of-the-art technology and Bühler’s extrusion processes delivers this – our renowned success in rice fortification is delivered through patent-protected production processes and equipment – through our research facilities, cutting edge technology is applied to every stage of the processing line; grinding, blending, conditioning, extrusion and drying to sifting, storage and packing.

Ground broken rice is transformed into new grains whose appearance is remarkably like that of natural rice and, if required, reconstituted rice can be fortified via addition of vitamins and minerals. Important properties such as colour, form, size and texture, as well as cooking characteristics and cooking time, can also be determined precisely. Customer can determine precise product-specific extrusion parameters.

Bühler’s production process for fortified rice is protected by patent and is used successfully in the rice processing industry all over the world.
In developing countries more than 40% of food losses occur at post harvest and processing levels.

TARGETING 0% waste

**Bühler by-product processing in rice.**
Adding value to every grain.
1. NutriRice™, A Bühler brand recomposed fortified rice.

2. Image of fortified rice, showing no difference to regular polished rice.