



## Process Development Centre

Tetra Pak Cheese and Powder Systems in The Netherlands



**Your partner in product development**

# The process and technology solutions we can offer

## Concentrate treatments

- Powder reconstitution in water and concentrate preparation, by mixing tanks and temperature controlled buffer tanks.
- Heat treatment by Direct Steam Injection (DSI) and indirect heating systems in combination with flash cooler system.
- Pre-heating and evaporation on falling film evaporator.
- Flash cooler and double walled crystallisation tanks for lactose crystallisation.
- Homogeniser pump(s) for 1 or 2 stage homogenisation.

## Powder production

- Spray drying
  - Atomisation with multi or single high pressure nozzles.
  - Atomisation with two fluid- and spray cook nozzles.
  - Atomisation with NEEZ nozzles.
  - Atomisation with rotating disk atomiser.
- Agglomeration, straight through
  - Inter spray agglomeration, by swivel and rotating lance system.
  - Fines recycle system for fines agglomeration with a variable split flow system for bulk density control.
  - Rewet agglomeration system, see specials.
- Prolac spray dryer process for the production of non caking products such as whey, whey permeate and other permeates.
- Specials
  - Spray cooking process for starches, caseinates, etc.
  - Foam spray drying.
  - Rewet powder agglomeration.
  - Powder coating, for example instant powder coating with lecithin.
- Auxiliary
  - Powder handling systems - conveyors, loss and weight feeder, etc.
  - Powder classification equipment - sieve and milling (cone type mill)

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## Process configurations and applications we can offer

- **Tetra Scheffers falling film evaporator**

For all product applications; infant formula, follow-up milk, sweet condensed milk, whole- and skim milk, whey and permeates, as well as special products, your product?

- **Tetra Magna Dryer Wide Body with external fluid bed**

Application: agglomerated powders and regular powders

- Prepared foods and ingredients as infant formula, starch (cold swelling), malto dextrines, egg and egg protein powders, etc.
- Dairy products like regular and agglomerated whole milk, skim milk and MPC's.
- WPC's, regular whey powders and caseinate powders.
- Your product?

- **Tetra Magna Dryer Wide Body with integrated bed and external fluid bed**

Application: agglomerated products and thermoplastic / sticky products

- Baby foods, infant formula, follow-up milk, etc.
- Thermoplastic products, sugar rich products, glucose syrups, lactates, gluconates, etc.
- Starch (cold swelling) and malto dextrine powders.
- Your product?

- **Tetra Magna Prolac Dryer - Tall Form bustle with belt and external fluid bed**

Application: production of premium, non caking, non dusty whey and permeate powder.

- **Tetra Magna Tall Form bustle with U-tube, bag house / cyclone**

Application: regular / non agglomerated powdered products.


- Proteins (gluten proteins / pea proteins / soy proteins / caseinates).
- Regular skim powder
- Your product?

- **Tetra Magna Rewet Agglomerator Tall Form, low build, internal bed and powder handling equipment**

Application: agglomeration of dusty powders (and mixes) into non dusty, homogenous (instant) agglomerated powders.

- Creamers, cocoa pre-mixers, instant tea and agglomerated products for drinks.
- Baby food and senior food.
- Cold swelling starch.
- Your product?

- **Bench scale, mobile and laboratory scale equipment**

- Boiling point tester.
  - Rotavap, rotating evaporator.
  - Single pipe, falling film evaporator.
  - Small scale U-tube spray dryer with two fluid nozzles.
  - Bench scale fluid bed and sticky point tester.
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# Analytical laboratory

## Concentrate properties

1. Total solids content, (oven method)
2. Viscosity meters
  - Brookfield DVII + PRO, with various standard spindles and small sample adapter
  - Haake VT 181 + 2 spindles
  - Hot / cold water controlled water bath
3. Conductivity
4. pH
5. Standard microscope, for observation of sizes on lactose crystals
6. Refraction / Brix, hand and digital refraction meters
7. Various titrating possibilities, chloride and titrable acidity
8. Centrifuge, Gerber for sedimentation tests, etc.

## Powder properties

9. Full range of moisture content analysers
  - (Vacuum) oven moisture
  - Ceramic / quartz – rod heater, moisture analyser, Sartorius MA45
  - Karl Fisher moisture analyser
10. Free moisture content (oven method)
11. Density
  - Particle density, Micromeritics AccuPyc 1330
  - Bulk density tester Engelsmann
12. Particle size distribution and visual particle observation
  - Shaking sifter, Engelsmann with various sieve sizes
  - Air jet sifter, Alpine with various sieve sizes
  - Standard microscope, with eyepiece micrometer

## Powder functionality test methods

13. Flowability, rotating drum with slot
14. Mechanical stability, Alpine, air jet sifter
15. (In)Solubility index
16. Scorched particles
17. Free fat content
18. Sludge and sediment tests
19. Wettability and dispersability
20. White flecks number
21. Baby bottle test
22. Caking and hygroscopic properties test
23. Compressing test
24. Your test

All powder functionalities are executed according international standards (on request your standards).