



REALice instructions and tips



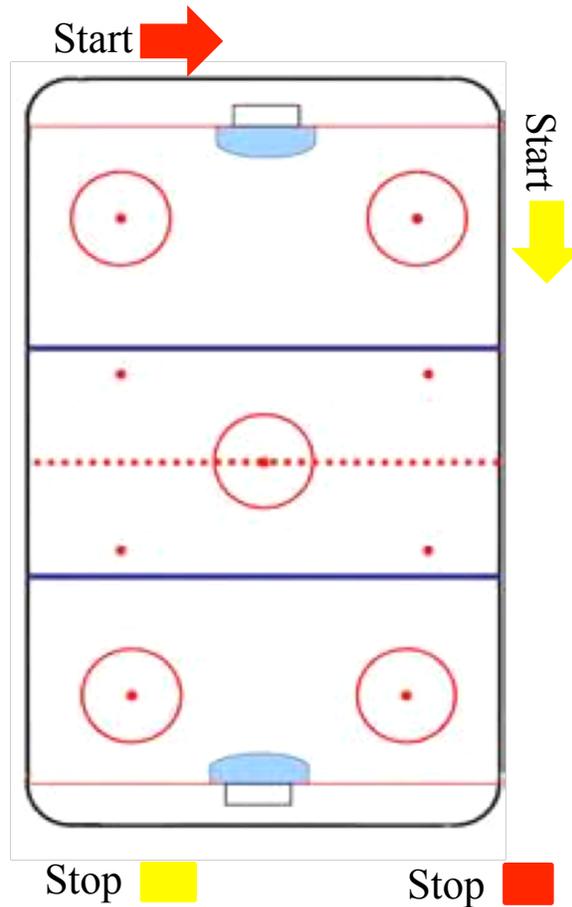
Instructions (1.9)

Building ice with REALice on an existing ice.

First increase the ice temperature to make it easier to shave the ice. Shave the ice to just above lines and/or advertising. After finishing shaving return to the normal ice temperature. Go to 2.9

Building new ice with REALice.

Use the REALice hand unit only with cold water. The water should be added in thin layers. There will be more water coming out from the unit than it seems to, never stand still move slowly backwards, from short side to short side. Point the unit at about 45° upwards and move it constantly from one side to the other. Divide the rink in 5 parts until the ice is done. Allow the water to freeze before the next layer is applied. Repeat this by going the other way, from long side to long side. Divide the rink into 10 parts. You need to build approximate 10mm or ½ inches until the ice is strong enough to use the Ice Machine.



Instructions (2.9)

Empty the Ice Machine from normal water. Fill the Ice Machine with REALice-treated water.

Make sure the pressure (minimum 3bar/43.5psi) and flow (depending on RI size) are correct. In order to get the best effect the tap must be opened fully to get as much flow as possible. Only use cold water.

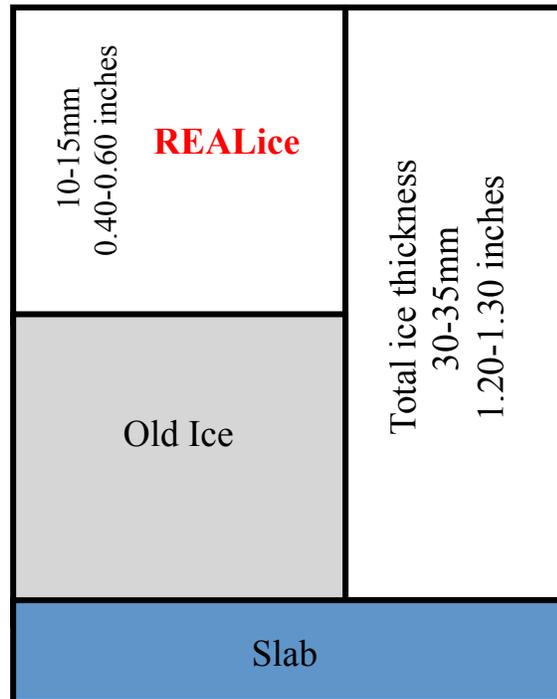
Add water in thin layers. Adding a layer of water with the Ice Machine should take about 10-12 minutes (Olympic size) 8-10 minutes (NHL size). Drive slowly in the corners to avoid the water been thrown out in the corners and build up dikes.

Turn off the water in places where you will pass several times, such as behind the net.

After flooding the ice once, wait until water is frozen. Repeat the above procedure until you have built some extra 10-15mm or $\frac{1}{2} - \frac{3}{4}$ inches. Total thickness should be about 30mm or 1 $\frac{1}{4}$ inches.

Instructions (3.9)

When building the ice, salt, minerals and lime following the water and settles on the surface. When you have reached the right height of the ice, about 30mm or 1.20 inches if you build from start, or about 10-15mm, 0.40–0.60 inches REALice-ice if you are building on old ice, you dry-shave the top layer to remove the impurities and smooth the ice. You then perform the finishing touch on the ice by applying 1-2 layers of REALice water with the Ice Machine.



Check the ice temperature. Normally you can raise the temperature about 1-1.5°C, 2-4°F in relation to your former ice temperature. This should be done in steps, by raising the temp with 0.25-0.50°C, 1-1.5°F at the time. Wait about a week, the ice need to stabilize before you raise the temperature another step. Repeat this until you feel that ice is no longer good. Then lower the ice temperature one step.

**Raise ice
temperature
1-1.5°C, 2-4°F**

Instructions (4.9)

Water temperature

Normally, REALice is used with only cold water. In some circumstances it may be necessary to add some warm water. Try this by adding a little warm water at a time, if you do not get good results with only cold water. Normally the water temperature never needs to exceed 18° C, 64° F.

Cold water

5-18°C, 41-64°F

Humidity

High humidity creates rime on the ice and therefore produces more snow. To obtain an optimal ice, the humidity in the ice arena should not exceed 50-55%.

Humidity

between 50-55%

Instructions (5.9)

Do not mix water

Normal water and REALice-water have different properties and should not be mixed. The different waters have different freezing characteristics and various ice crystals. Mix of water will give you a poor ice quality and higher energy consumption.

Do not mix

REALice-water

The effect of REALice treatment lasts at least 24 hours. This means that you can fill up the Ice Machine in the evening, before next day's work.

24h

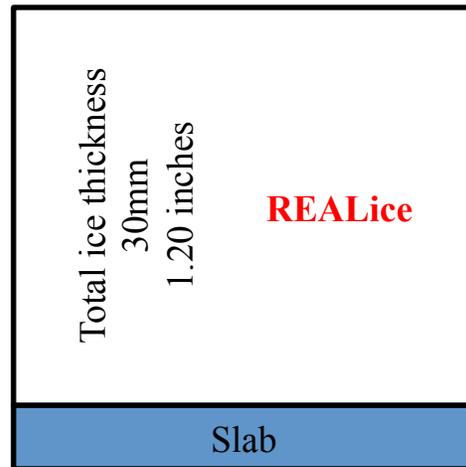
Wash water

The wash water in the Ice Machine may need to be slightly warmer, not to be cooled by the re-circulating water, to prevent it from clogging.

Instructions (6.9)

Ice thickness 30mm, 1.20 inches.

The REALice-ice is usually clearer than ordinary ice. It is difficult to estimate ice thickness. Make it a habit to regularly check that the ice has not become too thick. It is generally sufficient to have an ice thickness of 30mm or 1.20 inches. If you have 10mm/0.40 inches extra ice is equivalent to 18 m³ / 193.750ft² of ice to keep frozen during the whole season.



Gates and doors

Make it a habit to always close gates and doors to both the arena and to the ice rink. Depending on weather conditions, large amounts of warm and moist air goes into the rink, with higher energy costs and poor ice quality as a result, if a gate or door remains open for a longer time than is necessary. Is there an option, an air lock is to be preferred.

Instructions (7.9)

Ice temperature

The ice has only one temperature range where it's best. If the ice is too warm it becomes soft and tough. If too cold, the ice becomes dry and brittle and it builds up a lot of snow on the ice. The temperature of the optimal range is different from ice rink to ice rink where each ice rink is unique. The best way to find the optimal range is to raise ice temperature in small increments, about 0.25 to 0.50°C, 1-1.5°F at a time and then wait at least a couple of days and during the time study the ice quality. This is repeated until you feel that the ice quality is too bad. Then you lower the ice temperature one step.

To hot - Bad

Optimal

To cold – Bad

Instructions (8.9)

Resurfacing

Ice made of REALice-treated water is more durable than ordinary ice. This means that it does not get as much and as deep scars and injuries in a REALice-ice compared to a regular ice. This also means that the water that is added at each resurfacing usually can be reduced. Please be observant of the amount of water so you do not spend too much water. Try your way into a good adjustment. Important is that you shave the ice, not only “collect” the snow, it’s always better to shave more than less. Always have a good, sharp blade installed.

Instructions (9.9)

One change at a time

An ice rink is complex, where many components contribute to the overall perceived quality and energy consumption. It requires substantial experience and expertise to get into a really good ice. When you make changes and tune the ice rink after having installed a REALice system, it is important to make just one change at a time to be able to see exactly what the adjustment achieved. There is a certain delay in the ice after an adjustment wait at least a few days before taking further adjustments.

Ice thickness

Resurfacing temperature

Humidity

Spectators

Ice temperature

Outside temperature

Arena temperature

Amount of water

Compressor

Best practices, REALice, summary

	All water used for your rink needs to be REALICE treated	Comments
After install of REALICE	First increase the ice temperature to make it easier to shave the ice. Shave the ice to just above lines and/or advertising. After finishing shaving return to the normal ice temperature.	
Building New Ice	<p>Use REALICE Un-heated Water</p> <p>Normally, REALICE is used with only cold water. In some circumstances it may be necessary to add some warm water. This is seen more when there is very cold water near 5C/40F and/or if the brine temp either has not been reset upwards or if there are inconsistencies in resetting the brine temperature. Try this by adding a little warm water (REALICE treated) at a time, if you do not get good results with only cold water.</p> <p>Use the REALICE handheld nozzle to build very thin layers for both new ice after taking down the rink and also for building ice over existing ice.</p>	<p>Adjust temp as needed typical un-heated water</p> <p>Note: recommended unit installation to allow hot/cold mixing. This can help with rate of freezing as does confirming accurate control of brine temperature.</p>
Water Pressure	Needs to be at least 3bar/45 psi	City water usually, 3-5 bar or 45-60 psi
Resurfacing Tank	Fill with only REALICE treated water	All cold or mixed
Do not mix REALICE water with untreated water for the best results	<p>Normal water and REALICE-water have different properties and should not be mixed. The different waters have different freezing characteristics and various ice crystals. Mix of water will give you a poor ice quality and higher energy consumption.</p> <p>The effect of REALICE treatment lasts at least 24 hours. This means that you can fill up the Ice Machine in the evening, before next day's work</p>	
Wash water	The wash water in the Ice Machine may usually need to be slightly warmer, not to be cooled by the re-circulating water, to prevent it from clogging.	Does not need to be REALICE water – or can use REALICE but need to use mixing to make warm
Typical Ice thickness about 30mm, or 1.20"	Will vary based on your conditions or if rink is covered for other venues or due to regulations.	
Ice temperature (Brine Temp)	If the ice is to warm it becomes soft and tough. If too cold, the ice becomes dry and brittle and it builds up a lot of snow on the ice. The temperature of the optimal range is different from ice rink to ice rink where each ice rink is unique based on climate zone, age and use of refrigeration equipment, etc. The best way to find the optimal range is to raise ice temperature in small increments, about 0.25 to 0.50°C, 1-1.5°F at a time and then wait at least a couple of days and during the time study the ice quality. This is repeated until you feel that the ice quality is too bad. Then you lower the ice temperature one step.	There needs to be accurate automatic control of the brine temp? How is Brine temp for the specific rink measured/controlled?
Resurfacing	Ice made of REALICE-treated water is more durable than ordinary ice. This means that it does not get as much and as deep scars and injuries in a REALICE compared to a regular ice. This also means that the water that is added at each resurfacing usually can be reduced or use fewer resurfacing rounds. It is important that you shave the ice, not only "collect" the snow.	
Humidity	High humidity creates rime on the ice and therefore produces more snow. To obtain an optimal ice, the humidity in the ice arena should not exceed 50-55%. Also very low ambient temp, (less than 10C/50F) especially if the temp approaches the dew point can cause fogging and frost/rime on the ice.	What is the humidity and dew point