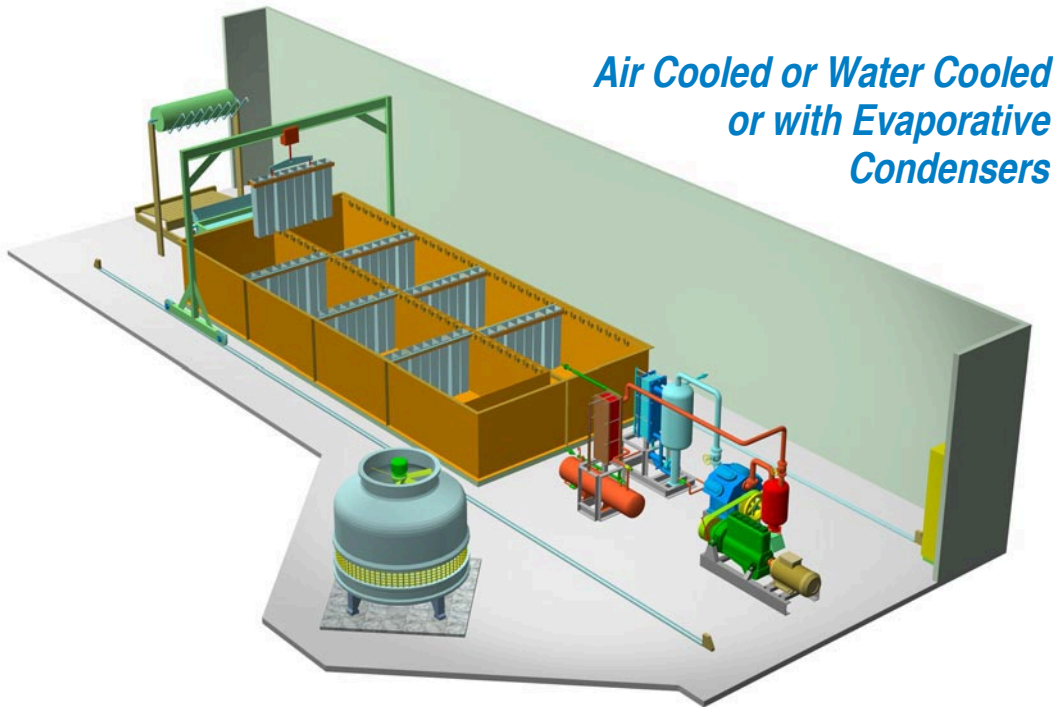


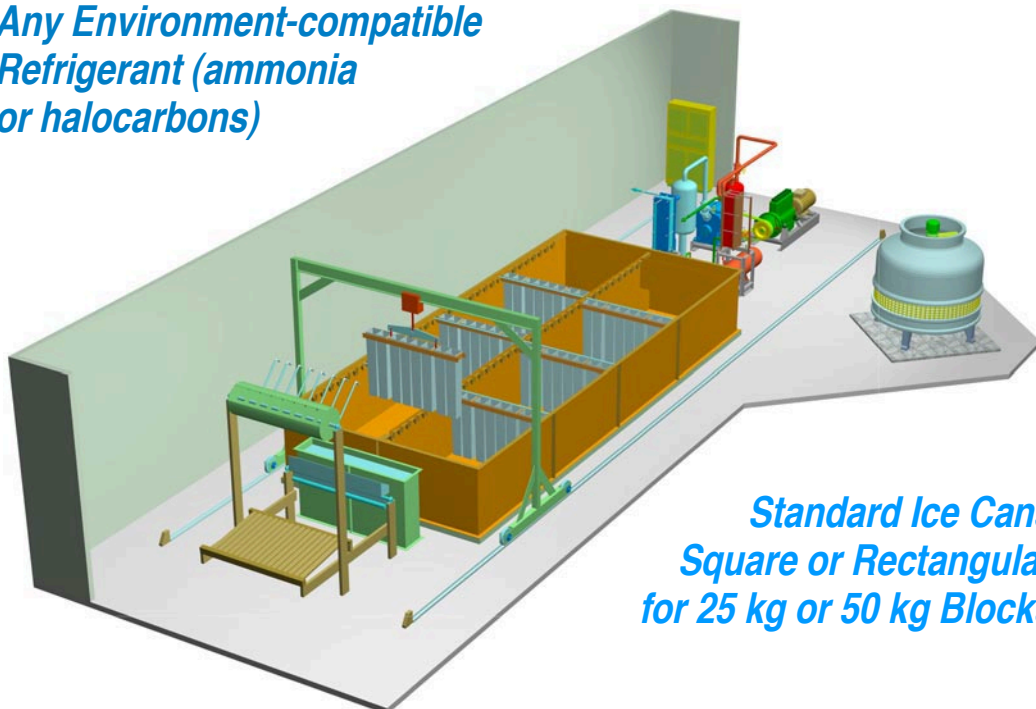
Block Ice Plants

*and the automatic ice making facilities:
Plate Ice, Flake Ice, Tube Ice and Pulp Ice*



*Air Cooled or Water Cooled
or with Evaporative
Condensers*

*Any Environment-compatible
Refrigerant (ammonia
or halocarbons)*

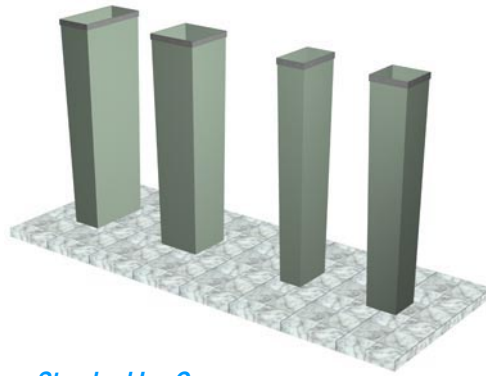


*Standard Ice Cans
Square or Rectangular
for 25 kg or 50 kg Blocks*

***Refrigerating Equipment:
Used and Reconditioned (2ndH) - or New***
Drawings and designs for Local Fabrication

Stationary (conventional) ...

On the front page are two 3D views showing a typical layout of a plant with a capacity to produce 12 mTon/24h of 25 kg square blocks. The 'in-line' set-up has the advantage that the portal crane can travel over the machine room area for use while servicing the equipment.



Standard Ice Cans

(above, from left to right):

50 kg rectangular; 380X190/340X160/1115 mm

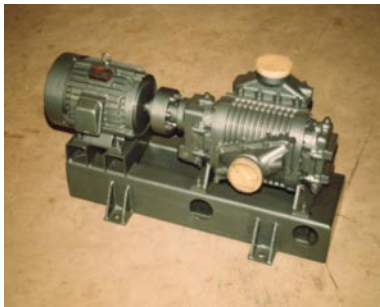
50 kg square; 260X260/230X230/1115 mm

25 kg rectangular; 240X150/210X120/1115 mm

25 kg square; 190X190/160X160/1115 mm



Agitators; with the propellers on extended shafts of flange motors.



'Roots' Type Blower for Air Agitation to make Clear Ice



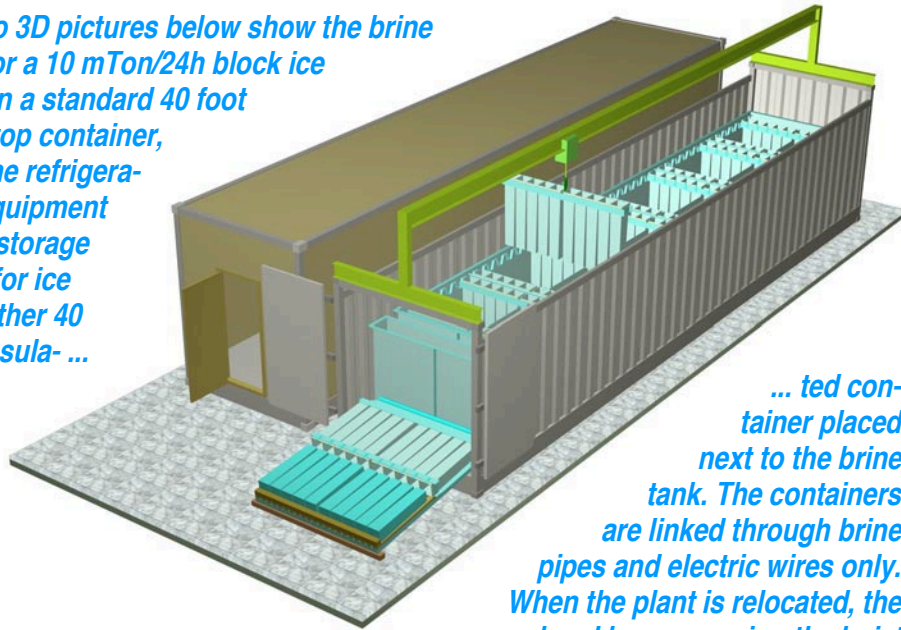
Harvesting the ice on a seaborne block ice plant (Page 3, bottom)



The picture above shows an Overhead Gantry Crane and an Ice Can Filler to refill twenty (20) square 25 kg ice cans at a time, for a 50 mTon/24h plant built by IceBits in Singapore in the early eighties and delivered to Pekalongan on Central Java, Indonesia.

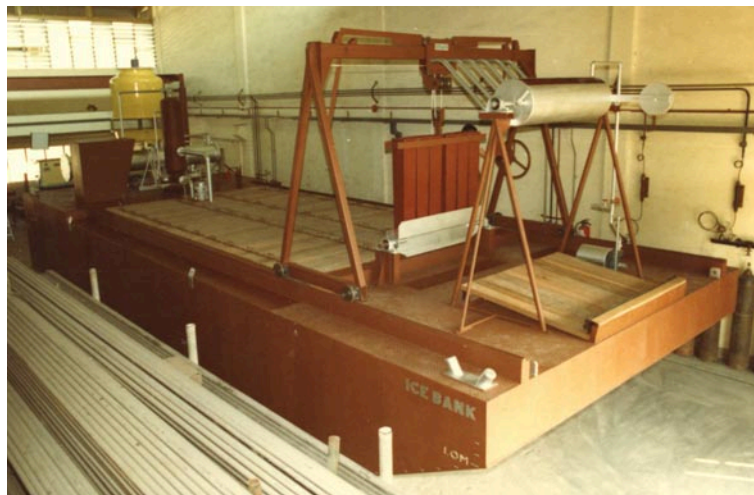
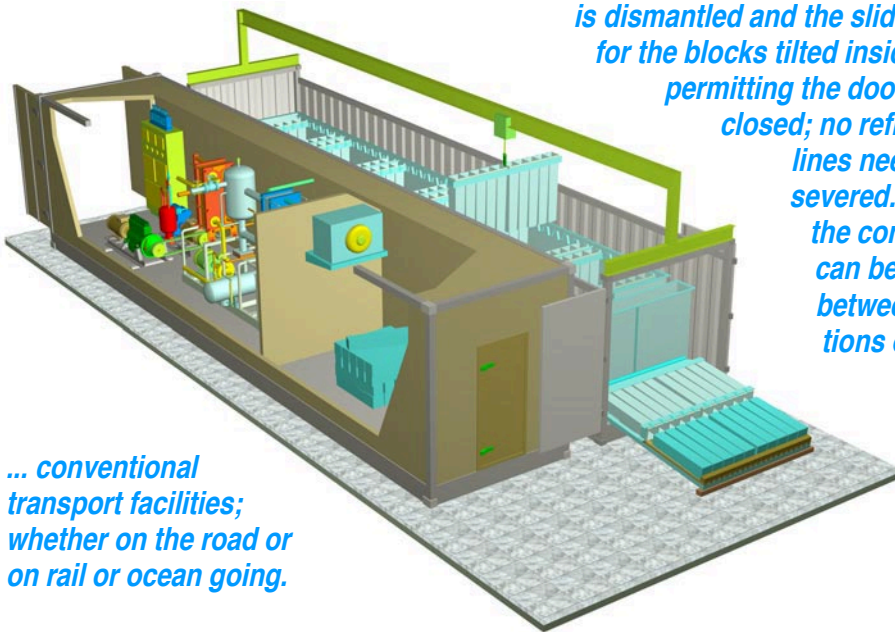
... and Movable ('containerised' and seaborne)

Two 3D pictures below show the brine tank for a 10 mTon/24h block ice plant in a standard 40 foot open-top container, with the refrigerating equipment and a storage room for ice in another 40 foot insula- ...



... ted container placed next to the brine tank. The containers are linked through brine pipes and electric wires only. When the plant is relocated, the overhead beam carrying the hoist is dismantled and the slide board for the blocks tilted inside, thus permitting the doors to be closed; no refrigerant lines need to be severed. Hence, the containers can be moved between locations on all ...

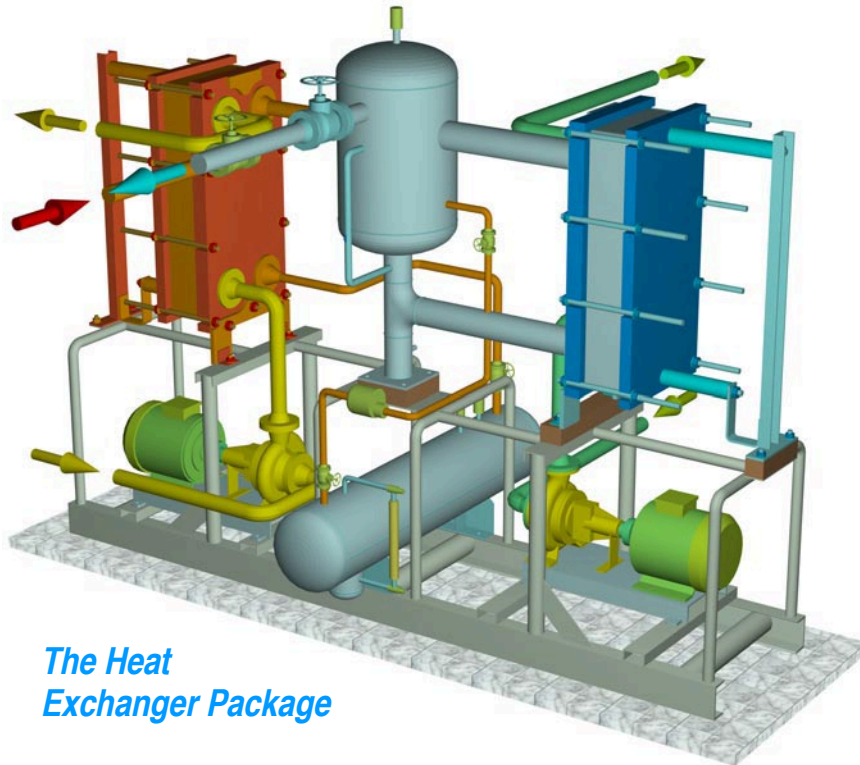
... conventional transport facilities; whether on the road or on rail or ocean going.



The seaborne block ice plant (picture above) was built by IceBits in Singapore in the early eighties. It served for many years in the Ganges-Brahmaputra delta (below Dhaka, Bangladesh), providing ice to fishermen catching Hilsa fish.

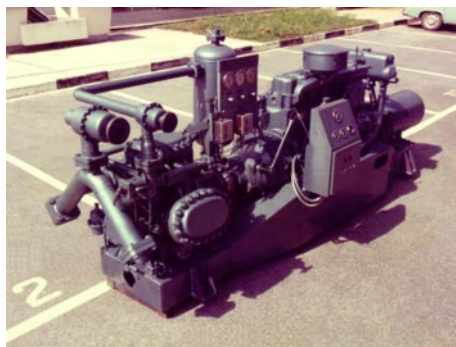
The Refrigerating Equipment

Pictured below is a refrigerating package, where the conventional 'herring bone coil' usually submerged in the brine, and the horizontal shell-and-tube condenser are replaced with state-of-the-art plate heat exchangers—blue for brine cooling and red for condensing.



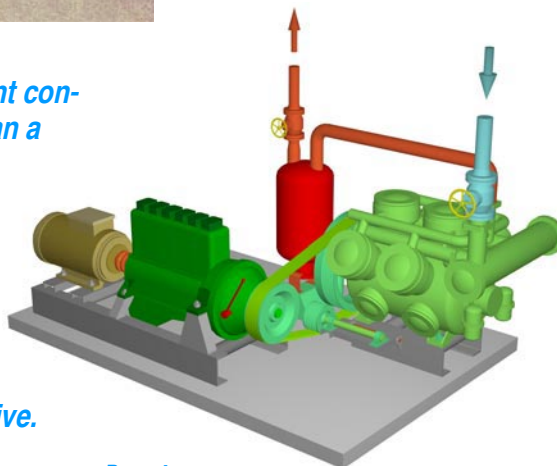
The Heat Exchanger Package

The package is fitted with a vertical Liquid Separator—Accumulator—and a horizontal Liquid Receiver (both light-blue) for operation with Refrigerant R717 (NH₃), but can equally well be equipped to work with other environment-friendly refrigerants. The set-up requires only 15% of the refrigerant charge needed in plants with herring bone coils and shell-and-tube condensers and greatly simplifies the operation.



In remote locations and on movable installations the compressor can be primed directly with a diesel engine, known as RPE Arrangement. RPE—Refrigeration-Power-Electricity—makes the plant self-sufficient; independent of electric power supply.

The RPE Arrangement consumes 20% less fuel than a conventional set-up, in which electric motors driving the equipment receive power from a diesel generating set, thus making the product—in this case the ice—more competitive.

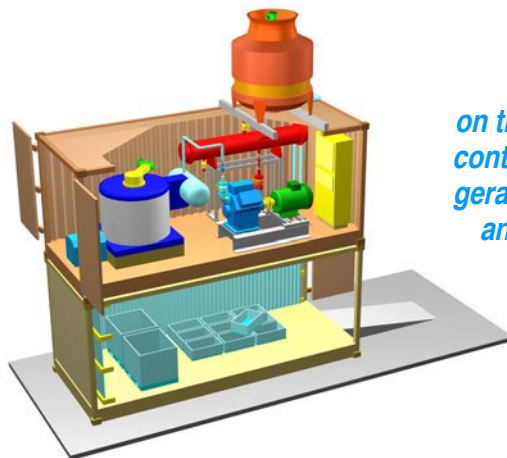
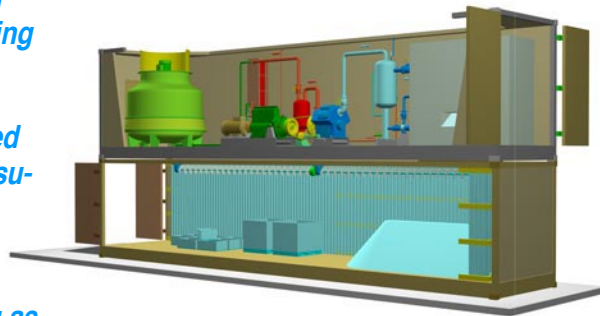
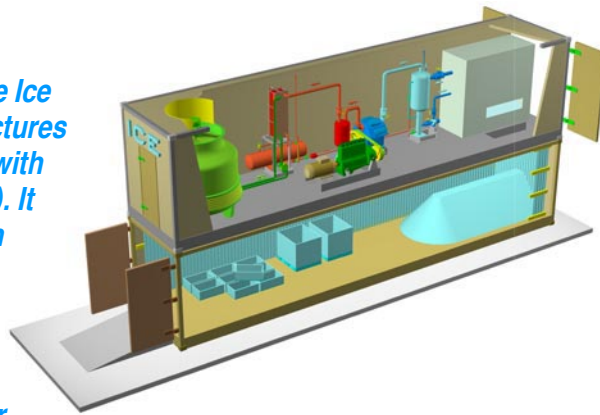


The Automatic Ice Facilities

Plate Ice ...

The automatic Plate Ice Plant in the two 3D pictures on the right operates with Refrigerant R717 (NH₃). It is refrigerated through an RPE Unit (diesel engine green) and heat is rejected to the atmosphere via a plate heat exchanger (beige/red) and a cooling tower (light green).

The plant is installed in a 40 foot hi-cube insulated ISO container, which is placed on top of another identical container serving as storage for the ice. When the entire storage capacity is used, a bare screw conveyor rotor (without the scroll) in the ceiling moves the ice towards the front of the container. The plant is movable and fits on all standard transport facilities (road, rail and seagoing).



... Flake Ice ...

The automatic Flake Ice Plant on the left is installed in a 20 foot container and operates with Refrigerant R717 (NH₃). It sits on top of another container serving as an ice storage. A conventional reciprocating compressor (blue) is directly driven ...

... through an electric motor (green) and the heat is rejected to the atmosphere through a horizontal shell-and-tube condenser (red) and the cooling tower on top (orange).

... Tube Ice ...

Tube Ice Plants are comparatively expensive, but have a low specific power consumption (in kWh per ton of ice). They are tall and not suitable for movable installations. Used and reconditioned (2ndH) Tube Ice Plants are on the market at greatly reduced prices.



... and Pulp Ice

An ice handling concept is known in the market under different names, depending on who manufactures the equipment. The product is presented as Liquid Ice or Fluid Ice or Gel Ice or Flow Ice or Slush Ice or Slurry Ice; we have opted for calling it Pulp Ice.

Pulp Ice is made by crushing any kind of ice into a snow-like pulp and mixing it with water to permit it to be pumped. It involves additional investment, which must be justified through higher market prices for the produce it is used for—in this case fish.



A typical Pulp Ice Plant

Characteristics

Ice melts at freezing point (0°C or 32°F) and, in so doing, it draws 80 kilocalories (kcal) or 0,093 kilowatt (kW) from its surroundings for every kilogram (kg) that melts away (~144 Btu for every lbs). If left to itself at ambient temperatures above 0°C, the temperature of the ice will remain at 0°C until it has melted away completely. Hence, in an enclosed and insulated space without refrigeration, ice will melt away at a rate equivalent to the heat losses through the insulation of the space.

Consequently, cooling of an ice storage with no supporting refrigeration will come from the ice, which then remains at 0°C. The absence of refrigeration results in reduction of the ice, while refrigerating the room would require investment and operating cost. Flake Ice—also known as Scale Ice—is an exception from this rule; if kept at temperatures below -20°C, this type of ice will retain certain preferred characteristics; it will stay loose for convenient distribution over the goods, whereas at freezing point it will stick together and be unpleasant to use.

You Name It - We Cool It!

Ishróngl

***Ingvar
IceBits***

Ishroengl ehf - IceBits ehf

Glosalir 7, Suite 704

IS-201 Kopavogur - Iceland

Desk: 00354 5622524 - Pocket: 00354 8961892 - Fax: 00354 5621592

eMail: ingvar@ingvar.is - The Web: www.ingvar.is