

Operation

NOTE: Flake and nugget ice machines use an auger to remove ice from the evaporator. Occasional noises (creaks, groans, squeaks, or pops) are a normal part of the ice making process.

Bin Thermostat and Evaporator Low Temperature Safety Adjustment Chart

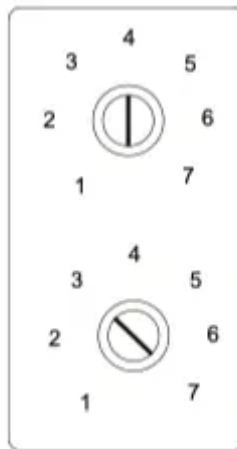
The bin thermostat sensing bulb is located in the ice chute or bin and turns the ice machine on and off as the level of ice in the ice chute or bin changes. The evaporator low temperature safety protects the evaporator and compressor from damage caused by water loss or gear motor failure.



Model	Bin Thermostat Setting	Evaporator Thermostat Setting
UNF0200	5	5
UNP0200	*5	*5
UFF0200	5	5
UFP0200	*5	*5
UNF0300	5	6
UNP0300	*5	*6
RFF0320	3	7
RNF0320	3	6
RNP0320	*3	*6
UFF0350	5	7
UFP0350	*5	*7
RNF0620	2	---
RNP0620	*2	---
RFF0620	3	---
RFP0620	*3	---
RNF1020C	3	---



RNF1100	3	---
RNP1100	*3	---
RFF1220C	3	---
RFF1300	3	---
RNF2000C	*3	---
RFF2200C	3	---
RFF2500	3	---
* Indicates preliminary data		



BIN THERMOSTAT SMALL NUMBERS = LESS ICE IN BIN LARGE NUMBERS = MORE ICE IN BIN

EVAPORATOR LOW TEMPERATURE SAFETY THERMOSTAT INCORRECT SETTINGS WILL CAUSE ICE MACHINE TO SHUT OFF

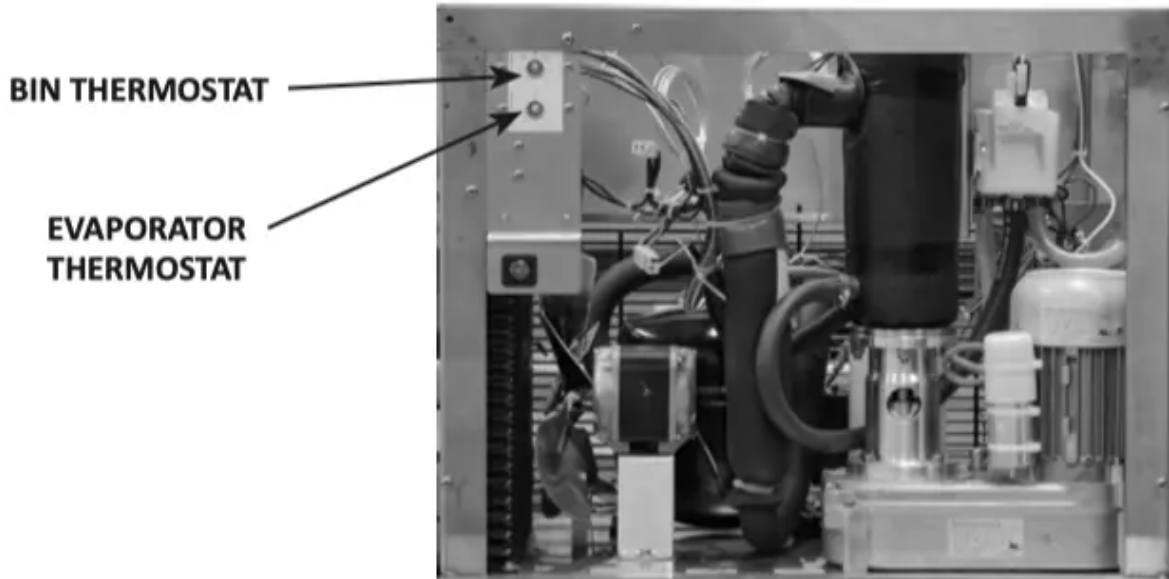
RFF0320/RNF0320/RFP0320/RNP0320 Operation

The ice machine will not start until:

- A. The rocker switch is moved to "ON".
- B. Ice does not contact the bin thermostat bulb.

C. The water reservoir is full of water.

Placing the toggle switch in the ON position starts the gear motor and a 8 minute compressor time delay. The compressor starts and the float valve controls the water inlet valve and water level. The freeze cycle ends when ice contacts the bin thermostat. The ice machine remains off until ice no longer contacts the bin thermostat.



Maintenance

Interior Cleaning and Sanitizing

Maintenance procedures covered in this manual are not covered by the warranty.

Caution

Use only Manitowoc approved Metal Safe Ice Machine Cleaner (part number 000000084) and Sanitizer (part number 9405653). Do not mix Cleaner and Sanitizer solutions together. It is a violation of Federal law to use these solutions in a manner inconsistent with their labeling. Read and understand all labels printed on bottles before use.

Warning

Wear rubber gloves and safety goggles (and/or face shield) when handling Ice Machine Cleaner or Sanitizer.

DESCALING/SANITIZING PROCEDURE

This procedure must be performed once every six months.

- All ice must be removed from the bin.
- The ice machine and bin must be disassembled, cleaned and sanitized.
- The ice machine produces ice with the cleaner and sanitizer solutions.

- All ice produced during the cleaning and sanitizing procedure must be discarded.

HEAVILY SCALED CLEANING PROCEDURE

Perform this procedure if you have some or all of these symptoms.

- Grinding, popping or squealing noises from the evaporator.
- Grinding noise from gearbox.
- Ice machine trips speed sensor.

NOTE: A Cleaning/Sanitizing Procedure must be performed after this procedure.

Exterior Cleaning

Remove dust and dirt off exterior surfaces with mild household dishwashing detergent and warm water. Wipe dry with a clean, soft cloth.

Descaling/Sanitizing Procedure

Use Metal Safe Ice Machine Cleaner, part number 000000084.

Use Ice Machine Sanitizer part number 9405653.

Step 1 Remove front and top covers and set the toggle switch to the OFF position.

Step 2 Remove all ice from the bin.

Step 3 Turn off the ice making water supply and drain water from evaporator and reservoir.

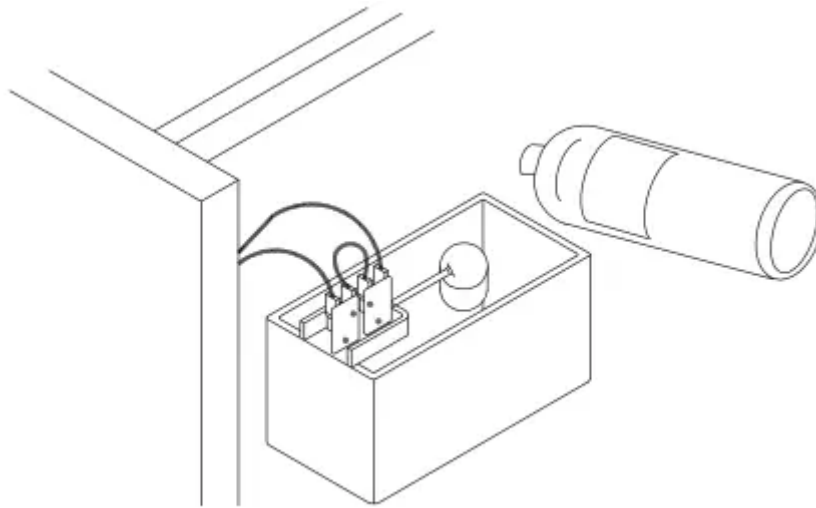
Step 4 Remove the top cover from water reservoir

Step 5 Follow the chart and premix cleaner and water.

Amount of Water	Amount of Metal Safe Cleaner - Part Number 000000084
1 gallon (4 Liters)	3 ounces (90 ml)

Step 6 Fill the evaporator and reservoir with cleaning solution.





Step 7 Move the toggle switch to the ON position. The ice machine will make ice with the cleaning solution and deposit the ice in the bin. Add the remaining cleaner/water solution as the water level in the reservoir drops.

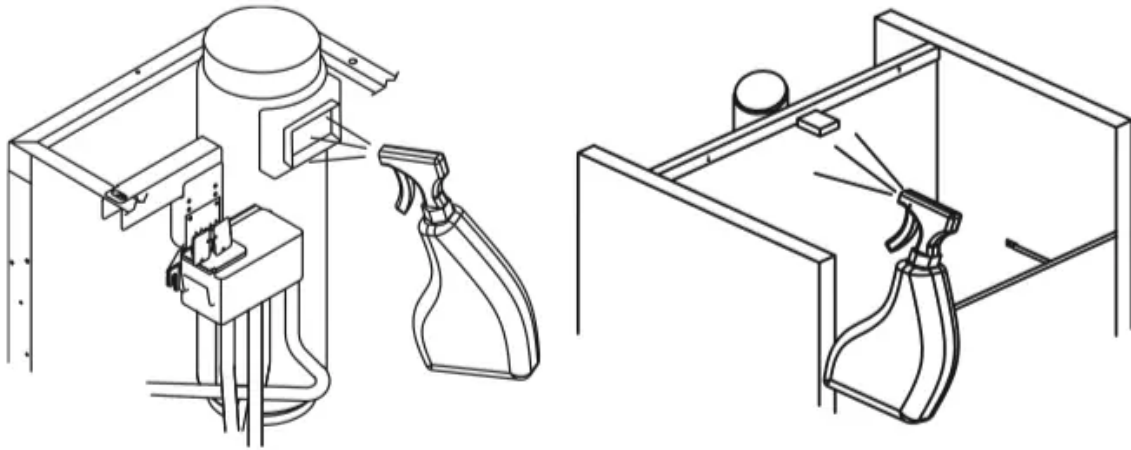
NOTE: Do not allow the cleaner/water level to drop below the minimum water level. The ice machine will discontinue the cleaning cycle if the water float switch opens.

Step 8 After all of the cleaner/water solution has been added, turn on the ice making water supply. Continue the freeze cycle for 10 minutes to remove the cleaning solution from the water circuit.

Step 9 Place the toggle switch in the OFF position.

Step 10 Refer to Removal of Parts for Cleaning/Sanitizing and disassemble parts for hand cleaning/sanitizing.

- Hand clean all parts.
- Rinse all parts with clear potable water.
- Sanitize all parts — do not rinse after sanitizing.
- Spray all interior bin surfaces with sanitizer (do not rinse sanitized areas).
- Spray evaporator discharge spout.



Step 11 Reassemble ice machine.

Step 12 Turn off the ice making water supply.

Step 13 Refer to chart and premix water and sanitizer.

Amount of Water	Amount of Sanitizer
1 Gallon (4 L) Water	0.5 ounce (15 ml)

Step 14 Fill the evaporator and reservoir with sanitizer/ water solution.

Step 15 Move the toggle switch to the ON position. The ice machine will make ice with the sanitizer/water solution and deposit the ice in the bin. Add the remaining sanitizer/water solution when the water level in the reservoir drops.

NOTE: Do not allow the sanitizer/water level to drop below the minimum water level. The ice machine will discontinue the cleaning cycle if the water float switch opens.

Step 16 After all of the sanitizer/water solution has been added to the reservoir, turn on the ice making water supply.

Step 17 Continue the freeze cycle for 30 minutes and then discard all ice produced.

Procedure to Clean Heavily Scaled Flake Ice Machines

Step 1 Remove front and top covers and set the toggle switch to the OFF position.

Step 2 Remove all ice from the bin.

Step 3 Turn off the ice making water supply.

Step 4 Remove the top cover from water reservoir. Step 5 Refer to chart below:

Premix cleaner with lukewarm water in a non-metallic container.

Model	Water Reservoir Capacity	Mix Cleaner and Water Use Metal Safe Ice Machine Cleaner, part number 000000084 only	
		Cleaner	Water
UNF0200 UFF0200 UFP0200 UFF0350 UFP0350 UNF0300 UNP0300	14 oz (400 ml)	9 oz (266 ml)	5 oz (148 ml)
RFF0320 RNF0320 RFP0320 RNF0620 RNP0620 RFF0620 RFP0620	17 oz (500 ml)	11 oz (325 ml)	6 oz (177 ml)
RNF1100 RNP1100 RFF1200C RFF1300	34 oz (1 L)	23 oz (680 ml)	11 oz (325 ml)
RNF2000C RFF2200C RFF2500	68 oz (2 L)	46 oz (1.3 L)	22 oz (650 ml)

Step 6 Remove all water from the evaporator and water reservoir. Add the entire cleaner/ water solution and re-install the reservoir cover.

Leave the cleaner/water solution in the evaporator for a minimum of 4 hours.

Step 7 Remove all cleaner/water from the evaporator and water reservoir.

Step 8 Follow the standard cleaning and sanitizing procedures.

Removal of Parts for Cleaning/Sanitizing

Warning

Disconnect electric power to the ice machine at the electric switch box and wear rubber gloves and safety goggles (or face shield) while handling cleaner or sanitizer.

Caution

Do not mix Cleaner and Sanitizer solutions together. It is a violation of Federal law to use these solutions in a manner inconsistent with their labeling.

1. Turn off the water supply to the ice machine at the water service valve.
2. Remove the components listed on the following pages for cleaning and sanitizing.
3. Soak the removed part(s) in a properly mixed solution of cleaner and water.

Solution Type	Water	Mixed With
Cleaner	1 gal. (4 L)	16 oz (500 ml) cleaner Part Number 000000084

4. Use a soft-bristle brush or sponge (NOT a wire brush) to carefully clean the parts.
5. Use the solution and a brush or sponge to clean all disassembled components and the inside of the bin.
6. Rinse all cleaned parts with clear water.
7. Mix a solution of sanitizer and water.

Solution Type	Water	Mixed With
Sanitizer	3 gal. (11 L)	2 oz (60 ml) sanitizer Part Number 9405653

8. Soak the parts in the sanitizer/water solution for 10 minutes. Use the sanitizer/water solution and a sponge to sanitize all removed components and the inside of the bin. Do not rinse the sanitized parts.
9. Continue with step 11 of the cleaning/sanitizing procedure.

ICE CHUTE REMOVAL

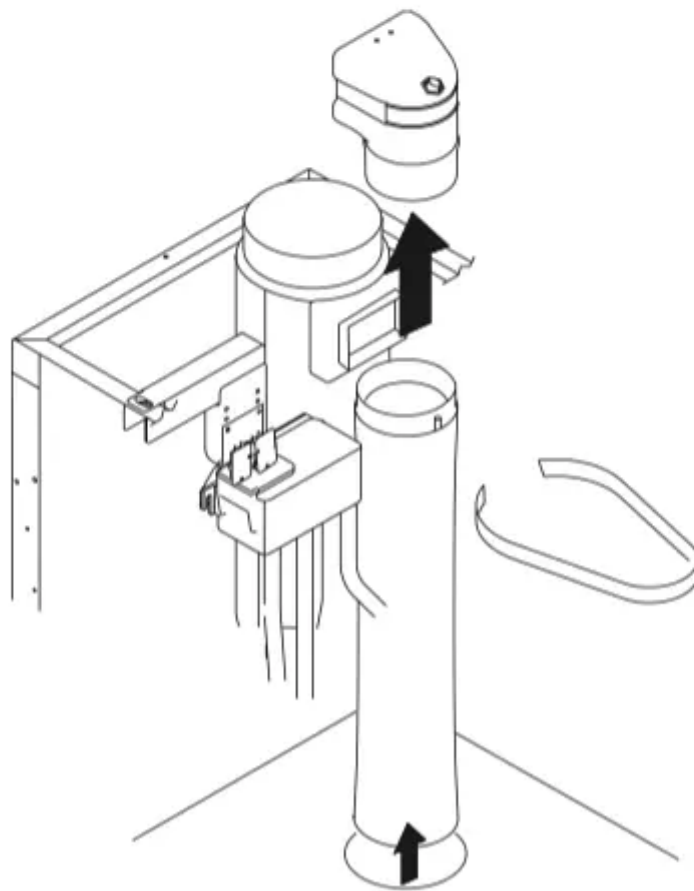
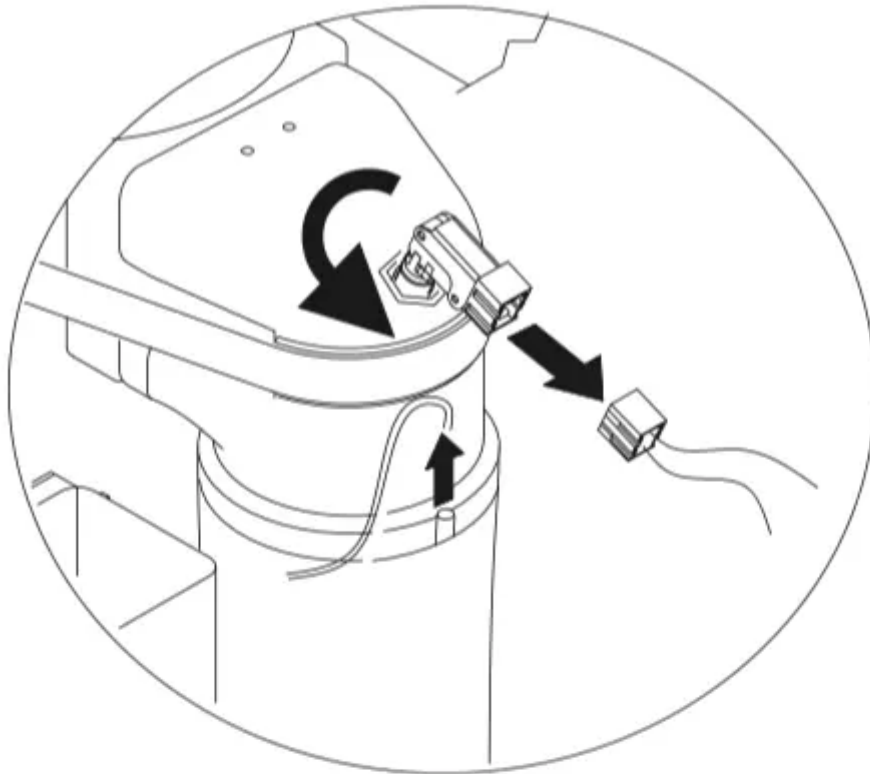
RNF0620/RFF0620/RNP0620/RNF1020C/RNF1100/RNP1100 RFF1200C/RFF1300/RNF200C/
RFF2200C/RFF2500 Only

Place the toggle switch in the OFF position, turn off the water supply and disconnect electrical power to the ice machine.

10. Disconnect water supply.
11. Remove water reservoir cover.
12. Remove microswitch and bin thermostat from the ice chute.



13. Remove retainer, ice chute elbow and ice chute.



Air-Cooled Condenser Cleaning

Warning

Disconnect electric power to the ice machine and the remote condenser at the electric service switch before cleaning the condenser.

A dirty condenser restricts airflow, resulting in excessively high operating temperatures and reduced ice production. Clean the condenser at least every six months.

Caution

The condenser fins are sharp. Use care when cleaning them.

1. Clean the outside of the condenser with a soft brush or a vacuum with a brush attachment. Shine a flashlight through the condenser to check for dirt between the fins. If dirt remains, a method suitable to remove the contamination must be used to ensure air flow.
2. Modular Units Only: Clean the washable filter with a mild soap and water solution.

Removal from Service/Winterization

1. Clean and sanitize the ice machine.
2. Press the power button and turn off the ice machine.
3. Turn off the water supply, disconnect and drain the incoming ice-making water line at the rear of the ice machine and drain the water trough.
4. Energize the ice machine, wait one minute for the water inlet valve to open and blow compressed air in both the incoming water and the drain openings in the rear of the ice machine to remove all water.
5. Press the power button and turn off the ice machine.

Disconnect the electric power at the circuit breaker or the electric service switch.

6. Fill spray bottle with sanitizer/water solution and spray all interior food zone surfaces. Do not rinse and allow to air dry.
7. Replace all panels.

WATER-COOLED ICE MACHINES

1. Perform steps 1-6.
2. Disconnect the incoming water and drain line from the water-cooled condenser.
3. Energize the ice machine in the freeze cycle. The increasing refrigerant pressure will open the water regulating valve.
4. Blow compressed air through the condenser until no water remains.
5. Replace all panels.

Troubleshooting

Checklist

If a problem arises during operation of your ice machine, follow the checklist below before calling service. Routine adjustments and maintenance procedures are not covered by the warranty.

Problem	Possible Cause	To Correct
Ice machine does not operate.	No electrical power to the ice machine and/or condensing unit.	Replace the fuse/reset the breaker/turn on the main switch.
	High pressure cutout tripping.	Clean condenser coil. (See Section 4)
	Power switch set improperly.	Move the switch to the ON position.
	Bin thermostat open or ice touching thermostat probe.	Adjust thermostat or remove ice.
	No water in reservoir.	No water to ice machine, plugged filter, float valve defective.
	Ice chute switch open.	Check for ice or binding and close switch.
	Low air temperature around ice machine.	Air temperature must be at least 35°F (2°C).
Gear motor runs and no ice is produced	Time delay has not expired.	Wait 10 minutes for time delay to expire.
	High pressure cutout tripping.	Clean condenser coil and reset.
	Low pressure control open.	Thaw evaporator and retest - Call for service.
Low Production	Due for normal maintenance.	Perform cleaning procedure. (See Section 4)



	Ice machine starts and stops without a full bin of ice.	Perform cleaning procedure. (See Section 4)
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Installation Instructions

Location of Ice Machine

The location selected for the ice machine must meet the following criteria. If any of these criteria are not met, select another location.

- The location must be free of airborne and other contaminants.
- This equipment is intended for indoor use only. Do not install or operate this equipment in outdoor areas.
- The air temperature must be at least 50°F (10°C), but must not exceed 110°F (43°C).
- The water temperature must be at least 37°F (3°C), but must not exceed 90°F (32°C).
- The location must not be near heat-generating equipment or in direct sunlight.
- The location must be capable of supporting the weight of the ice machine and a full bin of ice.
- The location must allow enough clearance for water, drain and electrical connections in the rear of the ice machine.
- The location must not obstruct airflow through or around the ice machine.

CLEARANCE REQUIREMENTS

Undercounter Units	Air-Cooled	Water-Cooled
Top	0" (0 cm)	0" (0 cm)
Sides	2" (5 cm)	2" (5 cm)
Back	8" (20 cm)	8" (20 cm)

NOTE: Allowance must be made for removal when the ice machine is built in. Removal of the top panel is required for cleaning & sanitizing.



Modular Units	Air-Cooled	Water-Cooled	QuietQube® Air-Cooled
Top/Sides	8" (20 cm)	8" (20 cm)	0" (0 cm)
Back	5" (13 cm)	5" (13 cm)	0" (0 cm)

RCUF Units	Remote Condensing Unit
Front/Back	24" (61 cm)
Sides/Top	6" (15.2 cm)
24 inches clearance on top and sides is recommended for serviceability.	

Installation Requirements

- The ice machine and bin must be level.
- Install the bin drain and ice machine drain separately.
- Ice machine drain must be vented.
- Bin drain termination must have an air gap.
- When local code requires, a backflow preventer must be installed on the water inlet line.
- The ice machine and bin must be sanitized after installation.
- Local water conditions may require treatment of the water to inhibit scale formation, filter sediment, and remove chlorine odor and taste.
- Routine adjustments and maintenance procedures outlined in this manual are not covered by the warranty.

Ice Machine Heat of Rejection

Series Ice Machine	Heat of Rejection Btu/h
UFF0200 - RFF0320 - RFP0320	2400
UNF0200 - UNP0200	2800
UNF0300 - UFF0350	5000
RNF0320 - RNP0320	3075
RFF0620 - RNF0620 - RNP0620	5200
RNF1100 - RNP1100	7500
RFF1300	7500
RFF2500	17000



Ice machines, like other refrigeration equipment, reject heat through the condenser. It is helpful to know the amount of heat rejected by the ice machine when sizing air conditioning equipment.

This information is also necessary when evaluating the benefits of using water-cooled or remote condensers to reduce air conditioning loads. The amount of heat added to an air conditioned environment by an ice machine using a water-cooled or remote condensing unit is negligible.

Knowing the amount of heat rejected is also important when sizing a cooling tower for a water-cooled condenser.

Water and Drain Requirements

POTABLE WATER REQUIREMENTS

Follow these guidelines to install water inlet lines:

- Do not connect the ice machine to a hot water supply. Be sure all hot water restrictors installed for other equipment are working. (Check valves on sink faucets, dishwashers, etc.)
- If water pressure exceeds the maximum of 80 psig (552 kPA) recommended pressure, obtain a water pressure regulator from your local plumbing supply house.
- Install a water shut-off valve and union for both the ice making and condenser water lines.
- Insulate water inlet lines to prevent condensation.
- Plumbing must conform to local codes.

Caution

Do not apply heat to water valve inlet fitting or overtighten. This will damage plastic water inlet connection.

DRAIN CONNECTIONS

Follow these guidelines when installing drain lines to prevent drain water from flowing back into the ice machine and storage bin:

- Drain lines must have a 1.5 inch drop per 5 feet of run (2.5 cm per meter), and must not create traps.
- The floor drain must be large enough to accommodate drainage from all drains.
- Run separate bin and water-cooled condenser drain lines. Insulate them to prevent condensation.
- Vent the ice machine drain to the atmosphere. The ice machine drain requires an 18" (46 cm) vent. Do not vent the condenser drain on water-cooled models.
- Drains must have a union or other suitable means to allow in-place disconnection from the ice machine when servicing is required.

COOLING TOWER APPLICATIONS

A water cooling tower installation does not require modification of the ice machine. The water regulator valve for the condenser continues to control the refrigeration discharge pressure.

It is necessary to know the amount of heat rejection, and pressure drop through the condenser and water valves (inlet and outlet) when using a cooling tower on an ice machine.

- Water entering the condenser must not be lower than 37°F (3°C) or exceed 90°F (32°C).
- Water flow through the condenser must not exceed 5 gal. (19 L) per minute.
- Allow for a pressure drop of 7 psi (48 kPa) between the condenser water inlet and the outlet of the ice machine.
- Water exiting the condenser must not exceed 110°F (43°C).

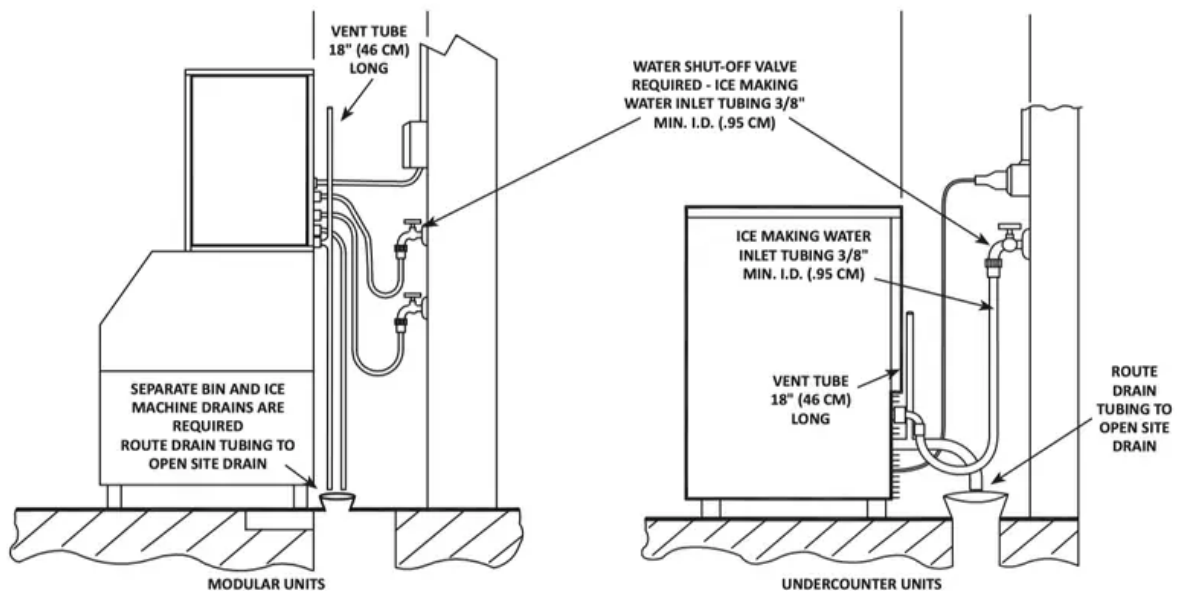
ICE MACHINE WATER USAGE

Series Ice Machine	Potable Water Gal/100Lbs Ice	Condenser Gal/100Lbs Ice
UFF0200 - UFP0200 - UNP0200	12.0	—
RFF0320 - RNF0320 - RFP0320	12.0	—
RNF0620 - RNP620	12.0	109
RFF0620 - RFP0620	12.0	106
RNF1100 - RNP1100	12.0	131
RFF1300	12.0	116
RFF2500	12.0	138

WATER SUPPLY AND DRAIN LINE SIZING/CONNECTIONS

Location	Water Temp Min/Max	Water Pressure Min/Max	Fitting/Min Tubing Size
Potable Water Inlet	37°/90°F (3°/32°C)	20/80 psi (138/552 kPa)	3/8" FPT
Potable Water Drain	---	---	1/2" MPT
Condenser Water Inlet	37°/90°F (3°/32°C)	20/150 psi (138/1034 kPa)	3/8" FPT RFF2500 only = 1/2" FPT
Condenser Water Drain	---	---	1/2" MPT
Bin Drain	---	---	3/4" FPT
Large Capacity Bin Drain	---	---	1" FPT





Typical Water Supply Drain Installation

Electrical Service

Warning

All wiring must conform to local, state and national codes.

VOLTAGE

The maximum allowable voltage variation is $\pm 10\%$ of the rated voltage at ice machine start-up (when the electrical load is highest).

Warning

The ice machine must be grounded in accordance with national and local electrical codes.

All electrical work, including wire routing and grounding, must conform to local, state and national electrical codes. The following precautions must be observed:

- The ice machine must be grounded.
- A separate fuse/circuit breaker must be provided for each ice machine.
- A qualified electrician must determine proper wire size dependent upon location, materials used and length of run (minimum circuit ampacity can be used to help select the wire size).
- Check all ground screws in the control box and verify they are tight before starting the ice machine.

Important

Observe correct polarity of incoming line voltage. Incorrect polarity can lead to erratic ice machine operation. L1 is the wire colored brown and L2/N is the wire colored blue.

FUSE/CIRCUIT BREAKER

A dedicated circuit and a separate fuse/circuit breaker are required for each ice machine.

GROUND FAULT CIRCUIT INTERRUPTER

We do not recommend the use of a GFCI/GFI circuit protection with our equipment. If a GFCI/GFI is required by code, use a GFCI/GFI breaker rather than outlet which is more prone to intermittent nuisance trips than panel circuit breakers.


MINIMUM POWER CORD SPECIFICATIONS

The wire size to the receptacle is dependent upon location, materials used, length of run, etc., so it must be determined by a qualified electrician. Local, state or national requirements will supersede our minimum requirements.

FOR UNITED KINGDOM ONLY

As the colors of the wires in the mains lead of the appliance may not correspond with the colored markings identifying the terminals in your plug, proceed as follows:

- The wire which is colored green and yellow must be connected to the terminal in the plug

which is marked with the letter E or by the earth ground symbol  or colored green or green and yellow.

- The wire colored blue must be connected to the terminal which is marked with the letter N or colored black.
- The wire colored brown must be connected to the terminal which is marked with the letter L or colored red.

Maximum Breaker Size & Minimum Circuit Amperage Chart

Important

Due to continuous improvements, this information is for reference only. Please refer to the ice machine serial number tag to verify electrical data. Serial tag information overrides information listed on this page.

Series Ice Machine	Voltage Phase Cycle	Air-Cooled			Water-Cooled		QuietQube®	
		Max Fuse/Circuit Breaker	Min Circuit Amps	Total Circuit Amps	Max Fuse/Circuit Breaker	Min Circuit Amps	Max Fuse/Circuit Breaker	Total Circuit Amps
UNF0200	115/1/60	15 Amp	—	7.5	—	—	—	—
UNP0200	115/1/60	15 Amp	—	*7.5	—	—	—	—
UFF0200	115/1/60	15 Amp	—	7.5	—	—	—	—
UFP0200	115/1/60	15 Amp	—	*7.5	—	—	—	—
UFF0350	115/1/60	15 Amp	—	10.0	—	—	—	—
UFP0350	115/1/60	15 Amp	—	*10.0	—	—	—	—
UNF0300	115/1/60	15 Amp	—	10.0	—	—	—	—
UNP0300	115/1/60	15 Amp	—	*10.0	—	—	—	—
RFF0320	115/1/60	20 Amp	12.8	—	—	—	—	—
RFP0320	115/1/60	20 Amp	*12.8	—	—	—	—	—
RNF0320	115/1/60	20 Amp	12.8	—	—	—	—	—
RNP0320	115/1/60	20 Amp	*12.8	—	—	—	—	—
RNF0620	115/1/60	25 Amp	16.3	—	25 Amp	15.4	—	—
RNP0620	115/1/60	25 Amp	*16.3	—	25 Amp	*15.4	—	—
RFF0620	115/1/60	25 Amp	16.3	—	25 Amp	15.4	—	—
	208-230/1/60	15 Amp	8.7	—	15 Amp	8.2	—	—
RFP0620	115/1/60	25 Amp	*16.3	—	25 Amp	*15.4	—	—
	208-230/1/60	15 Amp	*8.7	—	15 Amp	*8.2	—	—
RNF1100 RNF1020C	115/1/60	—	—	—	—	—	15 Amp	2.9
	208-230/1/60	20 Amp	14.2	—	20 Amp	13.7	—	—
RFP1100	208-230/1/60	20 Amp	*14.2	—	—	—	—	—
RFF1300	208-230/1/60	20 Amp	12.5	—	20 Amp	12.5	15 Amp	1.4
RNF2000C RFF2200C	208-230/1/60	—	—	—	—	—	15 Amp	3.2
RFF2500	208-230/3/60	20 Amp	15.0	—	—	—	—	—

* Indicates preliminary data

NOTE: Maximum allowable voltage variation at compressor start-up is $\pm 10\%$ of voltage listed above and on the model/serial plate.

Refrigeration System Installation Remote Condensing Unit Only

Important

Manitowoc remote systems are only approved and warranted as a complete new package. Warranty on the refrigeration system will be void if a new ice machine head section is connected to pre-existing (used) tubing or condensing units or vice versa.

USAGE WITH NON-MANITOWOC CONDENSING UNITS

Manitowoc Remote Condensing Units are specifically designed for usage with a QuietQube® Ice Machine Head Section. Standard condensing units and Non-Manitowoc condensing units are not approved for use with a QuietQube® Ice Machine Head Section.

Caution

The 60-month compressor warranty (including the 36-month labor replacement warranty) will not apply if the Manitowoc Ice Machine and Manitowoc Remote Condensing Unit are not installed according to specifications. This warranty also will not apply if the refrigeration system is modified with a condenser, heat reclaim device, or other parts or assemblies not manufactured by Manitowoc Ice.

Factory Equipment Refrigeration Amounts

ICE MACHINE HEAD SECTION

Each ice machine condensing unit ships from the factory with a refrigerant charge appropriate for the entire system operation. The serial tag on the ice machine indicates the refrigerant charge. The refrigerant charge is sufficient to operate the ice machine in ambient temperatures between -20°F (-28.9°C) and 120°F (48.9°C). With line set lengths of up to 100 feet (30.5 m).

Warning Potential Personal Injury Situation

The QuietQube® Condensing Unit contains the refrigerant charge. Installation and brazing of the line sets must be performed by a properly trained and EPA-certified refrigeration technician aware of the dangers of dealing with refrigerant-charged equipment.

REFRIGERATION LINE SETS/TRAP KIT

Refrigeration Rated Tubing and Trap Kits are shipped capped with atmospheric pressure.

Warning

Installation of a QuietQube® Condensing Unit may require the use of special equipment for placement. Trained and qualified personnel are required for proper rigging and lifting.

Refrigeration Line Set Installation Remote Condensing Unit Only

GENERAL

Refrigeration line set installations consist of vertical and horizontal line set distances between the ice machine and the condensing unit. The following guidelines, drawings and calculation methods must be followed to assure proper oil return and remote condensing unit/ice machine operation.

The refrigeration line set installer must be USA Government Environmental Protection Agency (EPA) certified in proper refrigerant handling and servicing procedures.

Warning

The QuietQube® Condensing unit contains refrigerant charge. The two refrigeration valves must remain closed until proper installation of the line sets is completed.

Warning

Disconnect electrical power to the ice machine head section and remote condensing unit before proceeding.

Step 1 Verify Ice Machine and Remote Condensing Unit Locations Are Within Guidelines

Prior to installation of the ice machine head section and remote condensing unit be sure that the distance between them is within the line set routing guidelines outlined in this manual.

Roof/Wall Penetration

If required, cut a 3-inch (76.2 mm) circular hole in the wall or roof for routing of refrigeration tubing. A qualified person must perform all roof penetrations.

Step 2 Route Refrigeration Tubing

Properly route refrigeration tubing between the ice machine head section and the remote condensing unit.

A. LINE SET LENGTH

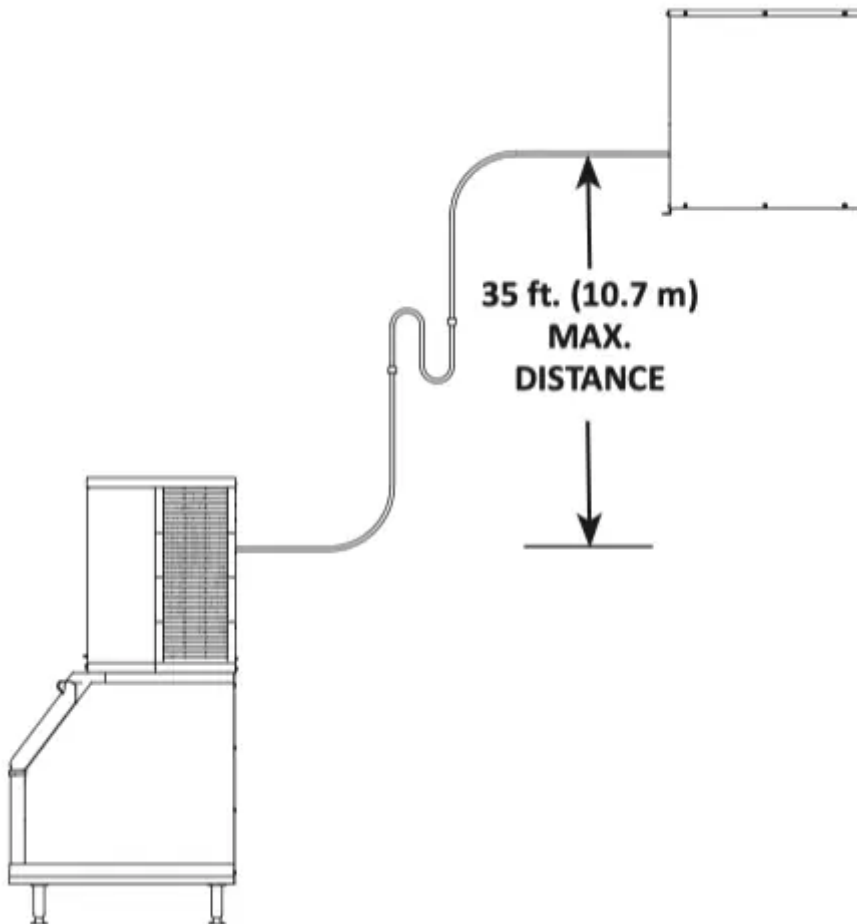
100 feet (30.5 m) Length: The maximum measured length the line set can be.

The receiver is designed to hold a charge sufficient to operate the ice machine in ambient temperatures between -20°F (-28.9°C) and 120°F (48.9°C), with line set lengths of up to 100 feet (30.5 m). The maximum amount of line set which can be exposed on the rooftop is 25% of the total length of the line set.

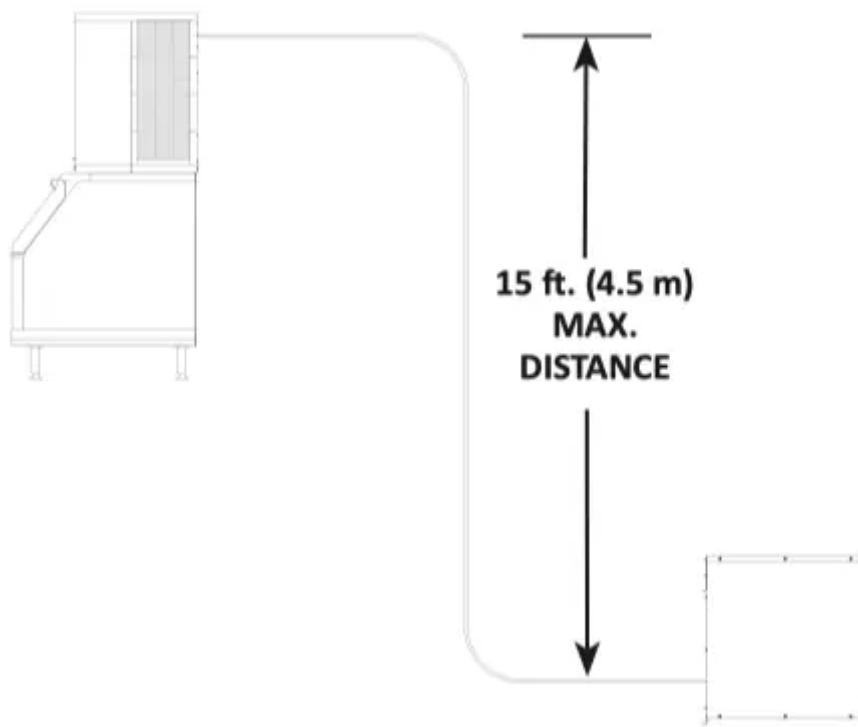
Important

QuietQube® ice machines will not function with line sets greater than 100 feet (30.5 m). Do not attempt to go beyond this distance and add refrigerant charge to compensate!

B. LINE SET RISE OR DROP



35 feet (10.7 m) Rise: The maximum distance the remote condensing unit can be above the ice machine.



15 feet (4.5 m) Drop: The maximum distance the remote condensing unit can be below the ice machine.

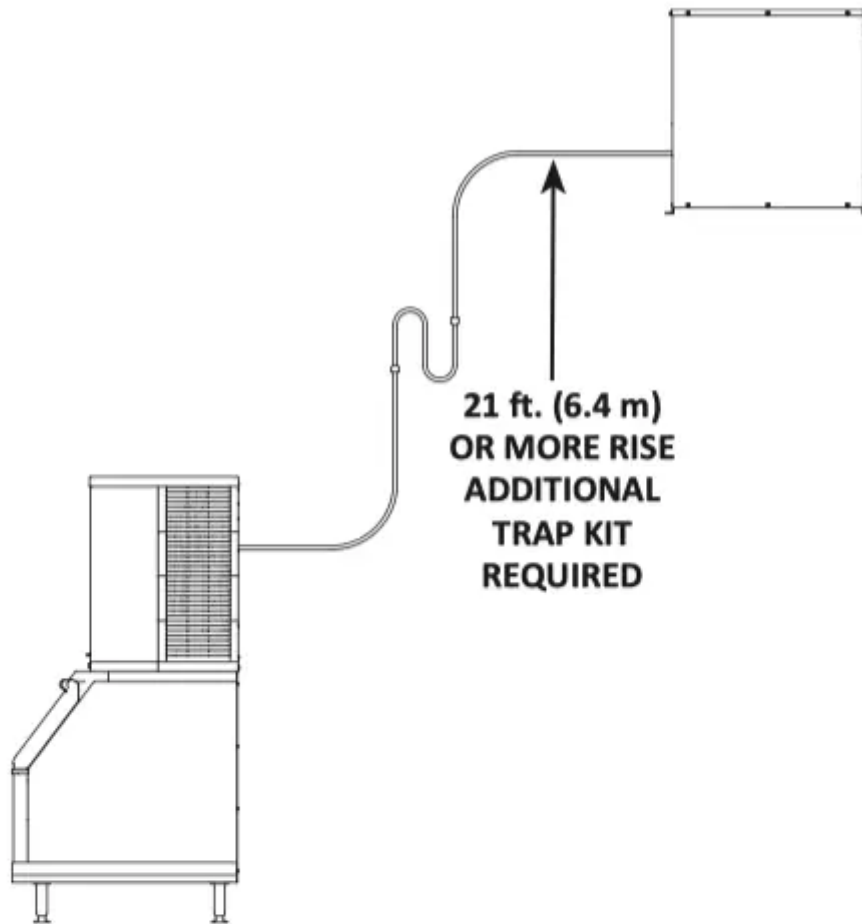
C. SUCTION LINE OIL TRAPS

Caution

Do not form unwanted traps in refrigeration lines. Never coil excess refrigeration tubing.

0 to 20 feet (0 to 6.1 m) Rise: No oil trap is required when the condensing unit is located 20 feet (6.1 m) or less above the ice machine head section.

21 to 35 feet (6.4 to 10.7 m) Rise: The suction line requires an additional Oil Trap ("S" type) to be installed. Install the trap as close as possible to midpoint between the ice machine head section and remote condensing unit. S-Trap Kits are available from Manitowoc.



Step 3 Lengthening or Reducing Line Set Lengths

Caution

Do not form unwanted traps in refrigeration lines. Never coil excess refrigeration tubing.

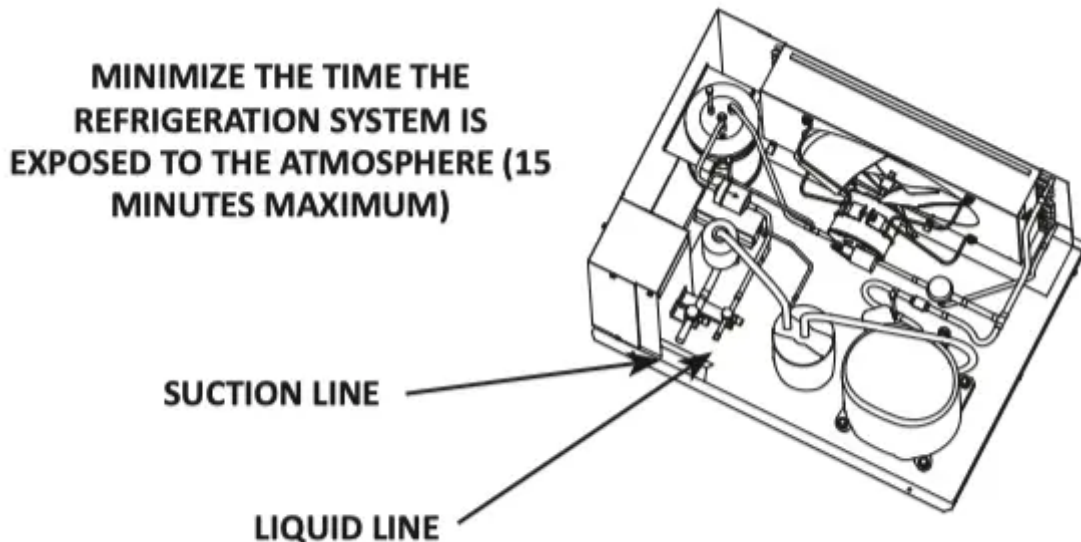
When the line set requires shortening or lengthening, do so before connecting the line set to the ice machine head section or the remote condensing unit.

Step 4 Connecting the line set

To prevent oxidation of the copper, purge line set with dry nitrogen while brazing.

A. Connect the Line Set to the Remote Condensing Unit

The condensing unit is shipped with a refrigerant charge. The line set shut-off valves must remain closed during brazing. Protect the valves from heat during the brazing process. Wrap the valves in a wet rag or other type of heat sink prior to brazing. Cool braze joint with water immediately after brazing to prevent heat migration to the valve.



B. Connect the Line Set to the Ice Machine Head Section

- Cut the suction and liquid tubing with a tubing cutter, leaving enough tubing to easily braze.
- Connect the line set.
- Cool braze joint with water immediately after brazing to prevent heat migration.

Step 5 Pressure Test and Evacuate Line Set and Ice Machine Head Section

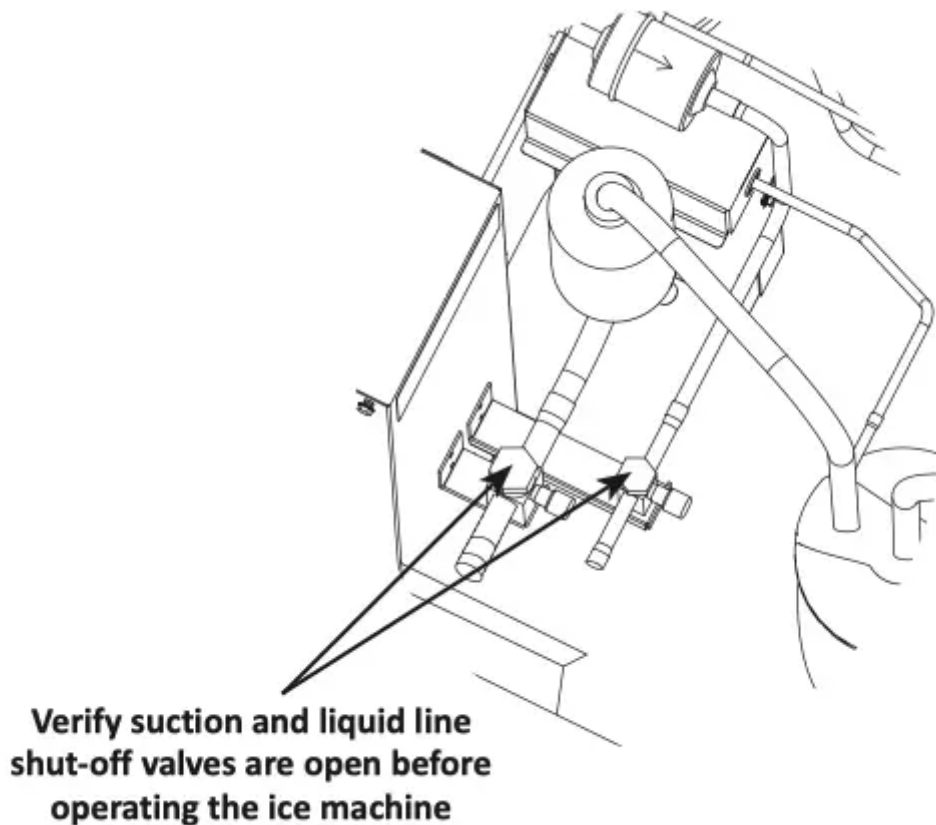
- Pressure testing and evacuation can be performed from the ice machine head section or CVD condensing unit shut-off valves.
- Schrader valve core removal tools that allow for removal and installation of the valve cores without removing manifold gauge set hoses are recommended to decrease the evacuation time.
- Pressure test @ 150 psi (1000 kPa) for a minimum of 15 minutes.
- Minimum evacuation level is 500 microns.

Step 6 Open the valves and leak check the refrigeration system prior to startup of the ice machine

- A. Backseat (open-turn counterclockwise) the suction shutoff valve.

B. Backseat (open-turn counterclockwise) the liquid line shutoff valve.

Disconnect power to the remote condensing unit. Confirm water is supplied to the ice machine, then place the ice machine rocker switch in the ON position. The water trough will fill and initiate an 8 minute delay period. When the 8 minute delay period ends the liquid line solenoid valve will energize and equalize the low side and high side pressures. Leak check the line set connections, S trap and all factory joints throughout the entire system. When the leak check is complete, place the rocker switch in the OFF position. Connect power to the remote condensing unit and allow system to pump down.



Important

All refrigeration valve caps must be reinstalled to prevent future refrigeration leaks.

Verify O-ring in Schrader valve caps are intact and reinstall on shutoff valves to prevent refrigerant leakage. Replace shutoff valve access caps and torque to the following specifications.

Torque Values

Stem	18-20 ft. lbs. (24.4-27.1 Nm)
Caps	12-15 ft. lbs. (16.3-20.3 Nm)
Schrader Core	1.5-3 in. lbs. (0.17-0.34 Nm)

Step 7 Insulation Requirements

To prevent condensation, the entire suction line must be insulated. All insulation must be airtight and sealed at both ends.

The following insulation requirements prevent condensation at 90°F (32°C) ambient 90% Relative Humidity. If higher humidity is expected, increase insulation thickness.

The entire suction line set requires:

Suction Line	Liquid Line	Min. Insulation Thickness
5/8 in. (16 mm)	3/8 in. (10 mm)	3/8 in. (9 mm) Suction Line 3/8 in. (9 mm) Liquid Line

Important

To prevent condensation, the entire suction line must be insulated. All insulation must be airtight and sealed at both ends.

The minimum requirements are for conditions at or below 90% humidity and 90°F (32°C) ambient. When higher humidity will be experienced, or local code requires, insulation wall thickness will need to be increased.

Warning

This content is compiled from multiple sources and is provided for reference purposes only. It may not be complete or fully applicable to all situations. If you are unable to resolve your issue, please contact the product manufacturer or an authorized service provider for official support.

