To speed up service to its customers world-wide, the CLEXTRAL Group has triggered a new development dynamic.

Investment in expansion of the Firminy R&D Centre has increased the resources that are placed at the customer’s disposal: tests, demonstrations, industrial simulations, creation of new processes and products. These developments extend to both extrusion and drying technology.

Production resources have been enhanced and specific actions set up to improve deadlines, and the quality of all of the Group’s products.

The CLEXTRAL Group’s growth goes hand in hand with a strong commitment to environmental concerns, and the continuation of its actions in the health and nutrition sectors.

Georges JOBARD
President of the Board
As described in the last issue (See Clextrusion No.12), drying is a key step in numerous procedures; it plays a major role in the final quality of the product. The control of this delicate operation requires specific expertise, knowledge that the AFREM Company offers with one of its driers: the Rotante.

The distinctiveness of the Rotante’s technology comes down to its simple but ingenious design: uninterrupted Archimedes screws are mounted in a fixed position on a rotating squirrel cage. Each screw is surrounded by a stainless steel mesh. Each time the cage achieves a full rotation, the product advances simultaneously one step along each screw.

A PEAK TECHNOLOGY DESIGN
2 technological lines were considered essential in defining the structure of this Very High Temperature equipment (VHT):

- **equipment insulation**: this is necessary to separate the controlled internal temperature from the ambient temperature within the factory. The stainless steel casing is sealed against air flow. The whole unit is heat-insulated with a high density rockwool, bonded to the outside surface of the drum. Exterior sliding polyester panels add further insulation. Lastly, the seals on the tilt doors (providing access to the dryers) ensure that the equipment is hermetically sealed.

- **material resistance to extremely high temperatures**: All of the mechanical components are located outside the drier drum, to increase operating life: they are not affected by the Very High Temperature drying conditions. This layout of the mechanical components, combined with the all-stainless steel design of the drum, contributes to high reliability and easy maintenance.

RESPECT OF PRODUCTION REQUIREMENTS
These technical choices comply with modern production requirements:

- **a design rendered hygienic by**:
  - the use of all-stainless steel material for every component that comes into contact with the product.
  - simplified machine opening: easy opening access hatches are located at the input collectors, as well as at the lower side of the machine for quick glance inspection.
  - an automatic drier cleaning system is included in every machine.

- **reliable and flexible process control by**:
  - the development of VHT resistant sensors
  - computerisation of complete lines, providing quick response to system actions and reactions, and guaranteeing the repeatability of production runs.

The air speed from the circulation fans is around 6 m/s, thus avoiding any dust stagnation in the upper part of the assembly. The smooth stainless steel walls, located on the lower part, have slopes of over 45°, and converge in the direction of the two Archimedes screws located at the base of the drier. These enable continuous elimination of dust particles.
Easy maintenance, through the choice of standard motors, removable from the exterior, and the consistent use of commercially available parts whenever possible (restricted number of specific parts).

**ITS PECULIARITIES**

The key features of AFREM Rotante technology lie in the unique transportation of products by Archimedes screw, guaranteeing:

- a regular product flow, with no dispersion of residence time. This means you can switch from one product to another without any risk of cross contamination, and also guarantees homogenous drying of any product in the drier;
- a continuous and smooth mixture of the product, with no risk of deterioration in terms of deformation or rubbing;

Furthermore, the linear product flow guarantees:

- total control of the drying process and the opportunity to define two drying zones at different temperatures and air speeds;
- easier product transportation and monitoring.

Rotante drying can be applied to products with extremely large particle size and density, which considerably widens its scope of application.

Contact us and test the performance of this technology in the CLETRAL test centre in Chazeau: you will find two Rotante machines: one laboratory pilot project and one industrial drier: the CDS.

**A COMPREHENSIVE DRIER RANGE**

In order to fully comply with each customer’s requirements, Rotante technology is modular. It can be built in accordance with the number of fans and Archimedes screws required.

Rotante technology is widespread throughout the world and is characterised by a remarkable flexibility in use: numerous products are dried, especially fragile products such as pasta, pellets, couscous, fruits, etc. This is because this technology enables homogenous and fast drying in compliance with the most stringent quality requirements: respect for texture, shape, surface appearance, colour, etc.
CLEXTRAL has been ISO 9001 certified since 1996. The outside certification organisation selected to carry out this certification was BVQI (bureau Veritas international), a firm of international nature and renown. CLEXTRAL has longstanding experience within the quality assurance domain as, from 1980, CLEXTRAL has created equipment for the nuclear power industry. This work required a level of manufacturing inspection and monitoring which has been progressively extended to cover all areas of business activity.

The Quality system covers all of the company’s business and equipment produced by CLEXTRAL and complies with all the quality requirements laid down in the International ISO Standards. It relies on a fully documented system, which includes a Quality manual, documented processes and procedures, instructions and printed work sheets. This system describes the tasks required of each member of the workforce, from the issuing of the order to delivery of the finished product or service, in order to obtain highest customer satisfaction.

This system integrates continuous quality improvement, which is the concern of everyone. Any inconsistency or imperfection discovered would be studied and result in corrective actions and improvements. Corresponding with the requirements outlined in the Standards that are common to all companies requesting certification, CLEXTRAL has a skills base and level of know-how in its business sector which is the result of fifty years experience in the design of dual screw machines and accessories, and the supply of complete lines.

**SOME EXAMPLES OF IMPLEMENTATION**

**Knowledge of metallurgy**

From its early membership of the Creusot-Loire Group which has proprietary foundries and steel works for creating and processing of special steel, as well as its own corrosion research centres, CLEXTRAL has retained its wide ranging metallurgical skills, highlighted and enhanced by its extrusion equipment. Each type of material and its associated processing is carefully selected and inspected during various stages in its manufacture.
A large machine park, associated with highly diversified operating conditions, enables data feedback on behaviour during the various metallurgical processes.

A traceability system has been established for the larger parts and it is possible to trace the final part back to the original batch or raw material.

Once validation is completed, CLETRAL manufactured and tested prototypes may be offered in larger numbers.

**CLETRAL inspection resources**

CLETRAL has all the necessary dimensional inspection resources available in its workshops. In particular:

- An air-conditioned metrology workshop managing more than 2,299 calibrated appliances.
- An inspection department using a digitally controlled three-dimensional measurement machine with a 1300 x 500 x 500 mm capacity.
- A room designed to accommodate checking for cracks in welds and hard facing by welding by the use of sweating.
- A pressurised test bench enabling cooling circuits to be tested for leaks.
- A test bench enabling correct operation to be ensured and to measure the critical electrical performance of the heating systems.

**Final machine inspection**

Each assembled machine is tested before dispatch. A specific procedure defines the various test stages: results are recorded in an in-house file and become part of the machine’s “history” file.

Overall, after checks and electrical circuit and automation adjustments, a series of unloaded tests are performed. Then the machine is loaded: in this way the hot/cold temperature adjustments and the sensors, etc., can be checked.

These tests represent the final phase in equipment manufacture and are confirmed when the Completion Report is signed by the Quality Department.

**Spare part reliability**

For more than fifty years, CLETRAL has maintained all equipment manufacturing files. This represents an immense resource of carefully recorded information and is a guarantee of lasting quality for our customers.

The original drawings are accessible and facilitate the manufacture of spare parts that are fully interchangeable with original parts. The original drawings also act as the starting point for equipment improvements.

Spare parts are manufactured in our workshops in the same way and are subject to the same rigorous inspections as new parts.

**Customer claims processing**

Within the framework of the ISO procedures, all customer claims are subject to a specific processing procedure. This procedure contributes to a system of constant improvement in exchanges between the customer and the supplier of CLETRAL quality equipment. CLETRAL’s expertise (design, machining, traceability) is both acknowledged and a guarantee of the supply of reliable equipment.

Customers are assured of a customised service that is precisely engineered for their manufacturing requirements.
The feeding of babies and young children is crucial for their proper development and has become a major factor in public health because it contributes to the child’s physiological development as well as its psychological and emotional development.

In this respect, the introduction of cereals plays a vital role in guaranteeing a correct food balance for children in the so-called developed countries in the same way as it does for those in the developing countries.

AFREM has offered a solution for infant cereal foods. The product is easy to prepare, suits the palate of very young children and includes all their nutritional requirements: a mixture of small (0.8mm) balls of Durham wheat flour and dehydrated powdered vegetables with added vitamins which may be eaten as a soup by adding milk or water. These weaning foods are very popular with mothers, as evident in multiple discussion sites and forums on baby feeding that include recipes for adapting and cooking these foods.

A complete meal, the food contains vitamins, proteins, carbohydrates, and lipids. It has a high energy value due to its slow absorption sugars which give the baby the pleasant sensation of a full stomach, which is important when provided as an evening meal. Incidentally, its advantages are many: it may be kept for a long time, a 500 g box contains enough for at least a dozen meals and slightly older siblings would also enjoy the taste. The same product — without added vegetables instead using small quantities of tapioca semolina — may be used in cakes, gratins, soufflés, stuffings etc, when creating more elaborate dishes than a simple soup.

In reality, the process is very simple and its success rests essentially on the recipe used for this “infant cereal food” that is produced on a short pasta production line using the “Rotante” drying technology designed by AFREM’s engineers.

The product is extruded into a single-screw pasta press to form the very fine balls so that cooking times will be very short (approximately 3 min.). These balls are dried using the “Rotante” process as described in this issue (see the section on Technology), and which has interesting features:

- an Archimedes screw covered in a finely meshed stainless steel sheet,
- none of the product being retained due to its linear progress and constant movement.

Additionally, a system of automatic recovery retains the dust that falls by gravity into a fine screw located at the base of the drying tank, thus ensuring that none of the product is lost. For these products, which are categorized as child foodstuffs, the automated traceability system set up by AFREM is critical within the strict framework of legislation that govern their manufacture.

Remember that the “Rotante” drying process is also used for other products such as rice, sugar coated fruit squares, pellets, bulgur, couscous certainly, but also for other applications outside the food sector.
ENVIRONMENT : 
A VOLUNTARY INITIATIVE 
TOWARDS ISO 14001 CERTIFICATION

The last issue of Clextrusion in December 2004 explained the relationship between CLEXTRAL products and environmental protection. Now, the CLEXTRAL Board of Directors wishes to endorse this commitment by implementing a voluntary initiative aimed at gaining ISO 14001 certification for all its business sites.

This EMS is centred around 4 principal themes:
- compliance with the regulations,
- managing the impact of the company’s business on the environment,
- accidental occurrence prevention,
- raising awareness and training of personnel.

A structured and ongoing initiative
First, the environmental department compiled a list of the company’s activities and services that could have an effect on the environment. Following this inventory, “environmental analysis” groups, made up of personnel drawn from every level within the company, met and identified the risks. This resulted in the creation of effective improvement plans to alleviate such risks.

In making the environment one of its priorities, the CLEXTRAL Group is taking all possible steps to identify and reduce the effects that its installations have on nature. For this reason, an environmental management system (EMS) that complies with the ISO 14001 Standard is currently being set up.

In September 2005, the Bureau Veritas Quality International (BVQI) auditors will pronounce judgement on the compliance of this initiative with the ISO 14001 Standard. This initiative is fully integrated into CLEXTRAL policy, and is at the centre of a group which considers environmental protection as a strategic issue in terms of continual improvement.
THE LATEST ON ...
ATEX DIRECTIVES

For all machinery and plants, the European Community has a beneficial tool that guarantees the safety of users and consumers: CE marking.

This mark is the visual symbol that a product complies with the essential safety requirements of one or more of the Communities Directives, called the New Approach, covering the entire European market. All machines and articles sold in the European Union should display CE marking. Manufacturers and distributors are responsible for the safety of marketed products. For industrial plants, several Directives are applicable:

The ATEX Directives
Following a transitional period of several years, ATEX Directives were imposed in July 2003 for new equipment, and in July 2006 will be extended to cover all. Here we are going to look at ATEX Directives 94/9/CE and 99/92/CE.

**Sole definition...**

ATEX = Atmosphere Explosive
An explosive atmosphere is a mixture of air, in atmospheric conditions, inflammable substances in the form of gas, vapour or dust particles which following ignition, combustion extends to all of the non ignited mixture.

The ATEX 94/9/CE Directive defines what is considered to be an explosive atmosphere, the application fields (mechanical, electric, hydraulic, etc.) and the essential safety requirements in terms of equipment.

The ATEX 99/92/CE Directive outlines the minimum safety requirements for places of work and classifies safety zones in production areas. It is the company managements’ responsibility to specify “if the company’s business activity can result in the existence of a localised explosive atmosphere, to assess the risk involved and define the areas affected.”

It is obvious that the customer must work in strict cooperation with the equipment supplier: starting with an in-house analysis, the operator defines the potential risk zones in the vicinity of the machines and communicates the characteristics of the products being processed. The supplier then provides the appropriate equipment enabling work to be performed in these zones.

**Zoning**

In accordance with the potential source of explosion G = Gas or D = Dust, the operator defines 3 at-risk zones: in addition, there is a possibility that the risk analysis carried out is not covered by any ATEX zone of application (cf fig.1).

Each zone implies the use of an item of categorised equipment (cf fig. 2).

Checking of equipment prior to delivery runs from category 3 (self-certification is possible) to category 1 where verification by a certified body is mandatory. Moreover, added to each equipment category is a temperature classifi-
cation which takes into account products that transform and the temperature at which they self-ignite, thus we go from a T1 classification which allows operation up to 450°C to T6 which corresponds to a maximum operating temperature of 85°C (the most restrictive).

In an analysis involving gas (G), we also associate, depending on the type of gas, gas groups IIA/ IIB / IIC. Finally, according to the location of the type of industry involved, an index I is allocated to underground operations (mining) and index II for surface industries.

In this way we list ATEX declarations by: [Type of industry°] EX [machine category] [G or D] / [gas group°] [T classification°]

Examples:
- II Ex 2G / IIB / T4 for a Gas application (Surface industry)
- II Ex 3D / T3 for a Dust particle application (Surface industry)

**Conclusion**

As you can see from this discussion, applying these Directives requires a need by the customer to be aware of its own usage conditions, and for the equipment supplier to provide the appropriate equipment to comply with such use.

As a result of the work done during the transitional period, the Directives have been the source of significant advances:

- true supplier-user co-operation,
- clear and rigorous specifications,
- advances in technology in order to adapt equipment.

These points quite naturally lead to improvements in safety conditions and environmental protection, as well as to increased productivity. CLESTRAL Group, through in business activity in the Food, Chemical-Plastics processing and Paper industries has gained sound experience, knowledge which we are pleased to offer to our customers and partners.

Our ATEX Directive trained specialists are here to listen and advise you during the establishment of your future project initiatives.
The dimensional features of the screw and barrel follow the same mathematical laws, which enable the EVOLUM extruders to follow an easy and reliable extrapolation process from one machine to another.

This change in scale makes studies significantly more productive, (through parameterisation of completion plans), in the manufacture of the screw components, and the barrel and shaft modules, giving the machine a competitive edge.

This reduced scale machine is easy to move and simple to connect to an electrical supply (“plug and play” system). This is the result of integrating the electrical equipment and the control commands inside the body: two wide doors ensure easy access and a clear view of all component parts.

As an option, the EVOLUM 25 may be fitted with a patented quick barrel opening device enabling immediate access to the screws for profile modification, easy maintenance, observation of the product’s rheological behaviour, and unrestricted cleaning.

Every barrel module is equipped with an exceptionally efficient independent temperature control system: heating and cooling systems are installed and driven by an PID system.

The extruder’s standard drive is a variable frequency, alternative current variable motor unit. It ensures, along with the mechanical torque limiter, effective protection of the screw drive reducer and maximum available torque at nil speed (clearing machine).
ADVANTAGES:
- Easy and reliable extrapolation to industrial machines.
- Identical robustness and reliability to production machines (can be used for small production runs).
- Can be implemented with a low quantity of products (cost, safety, etc.).
- Exceptional portability and very fast electrical connection owing to integrated electrical and automated components.
- Quick barrel opening system (patented).
- Self cleaning screw profile.
- Modular design of cylinder and screw enabling easy adaptation to different food, chemical, plastics, etc. processes.

Barrel length: 40 D or 24 D
- Maximum power at maximum speed: 14 or 27 KW
- Weight: approximately 900 Kg

CLEXTRAL is at your service should you need more information or desire a detailed presentation of the EVOLUM 25: your next development tool.
IN BRIEF

✔ The CLEXTRAL Group increases synergies between its subsidiaries: AFREM International and LYMAC will move into their parent company’s location in Firminy by the beginning of 2007.

✔ CLEXTRAL reinforces its representation in Shanghai. CLEXTRAL has decided to concentrate and expand its Asian business activity in Shanghai. Once set up, the After Sales Department will cover the entire Asian Pacific region.

✔ New order for AFREM: following the supply of 2 couscous lines to Libya, AFREM has affirmed its position as world leader by receiving an order for a new couscous line from Algeria.

SHOW-ROOMS

You can meet the CLEXTRAL Group teams during a number of shows in 2005:

- IFT : New Orleans (USA), 18-20 July 2005
- AACC : Orlando (USA), 11-14 September 2005
- POLAGRA : Poznan (POLAND), 21-24 September 2005
- AOM : Marrakech (MOROCCO), 26-28 September 2005
- Europack : Lyon (FRANCE), 4-7 October 2005
- Pet South America : (BRAZIL), 3-7 October 2005
- AGROPROMMASH : Moscow (RUSSIA), 3-6 October 2005
- ALIM : (COLOMBIA), 9-12 October 2005
- Congrès Mondial des Pâtes : Barcelone (SPAIN), 23-26 October 2005
- EUROPLAST : Paris (FRANCE), 18-25 November 2005
- Extrusion Course : Bangkok (THAILAND), 23-25 November 2005
- FIE : Paris (FRANCE), 29 November - 1st December 2005
- IPACK IMA : Milan (ITALIA), 14-18 February 2006

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