



# BREAKFAST CEREAL

## TWIN SCREW EXTRUSION LINES

FLEXIBLE SYSTEMS DESIGNED  
FOR PRODUCT INNOVATION AND  
PRODUCTIVITY



# BREAKFAST CEREALS IN ALL SHAPES, FLAVORS AND TEXTURES

Clextral twin screw extrusion production lines can process various cereal based ready-to-eat breakfast cereals – natural, coated or filled – with a wide variety of recipes and shapes.

Highly flexible and scalable, they can be quickly and economically modified to manufacture innovative products such as directly expanded, flakes, co-extruded, bicolor with clip-on equipment.



## **COST-EFFECTIVE: HTST (HIGH TEMPERATURE SHORT TIME)**

- Intensified transformation process generating savings in raw materials, water and energy
- Very hygienic processing and easy maintenance compact design with reduced floor space requirements.
- Advanced automation designed by our experts ensures precise process control, resulting in consistent and repeatable quality.

**DIRECT  
EXPANDED**



**SQUARE  
CRISPS**



**CO-  
EXTRUDED**



**FLAKES**



## **THE TWIN-SCREW EXTRUSION PROCESS: FAST, SIMPLE, COST-EFFECTIVE**

- Wide range of processing options for a variety of ingredients and raw materials
- Short production time
- Automated production systems for continuous and consistent production
- Flexible processes: fast startup, smooth changeover, easy cleaning
- Simple maintenance, easy cleaning
- Reduced floor space compared to conventional processes
- Support and training to optimize productivity and competitiveness.



# RESEARCH AND INNOVATION

Our skills and expertise span many areas of food processing in fields as diverse as thermal control, mechanical engineering, metallurgy, automation, etc. This choice to develop a wide variety of disciplines enables us to anticipate market trends and to assist our clients in their innovations.

## A PARTNER IN NEW PRODUCT DEVELOPMENT

Clextal helps clients develop new products and improve processes by providing expert assistance and equipment at our test facilities. Our R & D services help snack manufacturers anticipate and respond to new trends by managing and implementing their innovations.

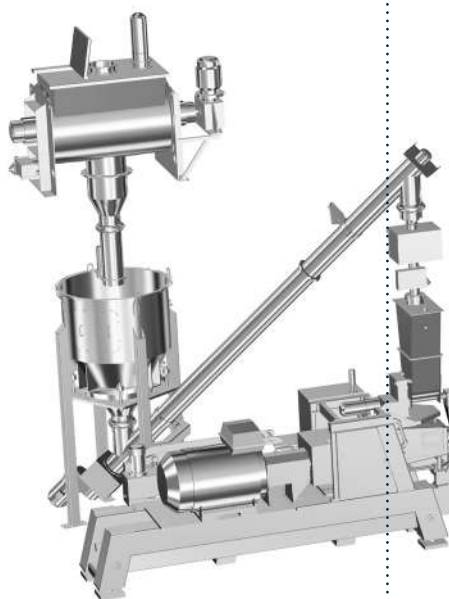
## TEST CENTERS

Clextal's three research centers in Firminy - France, Tampa - FL USA and Melbourne - Australia are dedicated to developing new products and improving processes.

Design, laboratory testing, prototyping, small batch processing, industrial simulation are performed independently and confidentially.



## RAW MATERIAL MIXING & FEEDING



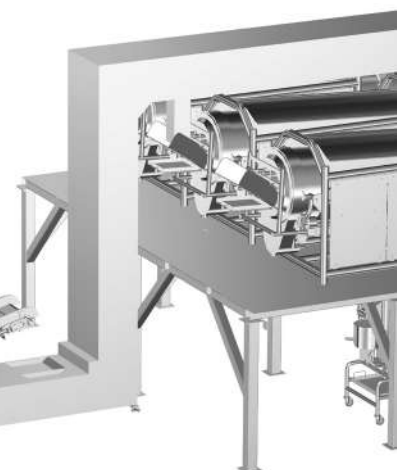
- A wide range a raw material can be used : cereals (corn, wheat, oat, barley, rice ...), whole grains and / or mixtures of grains, ancient grains (amaranth, quinoa, etc.) etc.

## EXTRUSION COOKING & SHAPING

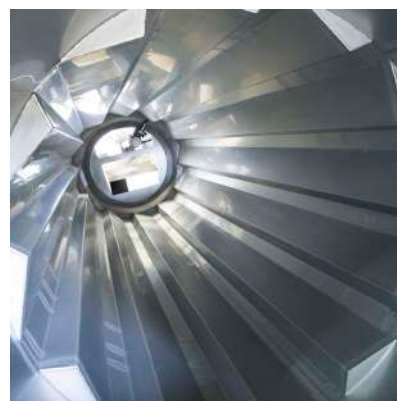
- The paste formed by the action of the co-rotationg screw is pushed throught the die to shape products in different sizes and structures.



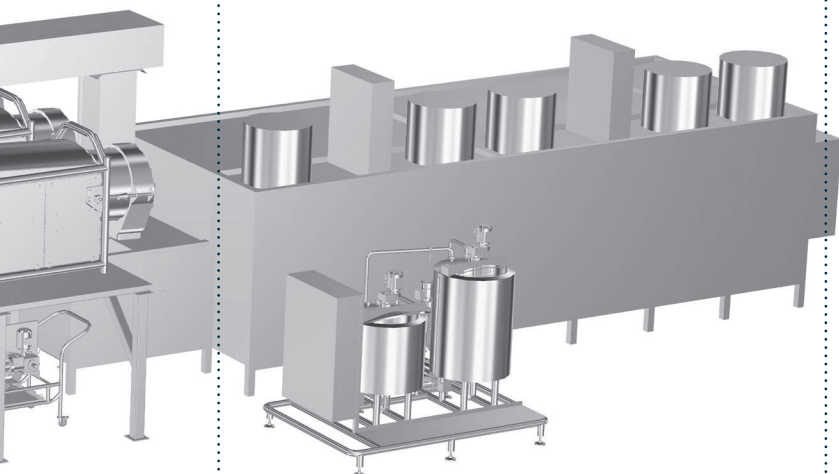
## COATING & FLAVOURING



- Coating impacts products' appearance, texture, structure and taste features. It gives the visual aspect and the desired taste to the finished product .



## DRYING



- Drying involves evaporating the liquid in the product, without altering its essential characteristics and/or enabling the introduction of new features. The drying step provides essential characteristics that extend product shelf life, ensure quality and simplify transport.

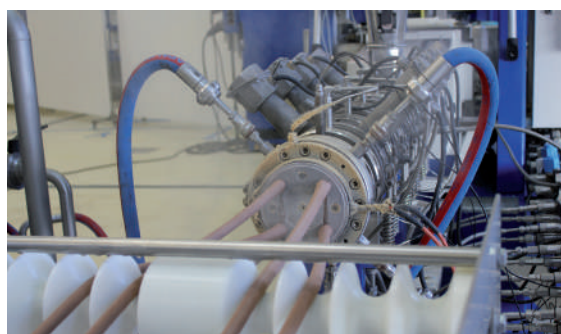


## CLIP-ON EQUIPMENT TO EXTEND YOUR POSSIBILITIES

Clip on modules allow you to extend your range of products. These technologies can be installed on existing lines.

### CO-EXTRUSION CLIP-ON

Co-extrusion is a process that runs a product combining two distinct characteristics: a crisp cereal-based envelope and a sweet filling. Co-extrusion uses the extruder to create the outer shell directly expanded, while an auxiliary system allows simultaneous injection of a filling at the die level. The production line can then process filled or unfilled products.



### BI-COLORATION CLIP-ON

Bi-coloration is a technology that allows a single platform to manufacture products with two colors which are clearly identified in the mass, possibly also with two different textures.



### LAMINATING AND STRETCHING UNIT

Laminating and stretching is a process consisting in shaping the extruded material by squeezing and stretching it between two cylinders.





Leveraging its core expertise in twin-screw technology, Clextral provides its customers with turnkey processing lines that integrate extruders, dryers and ancillary equipment. Its reliable and innovative systems are quality and excellence benchmarks in its three key markets: Food & Feed, Green Industries and Powder Industries. Clextral is also designing and manufacturing high-precision industrial pumps for the energy and chemical markets. Its global offering includes upstream design and testing of industrial solutions, equipment manufacturing, on-site installation and full maintenance and continuous process improvement services. Based in Firminy (France), Clextral is present on all five continents, providing local support to its customers all over the World.



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