Buhler Flour Service and Fortification Solutions

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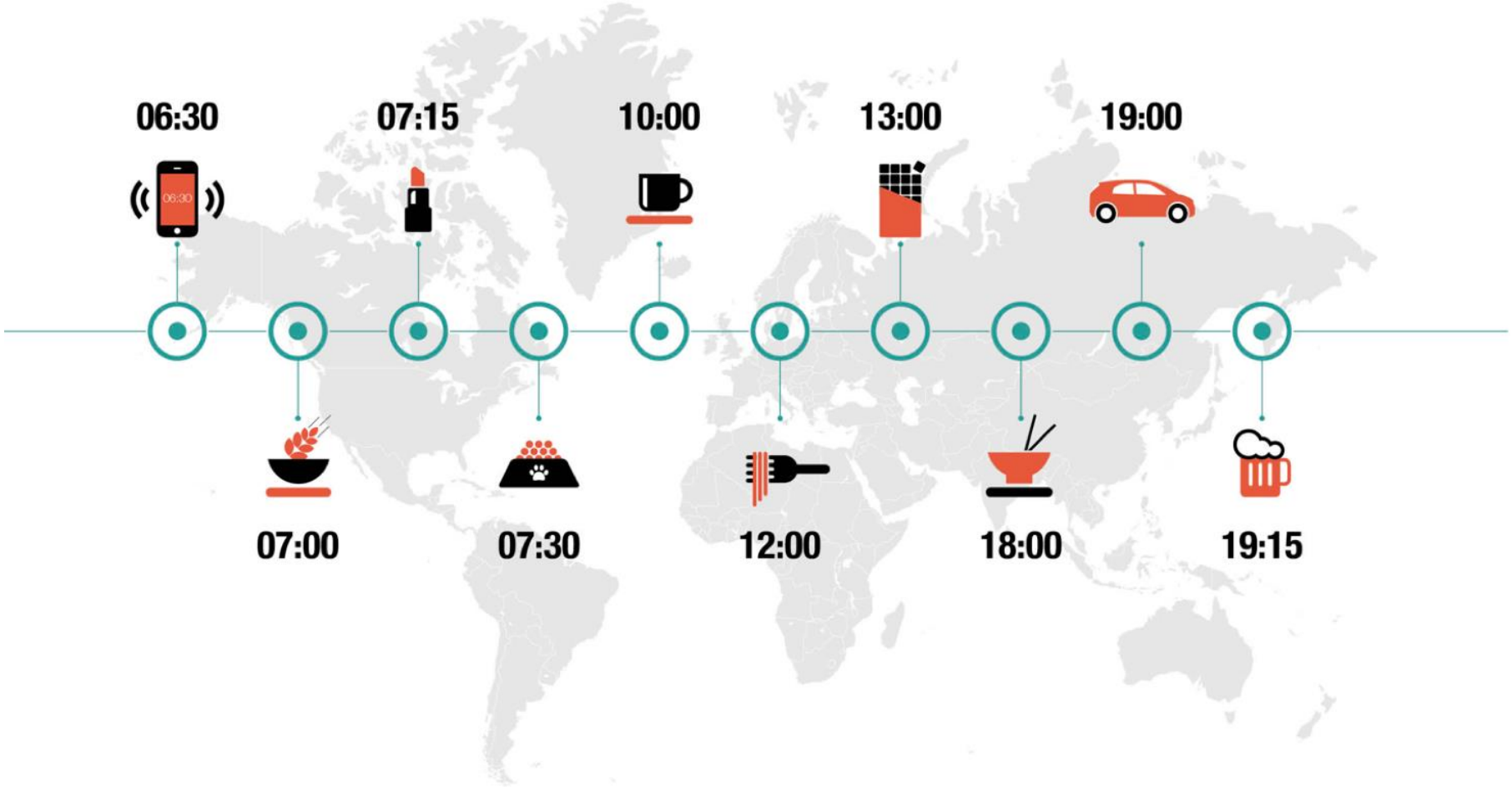
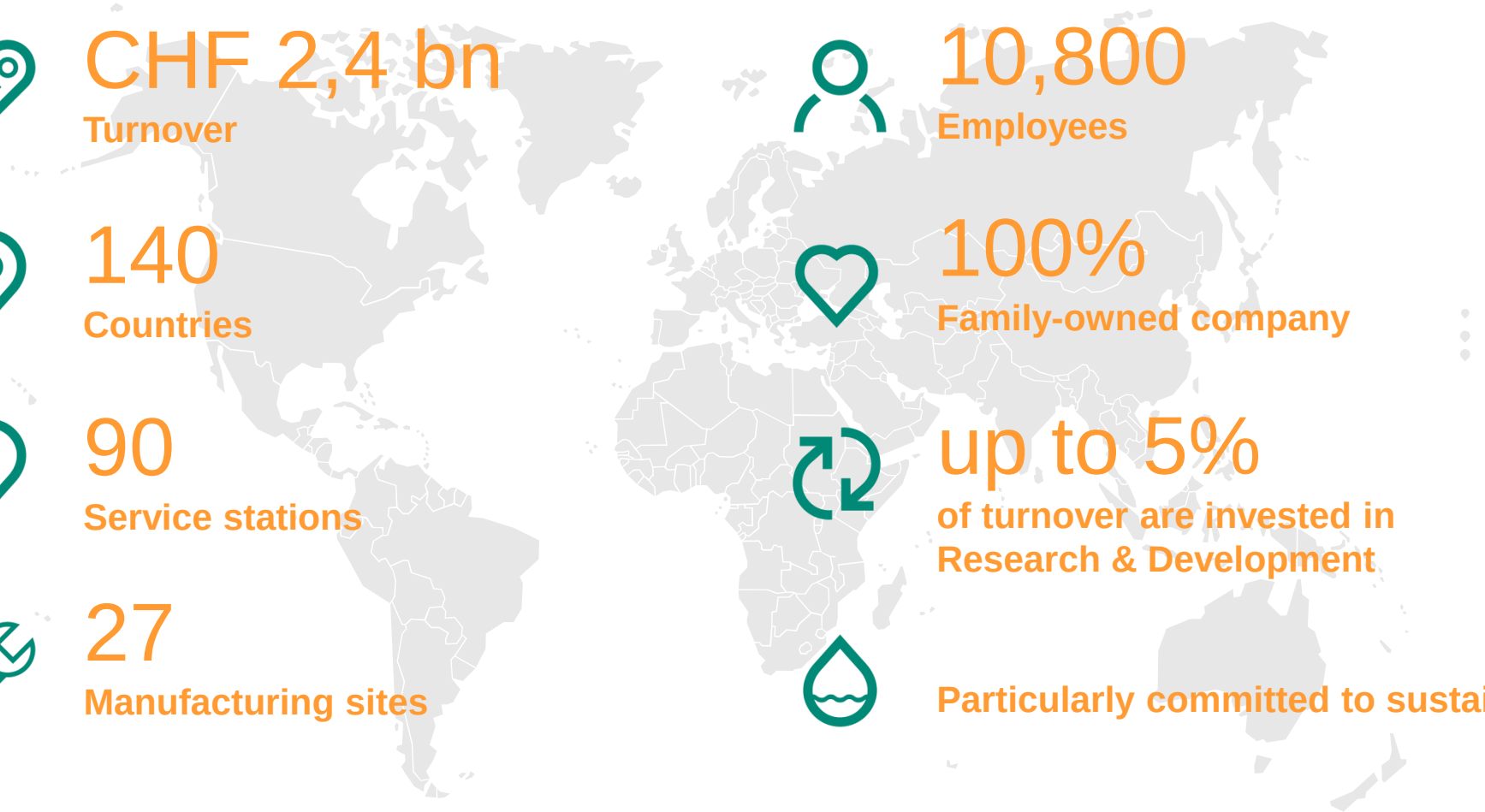
Innovations for a **better world**.

BÜHLER

Every day, billions of people come into contact with Bühler technologies to cover their basic needs for foods and mobility



Bühler at a glance.
Global market leader with a strong presence in local markets.



CHF 2,4 bn
Turnover

140
Countries

90
Service stations

27
Manufacturing sites

10,800
Employees

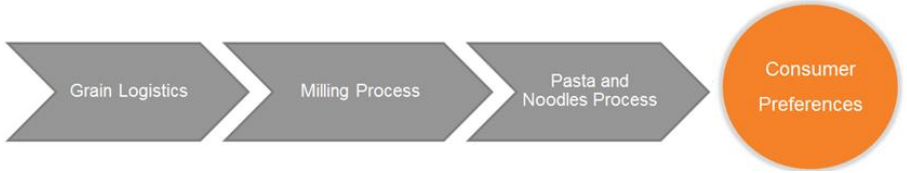
100%
Family-owned company

up to 5%
of turnover are invested in Research & Development

Particularly committed to sustainability

Bühler Flour Service

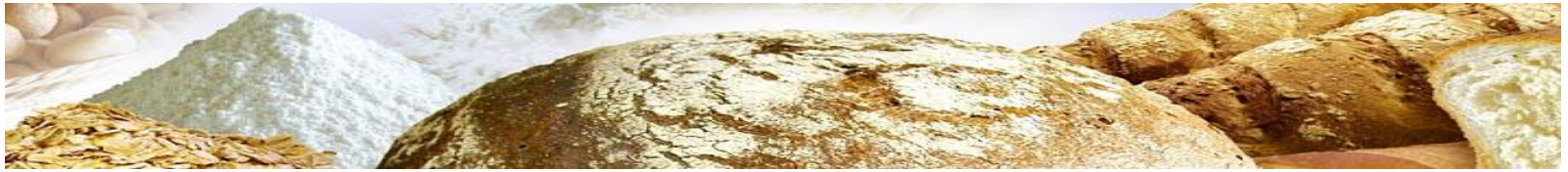
Integrated Solutions along the value chain



Bühler Flour Service

From Grain to Final Products – Our Solutions

- **Grain and Flour Quality Assessment** based on International Standards.
- **Process Optimization by Head Millers** to reach performance.
- Evaluation and **Improvement** of **Flour Quality** for specific applications **like Toast Bread** or **Noodles.**
- **Development** of **Customized Flour Ingredient Mixes.**
- **Training Courses in Grain and Flour Analytics and in Baking.**



Bühler Flour Service
Flour Fortification Solutions

Main Benefits:

- A cost-effective solution to add nutritional values to flours.
- Easy to dose with high accuracy.
- No side effects in terms of appearance and quality of the flours.
- Meeting the requirements of Ministry of Health, being food compliant.

Integrated Solutions in Fortification.
Procurement and Installation Micro-feeder system

This is done after technical evaluation of the production/milling systems and capacity of the streams.

Feeders should be set up with an electrical interlock system that prevents the flow of premix when flour flow is stopped.

An interlock causes the feeder to stop if the flour collection conveyor stops.

This will prevent the inadvertent over-Food Fortification of the flour, if there is a mechanical breakdown in the Mill.

An alternative approach is to have an automatic shut off switch on the feeder that is hooked up to a flour flow indicator or a pressure indicator in a pneumatic system.

Integrated Solutions in Fortification.
Micro-feeder mechanical principles

Gravimetric feeding

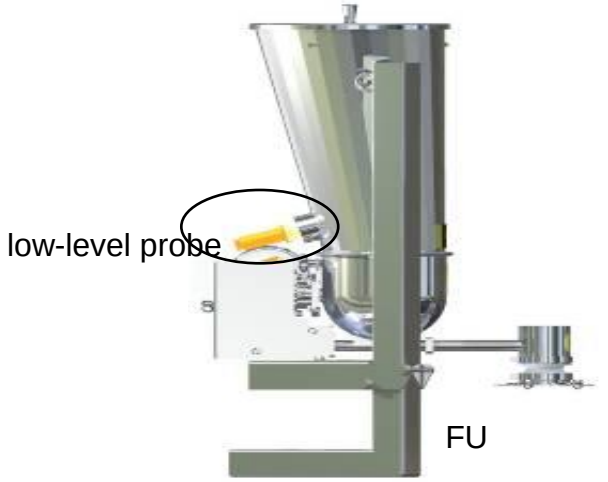
- Accurate gravimetric feeding of continuous product stream or small batch.
- very precise, accurate dosage.
- Traceability for food safety.

Gravimetric Addition:
Gravimetric addition involves measuring the weight of material to be added on a continuous basis. All feeders can be made into “loss in weight” feeders. The rate at which this weight drops with time indicates the true addition rate.

Volumetric feeding

- for constant volumetric feeding of micro components.
- very easy to use.
- cost-effective alternative.

Volumetric Addition:
Volumetric addition is similar to using a cup or spoon to measure out ingredients. This is based on the principle that the volume of the material being added has a set weight when handled in a uniform manner.



Integrated Solutions in Maize Fortification.

Micro-feeder with conveyer

Location of feeder on flour collection conveyer. Adequate Mixing - at the front half of collection conveyer above the blades of the mixing screw. At least 3 meters of conveyer length is normally needed to ensure adequate blending.

Another option for feeder location: If it would be difficult to install the feeder at the beginning of a conveyer, the feeder can be connected to the flour discharge spout of a plan sifter.

Micro-feeder fitted above mixing conveyer.

Integrated Solutions in Maize Fortification.
Sizing of micro-feeders to the capacity of the mill

Mills generally need one feeder per flour or meal line to be fortified. Larger Milling units with multiple products may require additional feeders including spares.

Feeders used for flour fortification need to deliver only relatively small amounts of material.

Hopper size on the feeder is also an important consideration, since you do not want to fill it constantly.

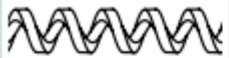
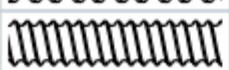
Integrated Solutions in Maize Fortification.

Micro-feeder Versions and Applications

Type	S/1-Typ (Performance Line) MSDC / MZMC	S-Typ (Top Line) MSDF / MZMO	R-Typ (Top Line) MSDF / MZMO	A-Typ (Top Line) MSDF
Capacity	0.75 – 127 l/h	0.75 – 500 l/h	0.75 - 2`000 l/h	0.75 - 9`000 l/h
Screw-ø	20/32		20/32/65	
Double screw	No	Yes		
Gravimetric	Yes			
Volumetric	Yes			No
Non-free flowing bulk materials	No		Yes	
Accuracy	perfect			excellent
Servo drive	No			Yes
Variability proportioning range	1 to 20			1 to 100
Refilling manually	Yes			
Refilling with screw	Yes			
Cleaning door	No		Yes	
Price	50%	100%	150%	200%

Integrated Solutions in Maize Fortification.

Micro-feeder Screw Configuration (Capacity range)

Type		Capacity range (dm³/h)[1]		
		Belt set[2]		
		36:36	36:18	54:18
MZMC - 20/1		0.75 – 12.7	0.94 – 25.3	1.40 – 37.3
		0.75 – 6.8	0.75 – 13.1	0.80 – 19.8
		0.75 – 3.1	0.75 – 6.2	0.75 – 8.9
MSDC - 20/1		0.75 – 12.4	0.94 – 24.6	1.40 – 36.2
		0.75 – 6.5	0.75 – 12.7	0.80 – 19.0
		0.75 – 3.0	0.75 – 5.9	0.75 – 8.5
MZMC - 32/1		3.3 – 84.2	6.6 – 164	9.5 – 239
		1.7 – 39.8	3.0 – 76.9	4.7 – 114
		0.75 – 18.0	1.4 – 35.0	2.1 – 50
MSDC - 32/1		3.6 – 80.7	6.6 – 155	9.3 – 228
		1.7 – 38.3	3.4 – 73.9	5.1 – 108
		0.75 – 17.0	1.6 – 33.0	2.3 – 48

[1] Product-dependent approximate values

[2] Belt pulley of reel and twin screw can be exchanged

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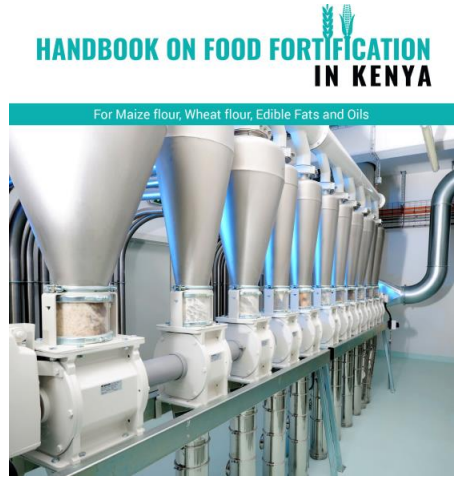
Conclusions.
To get it right – meet nutritional requirements

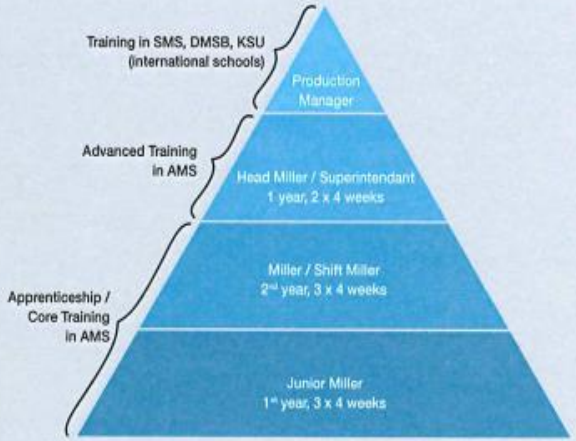
- Proper Assessment at the mill in terms of capacity of the streams and flow.
- Evaluation of the micro-feeders.
- Choosing the right screw configuration.
- Design and layout of the conveyers.
- Commissioning - installation of the feeders.
- Quality Check.
- Training and Education.

African Milling School



Training at African Milling School.
To get it right

- In Milling Processes
- Grain and Flour Quality Assessment.
- Flour Quality Improvement.
- Fortifications Solutions (DEMO).
- Baking Training.



Located in Nairobi, Kenya
Nairobi is a central business hub for East Africa and is the ideal location for the AMS, situated just 25 minutes from Nairobi's international airport.

Training for all skill levels
African Milling School (AMS) for Junior, Advanced and Head Millers / Superintendants.
Swiss Milling School (SMS), Deutsche Müllerschule Braunschweig (DMSB) and Kansas State University (KSU) for higher education degree.

Sustainability.

It has never been this easy to be a maize miller.

Buhler is making it easier than ever for entrepreneurs to move into the food production chain and become maize millers. Buhler has a new innovation called Isigayo; a compact maize mill that takes up little space relative to its impressive intake capacity of 2 tons per hour at de-germination. Its state-of-the-art design allows millers to concentrate harvesting, production and consumption into one place, reducing logistics costs and maximising space. Furthermore, the maize mill requires minimal resources and minimum training to operate and it can be fully operational within a week.

For more information, visit us at www.buhlergroup.com/isigayo

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Isigayo™ Maize Mill.

A two ton per hour compact maize mill.

A simplified, downscaled version of an industrial milling process.

Pre-engineered and pre-assembled inside two shipping containers.

Reliable Bühler processing, equipment and support services

Nutritious, high quality maize flour output.

Requires minimum capital investment.

High return on investment.

Innovations for a better world.

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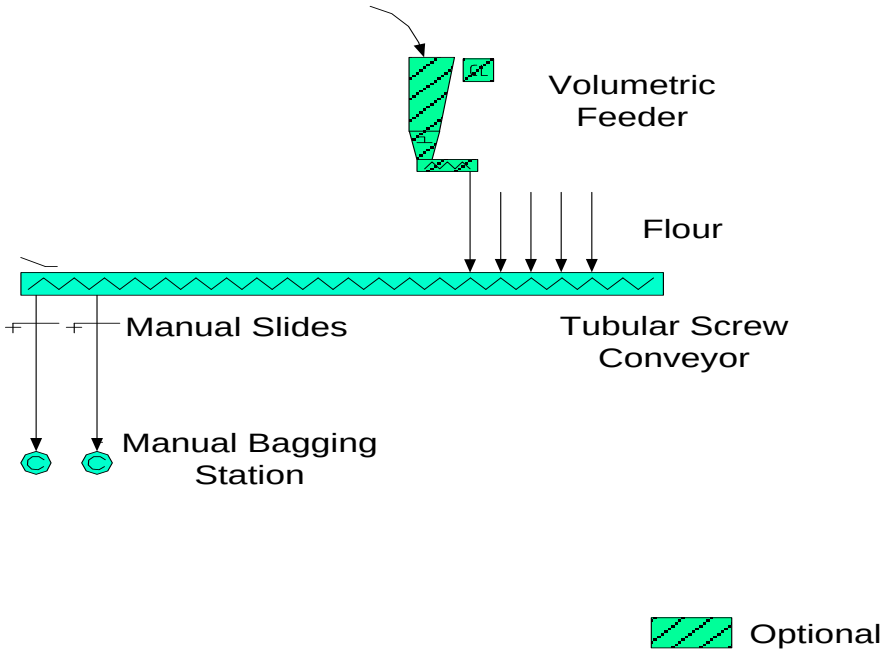
Photo: Isigayo assembled at Buhler Johannesburg- Z.A

Isigayo compact Maize Mill.
High quality nutritious maize flour.

- Multiple flour grades output possible – 3 options to choose from:
  - Two Flour Solution
  - Straight Run
  - Grits
- Milling process (including the excellent degerminator DRPA-M) generating a high quality maize meal.
- Flour yield and quality comparable with a modern industrial production plant.
- Optional micro-dosing of supplementary vitamins and minerals.

High quality maize flour.

Isigayo Maize Mill Flowsheet/ Fortification integration Packaging for Straight Run.



Flour: 65-70%, Fat >1.8%
Granulation: 98% >670µm
By Product: 30-35%

Isigayo compact Maize Mill.
Minimum investment with high return on investment.

- Minimal investment. Pre-engineered and pre-assembled 2 t/h plant.
- Low Cost of Ownership. Reliable equipment and little operational expenses.
- High ROI. Flour quality and production yield giving a short payback time.

Designed with your investment in mind.