

Parthe Tube Ice Technology is specialised in designing and manufacturing everything from a single tube ice machine to a complete turnkey tube ice plant with an ice production capacity range of 5 MD to 100 TPD or more. We have installed and started-up tube ice plants for chemical companies, concrete companies, food processing companies, fisheries, poultry-processing, meat plants etc.

Salient Features:

- Capacities offered: 5 MD to 100 TPD of ice or more
- Tube ice dimensions: 1 1/8" diameter
- Design/Engineering simplicity
- No requirement of skilled workers
- High durability, minimum maintenance
- High energy efficiency
- Prompt service
- Complete spare parts provided

Machine Components:

- Stainless steel tube ice machine
- Water Distributors: Made up of elastic material which creates a continuous uninterrupted peripheral seal between the tube ends and water distributor
- Accumulator with insulation
- Refrigerant: Ammonia
- Float switch
- Freezer: Of high quality stainless steel for all water and ice contact surfaces providing corrosion resistance and easy to clean
- Cutter: Stainless steel cutters driven by gear motors are uniquely designed to produce both cylindrical and crushed ice simply by reversing the motor of the cutter using a switch on the control panel that controls this function
- Cutter Motors: Built with heavy duty design to give years of reliable ice-sizing service
- Pumping Tank (Water Pumps): Centrifugal cast in iron pump large enough to circulate many times the quantity of water to be frozen producing crystal clear ice crystals
- Heavy-duty compressor.
- Control Panel: Gives use access to the automatic electrical system, which performs sequences for freezing and thawing precisely and dependably year after year.

APPLICATIONS OF TUBE ICE

- Hotels/Restaurants/Bars/Flight Kitchens/Catering. Concrete Cooling: Tube ice is mixed into the cement to achieve a better process of hardening and thereby improving the cement quality.
- Chemical Industry Processes: The quality of tube ice is actually better than the water it is made since the impurities present in the water are moved to the center of the ice tube and discharged during defrost ensuring that clean, crystal ice tubes are formed. Hence it improves the quality of the end product when used as a cooling agent during chemical reactions. Also it does not cause adverse effect on chemical/dye vessel thereby prevents damage to the vessel lining.
- Food Production Processes: Tube ice is used in poultry, red meat and sausage plants to retard heat build-up, bacteria and salmonella growth as well as to prevent water weight loss during

shipment. In the bakery industry it is used to mix ingredients, eliminate moisture and to keep yeast from working until the appropriate time. It can also be used for preserving fruits and vegetables.

- Fishing Industry: Cooling fish on board fishing vessels. Maintaining the freshness of fish during storage and land transportation.
- Cold Accumulation.
- Mining, Construction and a variety of laboratory and medical applications.

BENEFITS OF TUBE ICE PLANT COMPARED TO OTHER TYPES OF ICE PLANTS

- Highest electricity efficiency: Only 47 units per ton of ice versus more than 90 units for flake ice.
- Lowest operating cost: Production efficiency without brine solution, cans etc; using direct refrigeration principles.
- Lowest space to production ratio: Only 100 sq.ft required for 40 TPD machine making the tube ice machine one of the most sought after ice machines where land and building is expensive.
- Minimal maintenance: Machines are known to run with minimal or no maintenance due to inherent plant design and since only world class indigenous components are used:
- Flexible batch cycle: Ice batch in less than 20 minutes ensures no wastage of electricity and thus allows for production planning.
- Overall lowest investment: Net present value of tube ice plant is greater than flake or block ice plant.
- Quality ice: The quality of tube ice is actually better than the water it is made since the impurities present in the water are moved to the center of the ice tube and discharged during defrost ensuring that clean, crystal ice tubes are formed. On the other hand, block ice is manufactured using the outdated method of salt water brine chilling. Due to the leaking of ice cans, typically the block ice contains a high degree of salinity, which has an adverse effect on the concrete structure.
- Uniform melt rate: Since the tube ice is consistent in shape the tubes melt at an equal rate providing a uniform cooling medium.
- Variance in flake sizing: Using our customized on-line tube ice flakers, the ice can be produced at a required thickness allowing for present and future variance in flake sizes.
- Labor cost savings: Due to minimal manpower expense related to ice crushing and wastage along with accurate and consistent weight the overall labor expenses are significantly lower.

Machine Comparison Between Tube Ice & Flake Ice

TUBE ICE MACHINE	FLAKE ICE MACHINE
Direct refrigeration through heat transfer tube resulting in less energy consumption.	Continuous operation of flaker's motor across freezing plate, resulting in high electricity
No moving parts in ice maker and only one cutter assembly provided for ice sizing.	Wear and tear of moving parts resulting in high maintenance and reduced efficiency
Has in-built chilling system and does not require any external chilling plant further reducing electricity consumption.	Requires additional chilling plant (greater electricity consumption) to reduce inlet water temperature for rated capacity.
Tube ice conveyed through inexpensive screw conveyor or gravity.	Flake ice requires pneumatic conveyors, which is power intensive and expensive.
Uniform tube ice of 1" diameter, hence reduces melt age and zero lump formation.	The flakes lump together, forming into a snowball, which in turn creates air pocket in the concrete mixture.

Tube Ice System Operation:

The main part of the tube ice machine is the ice generator, a vertical shell-and-tube vessel surrounded by a water tank. Special water distributors on top of each tube control an even, spiral supply of water down the insides of the tubes. Excess water is collected in a tank beneath the ice generator and pumped back up to the tank at the top.

Automatic tube ice machine performs two main functions: Freezing and Harvesting. These functions are carried out in a continuous cycle and ensure the steady supply of high quality ice at a rate determined by the user.

Tube ice is formed on the inner surface of vertical tubes and is produced in the form of small hollow cylinders of about 50 x 50 mm with a wall thickness of 10 to 12 mm. The tube ice plant arrangement is similar to a shell and tube condenser with the water on the inside of the tubes and the refrigerant (Ammonia) filling the space between the tubes. The machine is operated automatically on a time cycle and the tubes of ice are released by a hot gas defrost process. As the ice drops from the tubes a cutter chops the ice into suitable lengths, nominally 50 mm, but this is adjustable. Transport of the ice to the storage area is usually automatic, thus, as in the flake ice plant; the harvesting and storage operations require no manual effort or operator attendance.

The discharge system from the plant incorporates an ice crusher, which can be adjusted to give an ice particle size to suit the customer's requirement. The usual operating temperature of this type of plant is -8°C to -10°C. The ice will not always be sub cooled on entering the store but it is usually possible to maintain the store at -5°C since the particle size and shape allow the ice to be readily broken up for discharge.