#### **EVOLUM**

#### DRYING TECHNOLOGY

A high efficiency dryer with a unique design

**Presented by Mohamed LAMMI** 





# A high efficiency dryer with an innovative design



90% energy efficiency

reduced energy consumption

Homogeneous finished product with maximum quality guaranteed

Rapid product changes

**User-friendly operation** 

**Reduced maintenance** 

#### **MORE PRODUCTIVITY AND PRODUCT QUALITY**





# THE EVOLUM® DRYER Dryer's application range

#### Typical data:

Size from 0.6 mm up to 50 mm No Shape limitation Drying rate from 40% back to 0.5%

Rotante technology could be applied to most of all "Dried" food product

Typical product range: Extruded product, Pasta, Couscous, Pellets, Ingredients, Bulgur, Pet food, Fish feed...

Specific appplication: Chemical (specialty products), fruits,





# THE EVOLUM® DRYER A unique design

#### Product progresses <u>very gently</u> in a <u>linear mode</u> via the Continuous Screws covered with stainless steel screens



« Winding cage » gathers the screws **Archimedes Continuous Screw** 

CLEXTRAL A DIVISION OF GROUPE EGRIS INDUSTRIES



=> All geared motors and fans located outside the Drying Chamber at the Upper frame : away from heat and moisture

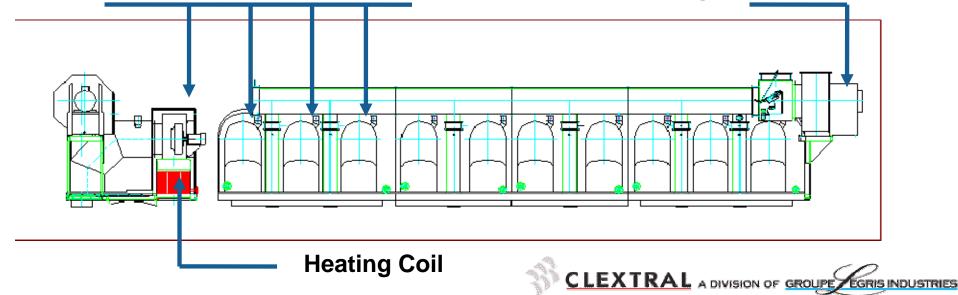






**Centrifugal Recirculation Fans (6 to 10)** 

**Centrifugal Exhaust Fan** 



## THE EVOLUM® DRYER A robust & reliable design

#### => Only one bearing at each end of the dryer







#### => Perfect insulation + stainless steel robust design

Fully insulated lower frame including the winding cage ready to be shipped by container or truck



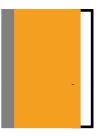


# THE EVOLUM® DRYER A robust & reliable design

⇒ Maximum insulation : reinforced insulation with insulated sliding doors for easy access





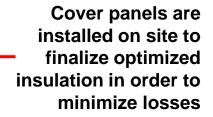


Stainless steel

Polyester panel

**Rockwool** 

Bottom part of the insulation can be opened for easy access in case of cleaning needs: sliding doors

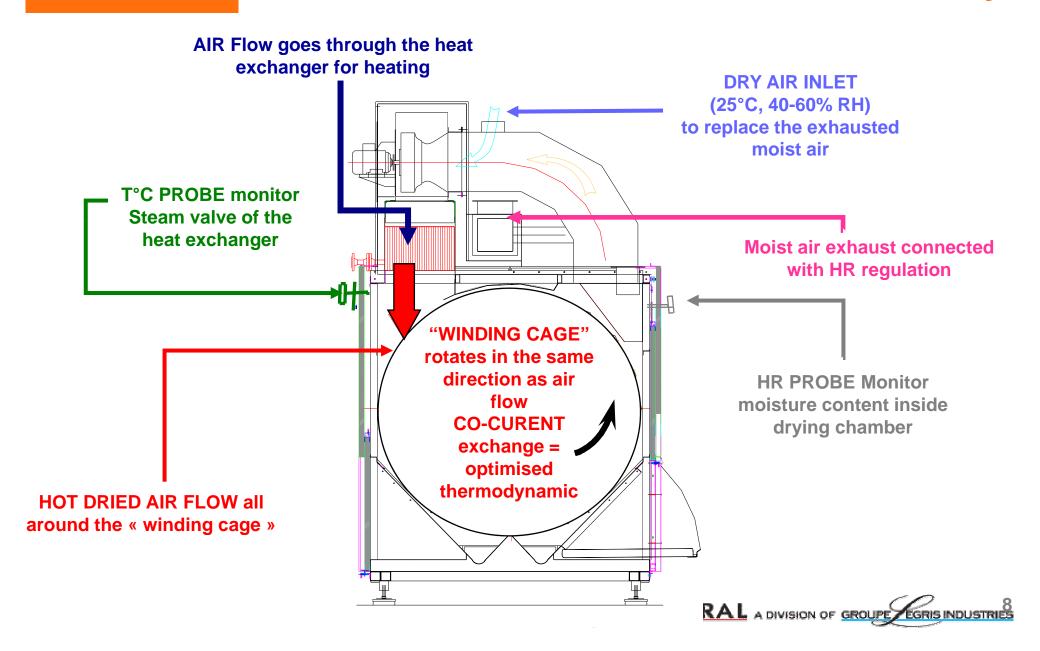


⇒ Quick onsite installation : 3 days





## THE EVOLUM® DRYER BENEFITS How does it work exactly?

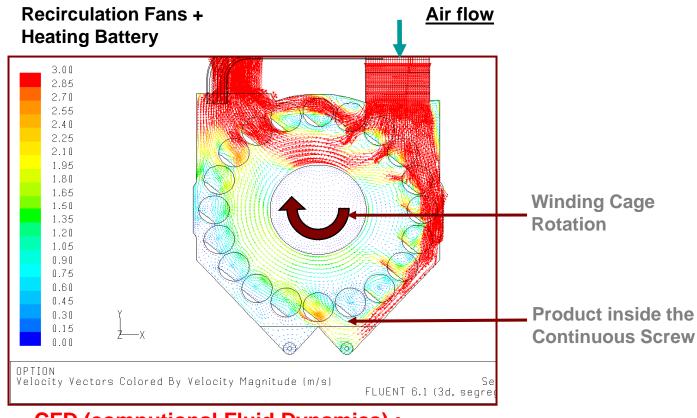


## THE EVOLUM® DRYER BENEFITS A perfectly mastered drying process

**Infeed Side view** 

#### ⇒ Optimized air flow & Mastered air exhaust





**CFD** (computional Fluid Dynamics):

Air flow study inside drying chamber





## THE EVOLUM® DRYER BENEFITS High energy efficiency: 860 kCal/KgH2O

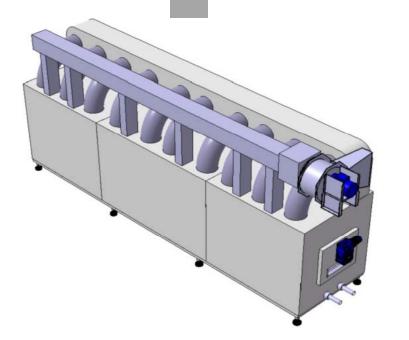
#### ⇒ 90% drying efficiency

- > Optimal product surface exposure to heated airflow
- Multiple drying zones
- > Uniform, thinner product depth
- Efficient use of airflow & air exhaust
- > Reduced air volume in drying chamber
- Consistent Time & Temperature exposure





## THE EVOLUM® DRYER BENEFITS High energy efficiency



Thermal energy given by steam Electrical energy given by fans

+ 570 kWh

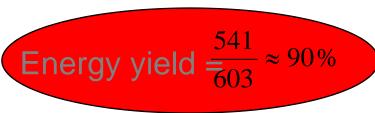
+ 33 kWh

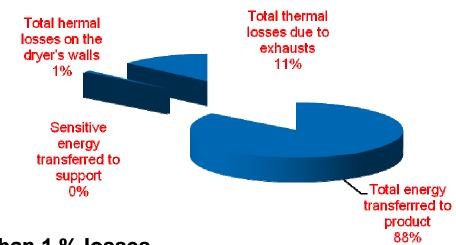
Total + 603 kWh

Energy given to product for drying - 541 kWh

Thermal losses - 6 kWh

Moist air extraction - 68 kWh





\_\_\_\_\_ Due to excellent insulation less than 1 % losses

Due to specific design: >90% energy efficiency (Std in food industry ~55-max 70%)

Most energy losses are linked with moist air extration but minimized due to specific monitoring of the moist air extraction process





## THE EVOLUM® DRYER BENEFITS Homogeneous drying – 0,1%

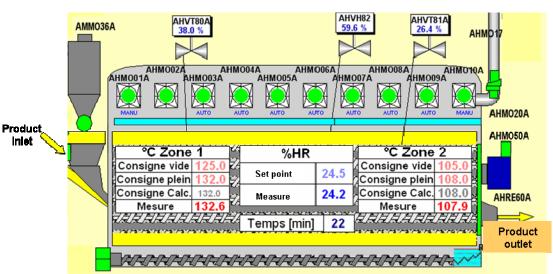
- ⇒ Homogeneous finished product with maximum quality guaranteed
  - Continuous rotation provides exposure of ALL PRODUCT SURFACES to drying airflow
  - Product flow divided into many smaller flows, which are easier to control
  - Multiple drying zones for fitting with product drying profile or product temperature limitation
  - Advanced humidity sensors adjust temperature & humidity for optimal drying (energy)
  - Consistent time exposure to drying





## THE EVOLUM® DRYER Quick product changeover

- Continuous screws in Winding Cage: linear progression
- > True FIFO product flow
- > Max. 2-3 minutes leadtime between different products
- No disruption of process air flow







#### THE EVOLUM® DRYER Ease of maintenance

- Externally mounted components:
  - > Fans
  - Bearings
  - Heat Sources
  - Drives



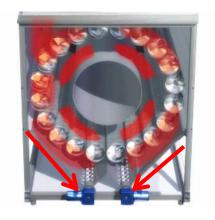
Proven design: Over 100 units in operation





## THE EVOLUM® DRYER Ease of cleaning

- High Velocity airflow moves fines from product
- > Dryer internal shape drops fines to bottom
  - Sloped sides
- > Internal fines removal screws remove fines
  - > Fresh fines can be recycled into the process
- Removable panels on dryer perimeter for complete interior access











#### THE EVOLUM® DRYER Sustainable solution

# The carbon footprint of the EVOLUM® Rotante dryer is

0,073 kg CO<sub>2</sub>/kg of dry product



# 20 screws 14 screws 10 screws diam 290 mm diam 390 mm diam 520 mm

## THE EVOLUM® DRYER A modular concept

#### From 6 to 10 fans



#### ⇒ Drying expertise : other dryers can be offered



