Society of Dairy Technology

spring conference

70th anniversary conference
WHEY TECHNOLOGY & UTILISATION

Wednesday 12th June 2013

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Hans van Pijkeren, RELCO Europe

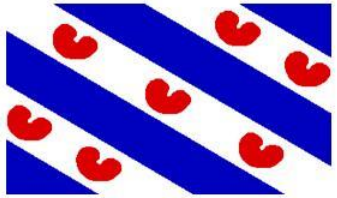
RELCO®

RELCO history

RELCO LLC

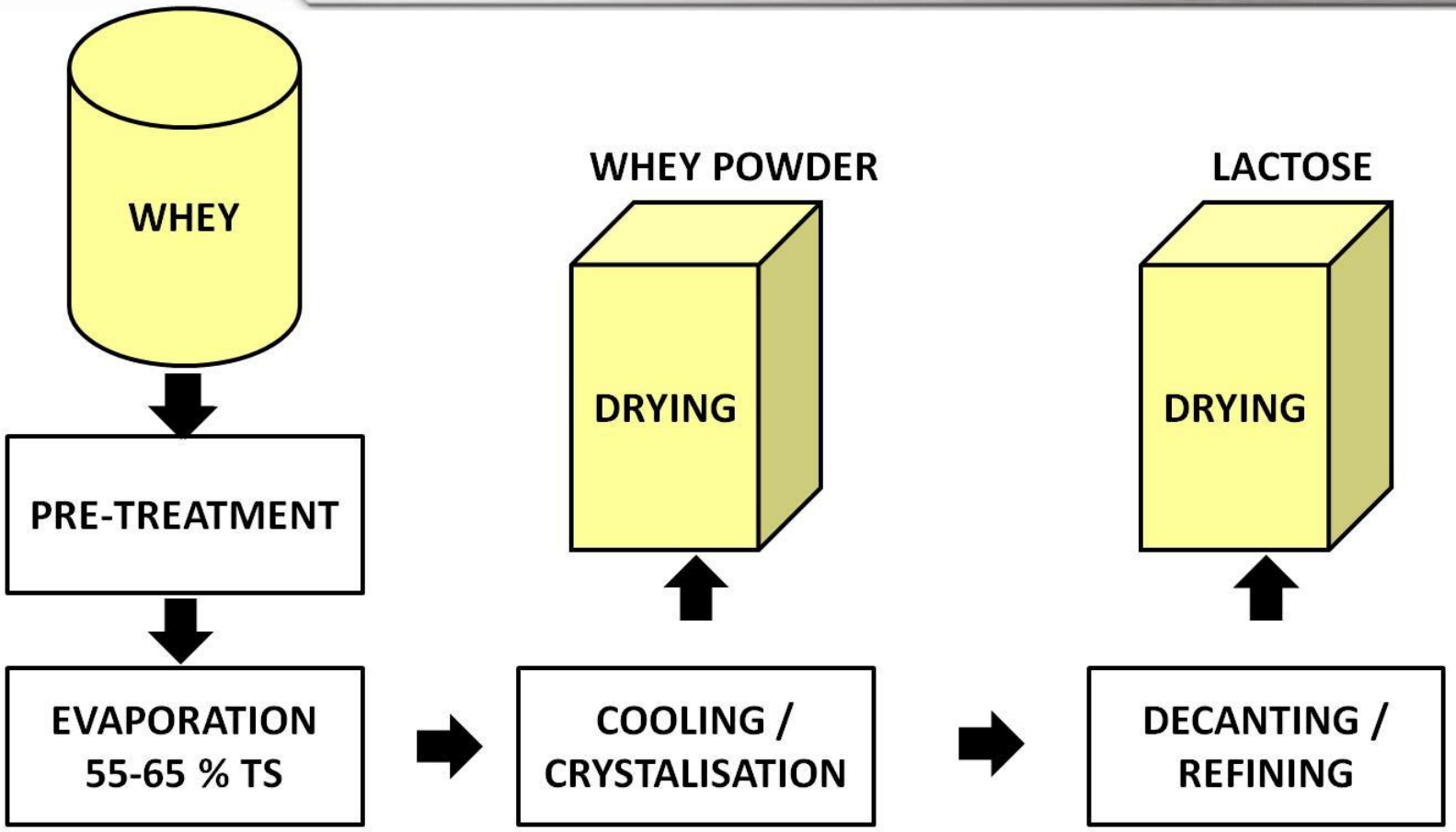
1982	The company was started with welding services only
1988	Added manufacturing shop
2000	Purchased whey processing equipment manufacturer • Whey Systems Inc.
2009	Purchased powder handling /
2012	cheese-equipment manufact. • Savel / Stoelting Technologies Inc.

RELCO Europe (wet & dry)



1984	The company started as an installation contractor
1995	Purchased Frimafa, tank fabrication shop
1997	Founded Wet & Dry Technologies B.V.
2007	Takeover by RELCO US

TRADITIONAL WHEY PROCESSING

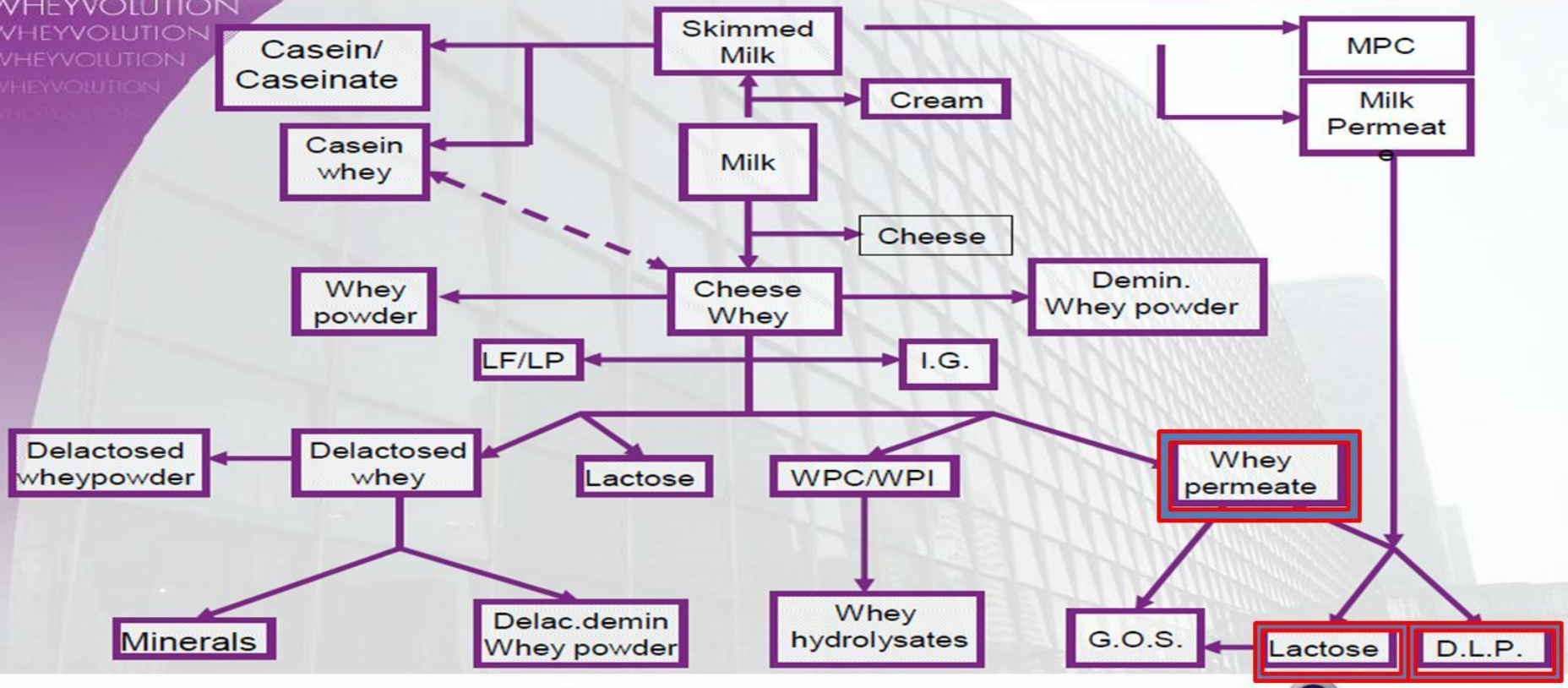


WHEY DERIVATIVES AS PART OF THE MILK-TREE

IWC PARIS 2008
5th International Whey Conference

WHEYVOLUTION

Filtration and cristallisation are main process techniques



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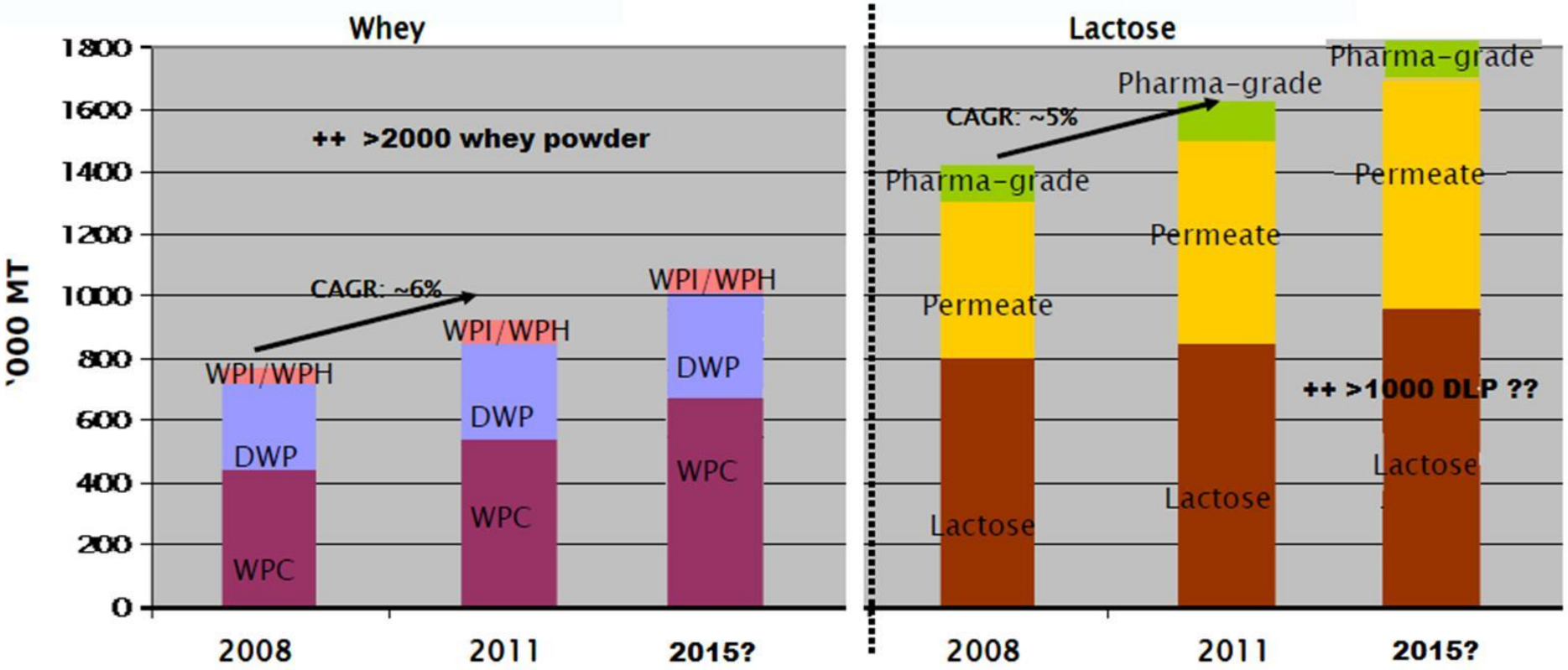
FURTHER GROWTH IN WHEY-DERIVATIVES MARKET



extrapolation based on figures from: 3A Business Consulting

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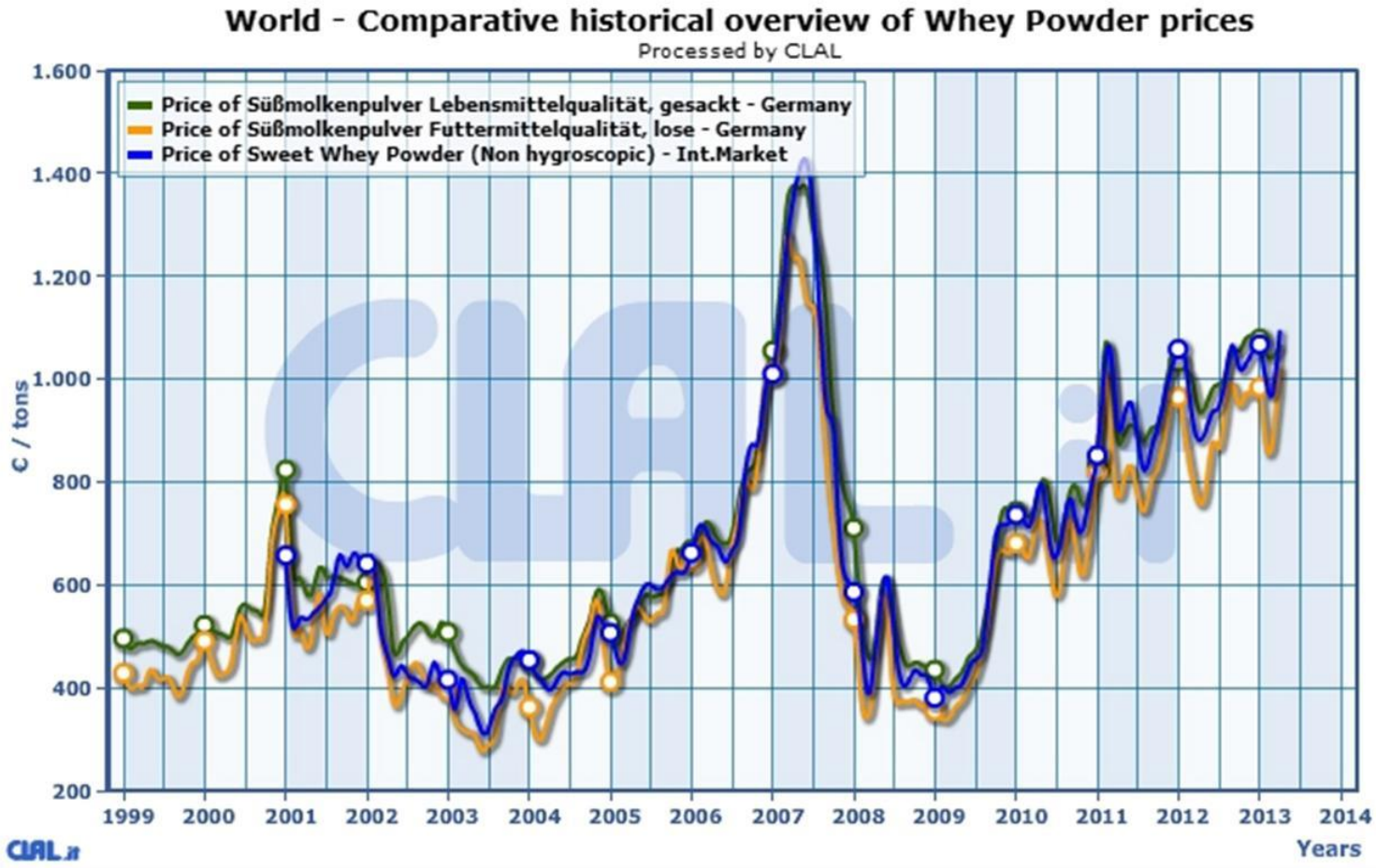
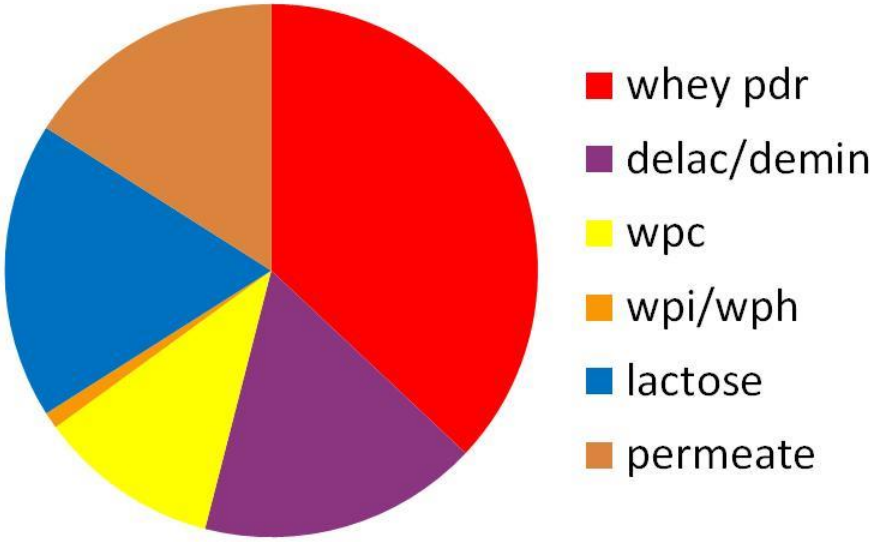
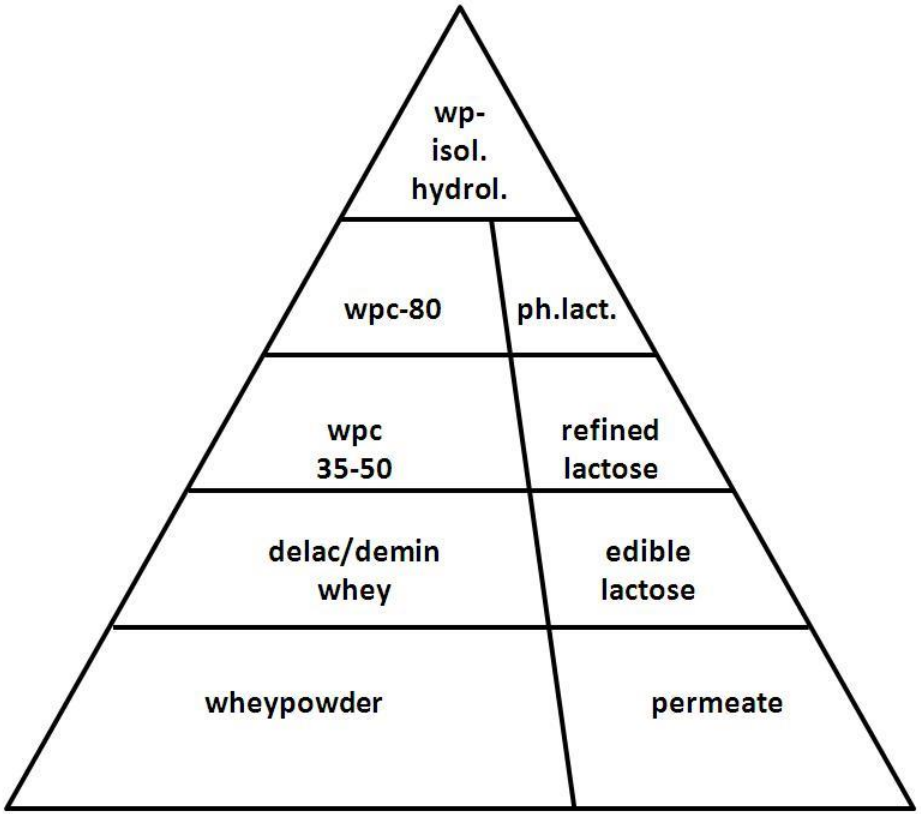
WHEY MARKET PRICE DEVELOPMENT



relative importance whey products (market/returns)

dry whey products





WHEY-ECONOMICS:

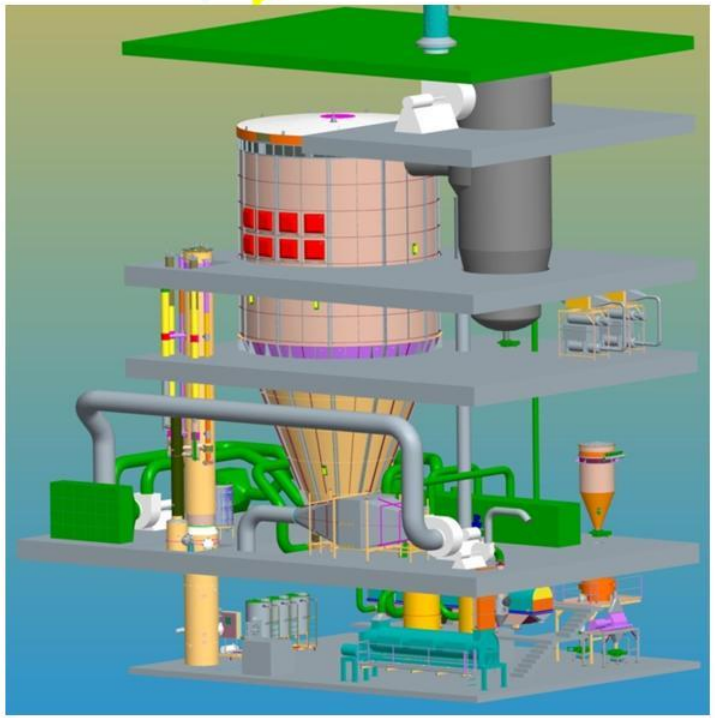
-- specialties >> low volume, higher margin ??

-- rest >> biggest volume, lower cost ??

CRITICAL STEPS IN THE RELCO PERMEATE DRYING PROCESS

Permeate from Evaporator / Finisher

55-60% TS Solution



Hi-Con

78-80% TS Solution

Triple-C

80-83% TS Paste

Dryer

Permeate Powder

RELCO®

RELCO Hi-Con Evaporator

- Inlet 60% Total Solids
- Outlet 78+% Total Solids
- Multi-pass
- (partial) Recirculation
- Low Fouling
- Compact
- Very Stable Operation
- Heat is Recoverable

RELCO Triple-C

Cooler
Concentrator
Crystallizer

Feeding permeate 78+% solids

- **Cooling through evaporation, by drawing air through the center**
- **Rapid crystallization**
- **Increased concentration with heat from crystallization**

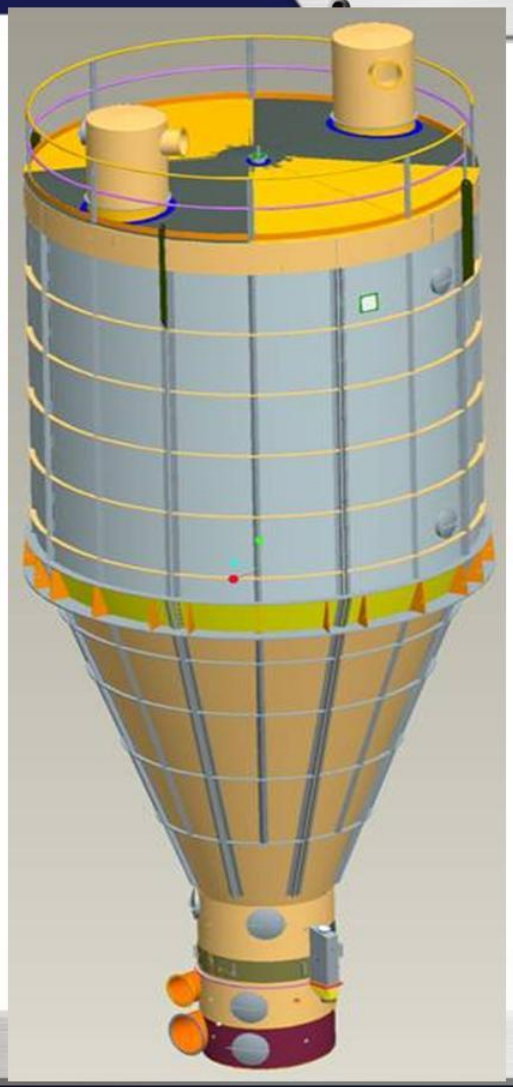
Result is heavy paste……

RELCO®

High Solids Permeate from the Triple-C

- Crystals too small to feel
- Creating huge crystal surface
- Pumps relatively easily
- Does not coat lines
- Permits atomization

RELCO Permeate Air-Lift Dryer



- Two-Stage Drying
- Integrated Fluid Bed
- Fines Agglomeration / Less Dust
- Compact Footprint
- Low Inlet/Outlet Temperature
- Final Drying External Fluid Bed
- Bag Filter for Exhaust Air

- Indirect air-heating (steam/gas)
- Dehumidifying secondary air

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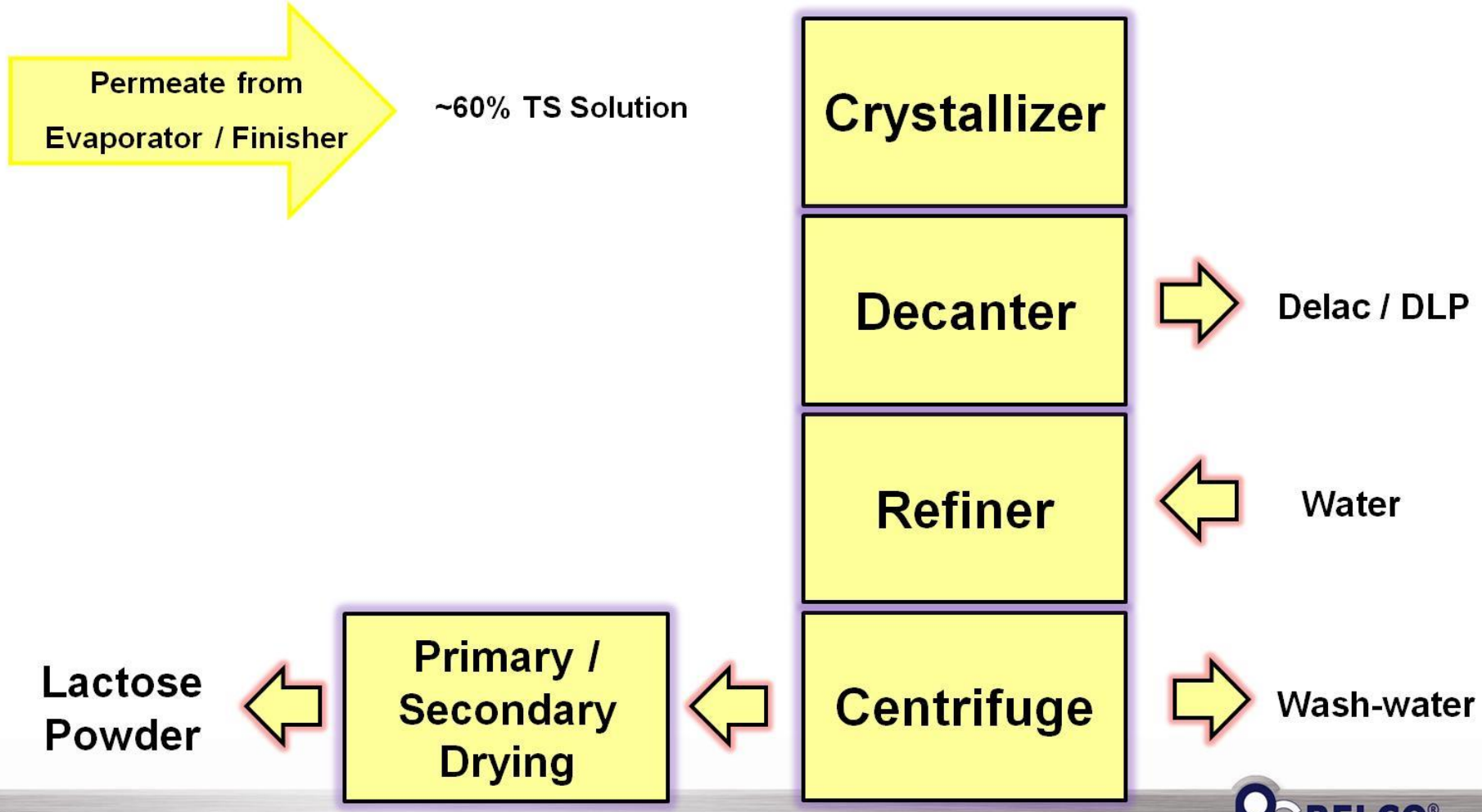
RELCO Permeate Powder

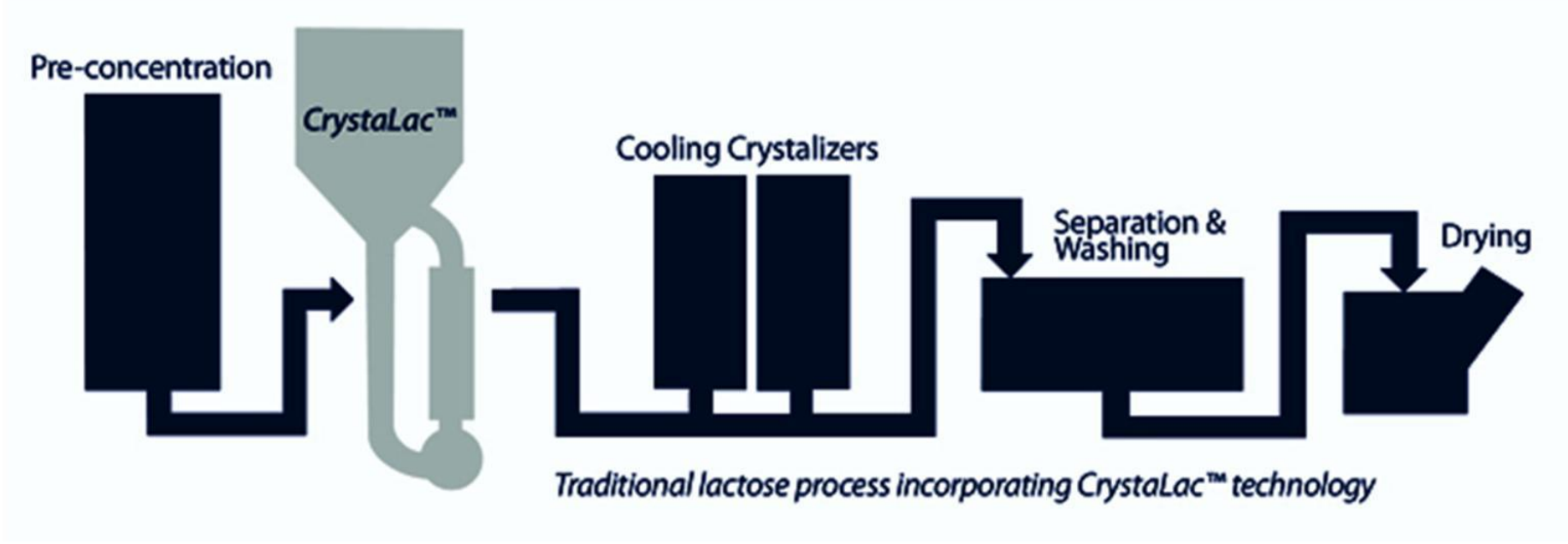
- Free-flowing powder
- Non-hygroscopic
- Moisture < 5 %

- Low energy cost

Traditional Lactose Manufacturing Stages

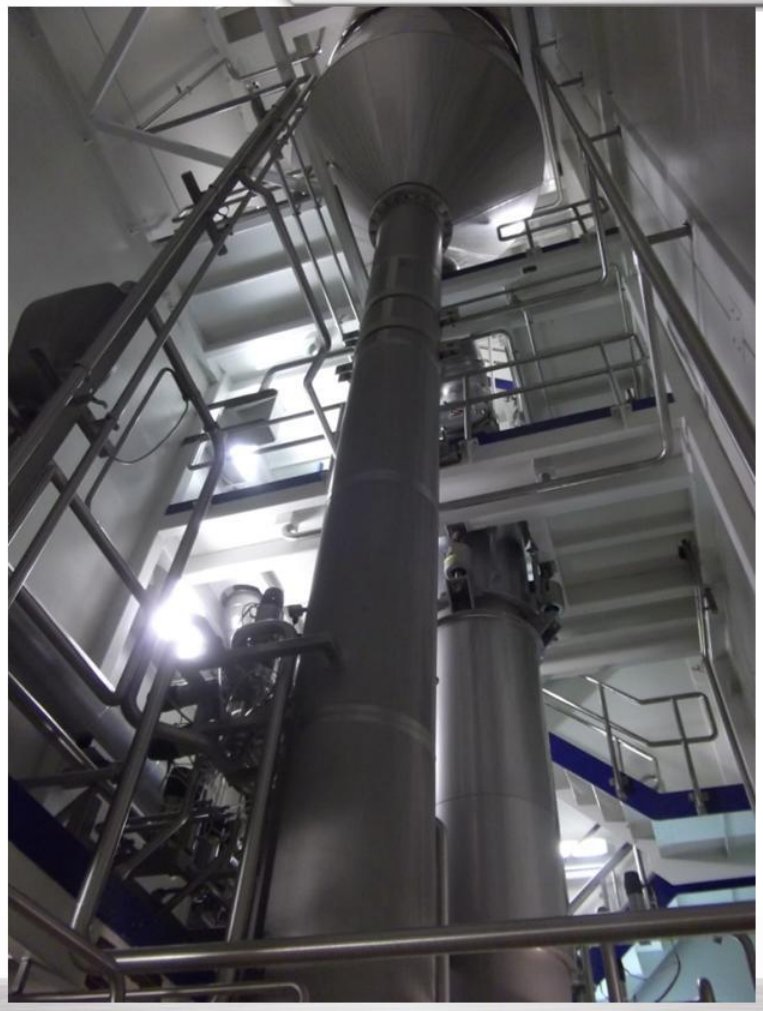


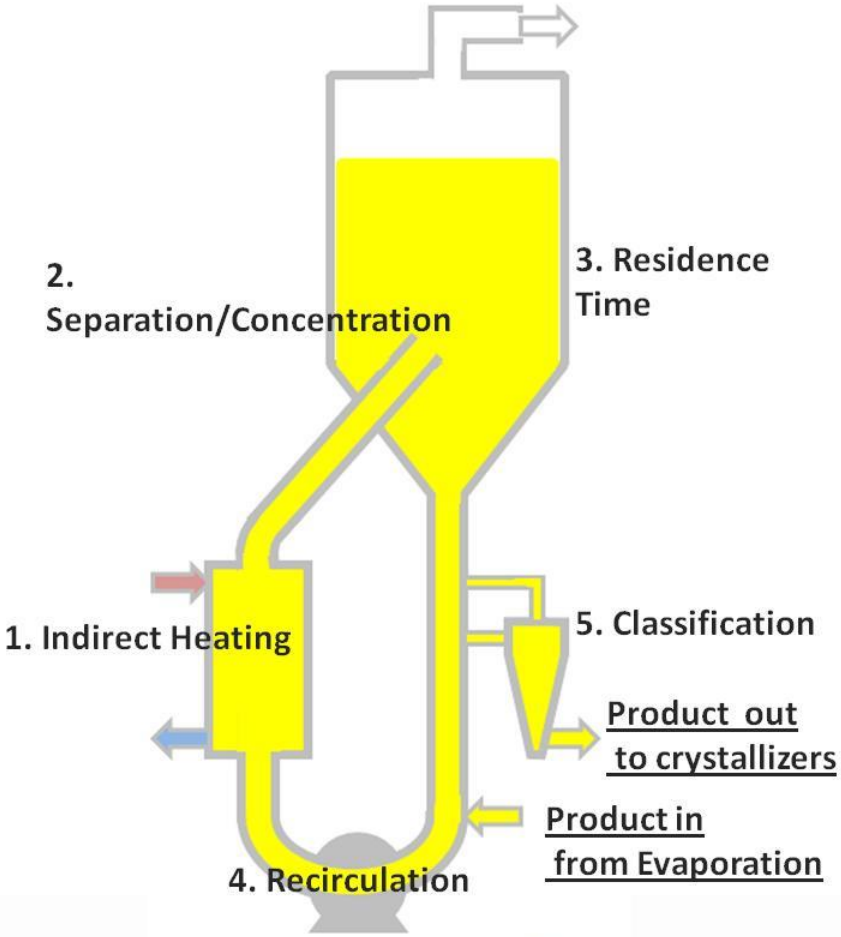
Adding RELCO CRYSTALAC™ technology



- Higher yield
- Less Delac / DLP
- Larger Crystals

RELCO CRYSTALAC™ Lactose Crystallizing Evaporator





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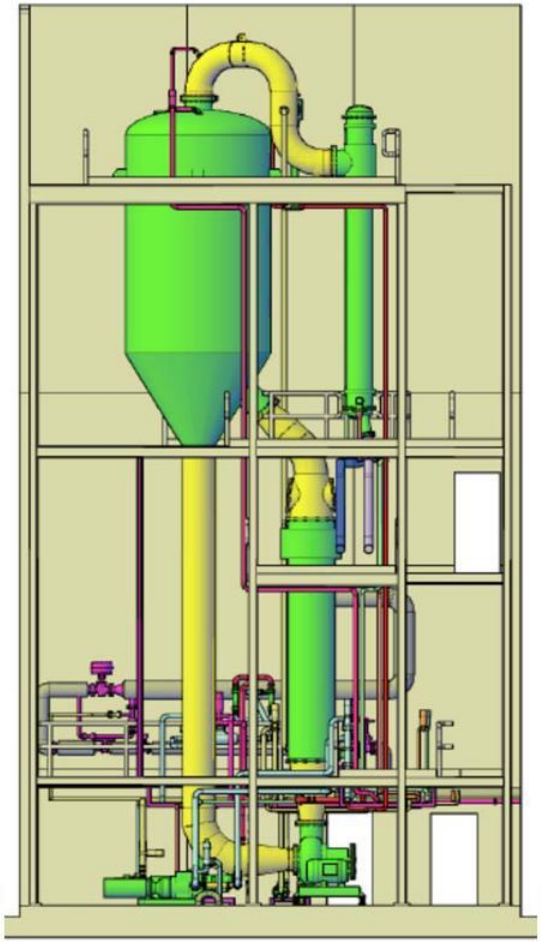
RELCO CRYSTALAC™ Process Features / Benefits



- Rising-film evaporator (circulating)
- Vapor separator (holding)
- Classification (separation)

higher solids start nucleation

residence time crystal growth

hydrocyclone larger / smaller crystals

Higher yield
Bigger crystals
Less Delac/DLP with higher solids
Fewer crystallizers
More constant process/product

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COMPARISON YIELD FIGURES with CRYSTALAC™

per hour	traditional	CRYSTALAC™
FINAL LACTOSE	1.500 kg	1.500 kg
Start-off PERMEATE	35.700 kg	29.800 kg
YIELD		
Lactose.1aq / Solids in Feed	55 %	66 %
Lact.1aq / Lact.1aq in Feed	60 %	71 %
Resulting Delac / DLP	17.000 kg	8.700 kg
solids	17 %	22 %

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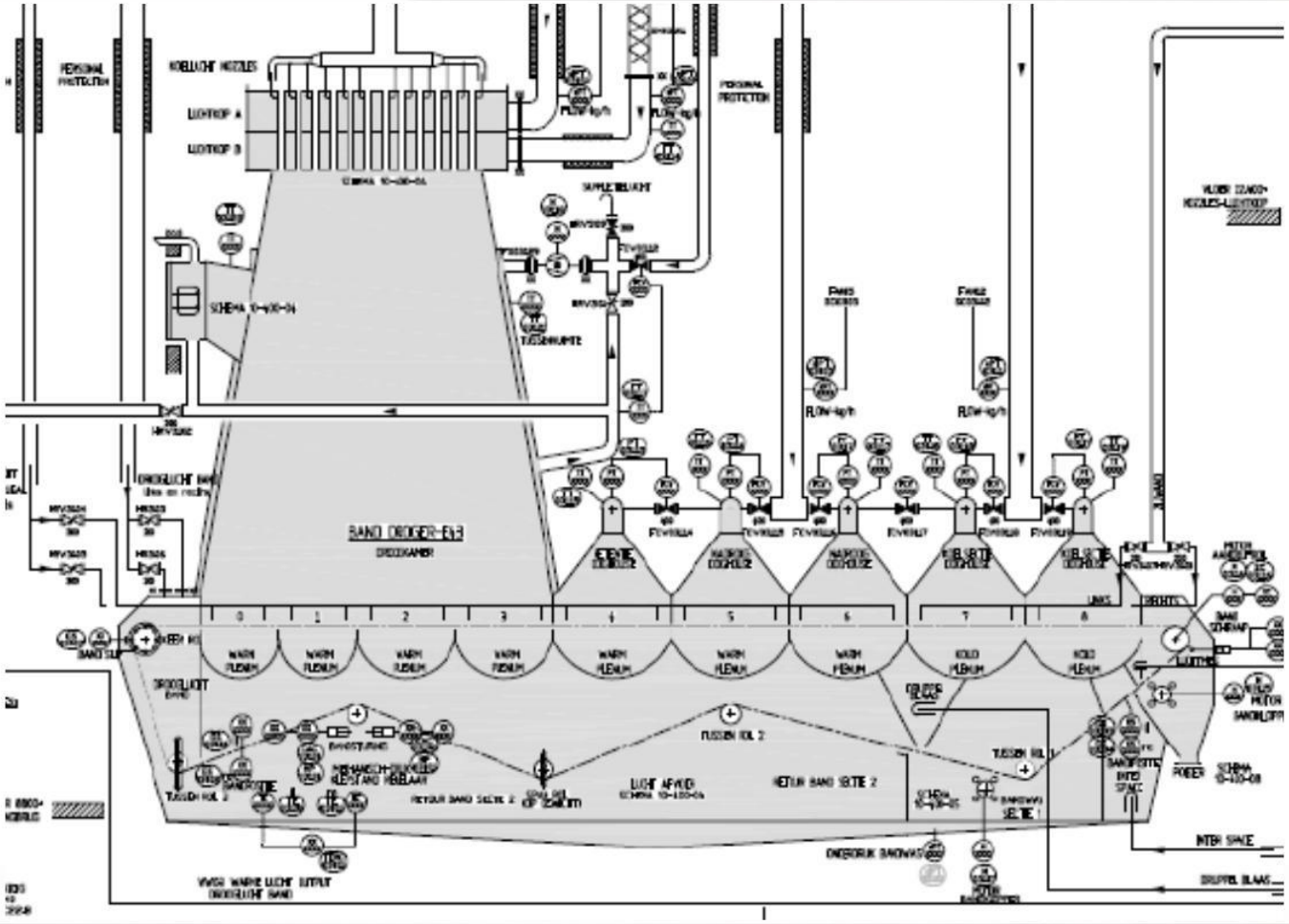
FURTHER OPTIONS WITH DRYING OF DELAC/DLP



BELT-DRYER:

-precrystallised Delac/DLP 60%TS

-semi-wet on belt

-crystallizing/ drying/ cooling in final stages

-free-flowing powder

-option for fat-filled

DRYING DLP DEMANDS CRITICAL CONDITIONING

RELCO®

DRY DELAC/DLP ON THE BELT: A LOOK INSIDE…

DEALING WITH PERMEATE / LACTOSE: LET THOSE CRYSTALS GROW…