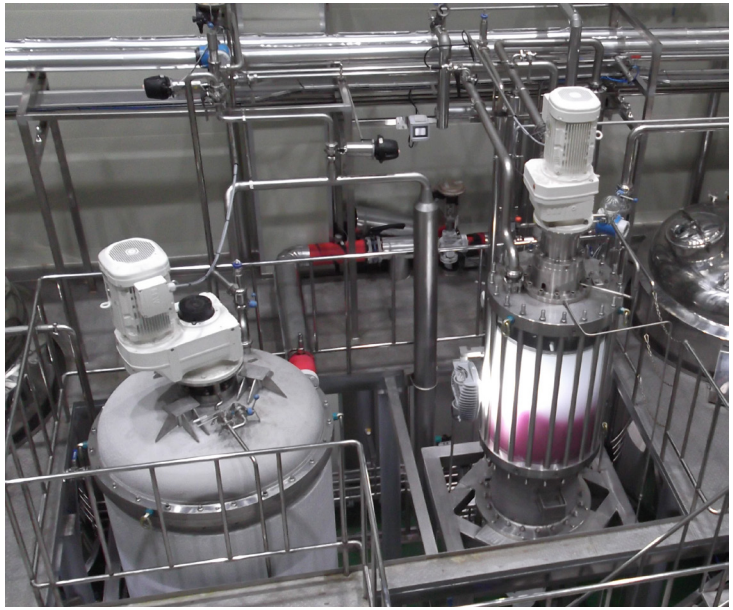
GEA ICECON®
COMPACT SERIES

Standard Skid Mounted Freeze Concentration Units
100 - 900 kg/h range

The GEA Icecon® Compact Series



Unit type		IceCon® Compact 25	IceCon® Compact 40	IceCon® Compact 60
General data				
Dewatering range (low – high)	kg/h	100 - 200	200 - 450	450 - 900
Dimensions (l x b x h)	m	5 × 4 × 5	6 × 4.5 × 5.5	6 × 4.5 × 6
Foot print (l x b x h), incl. maintenance area	m	7 × 6 × 7	8 × 7 × 8	8 × 7 × 8
Estimated operational weight	kg	6,000	12,000	20,000
Installed power process	kW	14	27	44
Example process data (based on concentrating a sugar solution from 10 to 40°Brix)				
Product output temperature	°C	-4.3	-4.3	-4.3
Dewatering rate	kg/h	175	400	875
Feed rate	kg/h	233	533	1,167
Production rate	kg/h	58	133	292
Annual feed processed (based on 8000 hrs)*	kg/year	1,866,667	4,266,667	9,333,333
Utility consumption data based on steady state operation				
Electrical consumption process (estimated)**	kW	8	19	26
Hot water (min. 70 °C)	m^3/h	0.9	1.9	4.2
Instrument air (min. 6 barG)	Nm^3/h	10.5	0.2	0.6
Basis for chiller design***				
Brine temperature@crystallizer inlet	°C	-13	-15.5	-19
Brine flow over plate heat exchanger (@ 5°C ΔT)	m^3/h	4.8	11.3	23
Cooling load @ brine temperature	kW	24	57	116

Table 1

* Data is based on a feed temperature of +4°C. Pre-cooling can be done by using cold wash water, concentrated product and/or using an external cold source (e.g. side load compressor). By using wash water and/or concentrated product part of the energy is recovered (most sustainable option). Whether a pre-cooling option is economic feasible is something that can be investigated.

** Based on batch run of 2 weeks, FC requires certain start-up time.

*** Chiller is excluded from scope of supply, but GEA will specify the required cooling load at required temperature. A chiller can also be offered as an option. Data based on using Temper-30 as secondary cooling medium.

Gentle Treatment for the Best Quality Concentrates

GEA developed a range of standard skid mounted units suitable for the production of liquid food concentrates. IceCon® provides the best solution for producing high quality concentrates, without loosing quality. The losses in the discharged water are negligible. This makes that the water can be re-used in any up/downstream processes or can be sent straight to the drain. The newly developed compact series will be offered as a complete solution.

All relevant components for running a freeze concentration plant are installed on three modules, meeting the standards for container transport. The modules will be commissioned and tested before shipment ensuring a smooth and fast installation and startup period.

The freeze concentrator works mostly electric and by installing a pre-cooling skid energy can be recovered for an even further reduced CO_2 footprint. The Compact series is available in three sizes:

- IceCon Compact 25
- IceCon Compact 40
- IceCon Compact 60

Features of the IceCon® process

- Straight forward automatic operation
- Minimum product losses (product can be recovered at end of batch run)
- Small footprint
- Continuous operation without intermediate cleaning
- Low maintenance costs

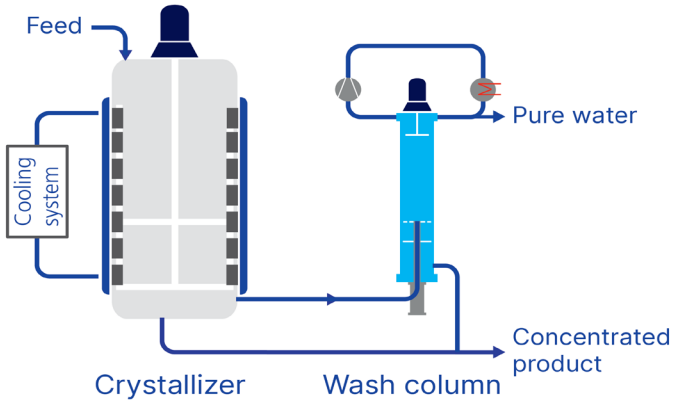
General design standards

- Good engineering practice, GEA Niro PT B.V. standards and EN standards
- Unit is designed for processing products for the food industry
- Process piping in accordance to DIN 11850/11851
- Cooling piping in accordance to Euronorm (DIN Flanges)
- Material of construction product contact surfaces SS316
- Finish of product contact surfaces Ra < 1.6
- Standard sealing material EPDM
- Automatic control after reaching steady state conditions
- Siemens PLC
- PLC and HMI software are based on the standard GEA Codex system

Advantages of the IceCon® technology

- Avoids thermal degradation
- Pure water discharge
- Preserves volatiles
- Prevents oxidation
- Inhibits bacterial growth
- Natural freshness, functionality, and nutritional value of the original products is secured

Figure 1: Process flowsheet



How the process works

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. The diagram shows the complete processs in its simplest form. This single stage process consists of one crystallizer and one wash column. 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 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.

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On-site demonstration of this technology is possible in various configurations using GEA pilot plants.
Please get in touch with our sales staff or browse our website where you can find our complete freeze concentration technology catalog as well as other brochures ready for download. Do not hesitate on contacting us, we will be happy to help you.

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