

GEA Messo PT Pilot Plant

GEA Messo PT has various freeze concentration pilot plants available for application development or sample production. Table 1 illustrates the wide variety of products tested on this equipment. The picture shows our NFC-W6 model, additional technical details are given on the back of this sheet.

Our pilot plants are designed using the same principles as the commercial units and provide reliable operational data. The product is concentrated using the same process and results in the same quality without loss of solids or aromas. The test results provide all the information necessary for scale-up and design of a commercial installation. The concentrate can be used for lab flavour analysis or even small market studies. Our pilot units can be shipped directly to the production site ensuring optimum product handling for the freshest possible concentrate production.

Typical operation

Most products require a significant concentration effort to reach the maximum product concentration. This generally requires continuous operation to reach final product concentration.

For example, we can start with a typical citrus juice at 12°Brix feed and calculate the feed required to reach 48°Brix (see Table 2). After the initial fill we need to add another 280 kg of feed and at 10 kg/hour this requires just over one day to complete. Once at final product concentration we can continue in steady state operation to measure system parameters and produce additional product samples. At the end of the test another 50 kg of concentrated product is drained from the pilot plant.

We provide a detailed test plan based on the feed properties and your production requirements.

Apple juice	Meat, fish & vegetable extracts
Aroma and flavour solutions	Pineapple juice
Beer and wort	many other juices
Citrus juices	Strawberry, grape
Coffee extract	Tea extract
Enzyme solutions	Tomato juice
Herb extracts	Wine and sake

Table 1: extract of successfully tested products

Freeze Concentration Pilot Plants

Pilot Plant type NFC-W6



Activity	Product requirement (kg)	Estimated time (hr)
Installation	0	4
Initial fill	160	1
Cooling and ice production	0	3
Concentration	280	28
Drain unit	0	1
Clean and pack	0	8
Total	440	45

Based on the following:

Initial feed concentration	12°Brix
Target final concentration	48°Brix
Concentrated product	50 kg
Water removal rate (avg.)	10 kg/h
Continuous operation up to maximum product concentration	

Table 2: Product requirements for typical operation

Process Engineering

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General Pilot Plant Test Information

Pilot plant data, type NFC-W6

Dimensions	:	2.7 x 1.1 x 2.1 m (9 x 3½ x 7 ft)
Floor space required	:	4 x 4 m (13 x 13 ft)
Weight	:	2,200 kg (4,840 lb)
Contents	:	160 liter (42 US gal)
Avg. dewatering capacity	:	10 kg/hr (22 lb/hr)
Installed motor power	:	30 kW
Power consumption	:	18 kWh/hr, 415 V/50 Hz (460 V/60 Hz), 3 phase (55 Amp service)
Cooling water	:	3 m³/hr, 20 °C (10 gpm, 68 °F)
Compressed air	:	3 Nm³ /hr, at min. 6 bar (1.5 scfm, 90 psig)
Refrigerant	:	R-507 (depending on local regulations)

Feed supply

Connection to a feed tank (not supplied with pilot unit) shall be provided locally.

Location

The pilot plant is designed for indoor testing.

Shipping

GEA Messo PT will arrange shipment to the test site. A forklift should be available for on-site placement.

Installation

The W6 requires a feed connection, cooling water, compressed air, and electricity. A checklist supplied during the planning provides a summary of the required utilities so that the actual installation can be completed in just a few hours after the unit is in location.

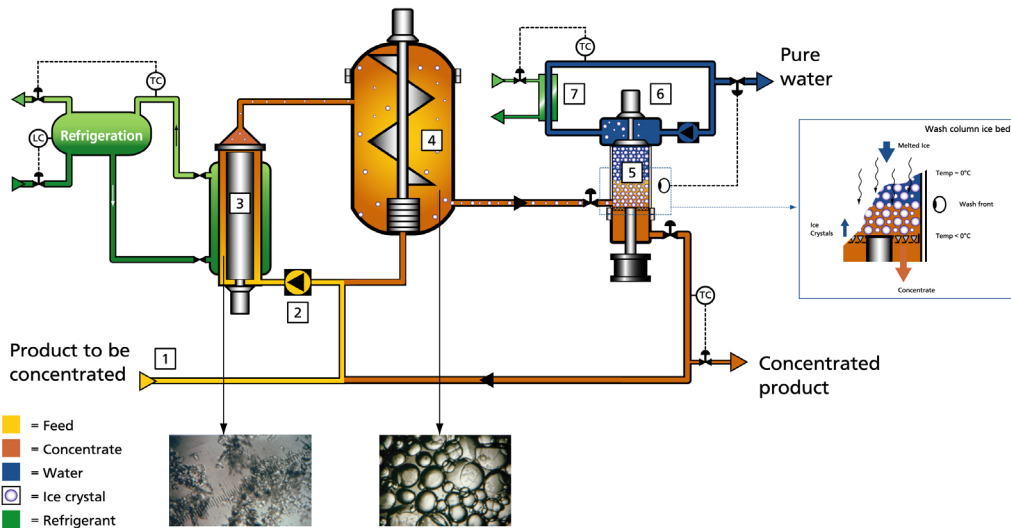
Test program

The product will be tested to determine the following:

- Demonstrate the freeze concentration process on this product
- Demonstrate pure water discharge and produce samples to determine product quality
- Determine maximum concentration factor of the product
- Determine design parameters for commercial system



W6 wash column illustrating the sharp separation between the washed ice crystals on the top and those still surrounded by concentrated product on the bottom.



A typical configuration illustrating the W6 pilot plant single stage operation. The W6 comes complete with refrigeration and control for efficient installation and trouble free operation. The product can be delivered in drums or as a slipstream connection from an existing processing line. Local installation ensures optimum quality. Most liquid food products can be concentrated in this configuration. The amount of feed material required for a test depends on the starting concentration and concentration factor. Approximately 50 kg of concentrated is available after a test run. The pilot plant can also be used in continuous production for larger production requirements.

Next steps

For more information regarding this technology and your specific configuration requirements please contact us at: info.niropt.nl@geagroup.com or phone +31.736 390 390.

