

Freeze Concentration

IceCon the next generation

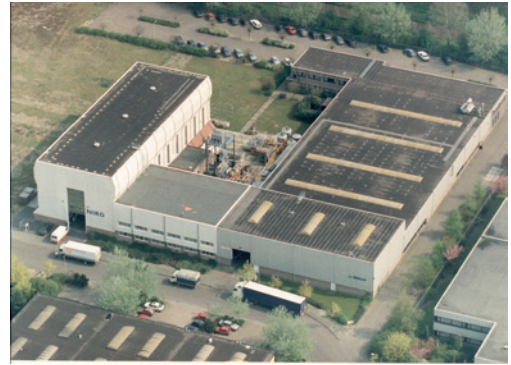


GEA Messo PT

GEA Messo PT is well established as a globally recognized technology supplier in the field of crystallization.

GEA Messo PT grew from the merge of the German based GEA Messo GmbH and the Netherlands based GEA Niro PT B.V. into one operational entity. The newly formed company combines the two technology centers for solution crystallization (Messo, Germany) and melt crystallization/freeze concentration (Niro PT, the Netherlands). This group forms the largest knowledge base with over 55 years experience in crystallization technologies.

GEA Messo PT forms part of the GEA Process Engineering segment of the GEA Group.



's-Hertogenbosch, the Netherlands



Duisburg, Germany



Introducing Freeze Concentration

Many industries need to dewater aqueous solutions. The objectives of the process vary widely depending on the specific applications. They range from achieving high quality concentrates (food liquids) to creating ultra-pure substances (chemical industries).

Freeze concentration equals quality

Freeze concentration is synonymous with supreme quality concentrates. Freeze concentration converts part of the water of aqueous solutions into pure ice crystals. Complete separation of these ice crystals result in specific removal of water at very low processing temperatures.

The result is unprecedented product quality.

When supreme quality liquid food concentrates are requested then freeze concentration is the process of your choice. Niro PT invented, developed and commercialized the present day freeze concentration technology. A new generation low cost system called IceCon has now been developed.

No other concentration processes can obtain the outstanding product qualities which are achievable with freeze concentration technology.

The very gentle concentration at sub-zero temperatures allows product freshness to be maintained and practically eliminates all biological degradation. Since the crystallization process is highly specific for water and no vapour phase is present, all volatile aromas and flavours will be preserved in the liquid concentrate.



Advantages of the FC process

- no loss of volatiles or solids
- sub-zero temperature processing
- maintains original product characteristics
- elimination of microbiological activity
- closed system, prevents oxidation
- continuous operation
- no need for intermediate cleaning
- continuous and stable operation
- flexibility in feed composition

Your business and Freeze Concentration

The freeze concentration process provides:

- premium quality concentrates
- development of new products
- quality improvement combined with spray drying
- reduction of cost combined with freeze drying
- preservation of product properties
- increased stability
- alternative for products not-from-concentrate

Liquids

Concentration by water removal has been a common procedure among liquid food processors for many years. Rather than moving tons of water around the world, they reduce volume to economize on packaging, storage and transportation. Conventional thermal concentration methods often compromise quality by heat damage and loss of important flavour components.

Here, the IceCon freeze concentration process makes the difference. This highly specific and low temperature water removal technique has proven to be superior in retaining the food product's original properties.

Nutriceutical products

Many nutriceutical products experience a loss of activity if processed through other processes. IceCon is ideal for treating heat-sensitive substances. The valuable components can now be concentrated from their natural source.

CONCENTRATION

IMPROVEMENT

NEW PRODUCTS

acacia
ale
almond milk
aloe
apple cider
apple juice
apricot
aroma extract
balm extract
balsamic vinegar
banana serum
barley extract
black currant
black tea
blood orange
blood serum
Burgundy wine
butter milk
carrot juice
cashew juice
celery juice
chamomile tea
cherry
cider vinegar
clavulanic acid
cloudy apple juice
coconut milk
coffee
concord grape juice
cranapple juice
cranberry juice
date juice
decaffeinated coffee
egg white
enzymes
fish extract
grapefruit juice
green tea
guava juice
herb extract
ice beer
lager beer
lemon juice
light beer
light wine
lowfat yogurt
malt beer
malt vinegar
maltodextrose
mandarin juice
maracuja juice
meat extract
mine water
muscatel grape juice
mushroom juice
must
non-alcohol beer
noni juice
onion juice
oolong tea
orange essence
orange juice
orange wine
passion fruit
penicillanic acid
peppermint
pineapple juice
plum vinegar
raspberry juice
red grape juice
red wine
rice wine
Riesling grape juice
sake
seaweed extract
skim milk
soju
Sorghum beer
soybean milk
soybean peroxidase
stout beer
strawberry juice
sucrose solution
tomato serum
umbu juice
wheat extract
whey
whey protein concentrate
white grape juice
white vinegar
white wine
whole milk
wine vinegar
wort
yeast extract
Zinfandel wine



Economics

Freeze concentration yields premium quality products. Additional advantages include low energy cost and a continuous process that enables long operating periods without intermediate cleaning. The total cost can be competitive with conventional systems. You receive unmatched quality as an extra reward. Our specialists will be happy to provide detailed insight about the feasibility of the process for your product.

Capacities

The capacity range available in industrial plants is very broad. Present day freeze concentration units have water removal capacities ranging from 5 to 30,000 kg per hour. The process can handle a variety of products from small volume specialty to large scale commodity products.

Try it yourself

Seeing is believing. Where calculations may suffice for proven applications, new applications and products demand that the technical feasibility is demonstrated prior to the investment. With various pilot plants available you can rent a fully transportable unit to conduct in-house trials. Or simply supply the feed stock and allow us to produce the concentrate samples for you, with the option to witness yourself.



Pilot plant unit

Proven Applications

Soluble/liquid coffee and tea

- quality improvement
- aroma retention
- product development
- quality boost of freeze- or spray drying
- cost reduction

Citrus juices, fruit- and vegetable juices

- maintain natural freshness
- quality retention
- premium branding
- cost reduction
- product development
- high quality ingredients

Beer

- only proven concentration technique
- economic storage and distribution
- peak shaving
- reducing aging time
- product development
- ice beer
- stability improvement

Vinegar

- ingredient of high concentration
- the only viable concentration technique
- cost reduction

Wine

- control of alcohol level
- cost reduction
- high quality intermediate

Dairy products

- new product development
- high quality ingredients
- improved final products
- better semi-finished products for processors

Meat and fish extracts

- quality retention
- new product development

Herb and vegetable extracts

- no thermal damage to active components
- quality retention
- new product development



IceCon Freeze Concentration

What is freeze concentration?

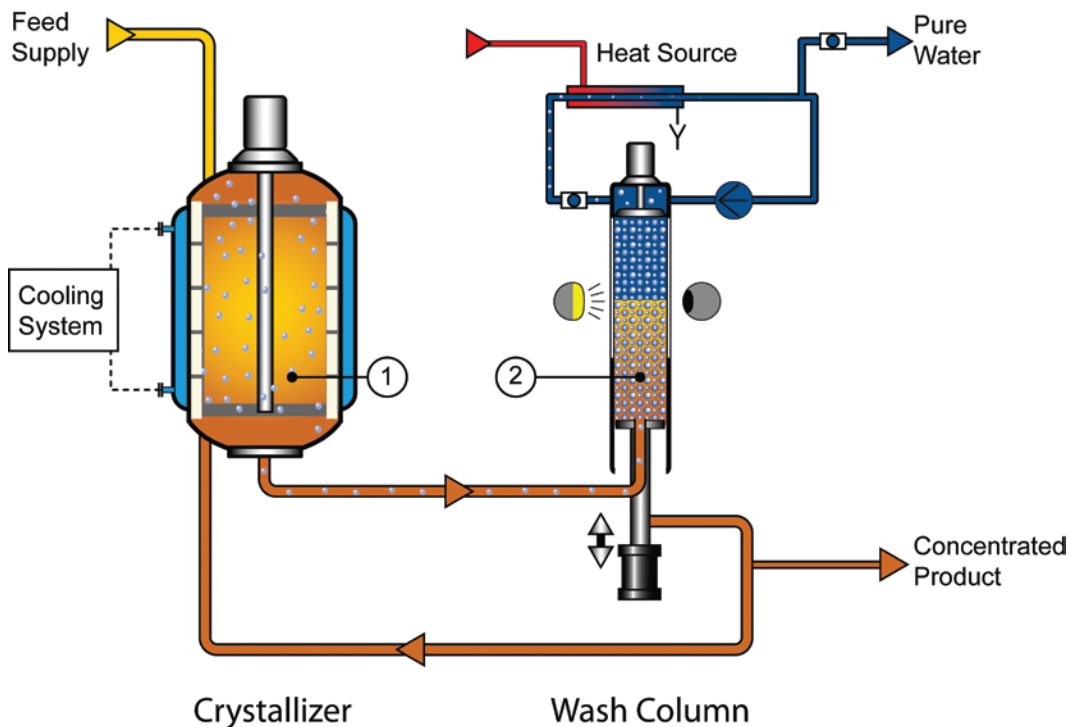
Freeze concentration is the removal of pure water in the form of ice crystals at sub-zero temperatures. IceCon is the latest innovation of freeze concentration design.

How the process works

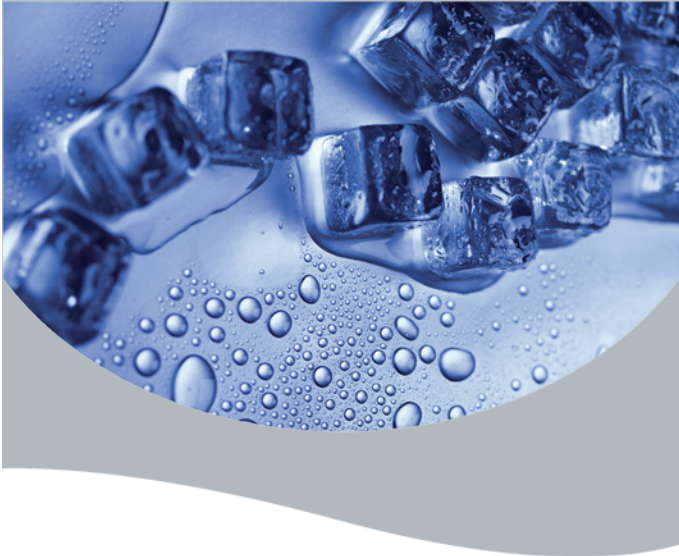
The diagram below shows the complete process in its simplest form. This single stage process consists of one crystallizer (1) and one wash column (2). The crystallizer is a vessel with a cooling jacket. The inner wall of the vessel is scraped. The outer wall is cooled by a circulating refrigerant. Ice production and ice crystal growth take place inside the crystallizer. By creating residence time ice crystals grow, creating an optimal crystal size distribution for efficient separation. In the wash column, the concentrated liquid is separated efficiently from the ice crystals. A compressed ice crystal bed is washed with melted ice to remove all traces of concentrated liquid. Freeze concentration ensures that all original product characteristics remain in the concentrate.



Wash column with wash front



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