FLOTTWEG INDUSTRIAL CENTRIFUGES
for the Recovery of Lactose and Casein

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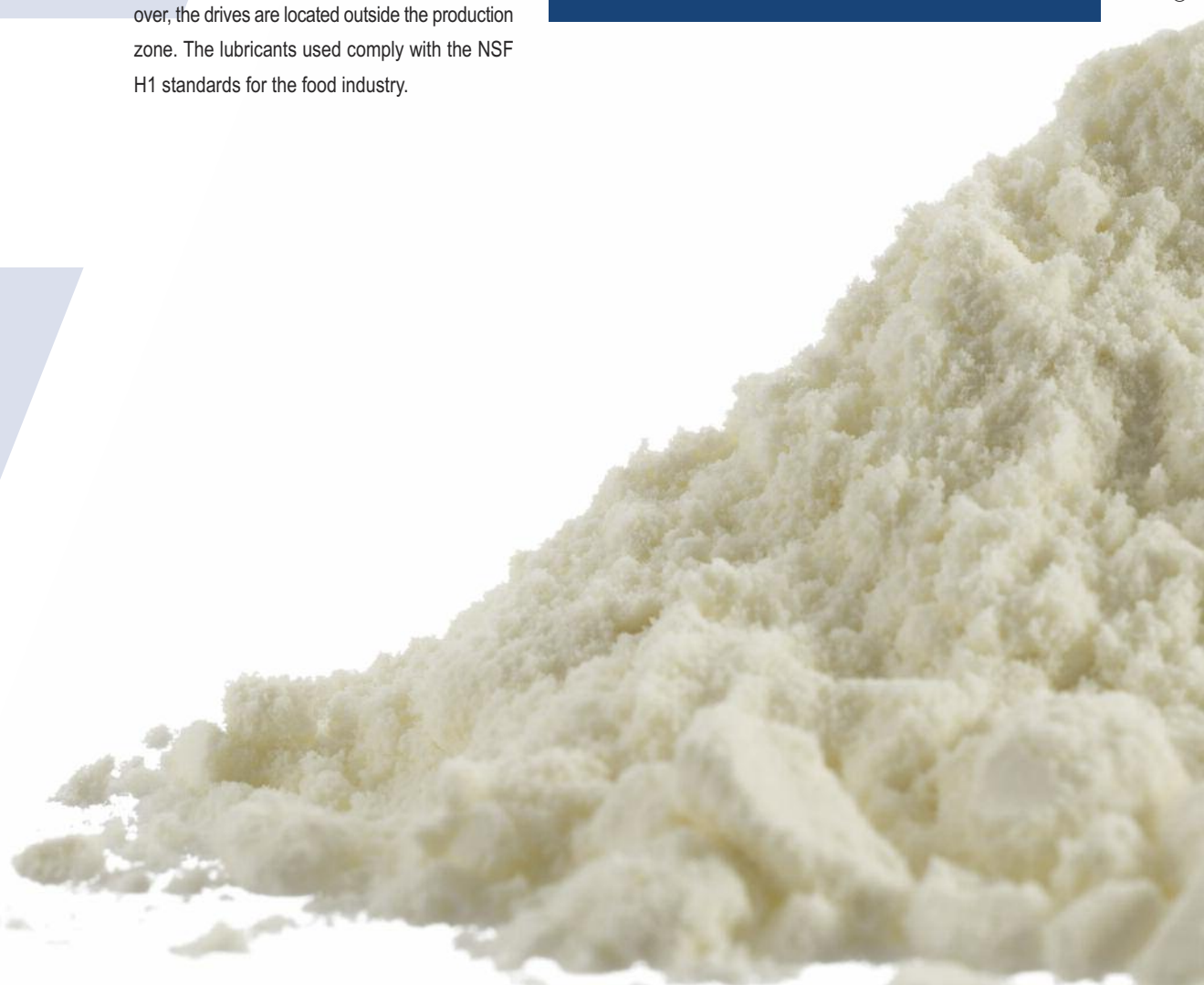## for the Recovery of Lactose and Casein

Special industrial centrifuges are used for the production of lactose and casein. Both products are used as basic materials in the food industry. Special machine and cleaning concepts are therefore essential for safe production.

Flottweg Decanter Centrifuges used for the production of lactose and casein are hygienically optimized in compliance with EHEDG directives and they are completely CIP-capable. Special CIP nozzles ensure the efficient cleaning of all critical areas. All product-wetted parts are made of high quality stainless steel with appropriate surface treatment. Seals made of FDA-approved material are available.

The Flottweg Simp Drive® assures high yields thanks to the automatic adjustment of the differential speed between the scroll and the bowl, even in case of varying feed conditions. Moreover, the drives are located outside the production zone. The lubricants used comply with the NSF H1 standards for the food industry.

Features of the Flottweg Decanter Centrifuges for processing casein and lactose

- Hygienic design and complete CIP capability for efficient cleaning and short downtimes
- Liquid discharge under pressure using the impeller – completely automatic on request, for adjustment to different process conditions
- Minimum foaming thanks to the closed discharge system
- Optimized CIP cleaning
- Sealing materials in compliance with FDA regulations
- Grease for the lubrication of bearings within the production zone (scroll) in compliance with NSF H1 standards
- Optionally: Rotor bowl components and scroll in an electro-polished design
- Differential speed depending on the torque due to the Simp Drive®, thus
  - High dewatering efficiency
  - Optimum separation

® = registered trademark in various countries

TECHNICAL DATA

TECHNICAL DATA OF THE FLOTTWEG DECANTER FOR LACTOSE AND CASEIN*				
Model	Z3E-4	Z4E-4	Z5E-4	Z6E-4
Bowl diameter	300 mm	420 mm	530 mm	620 mm
Bowl speed	5250/min	4200/min	3500/min	3200/min
Materials of construction	All product-wetted parts are made of stainless and acid-proof steel, e.g. DIN 1.4463 (Duplex) and 1.4571 (AISI 316 TI)			
Dimensions* (LxWxH)	2950 x 840 x 800 mm	3493 x 1000 x 1200 mm	4252 x 1405 x 1140 mm	5150 x 1440 x 1500 mm
Total weight*	1500 kg	3000 kg	6200 kg	9750 kg
Average motor size	18.5 kW / 7.5 kW	22 kW / 11 kW	45 kW / 15 kW	75 kW / 22 kW
Options	rotor housing made of high stainless steel, automatic impeller adjustment			

* The listed figures are to be understood as guidelines.

THE PRODUCTION OF CASEIN

Casein is the main protein in cow milk, with a ratio of 80 %. Casein or caseinates are used in the food industry in a number of different ways. They are added for protein enrichment in bakery products, sweets and meat products to help these products achieve certain physical characteristics.
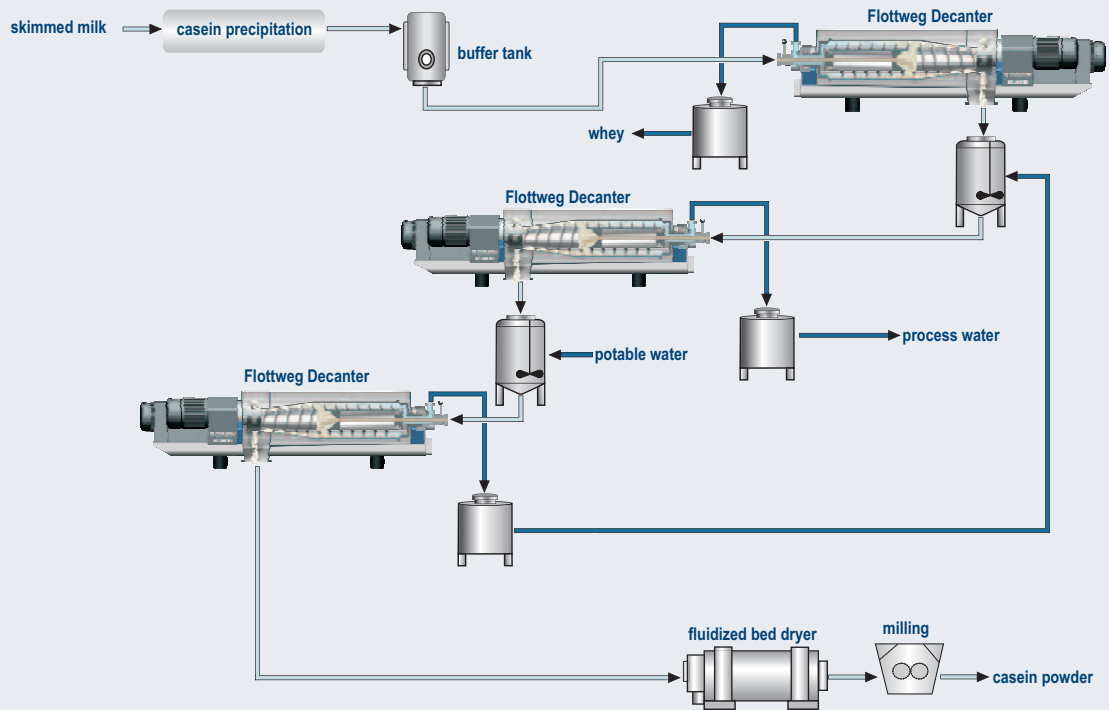
In order to obtain a high quality and pure final product, grease, whey proteins, lactose, and mineral compounds should be separated in several separation or washing stages, since they reduce the quality and the shelf life of the final product.

Caseinates (after separation of the butterfat) can be found in full cream milk or in skimmed milk in very fine particles. If the pH value of the solution is reduced, the casein coagulates and can easily be separated from the clear whey. Precipitation is possible by adding acids (e.g. HCl, H_2SO_4) or rennin or by lactic acid fermentation. Afterwards, the coagulated casein is washed in several stages using a counter-current process, eliminating excess whey and other impurities. The cleaned casein is dewatered before it is processed into powder in the dryer.

The separated centrate tends to generate foam in this process. That is why special Flottweg Centrifuges with adjustable impellers are used. The impeller discharges the liquid under pressure, reducing foam formation. It is also possible to adjust the liquid level in the machine during operation, which contributes to continuously high yields even when feed conditions vary.

Characteristics of the Flottweg Casein Decanter

- High dry substance content in the final product (40 – 50 %)
- Optimum separation efficiency
- Adjustable impeller and Simp Drive® for optimum separation results, even under varying feed conditions
- Easy integration into fully automatic CIP processes
- Broad range of capacities of up to 30 m³/h

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Flottweg
Separation Technology

skimmed milk → casein precipitation → buffer tank

whey

Flottweg Decanter

Flottweg Decanter

process water

potable water

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fluidized bed dryer   milling

casein powder

Process diagram: Production of casein

THE PRODUCTION OF LACTOSE

Lactose (milk sugar) is used in a wide range of applications in the food and pharmaceutical industries due to its special characteristics. Cleaned lactose is produced in several stages. First whey from cheese or casein production is evaporated in order to trigger the crystallization of lactose.

In the first washing stage, these crystals are separated from the mother liquor. The residue (molasses) can be reintroduced into the fresh whey or the lactic acid production process.
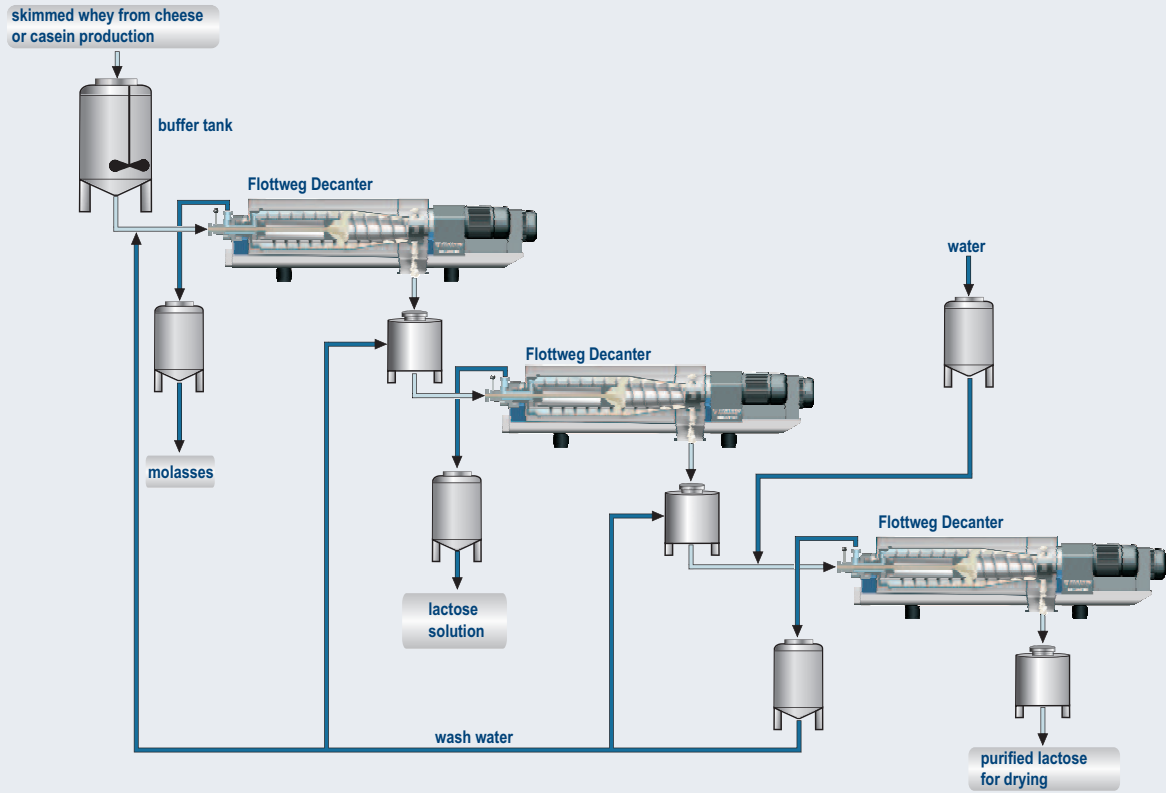
The lactose generated this way is not yet purified. The crystals are mixed with cold water and washed one more time. Impurities such as proteins, lactic acids, and mineral material, mostly located on the surface of the crystals, are separated from the raw lactose along with the wash water. To obtain a higher purity of lactose, a third washing stage follows. After centrifugation, the powder is dried.

Characteristics of the Flottweg Lactose Decanter

- High differential speed for optimized separation efficiency (variable between 1 – 60 rpm)
- High substance content in the final product (more than 90 % of dry substance content)
- Strong drive unit with high torque (6,000 Nm – 13,000 Nm) for processing high solids loads
- Electro-polished scroll surface
- No rifts or fillets within the rotor (all surfaces are polished/hygienically ground)
- Stellite hard facing, hygienically ground
- Easy integration in fully automatic CIP processes

Flottweg Decanter used in the production of lactose

TECHNICAL INFO

skimmed whey from cheese
or casein production

buffer tank

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water

molasses

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lactose
solution

wash water

purified lactose
for drying

Process diagram: production of lactose

Flottweg Separation Technology –
Engineered For Your Success

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