THE INDUSTRIAL & COMMERCIAL DEICER GUIDE
Ice formation on lakes, ponds and rivers is a natural occurrence throughout Canada and the northern United States from late fall to spring. But ice can cause problems in areas that contain structures that are susceptible to damage, or in areas that require the free flow of water all winter. This Guide will explain the problem of ice damage and how deicers can protect industrial and commercial equipment, assets and processes.
How ice forms on lakes and ponds

Lakes and ponds cool down in the early fall. At first, warmer water from below is brought to the surface by convection currents. When the temperature drops to around 3-4 degrees C, the surface water becomes less dense and stays on top, in a stationary layer. This layer just needs a nudge of a few degrees to reach the freezing point and ice begins to form on top of the lake or pond.

Using a fresh-water lake in Central Canada as an example, the temperature directly under the ice will be around zero and will get warmer as you move towards the bottom, to 3-4 degrees C maximum.

The change in water temperature with depth will depend on several factors; lake depth, lake currents, type of lake bed (silt, sand, stone). In any given year, the lake water temperature can be affected by weather conditions such as precipitation and wind. The important fact is that a temperature gradient exists in most lakes and ponds, and this stored heat in the lower layers not only keeps aquatic creatures alive, but can be used for ice prevention and deicing.
How fast does ice form? This depends on the size of the lake, the ambient temperatures, the lake depth and conditions. It’s important to note that a man-made pond or shallow water body may freeze over quite quickly whereas a lake may take several months.

**WHY ICE IS A PROBLEM**

One of the unique properties of water is that when it freezes and changes to ice it expands approximately 9%. If ice forms between two fixed surfaces, like your dock or boat crib, and a shoreline for example, the expansion causes pressure between the two surfaces. Surface ice will go through frequent cycles of freeze thaw, and damage is caused by repeated cycles of release and expansion pressure. Ice sheet expansion can splinter, crack and even break up docks and marine structures. Ice that damages industrial assets or hinders a plant process can cost thousands of dollars.

Ice jacking or ice heaving is caused by changes in water level or by a lifting action. Again the powerful action of ice from a large sheet of lake ice can lift lake bed pilings out of their footings and lift a dock right out of the water.

Ice flow damage is unpredictable and sometimes difficult to prevent. In the spring or late winter, ice around the shoreline begins to melt and sheets of ice can break-up and be moved by currents and wind.

Ice can also be a problem for industries trying to protect water in-take screens, pumping stations, submersed structures and other equipment. Open water can ensure continued plant operation and protect valuable company assets. Industrial run-off ponds, tailing ponds, and process water ponds often require surface evaporation throughout the year and must be kept ice-free.

Fortunately ice prevention technologies have evolved over the years and economical solutions exist to keep small and larger surface areas free of ice, in even arctic conditions.
There are two mechanisms that will melt ice or prevent it from forming on the surface of a lake or pond, heat and motion.

Warmer water below the surface and reaching down to the lake bottom, is only slightly more dense than the colder surface layer, and therefore, very little work is needed to raise it to the surface. That’s good news! It means even a propeller deicer with a low HP motor can be very effective at moving warm water to the surface where it’s heat can be used to melt ice.

The agitation of the water as it is pushed up and through the propeller, causes thermal mixing, so the surface water temperature increases above freezing as the warmer water is brought to the surface. The propeller also creates a circulating motion or current around the deicer pushing ice away at the surface and drawing in warmer water from the surrounding lake bottom.

When ice starts to form the ice particles flocculate and grow into crystals. The motion created by a deicer break up the crystals before they become large and this prevents the growth of ice. The ice particles are rapidly swept away from the deicer until they...
gradually slow and descend with currents where they disperse and melt in warmer water.

Even if the heat in the subsurface water becomes depleted and little temperature gradient exists, the motion caused by a deicer is often sufficient to remove ice and maintain open water in the area.
When deicer equipment is discussed there is often some confusion about the terminology, deicers and bubblers. Many of our clients call our deicers ‘bubblers’, but there are important differences between our deicers and air bubblers.

Arbrux propeller type deicers are the most effective method of ice prevention. An air bubbler, only uses compressed air, not a propeller, and it therefore moves smaller volumes of water to the surface. It is not nearly as effective at thermal mixing and water circulation as a propeller type deicer. An air bubbler will produce a vertical column of rising water where as a propeller deicer creates a larger area of water circulation. The rate at which a propeller deicer can melt surface water and create open water is much faster than most air bubbler systems because of the improved thermal exchange and greater induced currents. Some people call propeller deicers, ice-eaters!

A propeller deicer uses a submersed motor driving a propeller. They can be suspended at variable depths, but should be at least 1 foot from the lake bottom. At a 5 foot depth you can expect a 40ft circle of ice free water, in most cases.
Our 1/2 HP deicers are perfect for protecting docks. They circulate up to 500 GPM! You can run a deicer for set times during the day or have it operate automatically based on a temperature reading. Either way (or both!), an Arbrux deicer is economical to operate and it’s built to last with zero maintenance.

For commercial docks, marinas, barges, and industrial applications such as protecting water in-takes screens at manufacturing, power dams, and power plants - we have a full range of heavy duty deicers ready for the toughest conditions. Our 3 HP industrial deicer circulates a staggering 2,700 gallons per minute!

**ARBRUX MANUFACTURES THE TOUGHEST DEICERS**

Arbrux deicers have been proven effective and reliable in harsh Canadian winters and have been used by world-class mining companies and energy companies. They are inexpensive insurance for plant engineering asset management.

They are also used in commercial marine operations to prevent ice damage in large marinas and yacht clubs. We can recommend the motor size and number of deicers to protect any marine asset.

*We’ve built our line of deicers with quality components that are tough and long-lasting.*

- stainless steel, water-cooled & water lubricated submersible motor
- high-impact durable propeller
- new *** stainless steel motor mount
- heavy duty cable and underwater quick dis-connect on hard usage models
We’ve designed our products with extra features:

- housing protects power cord from propeller damage
- improved performance in shallow water
- large intake area to prevent leaf clogging
- includes mooring ropes
- can be installed in an augered hole or under a float
- ETL approval to UL and CSA standards
- 3 Year Warranty - best in the business!
- optional heavy duty timer and temperature controllers available

Available Models For Industrial & Commercial Use

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<th>Heavy Duty Cable Models with Quick Disconnect</th>
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<td>1/2 HP</td>
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| 1 HP | Volt/Phase/Amp | Cable | GPM |
| AR3040706zz | 240/1/7.5 | 15 to 60m | 1000 |
| AR3040705zz | 208/3/4.1 | 15 to 120m | 1000 |
| AR3040707zz | 230/3/3.6 | 15 to 120m | 1000 |
| AR3040708zz | 460/3/1.8 | 15 to 120m | 1000 |

| 1.5 HP | Volt/Phase/Amp | Cable | GPM |
| AR3040809zz | 575/3/1.6 | 15 to 120m | 1000 |

| 2 HP | Volt/Phase/Amp | Cable | GPM |
| AR3040906zz | 240/1/8.9 | 15 to 60m | 1800 |
| AR3040905zz | 208/3/6.3 | 15 to 120m | 1800 |
| AR3040907zz | 230/3/5.5 | 15 to 120m | 1800 |
| AR3040908zz | 460/3/2.8 | 15 to 120m | 1800 |
| AR3040909zz | 575/3/2.2 | 15 to 120m | 1800 |

| 3 HP | Volt/Phase/Amp | Cable | GPM |
| AR3041006zz | 240/1/11.8 | 15 to 60m | 2700 |
| AR3041005zz | 208/3/8.8 | 15 to 120m | 2700 |
| AR3041007zz | 230/3/7.6 | 15 to 120m | 2700 |
| AR3041008zz | 460/3/3.9 | 15 to 120m | 2700 |
| AR3041009zz | 575/3/3.1 | 15 to 120m | 2700 |
Deicer Accessories

Heavy duty outdoor timers allow you the option to put the deicer/ bubbler on a timer to reduce energy consumption and/or to have the unit running during off peak consumption times. The timer has multiple ON/OFF settings per day. The timer features: durable weatherproof construction, has a protective cover, is grounded, has a manual override switch, and is easy to install by just plugging it into a GFCI receptacle. The deicer would then plug into the bottom of the timer.

An Arbrux deicer temperature thermostat is a weatherproof portable prewired thermostat that has convenient mounting locations. It is adjustable from 30 to 110 degrees Fahrenheit, we recommend a setting in the 34 to 36 degree range for deicer control. Your deicer simply plugs in to the thermostat to allow you to install the deicer prior to freeze up. When a pre-set temperature is reached it will turn on your deicer and shut it off again when the water warms up thereby saving energy costs.

Other deicer accessories include float mounts.
Commercial and industrial deicing equipment is used by commercial pond owners, municipalities, commercial business, heavy industry, and manufacturing. Our heavy duty deicers are tough on ice, energy efficient, and cost effective.

Here are some practical uses of deicing systems. We have decades of experience designing deicing programs and systems for large and small commercial interests, and we’re always ready to answer your questions.

**Applications for Arbrux Industrial Deicing Systems**

1. Deicing and the creation of ice free water in bays, process lagoons, industrial holding ponds, transport waterways, canals, harbors, oil sands tailing ponds, retention ponds, leachate ponds, stormwater retention ponds, catch basins, composite basins, agricultural ponds and irrigation basins.

2. Protection of structures from ice damage, such as pumping stations, piers, docks, cribs, dams, storage tanks, submerged equipment, in-take screens.
3. Keep transportation waterways ice free for operation of boats, tugs, barges, dredges, including canals.

4. Create ice free open water for underwater construction activities and repairs, as well as other diving activities required in the winter.

5. Protect boats, yachts, barges stored in the water in the winter to avoid costly removal and storage costs.

6. Ice free water for industrial cooling tower operations

7. Prevent oxygen related winter fish kill in commercial stocked fish ponds

8. Attract waterfowl by creating open water for wildlife management organizations

9. Keep industrial water in-take screens, pump intakes and pipes free from ice blockage

10. Industrial waste water aeration and evaporation for pollution recovery processes

**Arbrux Deicers are used in heavy industry applications including mining, power, oil & gas.**
Here are some of the world-class organizations that use Arbrux deicers in their ice prevention programs.
WE’RE READY TO ANSWER YOUR QUESTIONS OR PROVIDE A QUOTE.
1-888-211-3548

• OUR DEICERS ARE TOUGH AND WE BACK THAT UP WITH THE BEST WARRANTY IN THE BUSINESS!

• EACH DEICER IS ELECTRICALLY SAFETY TESTED AND LISTED WITH ETL TO CSA AND UL STANDARDS.

• BUY DIRECT FROM THE MANUFACTURER AND SAVE!

© ARBRUX MANUFACTURING

Arbrux deicers / bubblers have been proven reliable in harsh Canadian winters. They are inexpensive insurance to help prevent winter ice damage. We manufacture the toughest deicers available! Visit our website to learn more and to get a no obligation quote.

http://www.arbrux.com