MILLING / DRYING / PELLETING

Maguin
A Moret Industries Company

/ MAGUIN PROMILL

SUGAR
- Drying
- Pelleting

ALFALFA
- Drying
- Milling
- Pelleting

WOOD
- Drying
- Milling.
- Pelleting

D.D.G.S
− Drying
(Direct , indirect)
- Pelleting

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ACTIVITIES

VARIOUS
- Bagasse..
- Seaweed.
- Rice.
- Wine residues.
-Ginko

FERTILIZER
- Drying
- Coating
- Cooling

FUEL
-Natural gas.
-Heavy or, light..
-Step furnace.
-Grate furnace.
-Screw furnace

CHEMISTRY
- Drying
- Calcination
- Cooling

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BEET PULP

ALFALFA

WOOD

MAGUIN PROMILL

From design to after-sales

DESIGN ENGINEERING				
MANUFACTURE				
TRANSPORT INSTALLATION				
AFTER-SALES SERVICE				

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MILLING	DRYING	PELLETING

PROMILL foundation (J.Thirouard)

Take-over by MAGUIN / MORET ENSIVAL

1950   1960   1970   1980   1995   2000

CATTLE FOOD	GREEN CROP ALFALFA	SUGAR INDUSTRY Beet pulp	DISTILLERY DRAFFS	WOOD	FERTILIZERS
. Hammermills . Pellet presses	. Drying . Milling . Pelleting	. Drying . Pelleting	. Milling . Drying . Pelleting	. Drying . Milling . Pelleting	. Drying drums . Granulating drums . Crushers

6

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PROMILL foundation (J.Thirouard)

1950	1960	1970	1975
	1st PELLET PRESS 1st HAMMERMILL	Triple pass drum drier	Belt dryer

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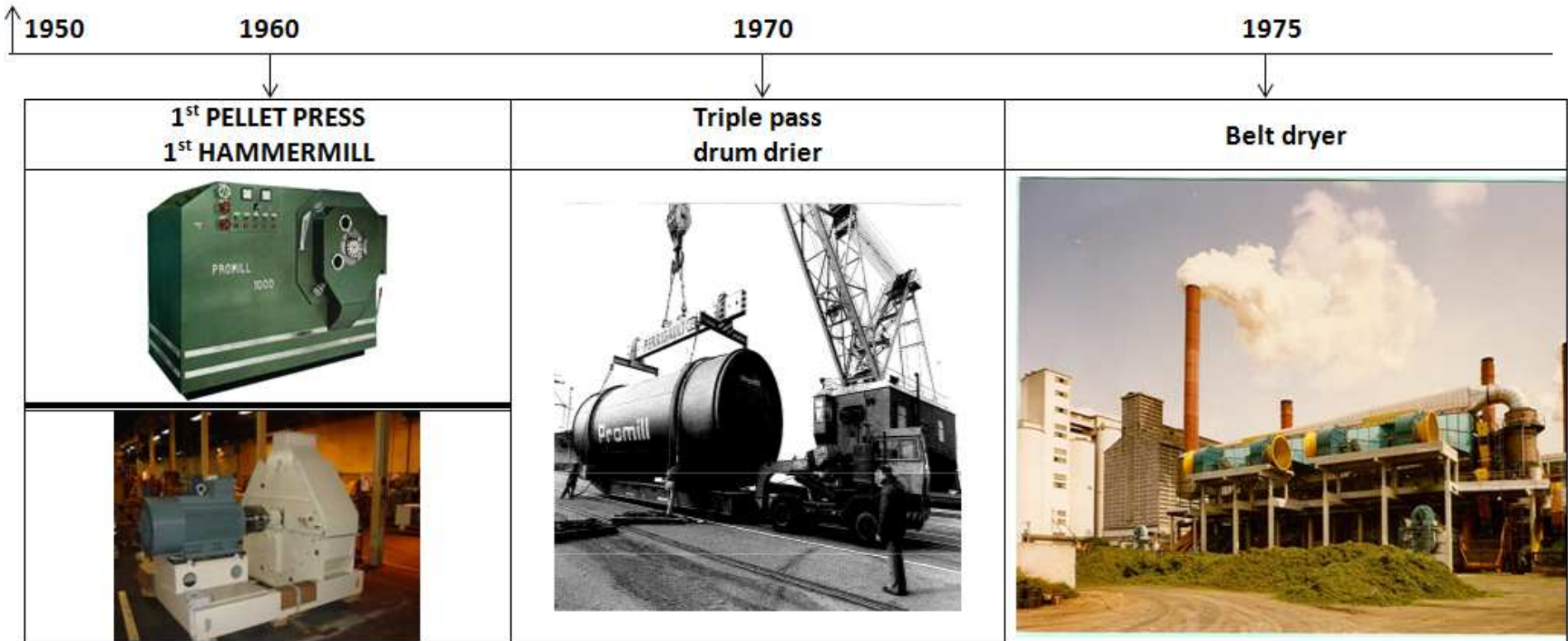
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1985	2000	2005
Pellet press, EVOLUTION type	Triple pass drier 85 000 L/H evaporative capacity	Manufacturing of gas/fuel-oil/biomass burner

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2005 — Turbo-drier with exchanger

2008 — Belt dryer for alfalfa/beet pulp — Evaporation : 10 T/H

2011 — TOTAL pilot plant running with overheated steam (partnership with LUZEAL / UNGDA / CRISTAL UNION)

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2011

Complete fertilizer plant (1000 T/D SSP)

| Combustion furnace | Granulating drum | Drying drum | Cooling drum | Coating drum |

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MAGUIN RECENT DRYER PROJECTS

Inlet Product	Dryer Type	Pelleting	Drying Capacity T H_2O/h	Country	Commissioning year	Fuel
Wood	3-pass drum	X (10 presses)	26	Estonia	2014	Wood
Beet pulp	3-pass drum	X (8 presses)	26	Russia	2013	Natural gas
Beet pulp	3-pass drum	X (3 preses)	36	Egypt	2013	Dual oil/gas
Beet pulp	3-pass drum	X (2 presses)	28	Ukraine	2013	Coal
Beet pulp	3-pass drum		26	Russia	2013	Natural gas
Beet pulp	3-pass drum	X (2 presses)	26	Russia	2012	Natural gas
Beet pulp	3-pass drum	X (2 presses)	26	Russia	2012	Natural gas
Beet pulp	3-pass drum	X (3 presses)	55	Egypt	2012	Natural gas + boiler flue gas
Beet pulp	3-pass drum	X (4 presses)	72	Egypt	2011	Mix : fuel-oil/ natural gas
Beet pulp	3-pass drum	X (4 presses)	65	Egypt	2010	Fuel oil → natural gas
Beet pulp Alfalfa	Belt	X	10 (→ 21)	France	2009	None
DDGS (cereals)	Turbo 3-pass drum	X (3 presses)	32	France	2008	Natural gas biogas, fusel oil
DDGS (cereals)	Turbo 3-pass drum	X (3 presses)	2 x 27 = 54	France	2007	Natural gas
Beet pulp Alfalfa Wood	(existing 3-pass drum)	X (5 presses)	25	France	2007	Conversion to biomass

PULP DRYING TECHNOLOGIES

	Belt drier	Direct fired	« turbo »
Hot stream in contact with pulp	air	Combustion flue gas	Superheated steam
remarks	Possibly wet air recycling	+wet flue gas recycling	With some air
Inlet T (°C)	70-110	650-900	400-450
Pressure inside dryer	atmospheric	atmospheric	atmospheric
Indirect heat exchanger : hot stream	Hot waters; steam…	Hot waters (combustion air heating)	Combustion flue gas
Fuel consumption type	(no)	Fossil; others	Flexible
Fuel consumption kWh/t H2O		800	800
Power consumption kWh/ t H2O	40	20	50
Heat recovery by coupling kWh/ t/H2O			500
Product temperature		<100	<100

COMBUSTION

Natural gas combustion furnace

Semi wet biomass screw furnace

Natural gas burner

Heavy-oil furnace

Wet biomass screw furnace

Coal furnace

COMBINED 3-PASS & BELT- DRYERS

Bazancourt scheme:

former 2 coal fired 3-pass drum dryers (wet bulb T° 75°C),

70 t H_2O / h

+ condenser

+ belt dryer

Fossil fuel 610 kWh/t H_2O

D20

90% DM

D20 + D30: 70 t/h H_2O

wet pulp

air preheating

air preheating

D30

90% DM

75°C (wet bulb)

5 000 m²

condenser

dust < 50 mg/Nm³

air 10°C

120 000 m²

73°C

water loop

70°C

3-stage belt dryer

600 m²

D20/D30

90% DM

21 t/h H_2O

36°C

condensates

62°C

dust < 25 mg/Nm³

21/70 = + 30% capacity

40 m³/h
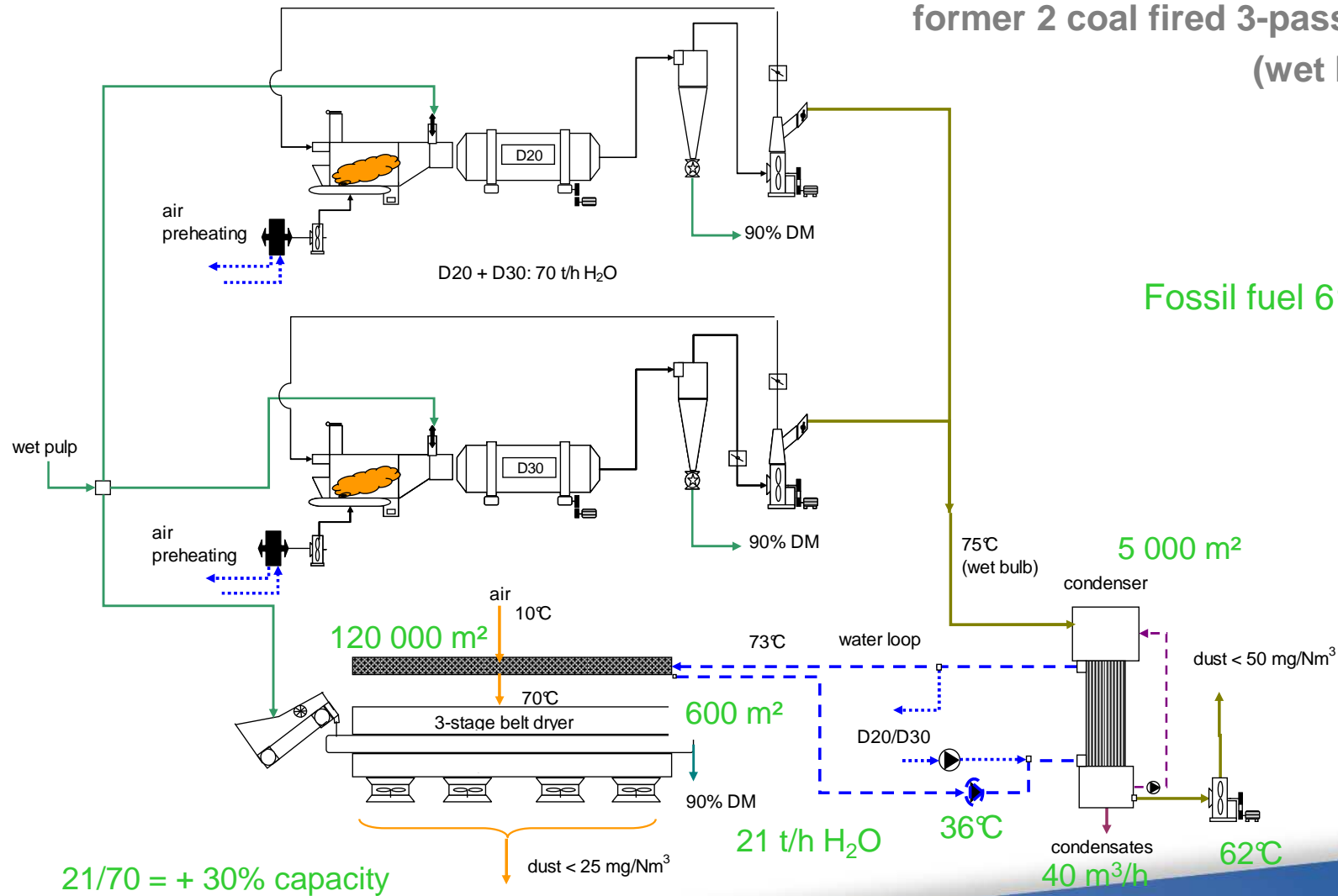
❚ BELT DRYER: OTHER COUPLINGS

▶ **Coupling with beet plant:**

- ■ **Hot condensates:**
  - ● **Temperature up to 90°C**
  - ● **Availability: 290 t/h / 10 000 t/d beet**
- ■ **Hot-condenser bottom waters:**
  - ● **Temperature 50°C**
  - ● **Availability: 350 t/h / 10 000 t/d beet**
- ■ **Steam (2nd effect, 3rd effect…)**
- ■ **Flue gas (boiler, …)**
- ■ **…**

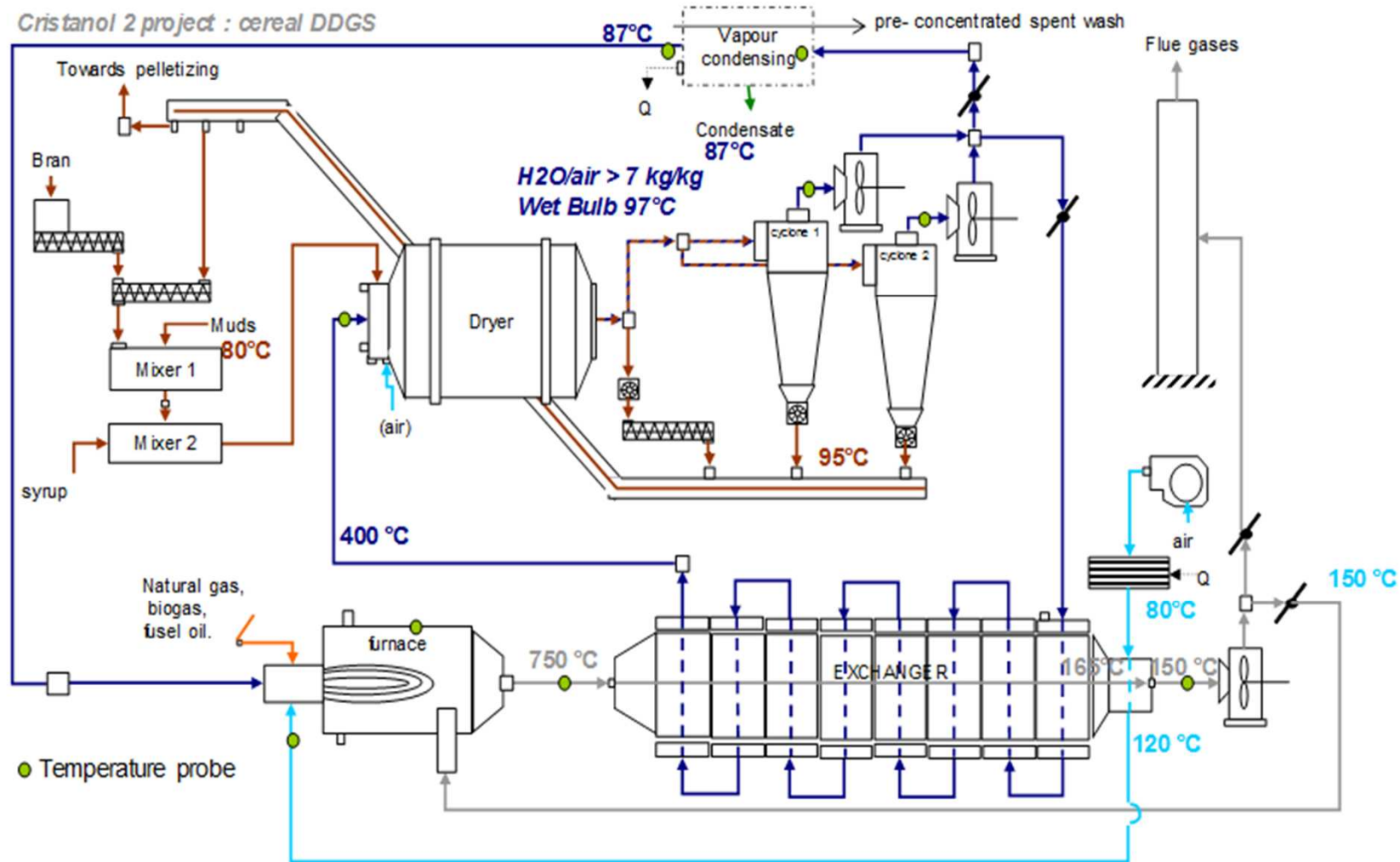# CONDENSER AFTER TWIN 3-PASS DRYERS

Bazancourt

BELT DRYER
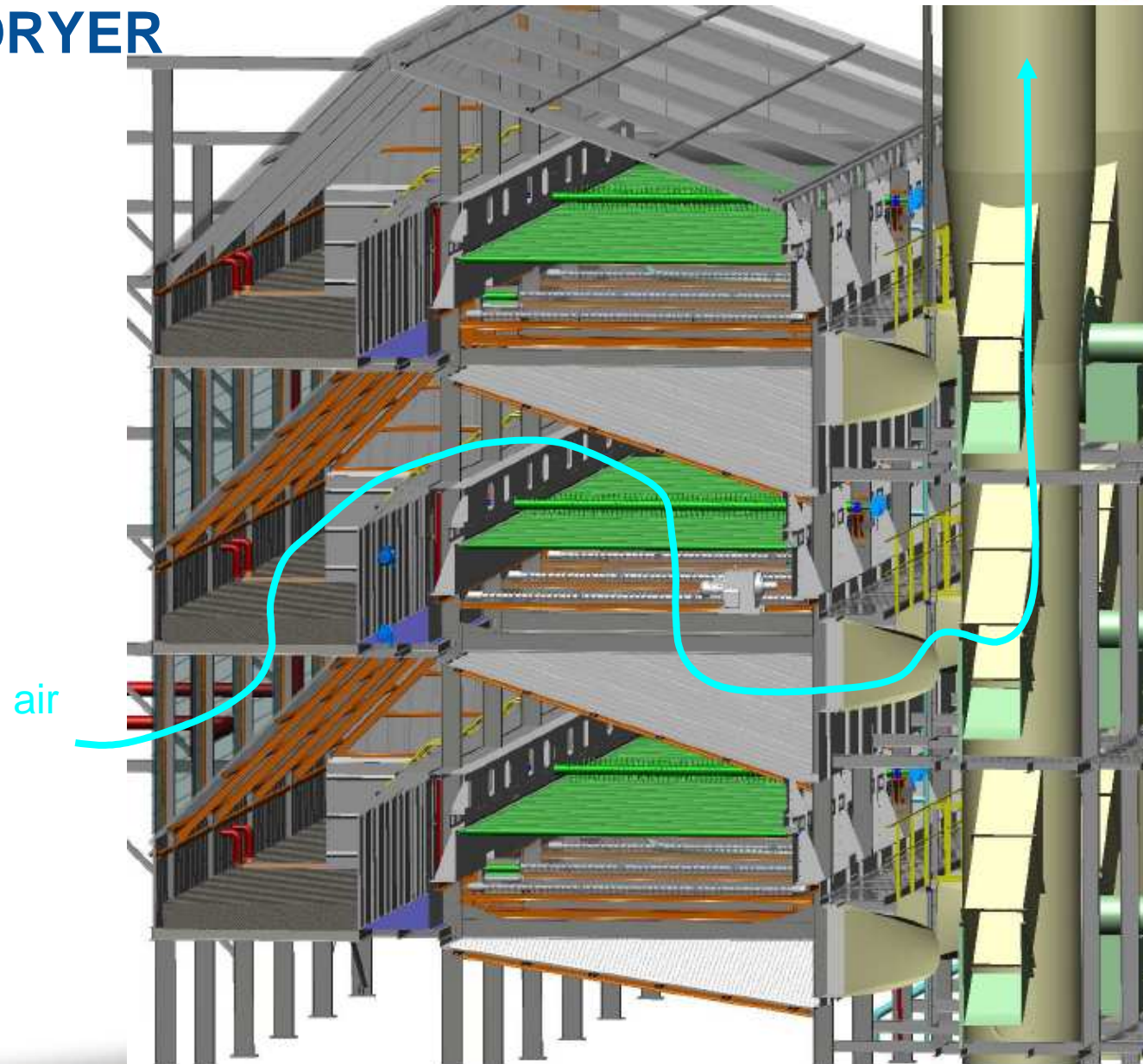
air
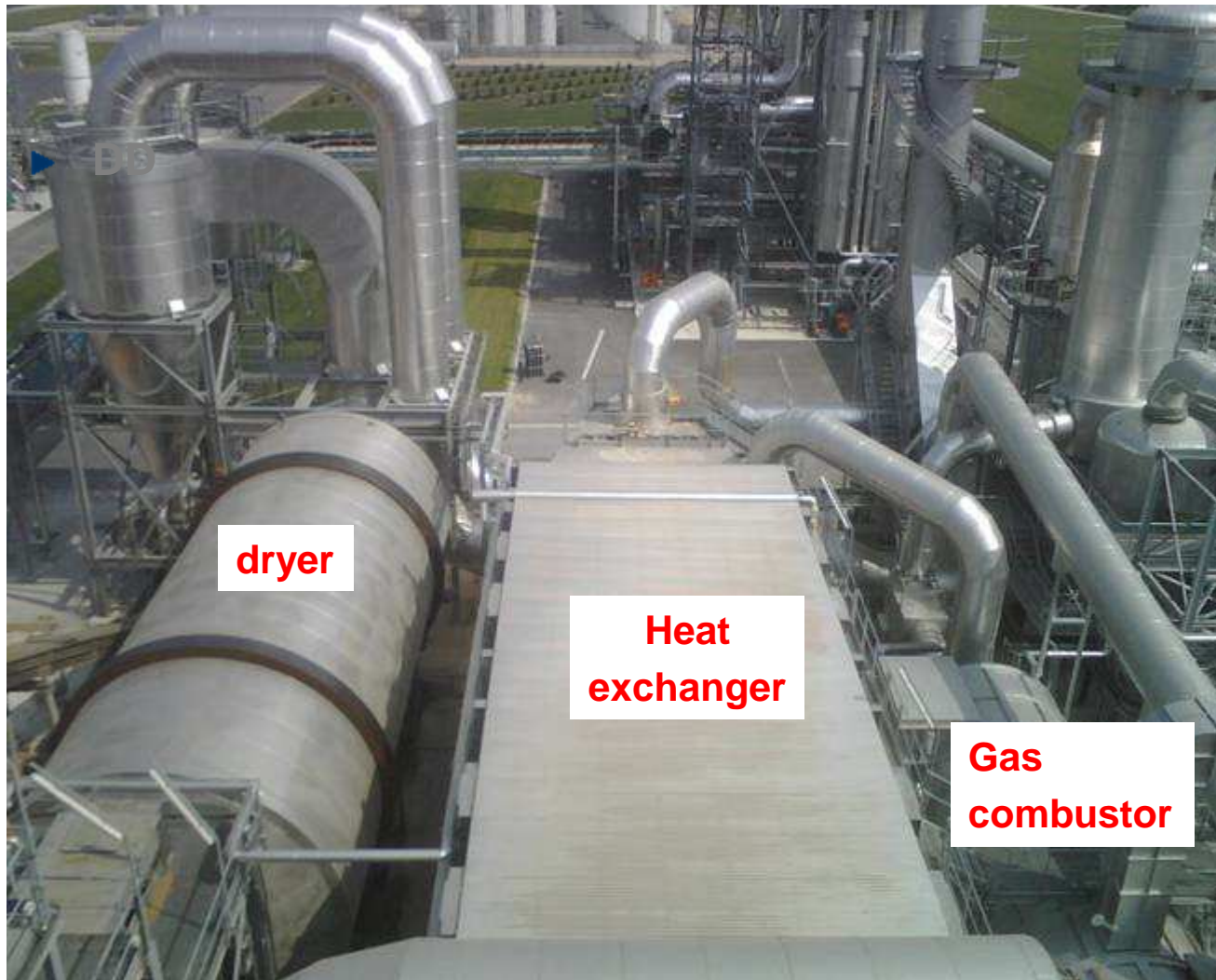
« TURBO » 3-PASS DRYER

Cristanol 2 project : cereal DDGS

« TURBO » 3-PASS DRYER: ADVANTAGES

- ▶ **Indirect heating:**
  - **pulp quality**
  - **Fuel choice: flexibility (biogas, biomass…)**

- ▶ **Energy recovery:**
  - **High condensation yield**
  - **At T > 97℃ (H_2O/air >> 7 kg/kg)**

- ▶ **Low Emissions:**
  - **Dust**
  - **V.O.C. (CO, CH_4, …)**
  - **NO_x**
  - **Odors**

/ Maguin Promill Rotary Dryer

Products

▶ **Beet Pulp**

▶ **Woodchips**

▶ **Bagasse**

▶ **Renewable Fuel**

▶ **Corn Germ**

▶ **Corn Fibres**

▶ **DDGS**

▶ **Spent Grains**

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Maguin Promill Rotary Dryer

▶ Use of direct fired gas or oil as or biomass as energy source – 100% convection drying

▶ <u>Preferred</u> for drying of coarse products – very broad application field

▶ Utilisation of hot exhaust gases (e.g. turbine or boiler exhaust gases) possible

▶ Water evaporation up to **90 ton/h** per dryer depending on the application

▶ Low energy usage

▶ Exhaust gas recycle option for improved energy efficiency, self inerting (improved safety)

▶ Integrated '*First flash effect*'

▶ Integrated cooler and pelletizer with energy recovery as an option
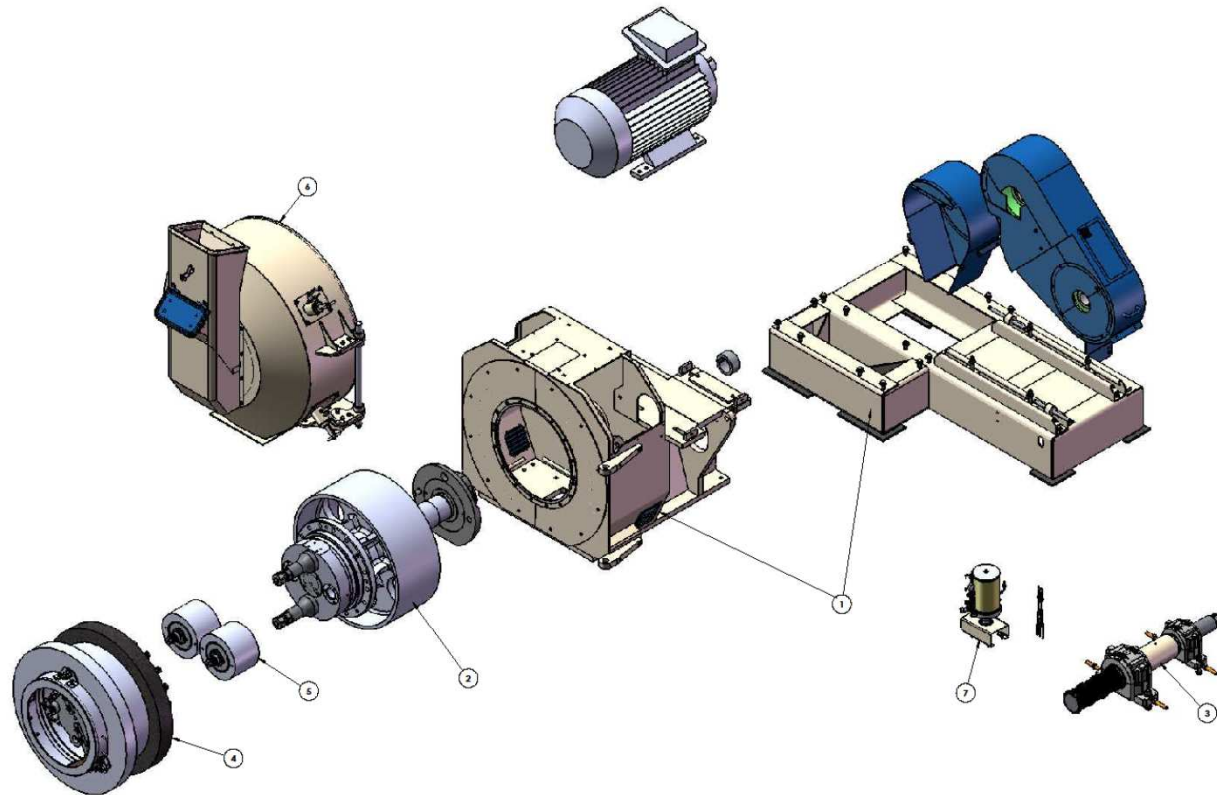
Working principle
Maguin Promill Rotary Dryer
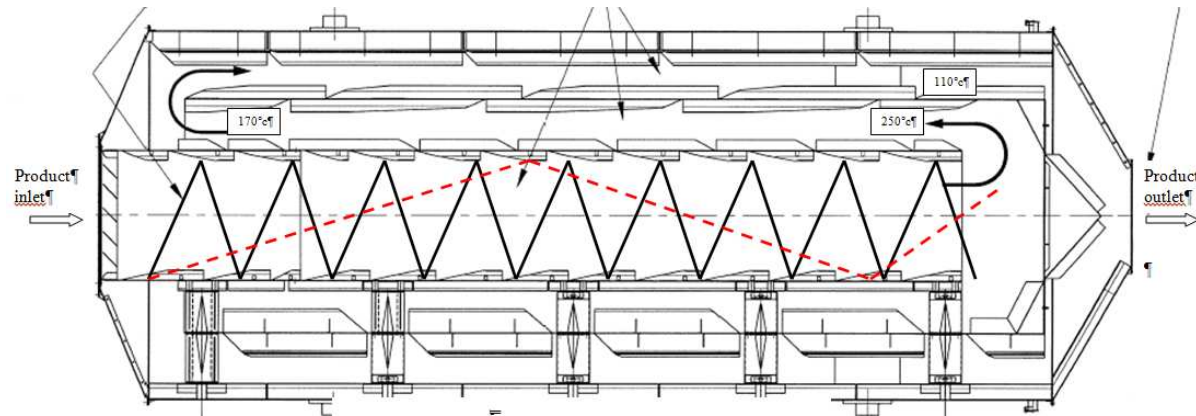
▶ **The product is transported into a hot air stream.**

▶ **Drying is achieved while the product is carried with the air stream until being separated.**

▶ **Depending on type of dryer, it can be a single pass or triple pass dryer.**

DIE

ROLLERS

Thank you