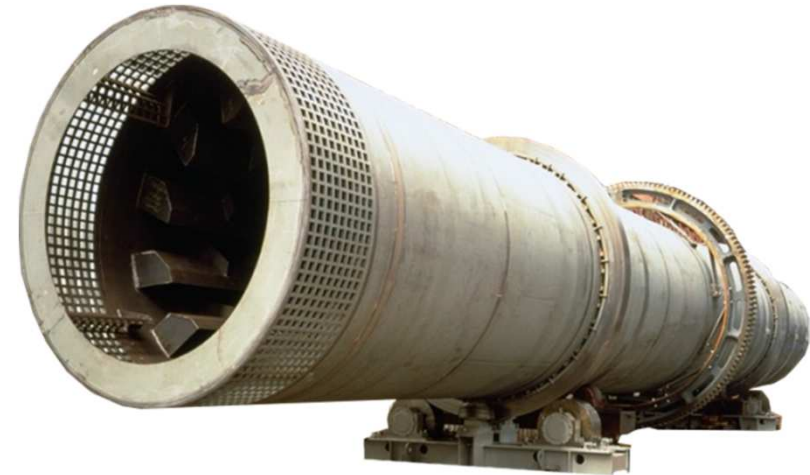


/ OUR TECHNOLOGY IN FERTILIZER INDUSTRY

04/2012

/ PROCESS AND CONSTRUCTION



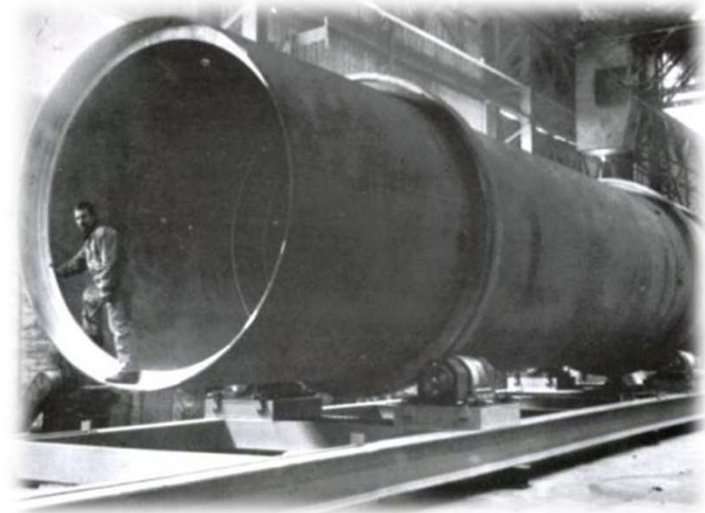
/ KEY STRENGTH

- ▶ Flexibility :
 - To produce SSP/TSP/NPK.
 - Of process allows to work with any type of phosphate rock and sulphuric acid (impacting price of basic raw material acting on final profitability).
- ▶ Very low price of maintenance :
 - due to process of dilution (reactor)
 - strong design of the drums.
- ▶ Good pollution control
 - dust and odour
 - without any water treatment.
- ▶ On-field experience.
- ▶ Improvements and safety in the process.
- ▶ High Skilled Engineering Team

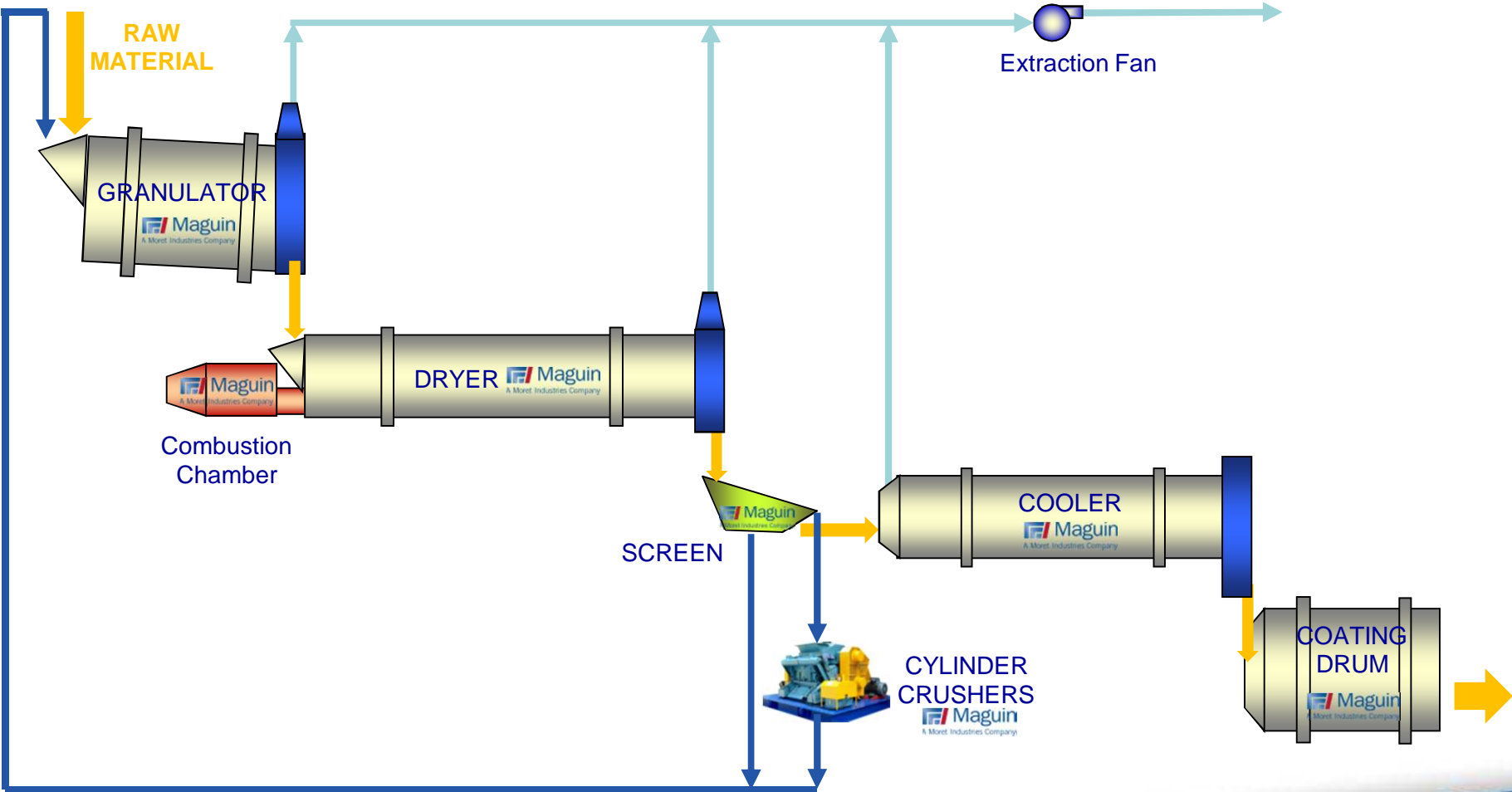


/ MAGUIN CONCEPTION AND FABRICATION

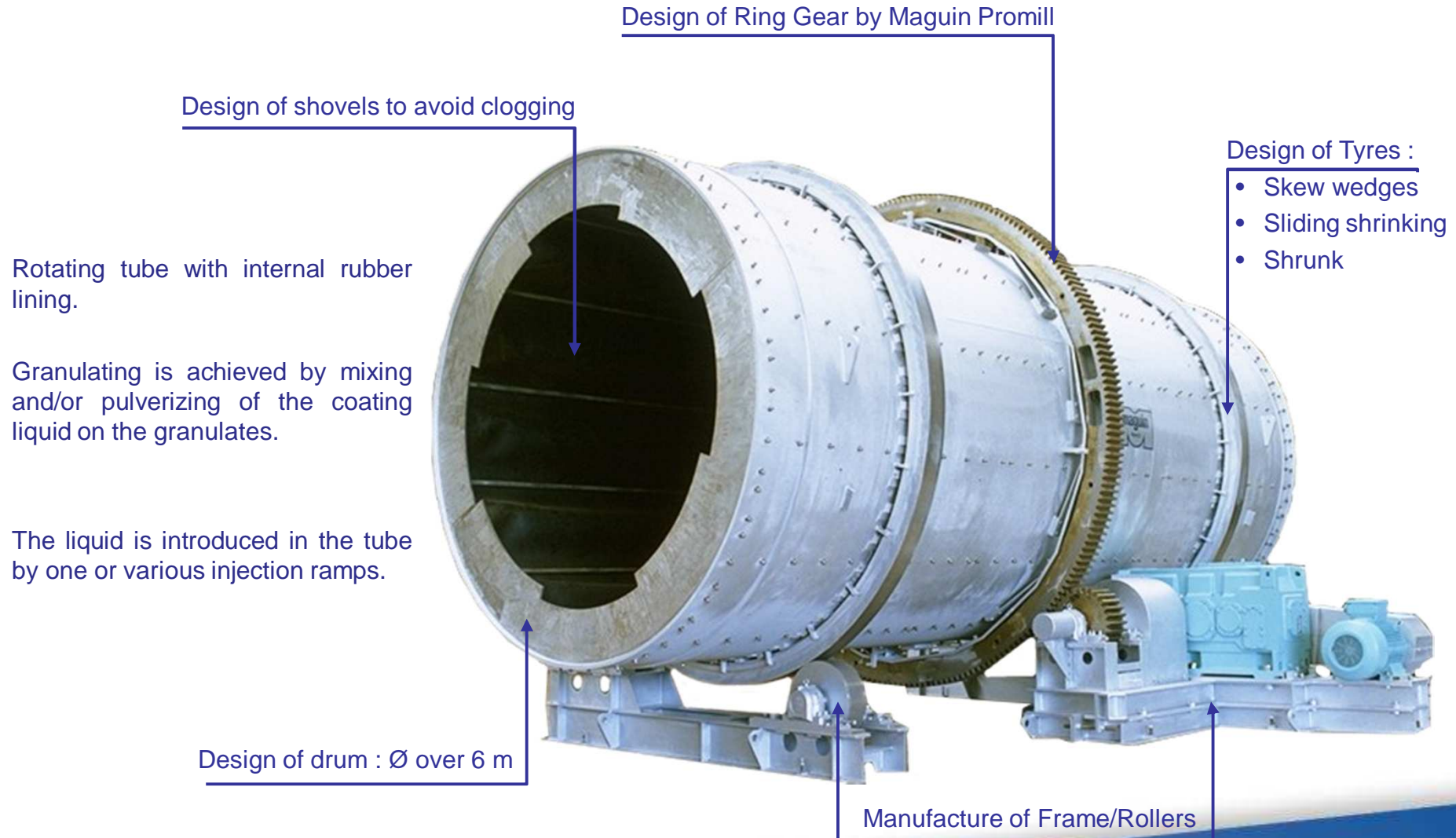
- ▶ A proven experience since 1960 in rotary drums up to 6 meter diameter.
- ▶ A strong design with most of providers ensuring final quality of product.
- ▶ Proven design / manufacture in our shops :
 - strongly limits the cost of maintenance.
 - ensures long life time of equipment.
 - ensures optimal operation (no stoppage nor leakage of product).



MAGUIN: SCOPE OF SUPPLY



/ GRANULATOR



/ GRANULATOR: References List

Client	Location	Qty	Size (mm)	Year	Processed Product
Groupe Chimique Tunisien	Tunisia	1	4000 x 8000	2004	DAP
TIMAC (Gabes)	Tunisia	1	4000 x 9000	2003	Phosphate
MAROC PHOSPHORE	Marocco	1	3700 x 7500	2001	TSP
KREBS	Pakistan	1	4000 x 9000	1996	NPK
KREBS	Jordan	1	3500 x 8000	1995	NPK-DAP
RHONE POULENC	France	1	2500 x 8000	1989	Metasilicate
SPIE	China	1	4000 x 8000	1989	NPK
¹ NORSK HYDRO	France	1	2500 x 3800	1989	Ammonium nitrate
¹ RHONE POULENC	France	1	3000 x 14 000	1986	Metasilicate
GUBRE	Turkey	1	3000 x 7000	1986	NPK
PRAYON		1	3200 x 7300	1984	NPK
SPEICHIM		3	5000 x 8000	1977	NPK
L.C.C	Lebanon	1	3750 x 7500	1976	NPK
GESA L'OSERAIE		1	3000 x 6000	1976	NPK + binaries
ZUID CHEMIE	Netherlands	1	3000 x 6000	1976	NPK + binaries
GESA / Bordeaux (33)	France	1	3000 x 6000	1973	NPK + binaries
L.C.C	Lebanon	1	2250 x 5000	1967	NPK + binaries
SOFO / Brest (29)	France	1	2250 x 5000	1965	NPK + binaries
PECHINEY / ST GOBAIN		2	1600 x 4500	1958	
CITRA CABOT		6	2430 x 14 500	1958	



And many more...

¹ Drums in stainless steel

COMBUSTION



Natural Gas Combustion Furnace



Natural Gas Burner



Semi-Wet Biomass
Screw Furnace



Wet Biomass Grate Furnace



Semi- Wet Biomass Furnace



Coal Furnace

Our Experience in Biomass Furnace

From Sawdust – Chips – Bark 30 % to 50 % moisture content  2 to 10 MW

From dry Sawdust 10 % to 30 % moisture content  2 to 20 MW

From Sanding and Screening dust, 7 % moisture content  2 to 30 MW



/ NATURAL GAS/OIL BURNER References List

CLIENT	Thermal Power	Type of burner	Fuel used	Product dried	Year of start-up
DOMINANT (Russia)	25 MW	Torch	Natural gas	Beet pulp	2012
KRISTALL (Russia)	25 MW	Torch	Natural gas	Beet pulp	2012
FAYOUM (Egypt)	25 MW	Torch	Natural gas	Beet pulp	2011
ERAMET (F)	1 MW	Torch	Natural gas	Sand	2010
DAKAHLIA SUGAR CO. II (Egypt)	75 MW	Torch	Oil / natural gas	Beet pulp	2010
NILE SUGAR (Egypt)	57 MW	Torch	Light oil	Beet pulp	2010
BAL KUPU (Turkey)	25 MW	Torch	Natural gas	Beet pulp	2009
JABINKA (Belarus)	25 MW	Torch	Natural gas	Beet pulp	2009
MFI (Tunisia)	2 MW	Torch	Natural gas	Chemical	2009
CRISTANOL (F- Bazancourt)	25 MW	Torch	Natural gas	DDGS	2008
FRILLI IMPIANTI (North Ossetia)	4 MW	Torch	Natural gas	DDGS	2008
EL FAYOUM (Egypt)	25 MW	Torch	Natural gas	Beet pulp	2008
ENSUS/SIMON CARVES (Great-Britain)	2 x 40 MW	Torch	Natural gas	DDGS	2008
LINEX (France)	15 MW / 6 MW	Torch	Natural gas	Wood chips	2007



And many more...

/ DRYERS

Design of shovels to optimized heat exchange and to avoid clogging

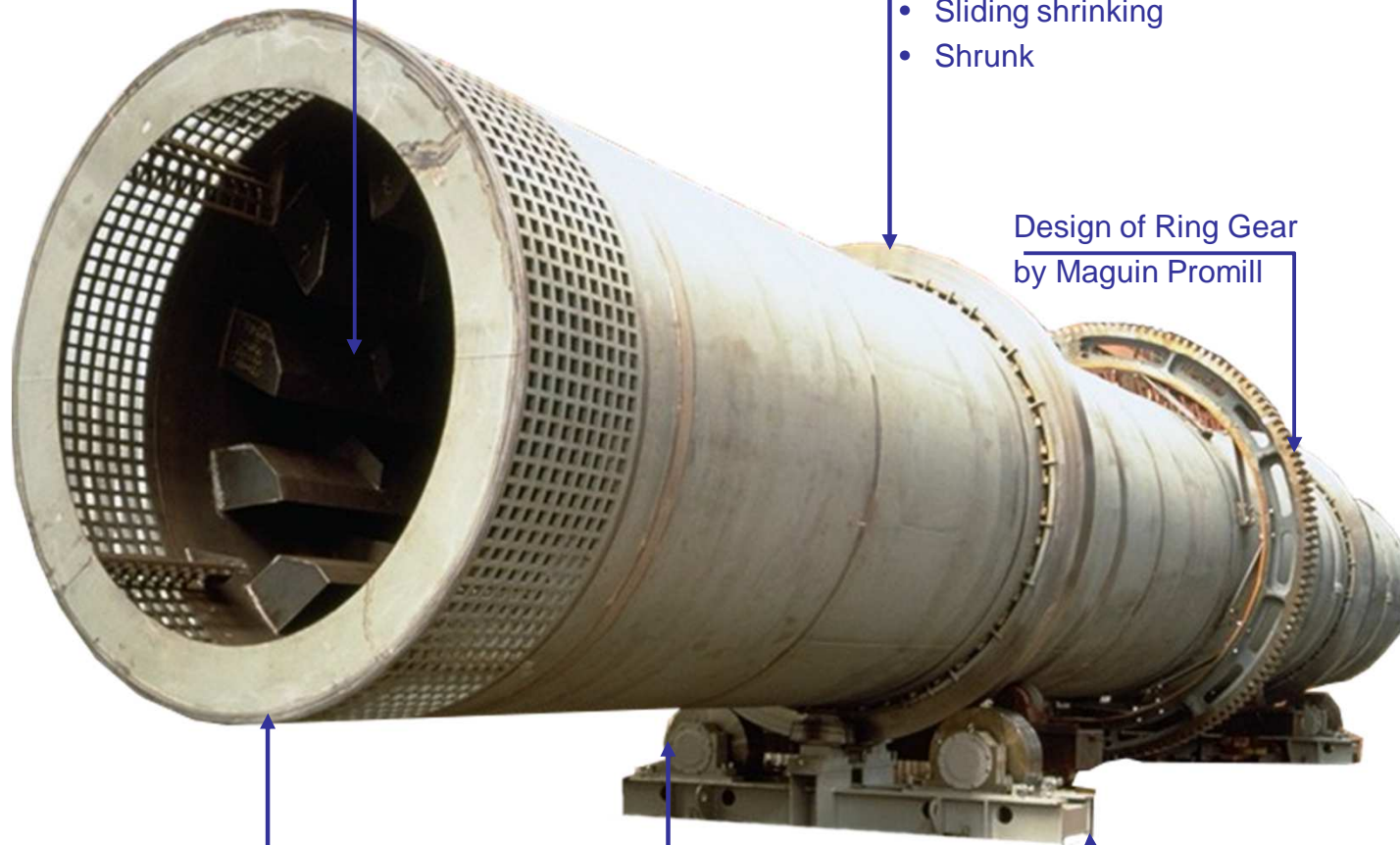
Design of Tyres :

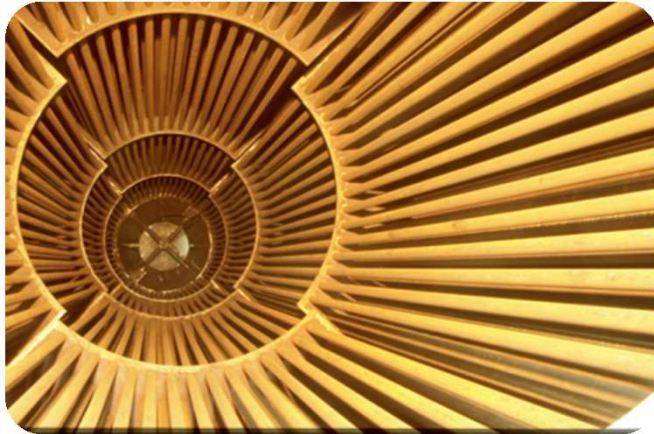
- Skew wedges
- Sliding shrinking
- Shrunk

Design of Ring Gear
by Maguin Promill

Design of drum : Ø over 6 m

Manufacture of Frame/Rollers





INDIRECT DRYER:

No direct contact between the hot gases or steam and the product.
Gases pass through a tube bundle.

Maximum gas inlet temperature

- 500 °C for normal carbonated steel
- 900 °C for refractory steel.

Diameter 1 to 6 m.

Length 3 to 20 m.

Throughput 1 to 100 T/H.



DIRECT DRYER:

Direct contact between the hot gases and the product.

Maximum Gas Inlet T°

- 500 °C for normal carbonated steel
- 900 °C for refractory steel
- 1300°C for carbonated steel with refractory brick coating.

Diameter 1 to 6 m.

Length 3 to 55 m

Throughput 1 to 300 T/H

/ DRYERS: References List

Client	Location	Size (mm)	Year	Processed product
Mediterranean Food Industry	Tunisia	2000 x 12 000	2010	MCP
SECO	France	3000 x 25 000	2009	MCP
Mediterranean Food Industry	Tunisia	2000 x 12 000	2009	MCP
Mediterranean Food Industry	Tunisia	2000 x 12 000	2006	MCP
ARKEMA	Poland	1800 x 14 000	2006	Siliporite
SECMA	France	3300 x 27 000	2005	PK – NPK
LINCOLN ELECTRIC	France		2005	Welding flux
BORAX	France	900 x 10 000	2003	Bore
TIMAC (Gabes)	Tunisia	2800 x 20 000	2003	Phosphate
THIDE	France	2000 x 11 000	2002	Domestic waste
ZUID CHEMIE	Netherlands	3600 x 24 800	2001	PK – NPK
SICA RIMOGNE		1700 x 8000	2000	Schist
PEC-RHIN	France	4000 x 2000	2000	Ammonium nitrate
ROQUETTE	France	2100 x 8500	1996	Industrial sludge
SOBRY		3350 x 12 000	1996	Sewage sludge
KREBS	Pakistan	4200 x 29 000	1996	NPK
BORIE SAE		2400 x 15 000	1995	Domestic waste
KREBS	Jordan	3800 x 27 000	1995	NPK-DAP
HUREL ARC		2500 x 18 000	1993	NPK
¹ RHONE POULENC	France	2300 x 23 000	1993	Soda ash
¹ Sté d'Impression d'Hem	France	2300 x 8000	1993	Dyeing sludge
SCGP / Rouen (76)	France	5000 x 36 500	1992	NPK
¹ METAUX SPECIAUX		1600 x 6000	1991	Salts

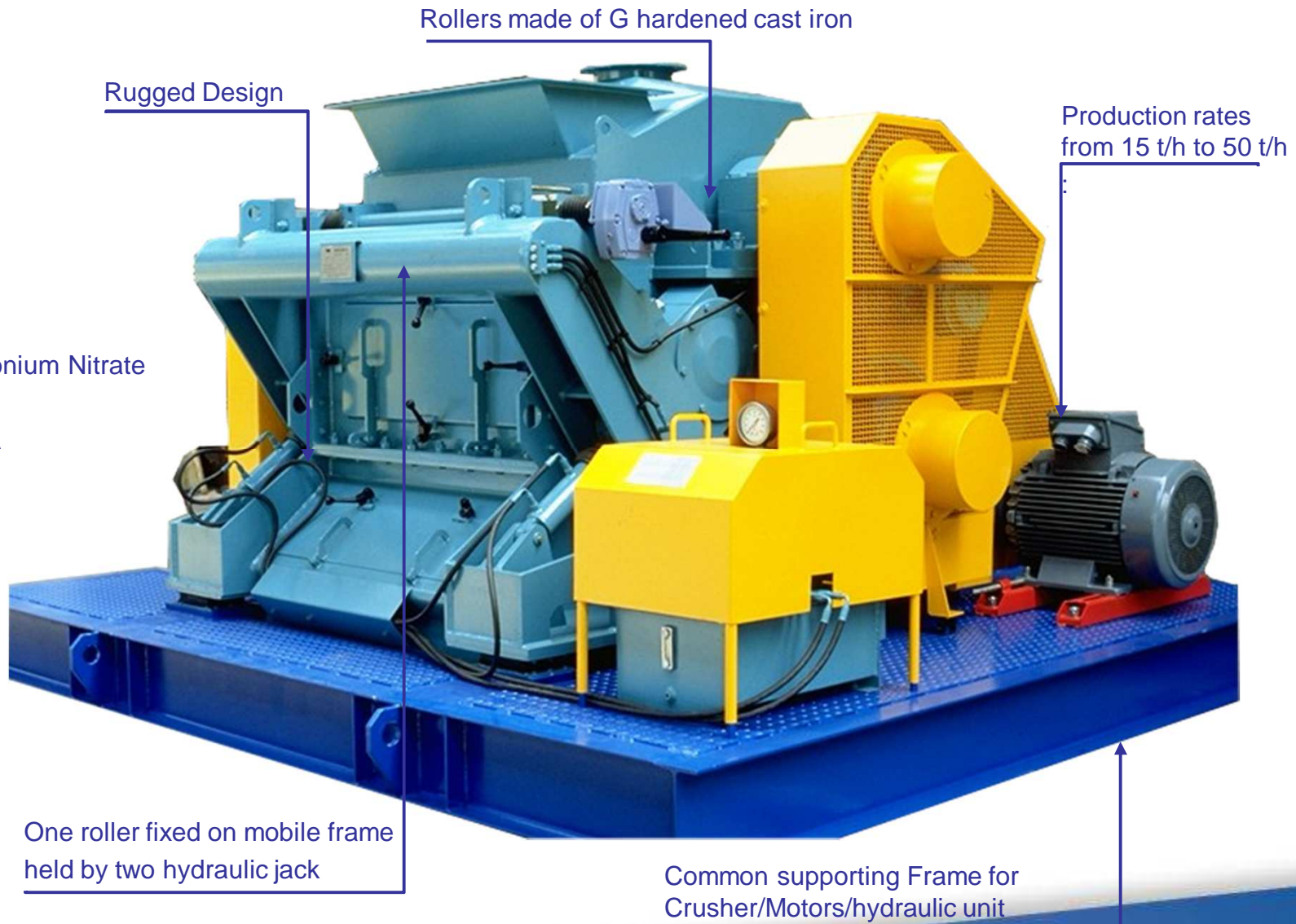
¹ Drums in stainless steel



And many more...

/ CRUSHERS

- MCP
- NPK
- Ammonium Nitrate
- DAP
- UREA
- SALT



/ CRUSHERS



Process:

Used in a recycling circle with a vibrating screener, allowing

- the large particles to recycle through the crusher,
- the right dimension to go to a coater or the stores
- the fine particles to be granulated.

MAGUIN's cylinder crusher is equipped with hardened rollers giving an important hardness.

Crushing is achieved by passing the product between the rollers, we build two and three cylinder crushers.



Maximum input:

Two cylinder unit : 30-50 mm (depending the product)

Three cylinder unit :80-100 mm (depending the product)

Output between 0.5 and 5 mm

Variable and adjustable without stopping the crusher and production.

/ CRUSHERS

Client	Location	Qty	Type	Year	Processed product
ZHANHUA Co., Ltd.	China	2	TRIO	2010	DAP
WYLTON International	China	2	TRIO	2009	DAP
GUIZHOU KAILIN Co.ba	China	2	TRIO	2009	DAP
BUNGE MAROC PHOSPHORE	Marocco	6	TRIO	2009	DAP
SNC LAVALIN International	Jordan	6	TRIO	2009	DAP
POWER STEP International	China	2	TRIO	2009	DAP
YICHANG DONGSHENG	China	4	TRIO	2008	DAP
ZUID CHEMIE	Netherlands	2	TRIO	2008	DAP
WUHUAN Eng.	China	2	TRIO	2008	DAP
SASOL	South Africa	4	TRIO	2008	CAN
PT PETROKIMIA	Indonesia	2	TRIO	2008	DAP
YIHAU	China	1	TRIO	2008	DAP
INCRO	Indonesia	1	TRIO	2008	DAP
ISAAK Eng. (Germany)	Russia	6	TRIO	2008	
UHDE MAADEN / INTECSA	Saoudi Arabia	16	TRIO	2008	DAP
GUIZHOU KAILIN Co., Ltd.	China	8	TRIO	2007	DAP
SECO	France	1	TRIO	2007	NPK
YUNNAN DESIGN INSTITUTE		4	TRIO	2006	DAP
YUNNAN THREE CIRCLE	China	4	TRIO	2006	DAP
HUBEI EQUIPMENT ING	China	4	TRIO	2005	DAP/NPK



And many more...

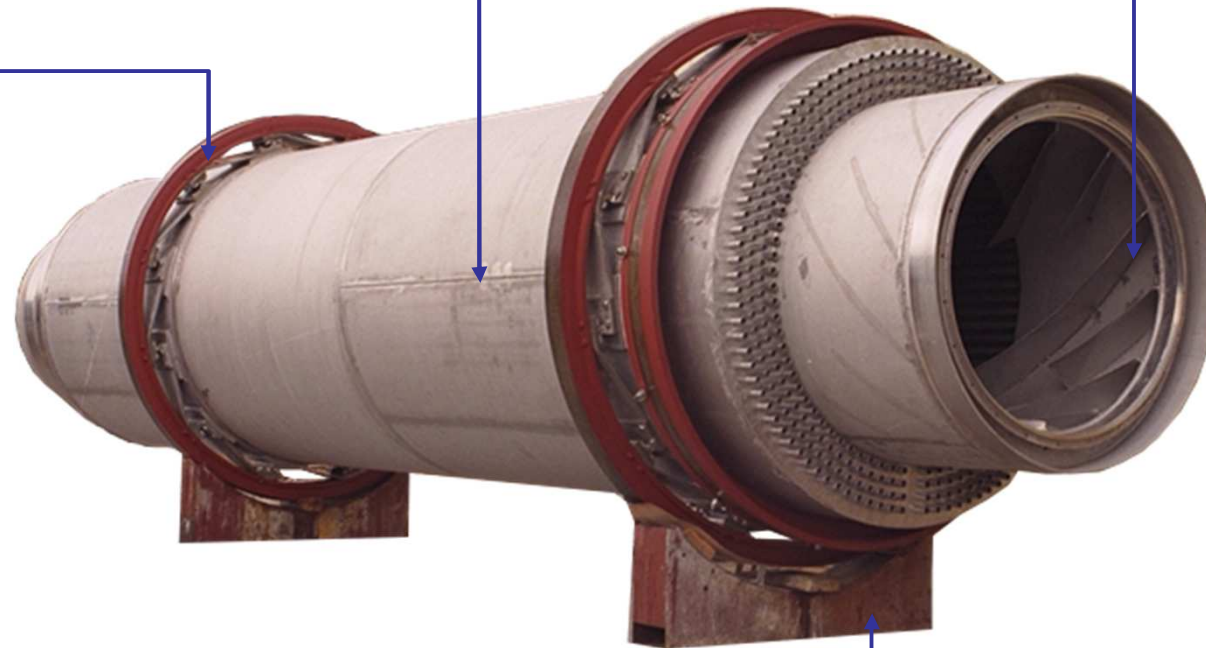
/ COOLER

Design of drum : \varnothing over 6 m

Design of shovels to avoid clogging

Design of Tyres :

- Skew wedges
- Sliding shrinking
- Shrunk



Rotating tube with product revolving paddles inside.

Manufacture of Frame/Rollers

Cooling is achieved by counter flow heat exchange

/ DIRECT / INDIRECT COOLER



DIRECT COOLER

direct contact between the gas or liquid and the product.
Airflow can be generated by creating vacuum or pressure.
Minimum gas/ liquid inlet temperature – 5 °C.

Diameter 1 to 6 m,
Length 3 to 55 m.
Throughput 1 to 300 T/H.

INDIRECT DRYER

No direct contact between the hot gases or steam and the product.
Gases pass through a tube bundle.
Minimum gas / liquid inlet temperature – 25 °C.

Diameter 1 to 6 m,
Length 3 to 20 m.
Throughput 1 to 100 T/H.

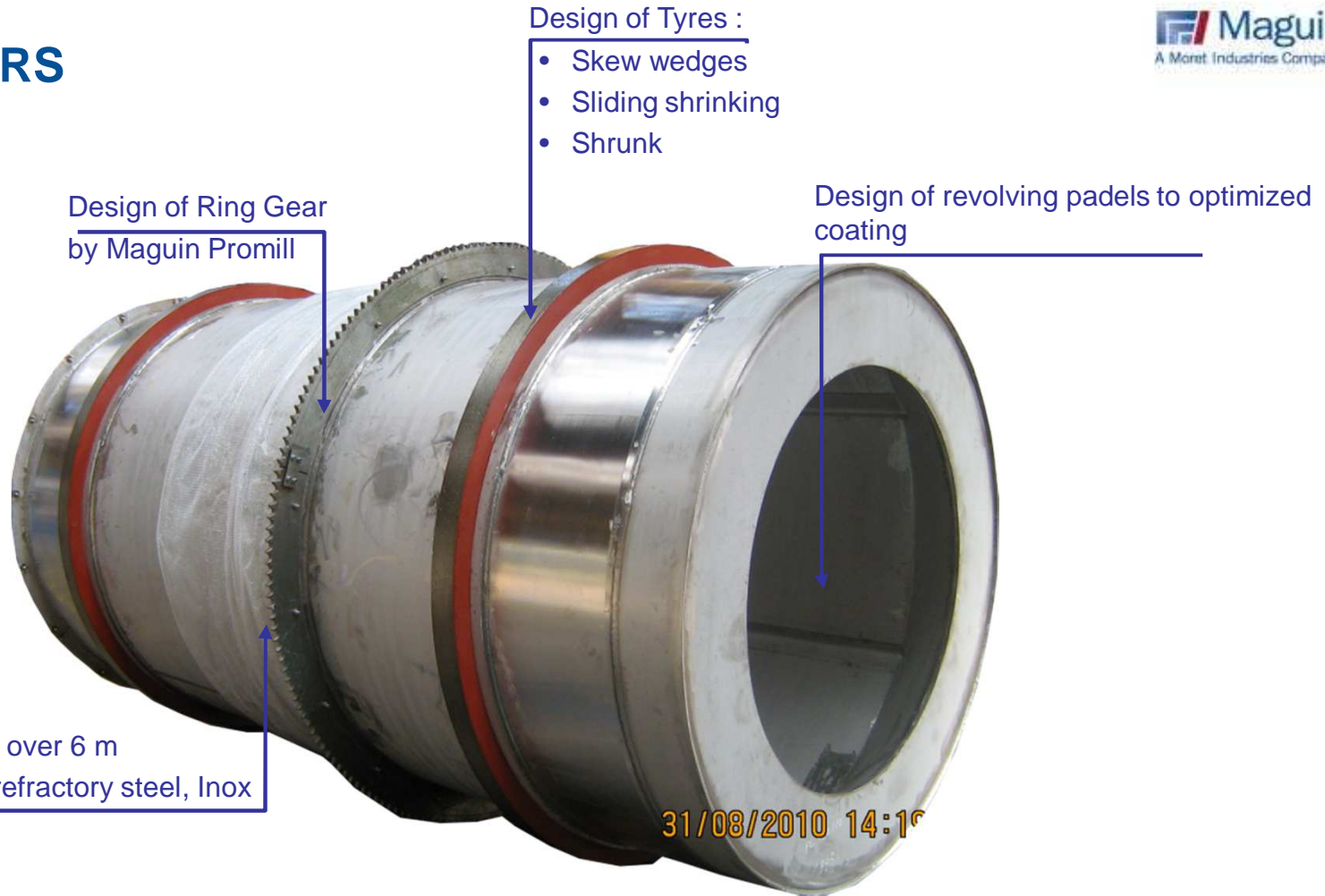
/ COOLERS

Client	Location	Qty	Size (mm)	Year	Processed Product
¹ PECH RHIN	France	1	3000 x 14 000	2010	NPK
¹ KEMIRA	Finland	1	3500 x 22 000	2007	Titanium oxide
LINCOLN ELECTRIC	France	1		2005	Welding flux
SYRAL	France	1	2400 x 15 000	1999	By-product from starch industry
AMYLUM / Nesle	France	1	2700 x 17 000	1996	Wheat bran
ARF		1	2150 x 5000	1995	
¹ VEREXPAN		1	1800 x 1400	1992	Cellular glass
¹ METAUX SPECIAUX		1	2100 x 7000	1991	Salts
¹ ALKIMIA	Tunisia	1	1400 x 6500	1990	STPP
¹ HOECHST		1	1400 x 5000	1990	Silicates
SPIE BATIGNOLLES		1	2550 x 12 250	1989	STPP
¹ KEMIRA / Tertre	Belgium	2	4000 x 17 000	1989	Ammonium nitrate
¹ RHONE POULENC	France	2	2500 x 8000	1989	TPP
SPEICHIM		1	2450 x 4000		Methionine



And many more...

/ COATERS

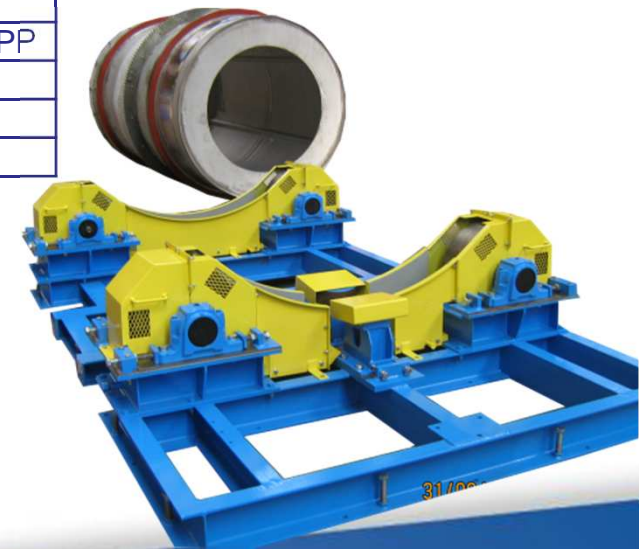


The coater is mainly used in fertiliser production and is always located after the dryer before the granulates are packed or stored.

Coating products typically are petrol, synthetic our mineral oil.

/ COATERS: References list

Client	Location	Qty	Size (mm x mm)	Year	Processed Product
YARA	France	1	2280 x 7500	2007	NPK
KREBS	Pakistan	1	2200 x 6500	1996	NPK
KREBS	Jordan	1	2000 x 6500	1995	NPK-DAP
¹ KEMIRA / Tertre	Belgium	2	2000 x 6500	1989	Ammonium nitrate
SPIE	China	1	2000 x 6500	1989	NPK
GUBRE	Turkey	1	2500 x 6000	1986	NPK
SPEICHIM		3	3500 x 8000	1977	NPK
GESA L'OSERAIE		1	2500 x 6000	1976	NPK + binaries
ZUID CHEMIE	The Netherlands	1	2500 x 6000	1976	NPK + binaries
L.C.C	Lebanon	1	1500 x 6000	1967	NPK + binaries TPP
PECHINEY	France	1	1400 x 7000	1966	NPK
SOFO / Brest	France	1	1750 x 4750	1965	NPK + binaries
KUHLMAN	France	1	1600 x 2500	1958	



/ OTHER DRUMS



/ OTHER DRUMS (miscellaneous)

Client	Location	Type of drum	Qty	Size (mm)	Year	Processed Product
¹ KEMIRA / Tertre	Belgium	Spherodizer	1	4750 x 14 000	2005	Ammonium nitrate
FRITZ WERNER	Germany	Complete unit incl. : Granulator - Calcining drum - Oscillating heating drum Cooler			2002	Glass Industry
SAINT GOBAIN	France	Shot blasting drum	1	3200 x 7000	2002	Cast parts
¹ THIDE	France	Thermolyse tube	2	1650 x 15 300	2002	Domestic waste
PLACOPLATRE	France	Oven	1	2750 x 26 500	2001	Plaster
PLACOPLATRE	France	Gypsum kiln	1	2750 x 26 500	2001	Plaster
NOVACARB	France	Decomposition kiln	1	1000 x 10 000	2000	Bicarbonate
¹ SYRAL	France	Crystalliser	1	2400 x 12 000	1999	By-product from starch industry
¹ SOLVAY	France	Pilot dryer/calcining drum	1	750 x 5700	1998	Flue ashes
ARF		Pyroliser	1	2500 x 8000	1995	Metal waste
GONDARD-DANO process		Compost tube	1	4200 x 42 000	1994	Domestic waste
CNCCC	China	Den	2	3750 x 8000	1993	TSP
SITRADI		Incinerator	1	4000 x 12 000	1992	Industrial waste
PONT A MOUSSON		Shot blasting drum	1	3500 x 7000	1992	Cast parts
CCM SULZER		Incinerator	1	2000 x 9000	1991	Plastic waste
¹ VEREXPAN		Multi-tubular drum	1	1850 x 10 700	1992	Cellular glass
¹ SEIF		Enlarger	1	4216 x 15 000	1990	Ammonium nitrate
¹ VEREXPAN		Expanding tube	1	1500 x 7500	1990	Cellular glass

¹ Drums in stainless steel



 **Maguin**
A Moret Industries Company