

North Star[®]

World Leader in Ice Technology

Mobile Ice Plants



North Star Ice Equipment is the global leader in supplying reliable, efficient and cost-effective solutions for concrete cooling. From the Itaipu Dam in 1972 to the Panama Canal locks in 2010, North Star concrete cooling equipment has been used in hundreds of mass pour concrete and ready-mix projects around the world. Contractors trust North Star flake ice as the best way to reduce the exothermic heat generated during the concrete curing process.

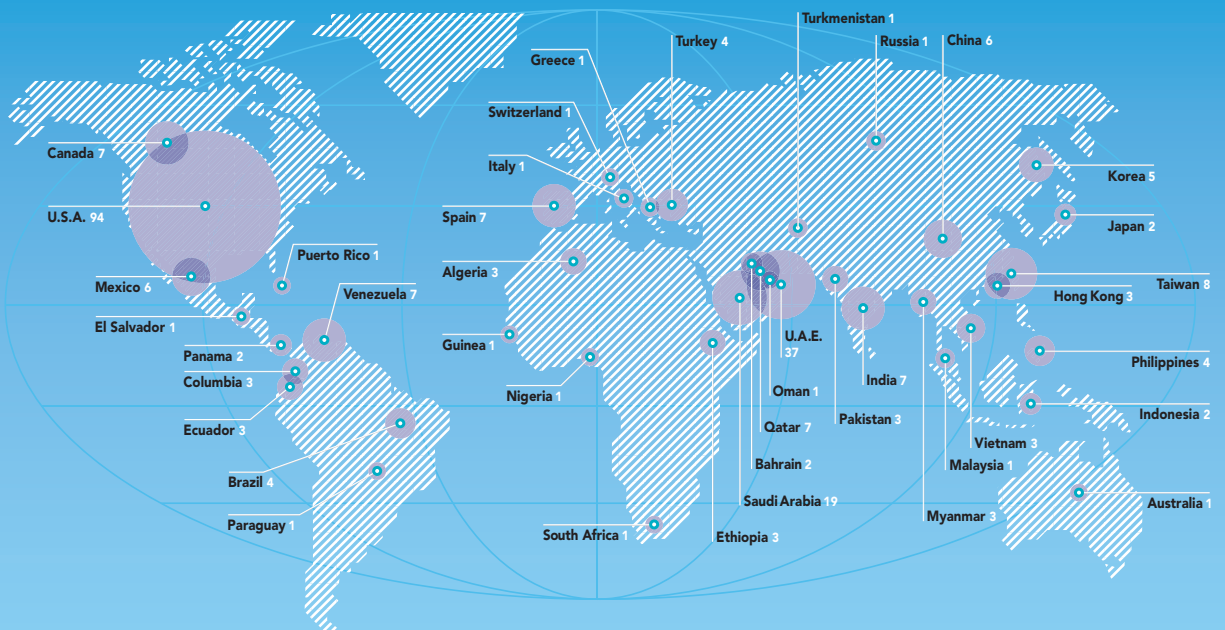
North Star concrete cooling systems are the best choice for mass pour projects and ready-mix plants for a number of reasons:

- **Reliability** – North Star concrete cooling systems are designed to operate continuously in extreme conditions to ensure predictable schedules with a minimum of downtime or delay.
- **Mobility** – Our systems fit into standard shipping containers, so they can be easily

moved to another project site. We also offer custom designed concrete cooling systems to meet unique project specifications.

- **Volume** – North Star concrete cooling systems can be designed to handle from small to very large concrete pours efficiently.
- **Experience** – For over 40 years, North Star equipment has been the choice for cooling concrete around the world.

North Star: The First Choice for Concrete Cooling Around the World



Flake Ice

The Most Effective Way to Cool Concrete

Temperature controlled concrete is required for most mass pour concrete projects to ensure proper curing. Contractors can force cool concrete by chilling the aggregates with water or air prior to mixing, or by adding North Star flake ice or flake ice and water to the concrete mix. Depending on the specified concrete placement temperature and local ambient temperatures, flake ice or a mixture of flake ice and water is often the most cost-effective way to achieve the correct concrete temperature.

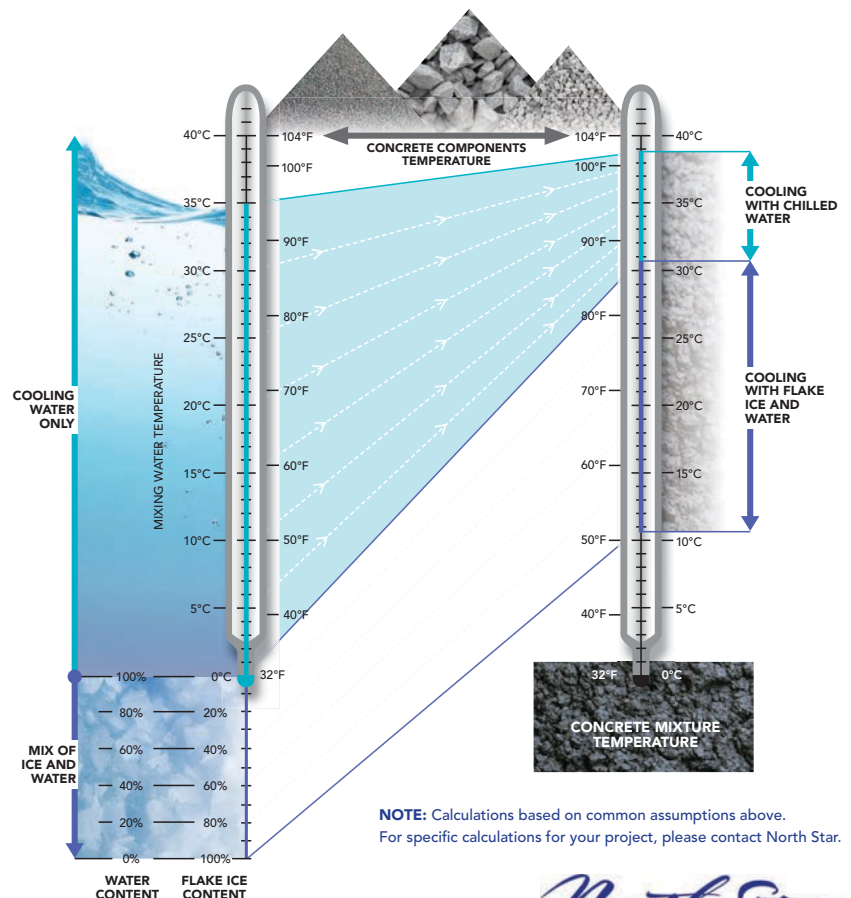
North Star offers these advantages over other concrete cooling methods:

- North Star flake ice provides over 17,000 square feet (1,600 square meters) of heat transfer surface area per ton, so it absorbs heat and cools more quickly and efficiently than other concrete cooling options.
- Because North Star flake ice is only about 1/16" (1.5mm) thick, it melts quickly and completely in the mix with no delay in mixing time.
- North Star ice systems give consistent concrete temperature control in every mix throughout the day. There is no waiting for start-up.
- If there is a delay in concrete production, North Star sub-cooled flake ice retains its cooling power.
- Unlike water cooling of aggregate, there are no waste water disposal issues or excess free water in the mix. With North Star systems all water is contained and utilized.
- Compared with cooling aggregate on a belt system or in containments, North Star systems have a very small footprint.
- As temperatures increase during the day, it is easy to adjust the amount of North Star flake ice in the mix; with no flake ice wasted.

The Effect of Flake Ice In Concrete Cooling

Composition Per Cubic Meter (1m³) of Concrete

Aggregates, (5 MM - 20MM).....	264 kg (582 lb)	Retaining Water in Sand.....	6%
Aggregates, (20 MM - 40MM).....	807 kg (1779 lb)	Total Water Content.....	195 kg (430 lb)
Sand.....	680 kg (1499 lb)	Cement Additives (Pozzolan).....	13 kg (29 lb)
Cement.....	370 kg (816 lb)	Components Temperature.....	40°C (104°F)
Retaining Water in Aggregates.....	0.5%		



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North Star Mobile Ice Systems

Reliable and Efficient Concrete Cooling

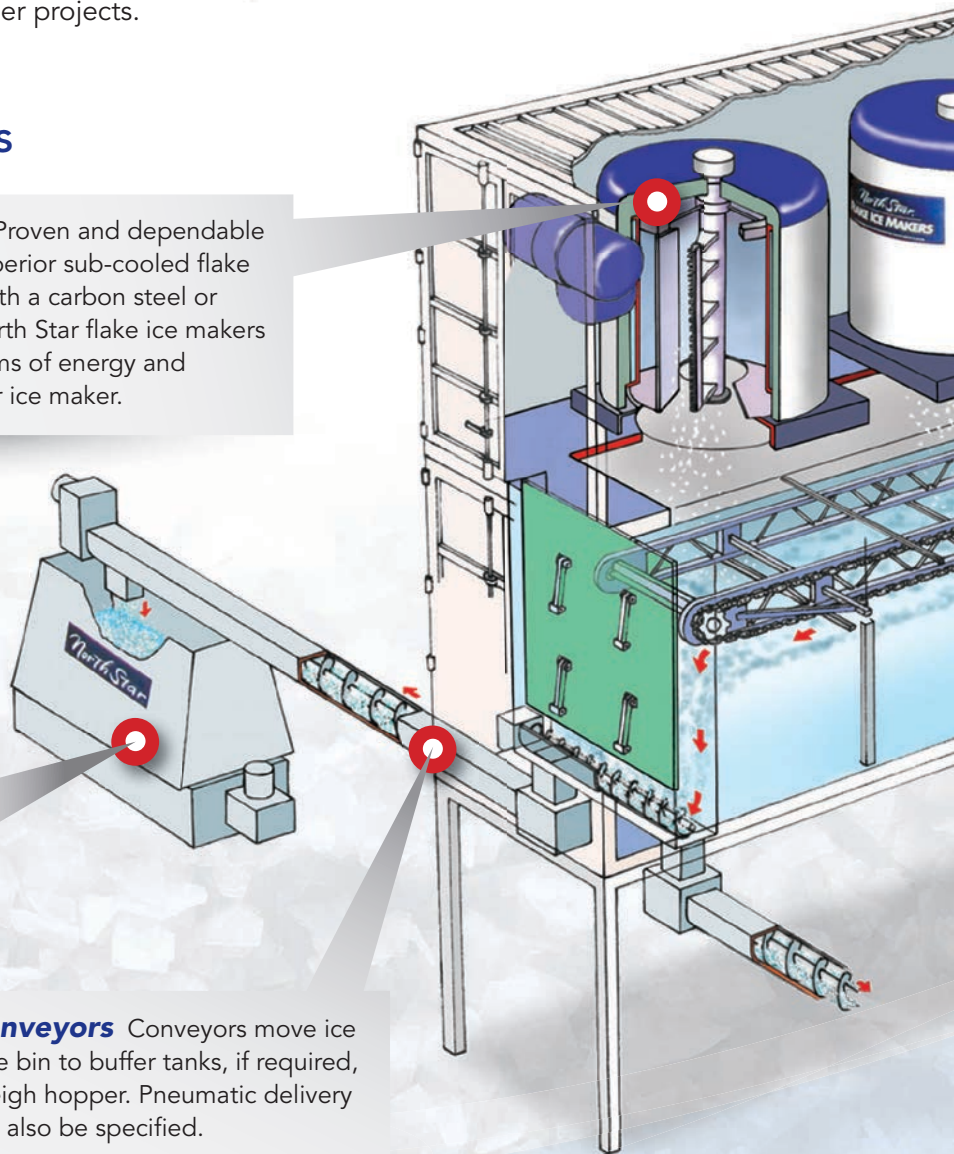
North Star has applied decades of experience to design concrete cooling systems to meet the demands of mass pour concrete projects and ready-mix plants. North Star mobile ice plants provide dependable 24-hour operation, precise temperature control, and fast discharge and mixing. Housed in two standard shipping containers for easy mobility, our ice plants make flake ice continuously with no defrost cycles, store the ice in an insulated bin, and deliver it when needed to the weigh hopper at the concrete batching plant. Depending on the configuration, a buffer tank above the weigh hopper can be used to ensure the free flow of ice for very quick charging cycles. North Star systems are designed to produce 30, 45 or 60 tons (27, 41 or 54 metric tons) per 24 hours and can be combined for greater capacity. Custom designed systems are also available for larger projects.

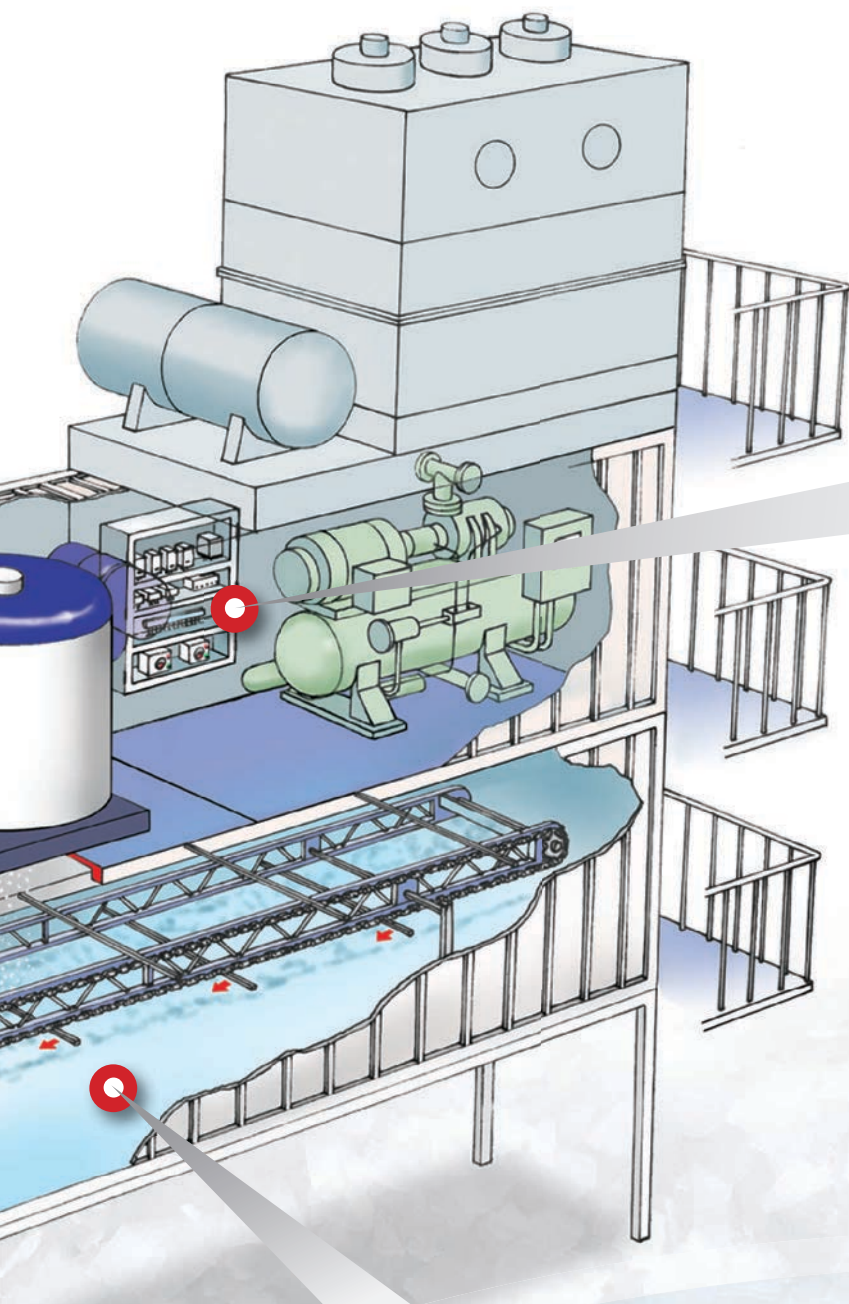
System Components

North Star Flake Ice Makers Proven and dependable for producing large volumes of superior sub-cooled flake ice, ice makers can be specified with a carbon steel or stainless steel freezing surface. North Star flake ice makers produce ice more efficiently in terms of energy and horsepower savings than any other ice maker.

Buffer Tank North Star systems can include insulated live bottom tanks to provide temporary storage for up to 2 tons (1.8 MT) of flake ice. They are designed to ensure even ice flow and quick charging cycles for continuous concrete cooling.

Screw Conveyors Conveyors move ice from storage bin to buffer tanks, if required, or to the weigh hopper. Pneumatic delivery systems can also be specified.





Control Panel The entire system is controlled by a state-of-the-art control panel with Allen Bradley programmable logic controller (PLC), touch screen operator interface and built in modem for remote troubleshooting support and program updates. North Star integrated control panels have received UL 508a certification, as well as ETL, cUL and CE listings.

Ice Storage System Ice produced by the ice makers drops into a refrigerated container that is fitted with a North Star ice rake. The rake levels the ice as it is made and also moves ice out of the bin through the automatic bin door during delivery.

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Specifying a North Star Mobile Ice Plant

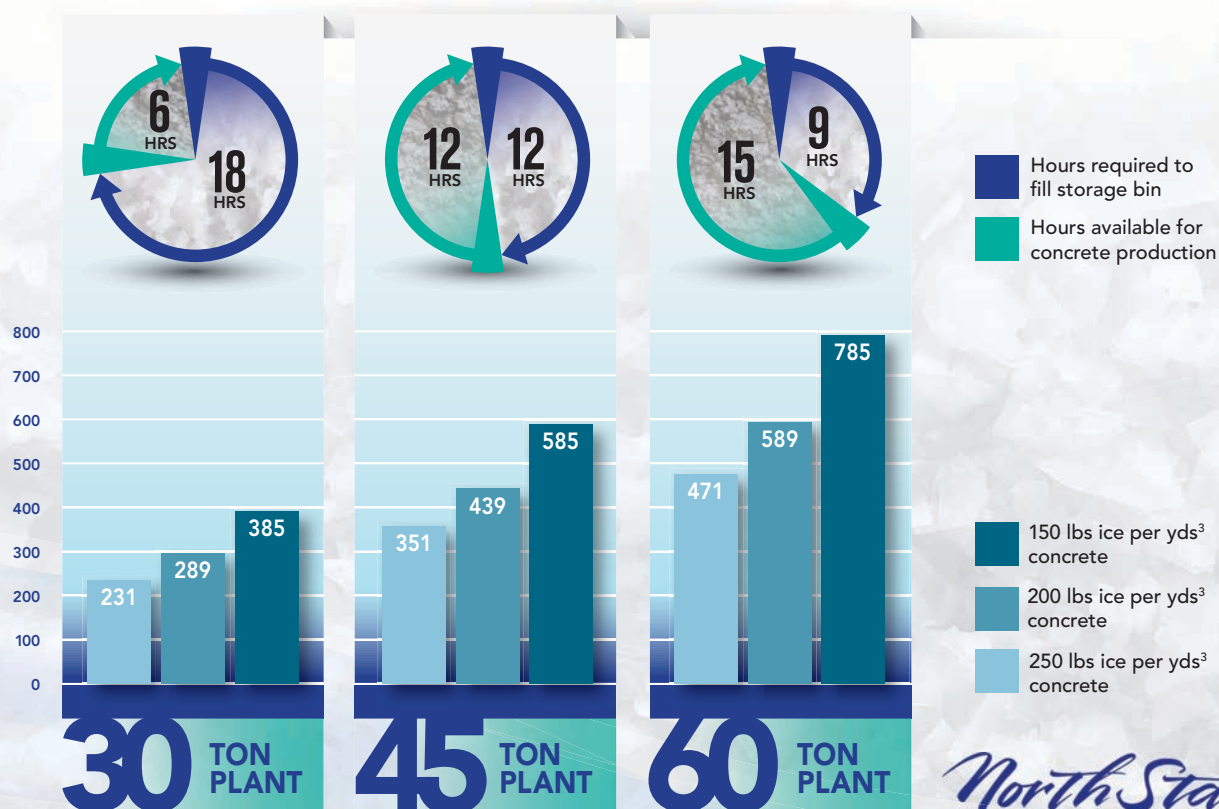
North Star is ready to assist you in specifying a mobile ice plant for your project.

The size of the ice plant depends upon several factors:

- The concrete mix,
- Specified concrete placement temperature,
- Ambient conditions,
- Total amount of concrete to be poured hourly and daily,
- Available water temperature.

The chart below provides general concrete production capacities for North Star mobile ice plants utilizing three different amounts of ice in the concrete mixture. Custom designed systems are also available.

Cooled Concrete Capacities of North Star Mobile Ice Plants (in yds³)





Worldwide Concrete Cooling Solutions

Since the early 1970s, North Star has provided cooling solutions to major concrete construction projects on every continent. Most of the largest dams, nuclear power plants, and airport runways in the world have been constructed with concrete cooled by North Star ice. Whenever your project requires a specific concrete placement temperature, trust North Star to provide a cost-effective and dependable cooling solution.



North Star Concrete Cooling Installations
(left to right): Panama Canal Expansion Project, Panama; Yeywa Dam, Myanmar; Taishan Nuclear Power Plant, China; Hartsfield-Jackson Atlanta International Airport, USA; Portugues Dam, Puerto Rico; Son La Dam, Vietnam.



North Star Ice Equipment Corporation

8151 Occidental Avenue South
P.O. Box 80227
Seattle, WA 98108 USA
Email: info@northstarice.com

Tel: 206-763-7300
Toll-free in USA: 1-800-321-1381
Fax: 206-763-7323
www.northstarconcretecooling.com