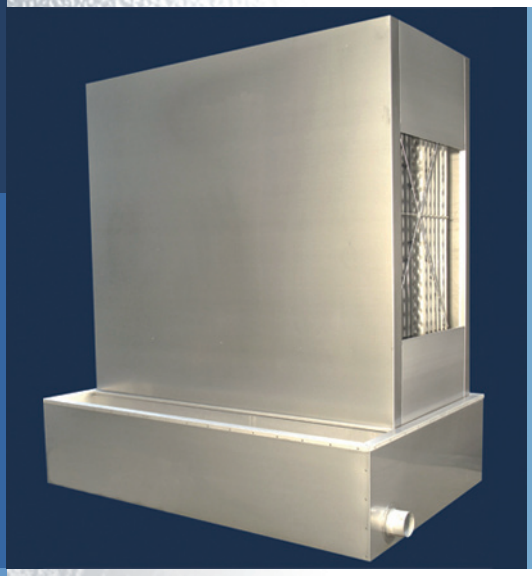
Falling Film Chiller

BUCOdelot









APPLICATION FIELDS

Industrial chilling of food

- fish, meet, poultryl
- fruit, vegetables
- milk, milk products
- softdrink production
- production of baked goods

Chilling in the production of

- concrete
- chemicals
- pharmaceuticals

Evaporator system for heat pumps at lowest water temperatures

BUCO 100 Jahre Innovation

RELIABILITY

In the BUCOdelot or baudelot cooler the homogeneous falling film allows to chill water down to 0,5 °C without danger of freezing. The unit will not even be damaged, if the regulation fails and causes the building of ice.

The Falling film chiller allows the operation with polluted liquids as well.

APPLICATION AND BENEFIT

- Water chilling down to 0,5 °C
- Chilling of products down to near the freezing point, without danger of freezing it!

SPECIFICATIONS

- Cooling power from 10 to 10.000 kW
- Evaporator for all refrigerants, gravity-, pump-, and dx-mode, or for brine
- Stainless steel completely







PIC LEFT TO RIGHT BUCOdelot compact system with tank, power 100 kW - dx; BUCOdelot typ A, power 1000 kW; BUCOdelot typ B, power 2000 kW

DESIGN AND DIMENSIONS

EXAMPLES FOR TYPICAL MEASUREMENTS, WITHOUT TANK	L	W	H
Compact - system	1,2	0,5	1,8
System typ A	2,0	2,1	2,0
System typ B	3,8	2,5	2,0
(ca. measurments in m)			

ACCESSIBILITY

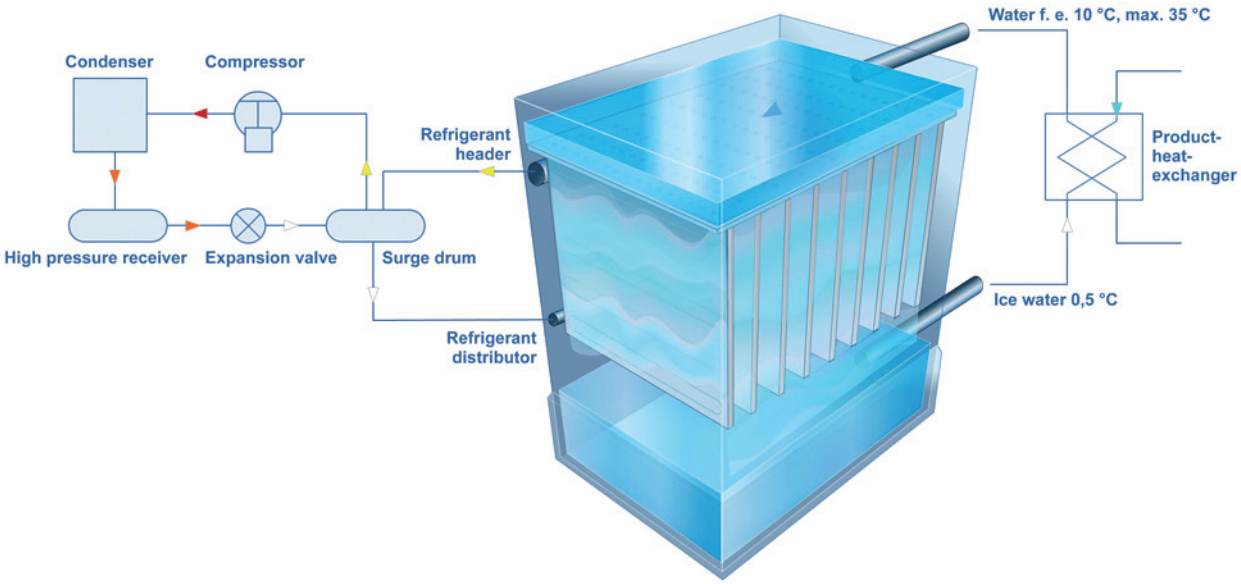
- open distribution tray,
- big drain to remove particle:
  - removeable side covers,
  - open panel system

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METHOD OF OPERATION

Water is pumped into the distribution tray and at a controlled rate is distributed homogeneously by a distribution through onto vertical panels in an open system. There the high flow velocity ensures highly efficient heat transfer with a self cleaning effect, which allows the operation with polluted liquids as well.

In the BUCOdelot or baudelot cooler the homogeneous falling film allows to chill water down to 0,5 °C without danger of freezing. The unit will not even be damaged, if the regulation fails and causes the building of ice.



ADVANTAGES

- water down to 0,5 °C without danger of freezing
- reliability
- for polluted liquids like grey water as well
- low affinity for soiling
- open design
- no gaskets
- easy to clean
- stainless steel completely, for salt water as well
- durability
- low refrigerant content
- individual design if required

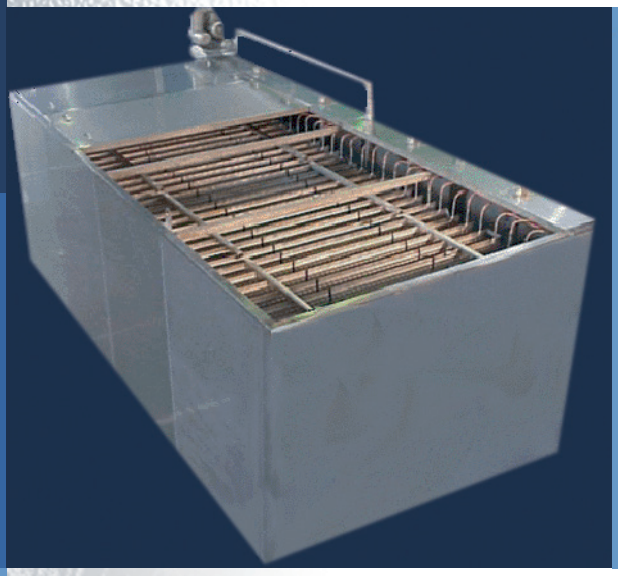
"BUCOdelot Falling Film Chillers for more than 30 years"
„More than 1500 BUCOdelot in operation"

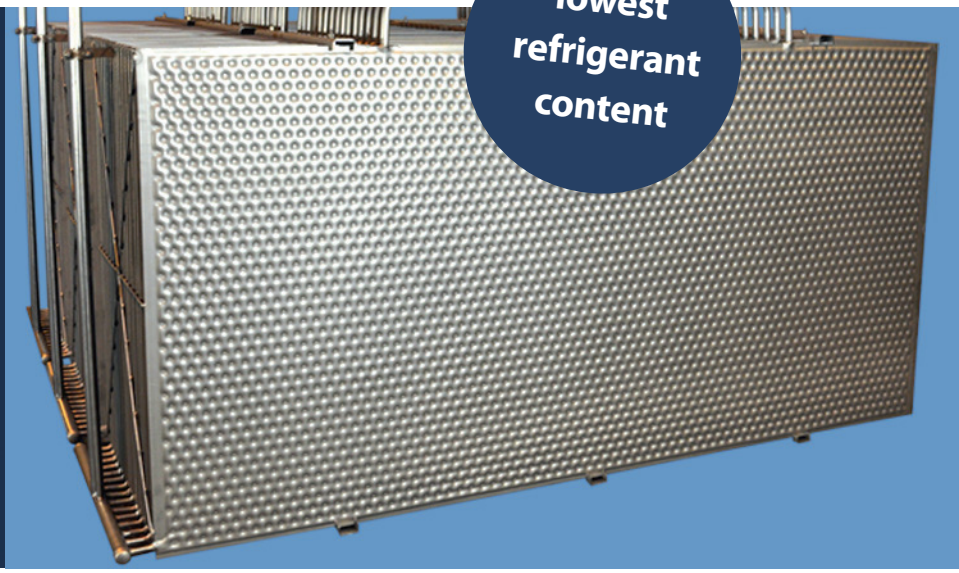
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BUCO 100 Jahre Innovation

Industrial Ice Bank

Cooler System - BUCO Ice Bank





lowest refrigerant content



APPLICATION FIELDS

Industrial chilling with peak loads

- Production of food
- Dairies
- Breweries
- Production of soft drinks

Chilling in the production of

- Chemicals
- Pharmaceuticals

BUCO 100 Jahre Innovation

EFFICIENCY

The benefit of an ice storage unit is the increased cooling power for peak loads while using smaller refrigeration machines, which have to be designed for the average demand only.

The cost efficiency is based on the utilization of low night tariffs, which sometimes cost half the money, or on limiting the max electricity peaks, which reduces the basic price of electricity.

APPLICATION AND BENEFIT

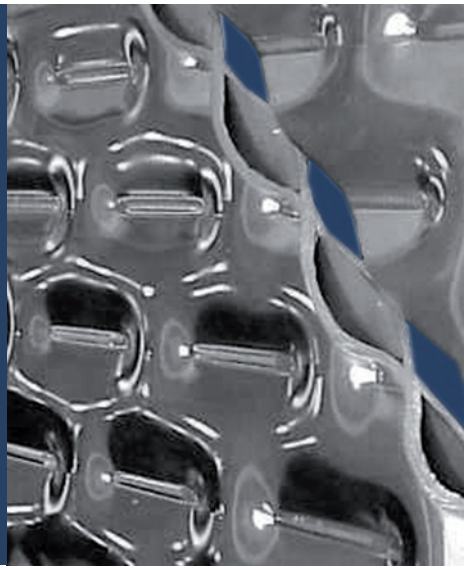
- Storage of refrigeration capacity in ice
- Increasing of peak cooling power with smaller refrigeration machine
- Limiting peaks in electricity consumption
- Advantage of using low night tariffs for electricity

SPECIFICATION

- Storage capacity from 50 kWh to 2000 kWh
- Evaporator for all refrigerants and modes or for brine
- Stainless steel completely
- Ready to plug or for local refrigeration units







DESIGN AND DIMENSIONS

EXAMPLES FOR TYPICAL MEASUREMENTS	L	W	H
Compact - system	0,5	2,3	1,5
System typ A	2,5	2,3	2,2
System typ B	10	2,3	2,2
(ca. measurments in m)			

PIC LEFT TO RIGHT

Air agitation to provide turbulence;
BUCO Ice Bank compact unit, 600 kWh;
Stainless steel evaporator panels - low refrigerant volume (about 40% compared to a coil system with pipes).

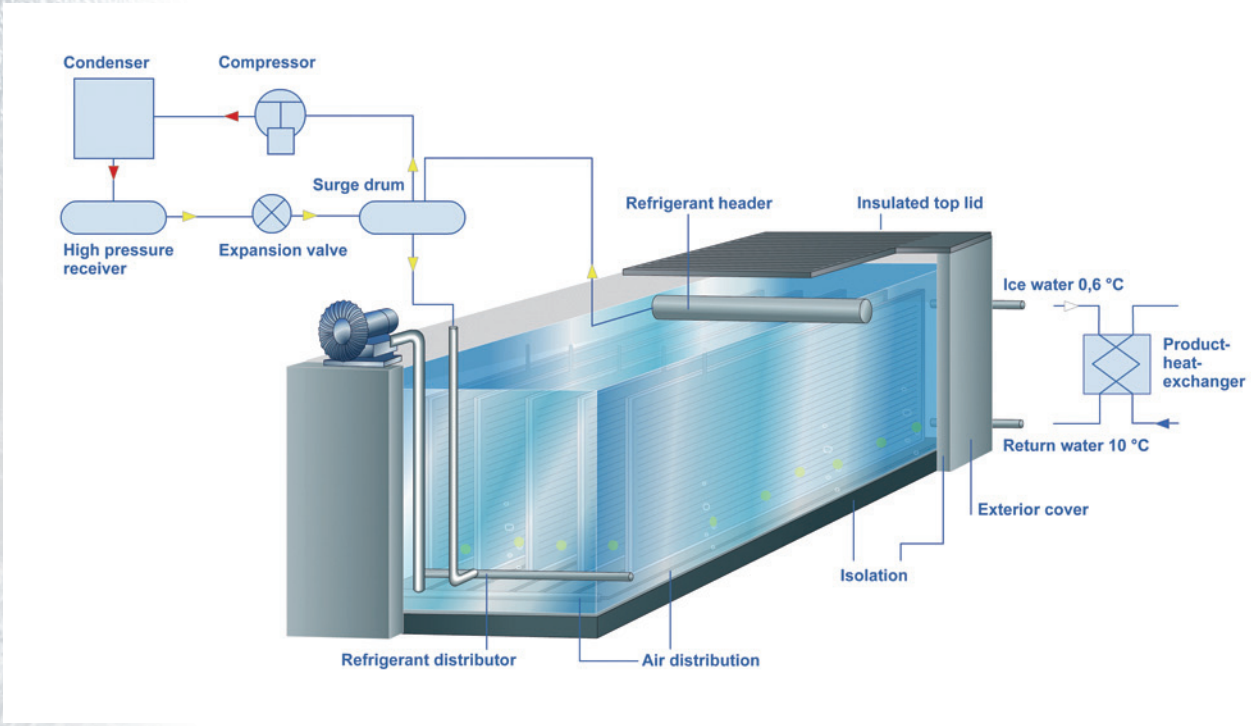
"BUCO Ice Banks for more than 50 years. More than 1000 BUCO Ice Banks in operation"

BUCO 100 Jahre Innovation

METHOD OF OPERATION

Storage or building ice: Evaporator panels are placed upright in a rectangular water tank. Ice is build at an evaporation temperature between -4 and -10 °C, depending on the storage time. The ice sticks to the evaporator panels. (static ice bank)
For ammonia systems, a separate suction pipe at the evaporator ensures the oil return.

Cooling phase or thawing phase: On the tank floor there is a distribution system for the warmer return water to ensure a homogeneous thawing of the ice. Additionally there is a distribution system for the air agitation, which provides intensive turbulence to ensure a perfect heat transfer and low ice water temperatures. The air agitation starts up automatically when required only. A maximum of cooling power is ensured at lowest ice water temperatures due to a nearly constant ice surface up to the very end of the cooling phase.



ADVANTAGES

- very stable ice water temperature below 1°C up to the end of the process
- very high cooling power for peaks
- stainless steel completely
- low refrigerant content
- open design
- easy inspection, easy cleaning
- compact design as a package for truck transport
- use of existing tanks possible

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BUCO 100 Jahre Innovation

Ice Bank Silo

Ice Storage Unit with Ice Maker

extra high cooling power









APPLICATION FIELDS

Industrial chilling with peak loads

- Production of food
- Dairies
- Breweries
- Production of soft drinks

Chilling in the production of

- Chemicals
- Pharmaceuticals

BUCO 100 Jahre Innovation

EFFICIENCY OF MAKING ICE

The efficiency of the dynamic ice making with hot gas melting is based on the prevention of a thick ice shell on the evaporator, which causes a big resistance for heat conductivity at static systems with a thick ice layer.

EFFICIENCY OF DIRECT CHILLING

The evaporator can be free of ice at any time after thawing and therefore can be used as a direct chiller for the warm return water. Direct chilling on the iceless evaporator allows a much higher evaporation temperature, a higher COP of the refrigerant compressor and thus less electri city costs.

The direct chilling is recommended to be used as long as possible for the ground load. The mode can be switched automatically as a function of the return water temperature.

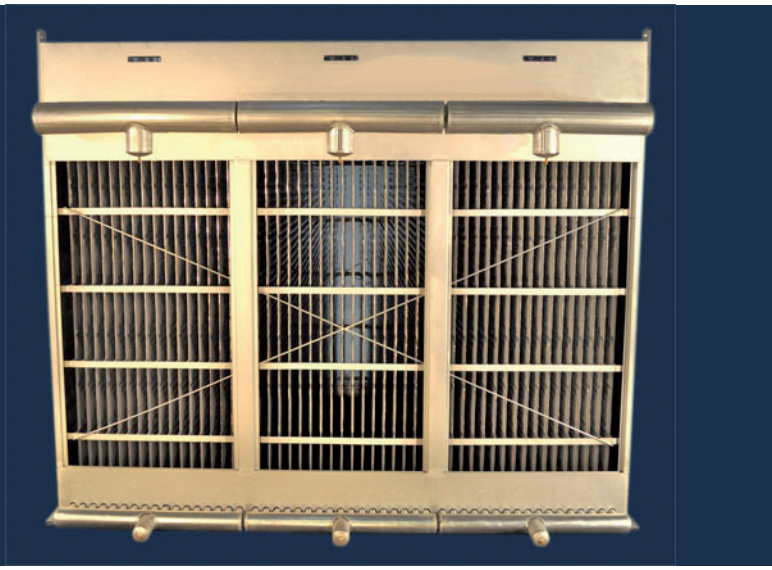
APPLICATION AND BENEFIT

- Storage of refrigeration capacity with crushed ice
- Increasing of top peak cooling power with smaller refrigeration machine
- Reduction of peaks in electricity consump- tion
- Additional use as direct chiller to allow lower energy costs.

DESIGN AND DIMENSIONS

TYPICAL MEASUREMENTS FOR THE EVAPORATOR	L	W	H
Compact - system	2,0	1,0	2,5
System type BEE	2,0	3,0	2,5
(ca. measurments in m)			
SILOS	**D**	**H**	
ca.	4,0	12,0	
up to ca.	4,0	20,0	





PIC LEFT ice silos with 5000 kWh storage capacity each **PIC RIGHT** ice maker for 6 to/h. At 10 h buildup time 5600 kWh

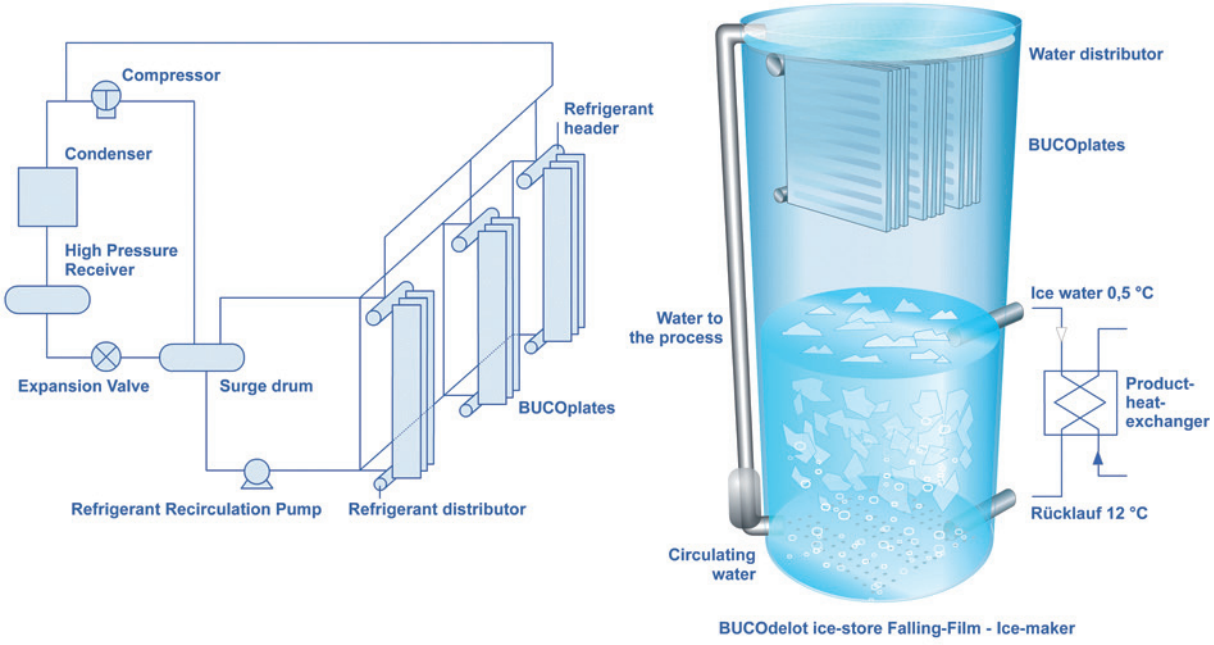
SPECIFICATION

- Storage capacity from 2.000 kWh to more than 10.000 kWh
- Stainless steel completely
- Evaporator for all refrigerants, pump- or dx- mode

BUCO 100 Jahre Innovation

METHOD OF OPERATION MAKING ICE

Ice is frozen on vertical evaporator panels and forms a 6 – 8 mm thin layer of ice, which keeps the resistance of heat conductivity always at a low level. After some minutes of building up ice, an automatic plc system will give a signal for hot gas injection to the heat exchange panel for some seconds in order to split off the ice. Afterwards the evaporator is free again to form ice in an efficient thin layer.



BUCOdelot ice-store Falling-Film - Ice-maker

ADVANTAGES

- stainless steel completely
- durability
- reliability
- low refrigerant content
- extra high cooling power for peaks
- efficiency through option of direct chilling
- very stable ice water temperature below 1°C
- open design
- easy inspection, the system is not under water
- nearly any tank geometry possible
- use of old existing tanks possible
- silos require minimum ground space

"BUCOdelot Falling Film ice making and storage for more than 20 years."
"More than 200 BUCOdelot ice makers in operation"

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BUCO 100 Jahre Innovation

Industrial Ice Maker

for Chip Ice - BUCO Ice Pack







APPLICATION FIELDS

Industrial chilling with peak loads

- Production of food,
- Dairies,
- Breweries,
- Production of soft drinks

Chilling in the production of

- Concrete
- Chemicals
- Pharmaceuticals

BUCO 100 Jahre Innovation

EFFICIENCY

The efficiency of the dynamic ice making is based on the big evaporator surface, which allows much more efficient evaporation temperatures compared to other systems that use small evaporator drums and mechanical scraper.
Drum systems work with evaporation temperatures between -20°C and -30°C.
The BUCO-Ice Pack works between -8 and -10 °C.
That saves energy for electrical drives and allows to make ice for about half the price.

ICE HARVESTING

When the ice falls from the evaporator, it breaks to pieces which pass a separator for water.
Afterwards the ice is crushed to small pieces by using a rotating ice crusher:
The crushed ice falls downwards below the ice maker on the whole length of the system and is ready for transport to any industrial process via conveyor belt or a screw conveyor. The exit height may be adjusted by a scaffold.
The size of the ice pieces and the ice thickness can be preadjusted steplessly.

MAKING ICE

Ice is frozen on vertical evaporator panels and forms a thin layer of ice, which keeps the resistance of heat conductivity always at a low level. Normally the ice thick is 6 – 8 mm, but it can be adjusted steplessly from 3 to 15 mm depen ding on the application. After some minutes of building up ice, an automatic plc system will give a signal for hot gas injection for some seconds in order to split off the ice.

EXAMPLE:

30 to ice/day, Price for electricity: 0,15 €/kWh el

Running costs at -30 °C - Drum system
324 €/day or 11 € / to ice

Running costs at -10 °C BUCO Ice Pack:
173 €/day or 6 € / to ice

Savings: 151 € / day
For 300 days production: 45.300,- € / year savings of electricity costs!

APPLICATION AND BENEFIT

- Consumable ice for direct cooling of products
- Increasing of cooling effect by direct contact with ice

SPECIFICATION

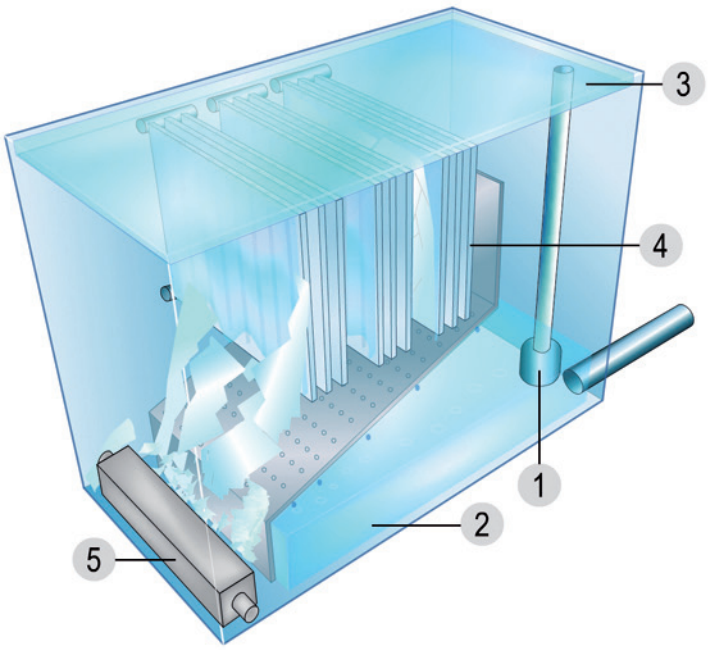
- Chip ice, not subcooled, no sharp edges
- 10 bis 60 to ice/day (or 400 to 2500 kg/h)
- Refrigerating power 40 to 250 kW
- Ready to plug or for local refrigeration units
- Evaporator for all refrigerants, pump- or dx-mode
- Stainless steel completely

DESIGN AND DIMENSIONS

TYPICAL MEASUREMENTS	L	W	H
Compact - system	2,5	0,8	2,3
System type A	2,5	1,0	3,3
System type B	2,5	2,5	3,3
(without refrigeration, including separator and crusher)			

BUCO 100 Jahre Innovation

CONSTRUCTION OF THE ICEMAKER



(1) Water pump
(2) Tank
(3) Water distribution system
(4) Ice harvester
(5) Ice crusher

ADVANTAGES

- Low running costs:
  - Low electric consumption due to high evaporation temperature
- Ice maker in stainless steel completely
- Durability
- Reliability
- Chip ice – some cm big:
  - Ideal ice temperature of -0,5°C, not subcooled
  - Dull edges
  - Suitable for sensitive products
  - No clogging of ice when stored
  - Long lasting cooling effect
  - Steplessly adjustable size of ice chips

"BUCOdelot Falling Film ice makers for more than 20 years."
"More than 200 BUCOdelot ice makers in operation"

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