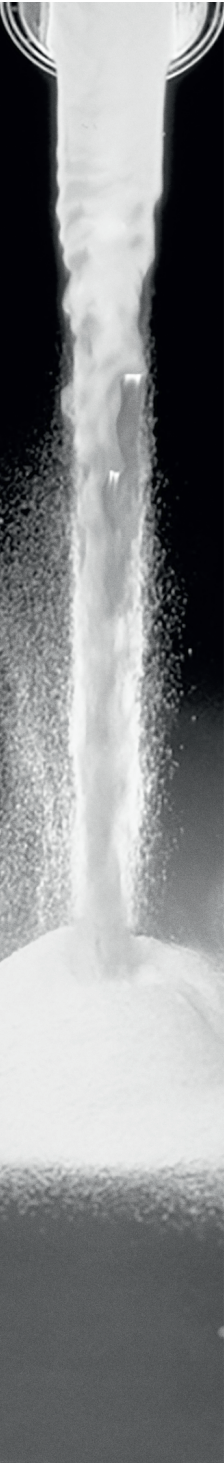


Non-Caking Whey Permeate Powder





Pump up your products with permeate

Whey permeate is widely used in the global food and beverage industry as a cost effective milk solid ingredient in food formulations. To produce high quality products with consumer appeal, you need a permeate powder that is non-caking and free flowing, enhances flavor and has a long shelf life.

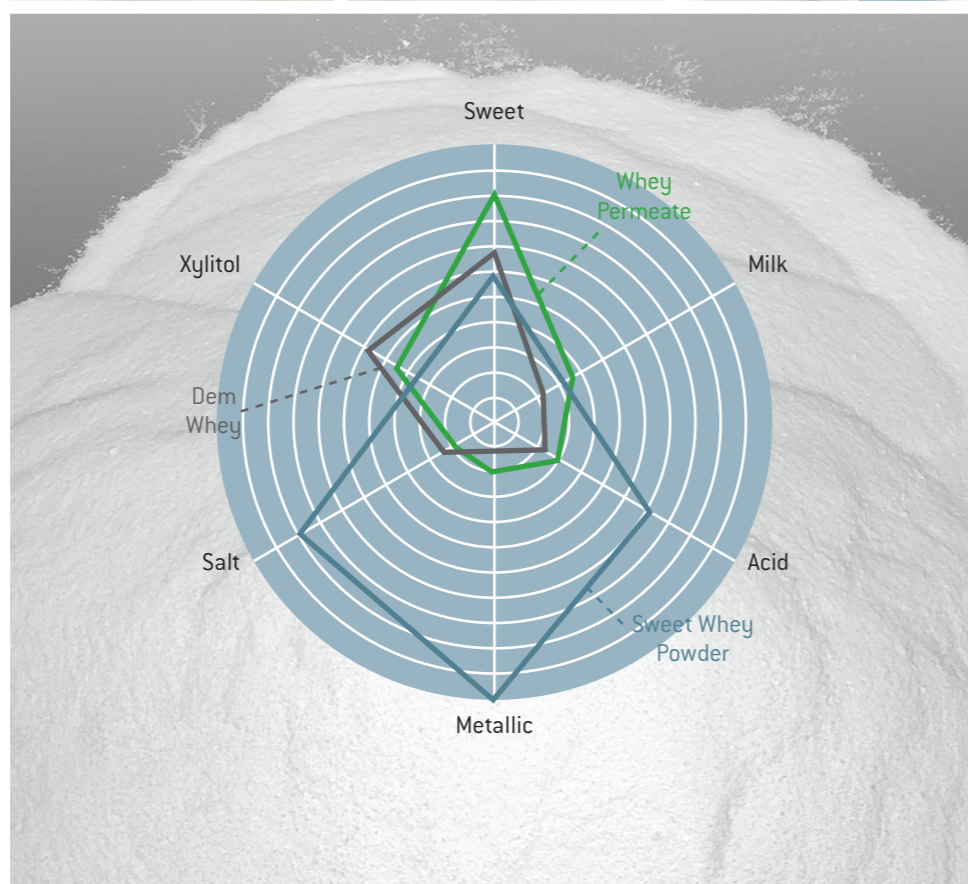
SPX FLOW's process systems produce high quality, non-caking permeate with non-hygroscopic behavior to prevent lumps and enable quick reconstitution for wet mixes and good bulk density for dry mixes. Our extensive expertise in dry processing has contributed to state-of-the-art permeate powder plants throughout Europe and South America.



Applications

- Bakery
- Ice Cream
- Confectionery
- Soups & Sauces
- Seasonings/Vending Mixes
- Dairy

Whey permeate outstandingly replaces other, more expensive milk Solids without altering taste and texture of the food product or changing any process parametres!



The advantages of whey permeate



Added-value level



Food manufacturers like you can increase your products' consumer appeal with the functional benefits whey permeate provides.

- In baked goods, permeate is used for browning, stabilizing emulsions, moisture retention, flavor enhancements and fat-like attributes.
- In soups, sauces and dry mixes, permeate reduces sodium content, improves texture and produces a creamy appearance.
- In applications such as ice cream, confectionery, baked goods, vending mixes, instant soups and seasonings and snacks, whey permeate can replace more expensive milk ingredients without altering taste and texture or requiring changes to processing parameters.
- Your products can achieve clean label status that appeals to health-conscious consumers because permeates are listed in nutritional facts information as dairy product solids. Plus, its simple composition contains minerals such as potassium, sodium, magnesium, phosphorus and calcium which deliver naturally occurring nutrients.
- Standardisation of milk.

Permeate offers food manufacturers value for:

- Price
- Functionality
- Sensory attributes
- Nutritional value

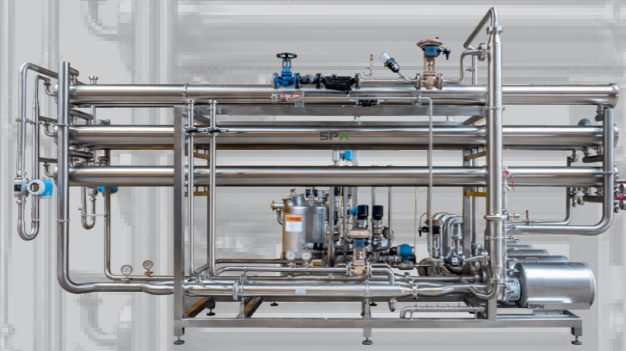
Food safety assured

Food safety means being in control of all production parameters – at all times.

You can maintain the highest standards of safety in your process with our sanitary designs, featuring smooth surfaces to avoid hollow spaces. Our equipment complies with global regulations including 3A Standards (USA), IDF and the EU Hygiene and Food-stuffs Directive (93/43/EEC).

You can be confident that your SPX FLOW system will deliver the highest levels of hygiene.

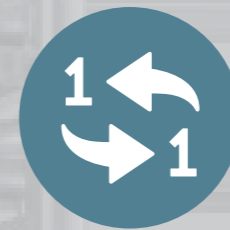




Cost saving



Pleasant milky flavour



1 on 1 replacement



Free-flowing

Expertise – At Every Step of the Process

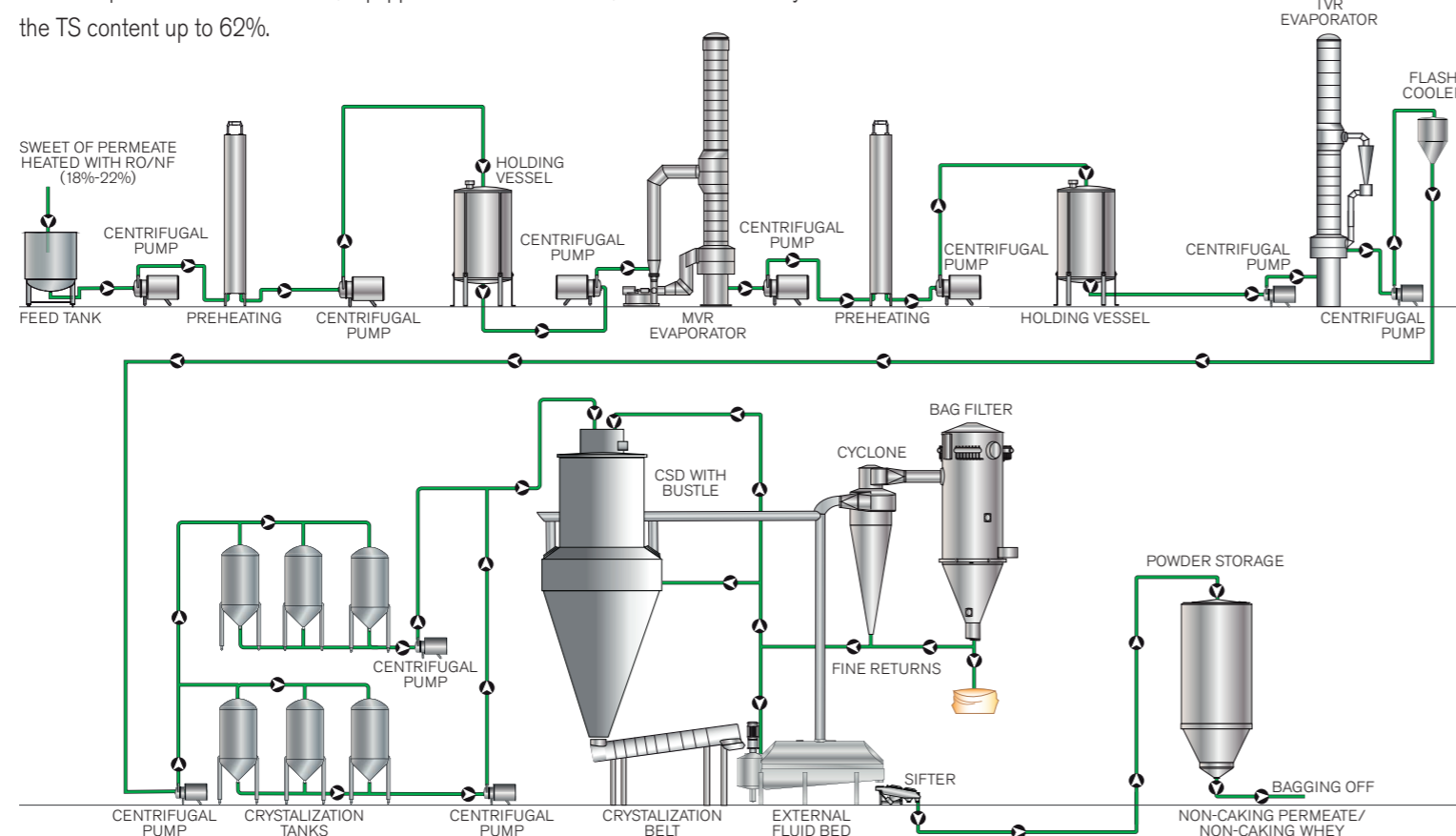
You can count on SPX FLOW's equipment and experience, well proven in every step of whey permeate production including evaporation, heat and hold control, crystallization and spray drying.

Membrane Filtration

Nanofiltration (NF) concentrated or Reverse Osmosis concentrate (RO) permeate with up to 22% total solids, produced from Ultrafiltration (UF) concentrated cheese whey, is typically used to produce permeate powder. SPX FLOW can customize membrane filtration plants to accommodate a wide variety of whey composition.

Evaporation

Permeate is evaporated using two types of plants installed in a series: mechanical vapor recompression (MVR) evaporation followed by thermal vapor recompression (TVR) evaporation. Each evaporator features precise boiling temperature profiles and comes equipped with our proprietary heating and holding controls in the up-stream process to maximize production time. The MVR increases the total solids (TS) content up to 40% while the TVR, equipped with a flash cooler, initiates lactose crystallization and takes the TS content up to 62%.



Crystallization

The permeate concentrate is transferred to crystallization tanks where the amount and size of lactose crystals in the concentrate is controlled by a precise cooling and crystallization program. This ensures the correct size and volume of crystals for the highest quality powder. SPX FLOW designed this proprietary program and continuously enhances it based on customer feedback.

Spray Drying

SPX FLOW's unique hybrid dryer, which is a combination of a tall form dryer with a bustle and a conical dryer, was designed specifically for non-caking permeate production. The atomization step is performed utilizing SPX FLOW's new direct driven centrifugal atomizer equipped with many unique features including no oil splash lubrication which provides a hygienic environment around the air distributor. The new atomizer is compact and light weight and comes with a number of added sensors and detectors.

Crystallization Belt

A crystallization belt at the outlet of the drying chamber is a unique feature of our process. The belt has been continuously improved to ensure effective process capabilities and compliance with stringent CIP requirements. Used in conjunction with a timer belt, this step crystallizes the lactose and gives the powder a specific amount of time to rest and transform into a non-caking powder.

External Fluid Bed

To ensure that the powder possesses the desired properties, the External Fluid Bed (EFB) implements specific heating and cooling air parameters. The first section of the EFB is equipped with an agitator to break up any lumps that may have come from the crystallization belt. The fluid bed is static and air streams are utilized to mix and fluidize the powder.



Innovations in Permeate Processing

SPX FLOW continuously improves our whey permeate production systems based on customer feedback and application testing. Take a look at some of our most recent innovations and the benefits they deliver.

Crystallisation belt

SPX FLOW design offers upgraded crystallization belt with:

- More CIP nozzles on top and below the belt
- Side guides
- Splash proof
- Migration certified belt

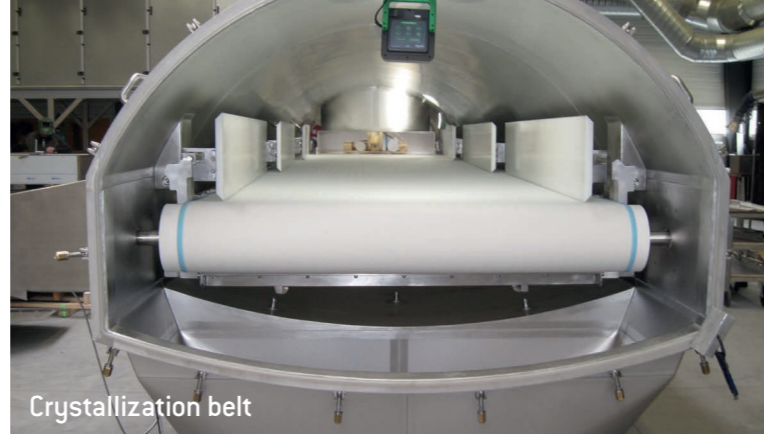


Direct Drive Atomizer

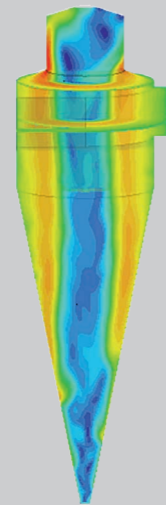
- Energy Efficient – Not belt driven/ Gear box
- Hygienic Design – No lubrication oil needed
- Flexible Design for Ease of Maintenance – Light weight, compact dimensions

External Fluid bed

- Non-vibrating Fluid Bed
- Unique air stream program
- Distinct air fluidization
- Fully welded construction
- Retractable CIP nozzles

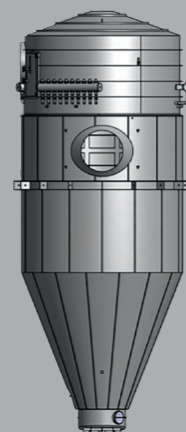


Crystallization belt



Cyclone separator

- High efficiency cyclone
- Longer cone for high fines retention
- Lowered losses
- Compact layout



Bag filter

- Walk-in plenum
- CIP'able at place
- Suppression or rupture disc for safety



External Fluid Bed

Decisions based on science

SPX FLOW continues to innovate to help our customers meet the changing needs of consumers and retailers.

Our global innovation centers offer testing of wet and dry processes. Additionally, our in-house computational fluid dynamics facility uses sophisticated algorithms to simulate and test drying parameters. This cutting edge technology gives our specialists complete control of the testing process allowing for a higher degree of data gathering accuracy to formulate the optimum system design for your product.

Take advantage of our ...

- Extensive experience with high yield lactose processing projects worldwide
- Insights of the crystallization process
- Customized in-house engineering design tools

Together – we'll discover the best process for your product.

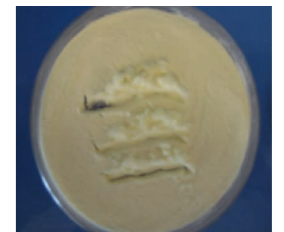
Test of non-caking permeate powder

Definitive and quantitative caking test development by SPX FLOW Anhydro to test if powder is "non-caking" permeate.

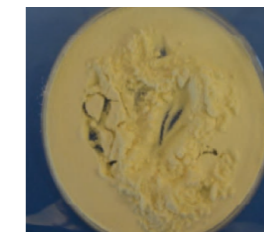
Caking evaluation



The powder has not changed. Non-caking.



Surface slightly crispy goes apart by a light pressure. Loose free flowing powder underneath.



Crispy coherent clot mixed with loose powder.



Rubbery.

PRODUCT SPECIFICATIONS		
PARAMETER	UNIT	PERMEATE
MOISTURE	%	< 1.5%
AW (TEMP. TO BE DEFINED)	-	< 0.1
BULK DENSITY NOT TAPPED	g/ml	0.55-0.60
BULK DENSITY TAPPED	g/ml	0.65-0.80
PARTICLE SIZE D50	µm	100
SCORCHED PARTICLES	-	A
SOLUBILITY INDEX	%	99.7





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