MIGRATECH HYBRID

THE GREEN MICROGRANULATION BY LB

Why MIGRATECH HYBRID?

The hybrid solution proposed by LB was created to allow customers who already own a wet mill preparation plant to keep the wet grinding active.

This solution is designed both for those customers who need to increase the production of powder to be pressed, and for those customers who want to change the body preparation technology to save energy and money.

The technology consists in mixing dry ground powder with wet ground slip, to obtain a granulate suitable for pressing.

To do this, the customer will need to install a dry grinding mill, a mixing line and a new kind of granulator.

Hybrid plant solutions for microgranulation

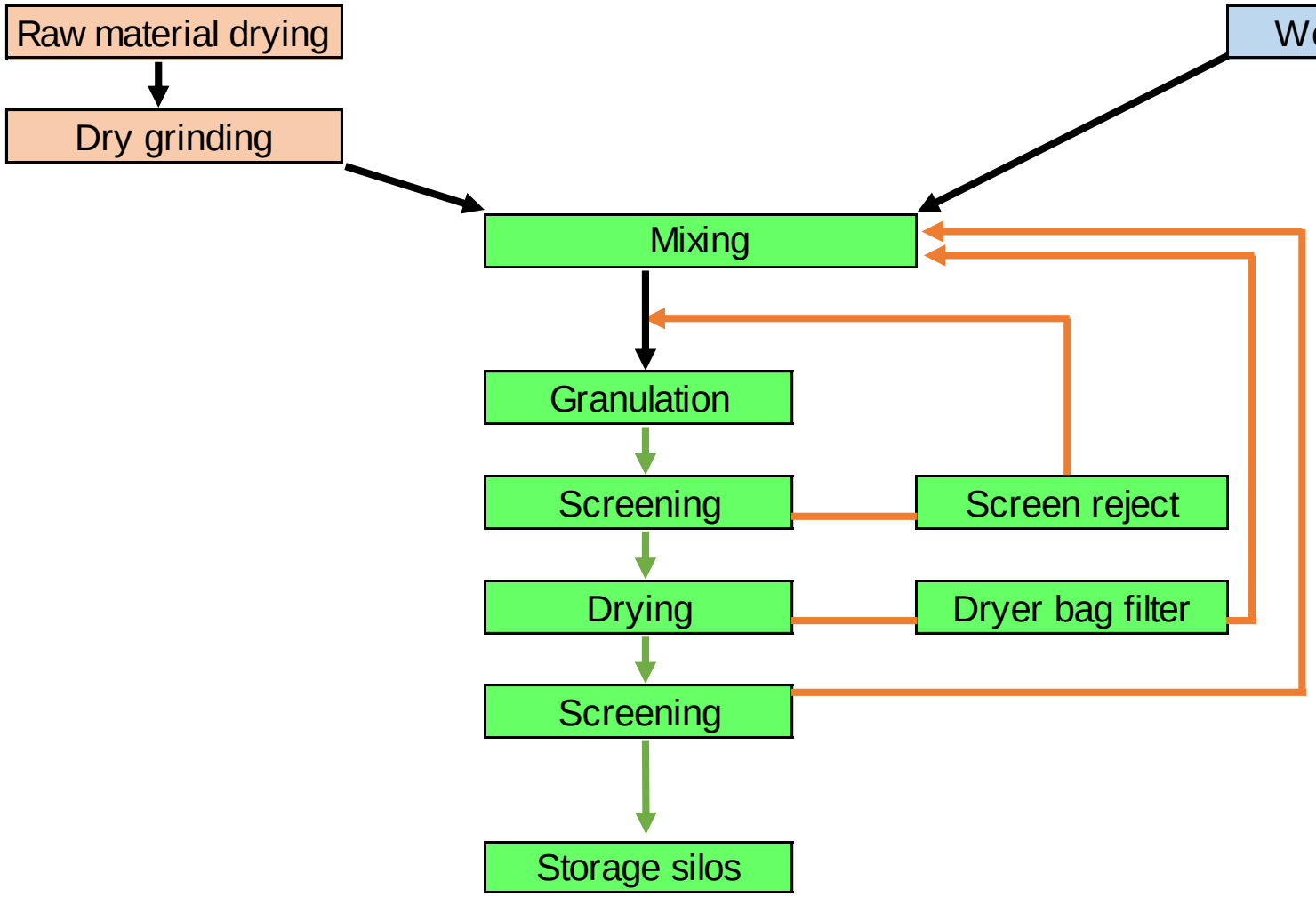
With this solution, the same body mixture is ground partly with dry grinding and partly with wet grinding.

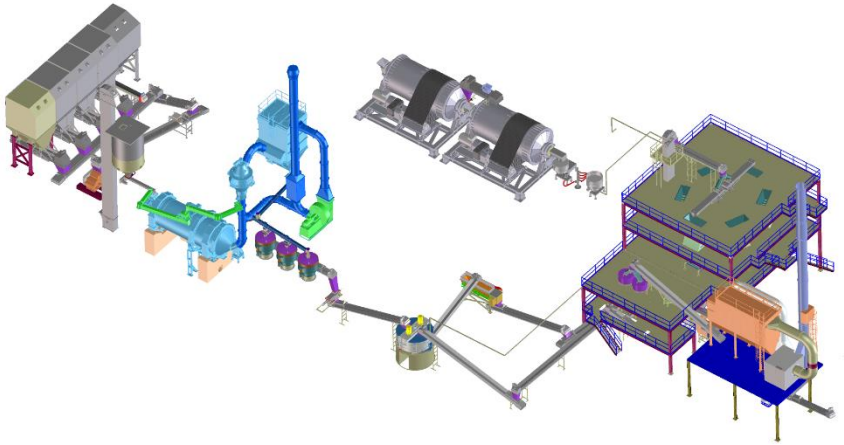
The two parts obtained from dry and wet grinding are homogeneously mixed in the appropriate proportions; the obtained semi-finished product is subsequently granulated with a new kind of granulator.

The granulate is brought back to a suitable humidity for the pressing process by fluid bed drying.

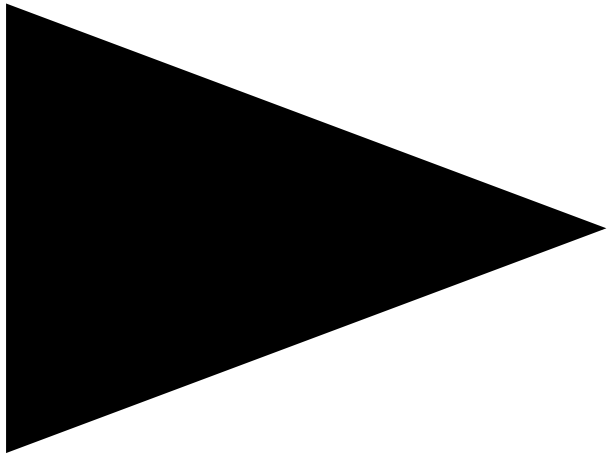
In the next slides it will be explained more in detail how the plant is structured and what results it returns from a technological point of view.

Hybrid plant solutions for micrograniulation

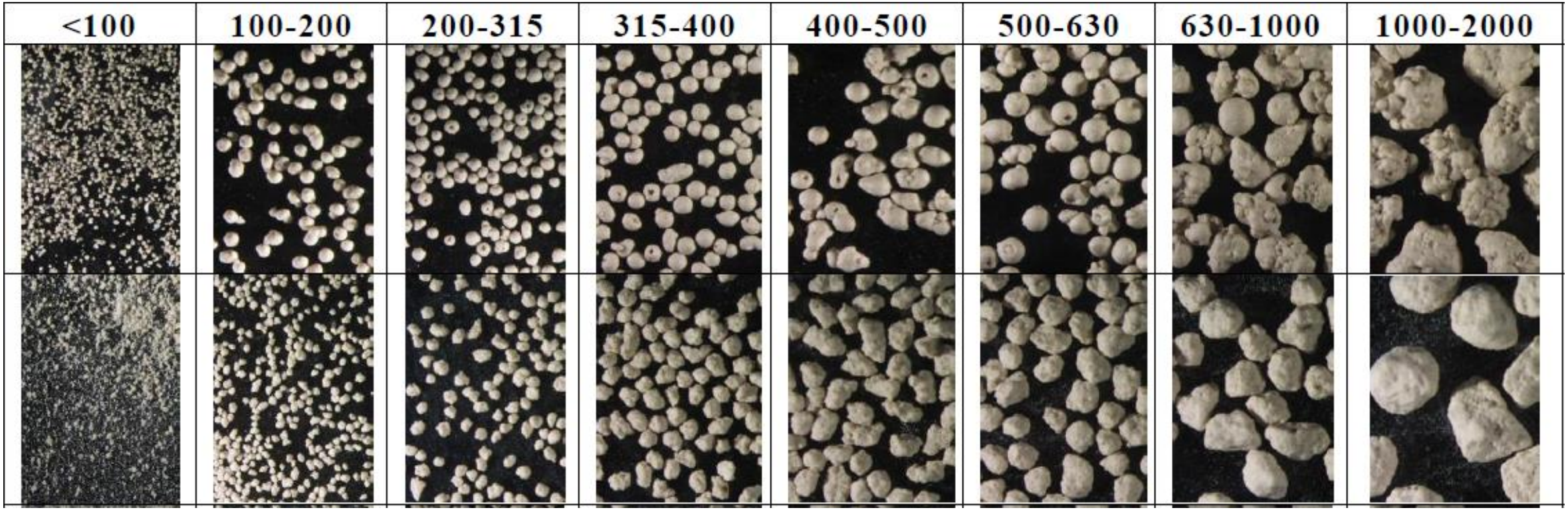




Hybrid plant solutions for microgranulation



Morphology of the microgranulate



The microgranulate granules are full granules, as opposed to the spray dried granules which are “hollow”.

Rheology of the microgranulate

	MG	ATM	Range granulati	Range atomizzati	Scorrevolezza maggiore quando:
Umidità delle polveri (% in peso)	5.9	6.0	5-8	4-8	*Ininfluente*
PD (g/cm^3) **Poured density**	1.003	0.957	0.90-1.02	0.92-1.05	*Vedi HR*
TD (g/cm^3) **Tapped density**	1.202	1.104	1.20-1.25	1.03-1.13	*Vedi HR*
HR (1) **Rapporto di Hausner**	1.20	1.15	1.22-1.33	1.07-1.17	*HR basso (<1.25) Eccellente se <1.15*
ARS (°) **Angolo di riposo statico**	31.6	27.1	30-39	30-35	*ARS basso (<45°) Eccellente se <30°*
ARD (°) **Angolo di riposo dinamico**	50.1	39.5	53-70	40-45	*ADR basso*
FdM (8mm, $g/s \cdot cm^2$) **Flusso di massa**	13.8	14.7	11-13	13-16	*FdM alto*

Results after firing

1200°C, 5’		**Microgranulate**		**Spray dryed**	
		average	st. dev.	**average**	st. dev.
		Pressing at 40 MPa			
Density after press	g/cm^3	2.433	0.022	2.406	0.004
Linear shrinkage	cm/m	5.22	0.02	5.61	0.05
Water absorption	%	0.12	0.08	0.07	0.03
Apparent porosity	%	0.30	0.21	0.16	0.06

Case study: MIGRATECH HYBRID installation in an Italian Tiles plant

Project data:

Annual body powder production:	165.000 tons/year
Total granulate flow rate to storage silos:	25 t/h
Dry grinding plant capacity:	13,75 t/h
Wet grinding plant capacity:	11,25 t/h
Plastic raw materials in the body mixture:	38,0%
Hard raw materials in the body mixture:	62,0%
Plastic raw materials average moisture:	17,0%
Hard raw materials average moisture:	5,1%
Cost of Electric energy:	€ 0,130/kWh
Cost of natural gas:	€ 0,250/Sm^3
Cost of wet grinding additive:	€ 0,300/kg

Economic savings hypothesis, without considering the cost of CO2 emissions

System	GP	Plant	4	Country	Italia

HYBRID

Body composition	38	% Plastic materials (clays, kaolin)
	62	% Hard materials (feldspar, quartz, carbonates)

Raw materials moisture	17,0	% Moisture plastic materials (clays, kaolin)
	5,1	% Moisture hard materials (feldspar, quartz, carbonates)

Costs					
E. E. €/kWh	0,13	Gas €/Sm3	0,25	CO_2 €/kg	0,025
Additive €/kg	0,30	Water €/l	-	Maint €/t	-

Production data	20	working h/day
	25.000	m^2/day
	18	kg/m^2
	330	working day/year
	165.000	t/year
	10	% perdite totali
	25,0	t/h

ENERGY AND MONEY SAVED DATA

Saved with LB MIGRATECH 4.0	**65,8**	% Thermal energy saved (% di NOx e CO_2 saved)
	56,5	% Water saved
	-4,5	% kWh
	56,0	% Grinding additive saved

Cost	**12,27**	€/t

Economic and resources saving

As it can be seen from the study carried out, the saving of resources is considerable:

Savings in thermal energy:	65,8%
Savings in water:	56,5%
Saving in fluidifying additive:	56,0%

There is a slight increase in electricity consumption, based on the plant configuration.

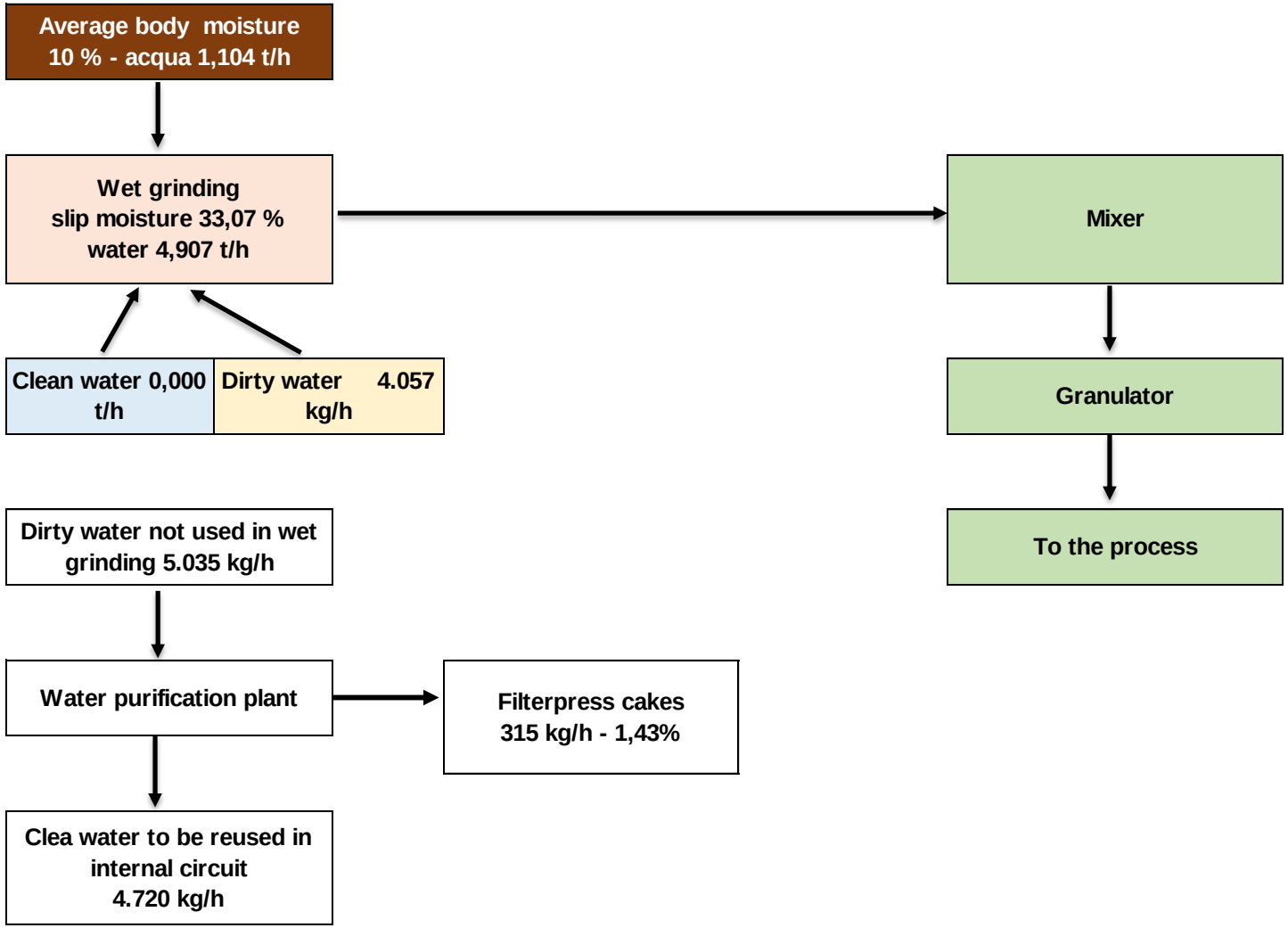
Water cycle management

The management of dirty water is done with a purification plant + filter pressing.

In the hybrid plant, part of the water is used in wet grinding, and the remaining part is purified and sent to the internal circuit for washing the departments (glazing, glaze grinding, etc.).

The filter-pressed cakes are introduced into the body mixture, before the grinding phase.

Water cycle management with Migratech hybrid system



Thank you for your attention