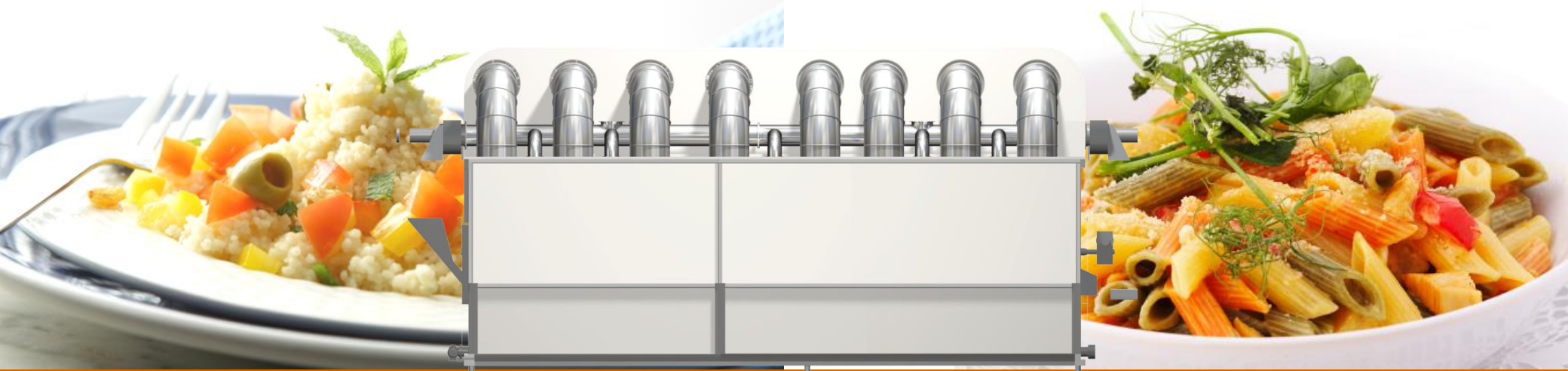


# PRECOOKED SEMOLINA & PASTA DRYING TECHNOLOGY

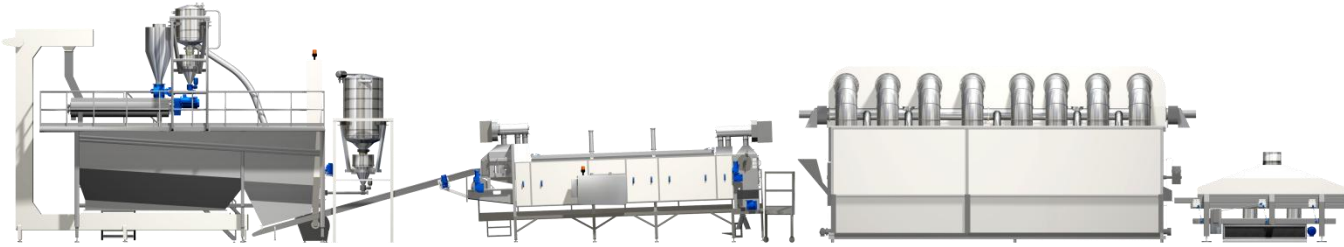
A high efficiency dryer with a unique design



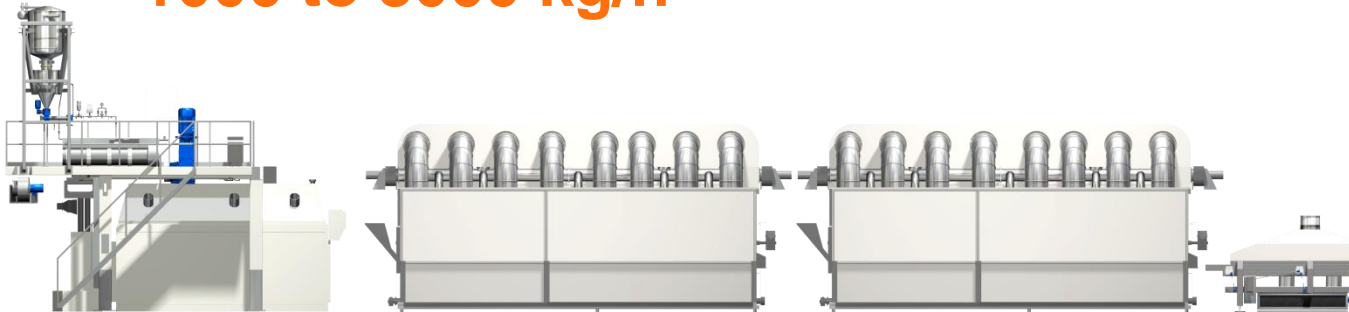
Presented by Mohamed LAMMI

# Drying is an essential stage in pasta and precooked semolina lines

- **Precooked semolina with Rotante drying**  
500 to 3600 kg/h



- **Pasta line with Rotante drying**  
1000 to 3000 kg/h



# 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 application : Chemical (specialty products), fruits,

....



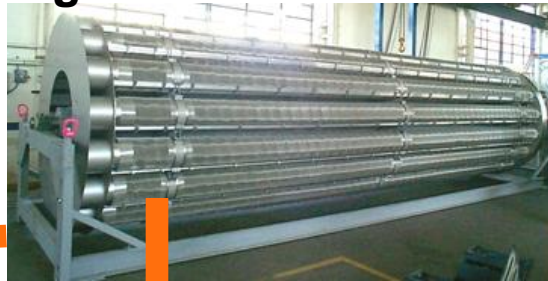
# THE EVOLUM® DRYER

## A unique design

Product progresses very gently in a linear mode via the Continuous Screws covered with stainless steel screens



« Winding cage »  
gathers the screws



Archimedes  
Continuous Screw

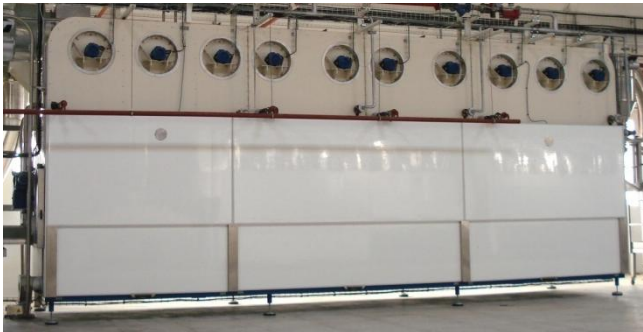


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# THE EVOLUM® DRYER

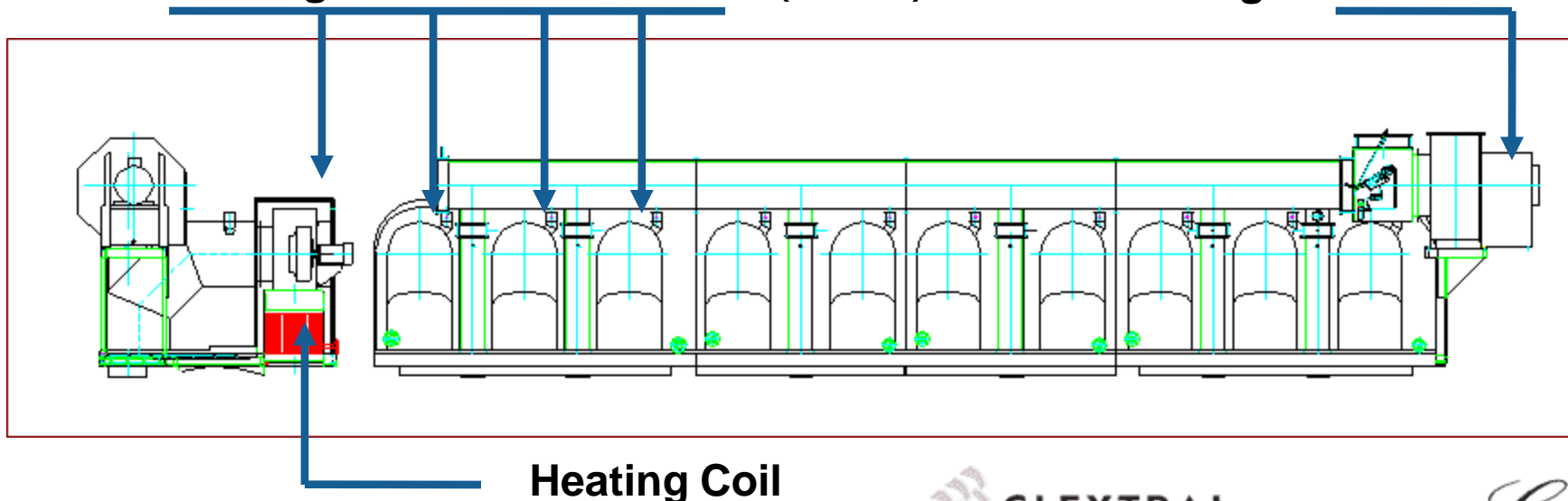
A robust & reliable design

=> 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



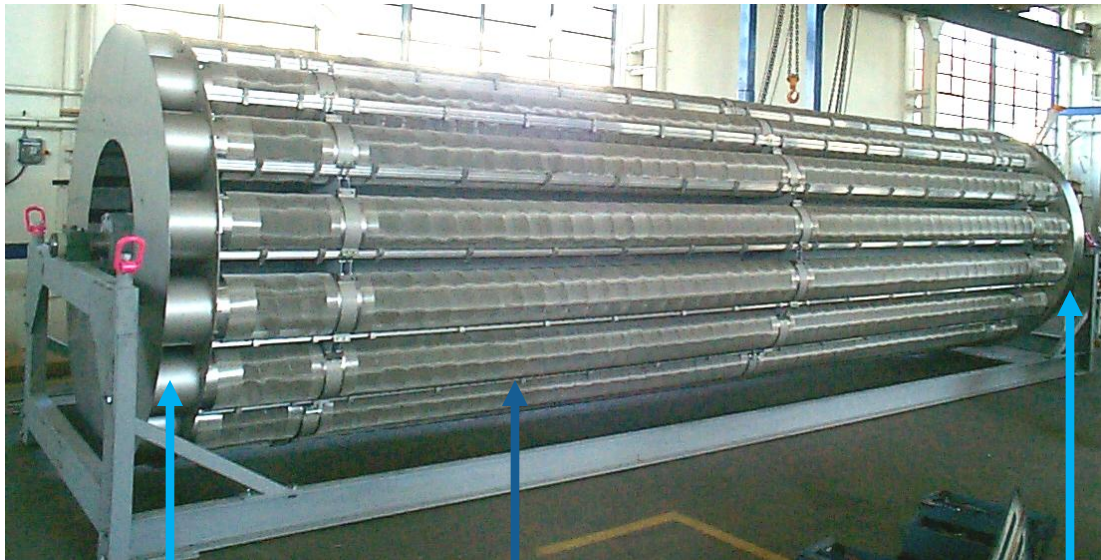
# THE EVOLUM® DRYER

## A robust & reliable design

=> Fully tight drying chamber

Bottom  
frame  
in SS

- « Winding cage», composed of several Archimède screw covered with metallic mesh sheet = **the heart of the dryer**
- 1 Infeed collector, 1 outfeed collector
- 2 dust exhaust never ending screws



Product  
Outfeed  
collector

Archimède never  
ending screw with SS  
mesh cover

Product  
Infeed  
collector



Dust exhaust  
screw device



# THE EVOLUM® DRYER

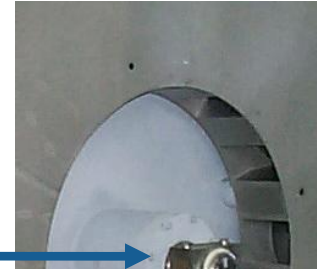
## A robust & reliable design

Infeed  
product  
collector

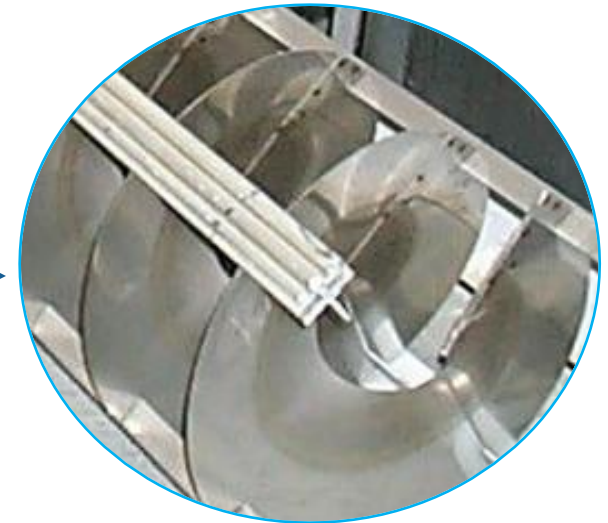


Only one bearing  
at each end of the  
« winding cage »

Outfeed  
product  
collector



Archimede never  
ending Screw

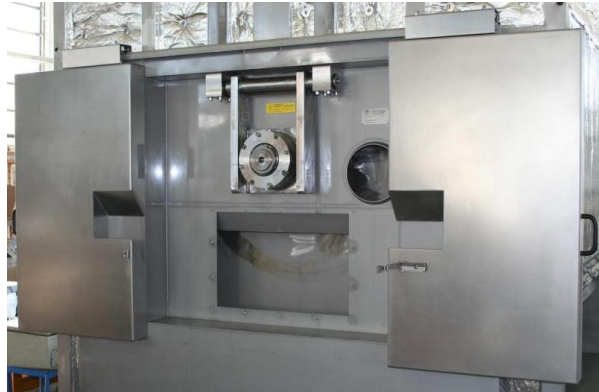




# THE EVOLUM® DRYER

## A robust & reliable design

=> Only one bearing at each end of the dryer



=> Perfect insulation + stainless steel robust design

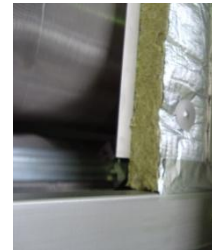
Fully insulated lower frame including the winding cage ready to be shipped by container or truck



# 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

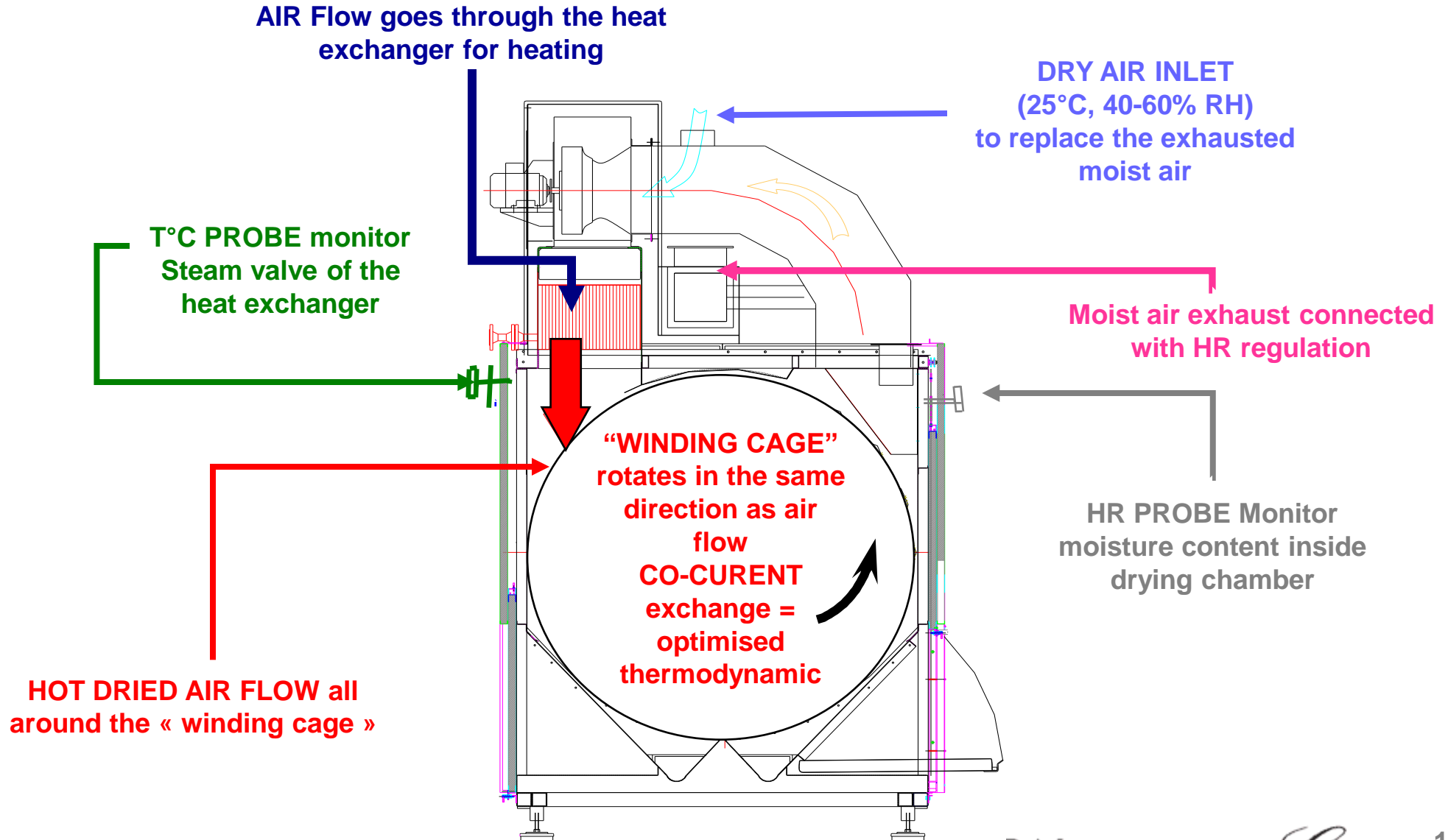


Cover panels are installed on site to finalize optimized insulation in order to minimize losses

⇒ **Quick onsite installation : 3 days**

# THE EVOLUM® DRYER BENEFITS

## How does it work exactly ?





# THE EVOLUM® DRYER BENEFITS

## A perfectly mastered drying process

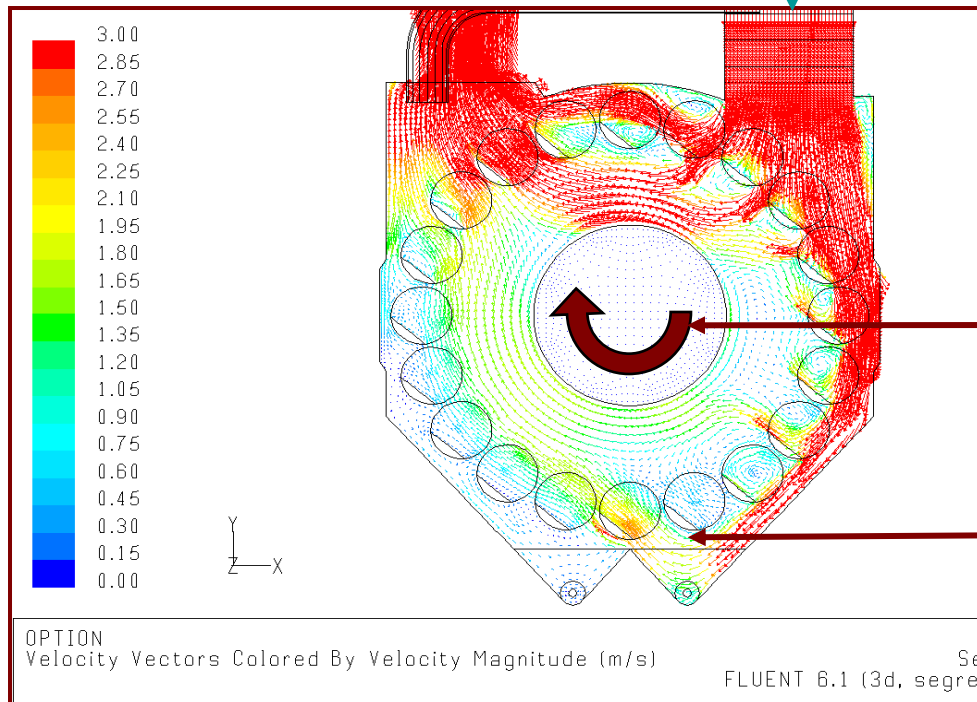
Infeed Side view

⇒ **Optimized air flow & Mastered air exhaust**



Recirculation Fans +  
Heating Battery

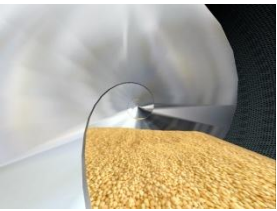
Air flow



Winding Cage  
Rotation

Product inside the  
Continuous Screw

**CFD (computational Fluid Dynamics) :**  
**Air flow study inside drying chamber**



# THE EVOLUM® DRYER BENEFITS

## High energy efficiency : 860 kCal/KgH<sub>2</sub>O

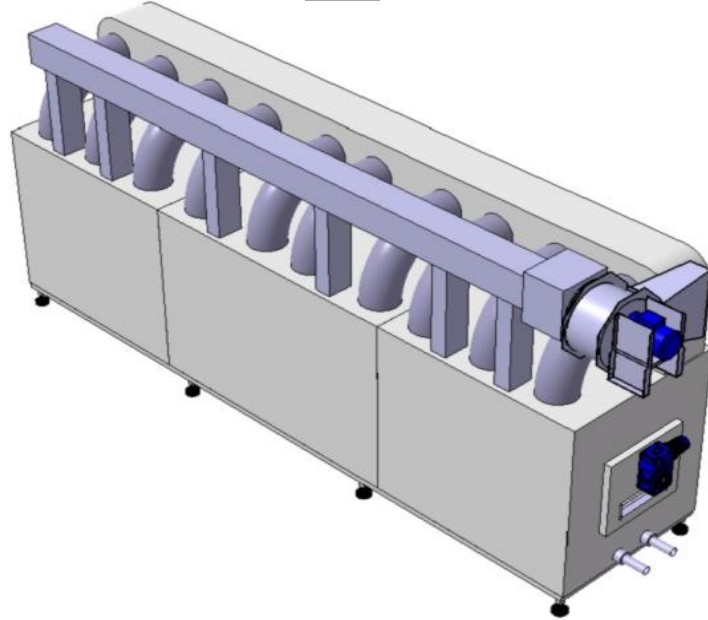
⇒ **90% drying efficiency**

- **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	+ 570 kWh
Electrical energy given by fans	+ 33 kWh
Total	+ 603 kWh

Energy given to product for drying	- 541 kWh
Thermal losses	- 6 kWh
Moist air extraction	- 68 kWh

$$\text{Energy yield} = \frac{541}{603} \approx 90\%$$

Total thermal losses on the dryer's walls  
1%

Sensitive energy transferred to support  
0%

Total thermal losses due to exhausts  
11%

Total energy transferred to product  
88%

→ 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



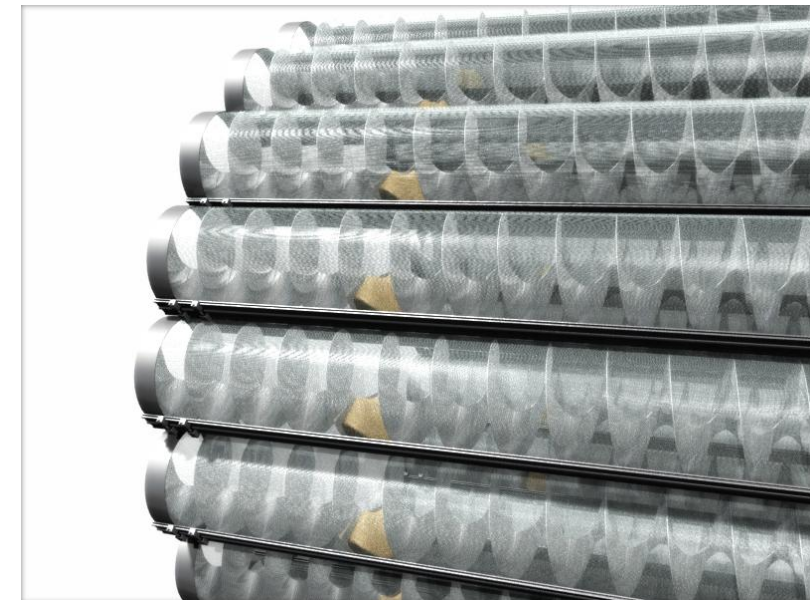
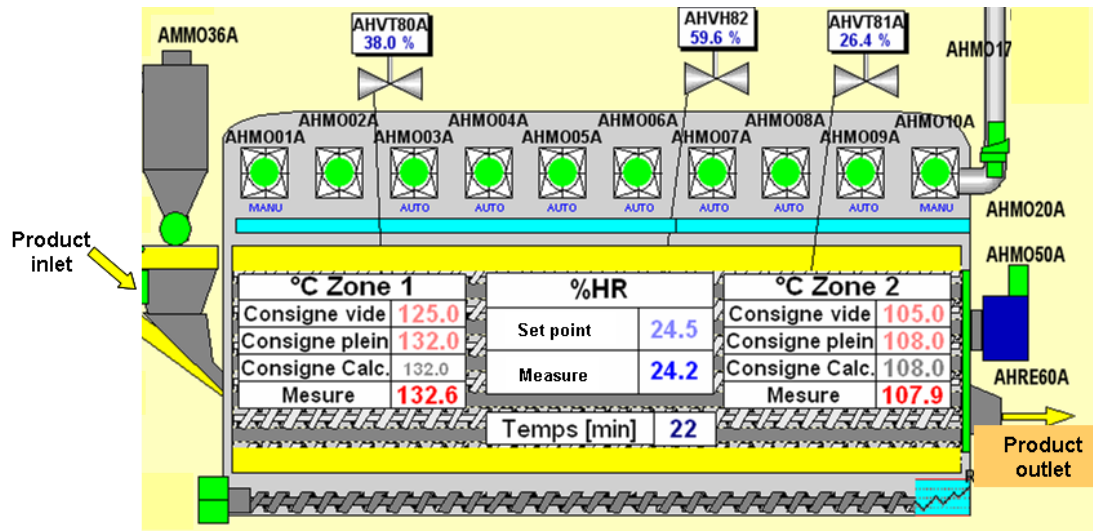
⇒ **Homogeneous finished product with maximum quality guaranteed**

- **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
- **Removable panels on dryer perimeter for complete interior access**
- **Proven design: Over 100 units in operation**



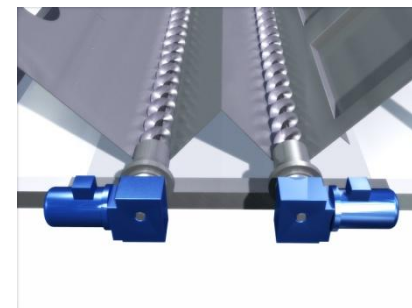
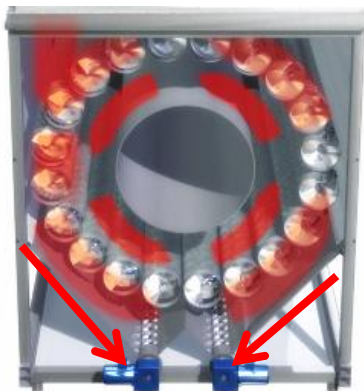
FILM



# 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**





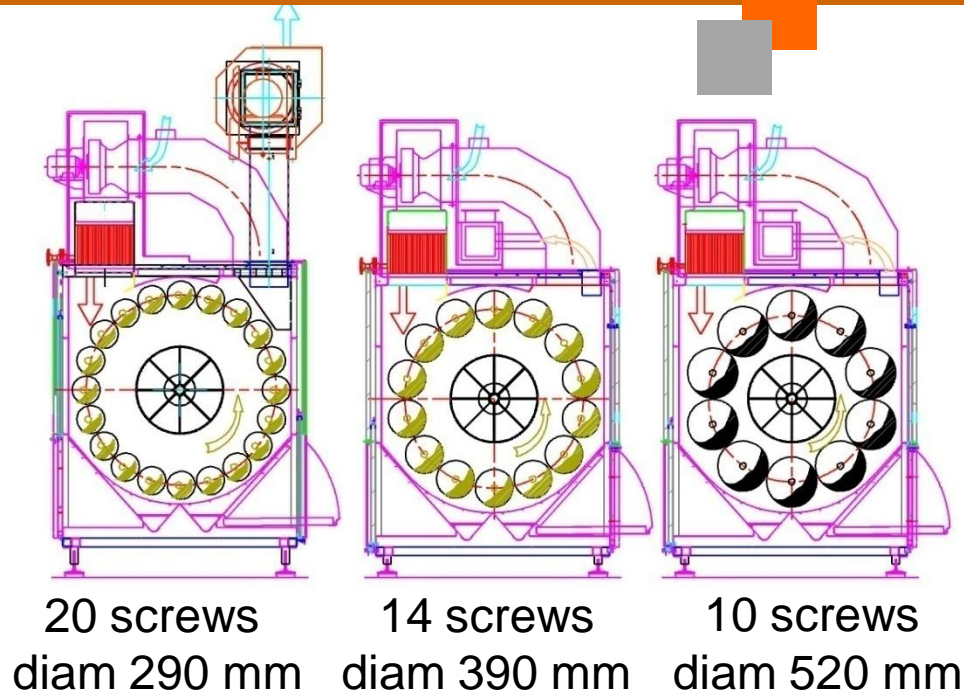
**The carbon footprint  
of the EVOLUM® Rotante dryer is**

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

# THE EVOLUM® DRYER

## A modular concept

From 6 to 10 fans



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



**FILM**

**Rotante dryer**



**CLEXTRAL**

A DIVISION OF

**GRUPE LEGRIS INDUSTRIES**