



INTERNAL TRAINING - ICE TECH ICE MAKERS

Machines by type of ice

ICE MAKING

Ice is produced by freezing water. To freeze water, a thermodynamic process occurs extracting heat from the water, cooling down the water, until it freezes. To do such process, different components are used, all of them are known as the refrigeration system of an ice machine.

The ice machines are **cyclical** when heat is used to harvest the ice, every cycle is the sum of freezing and harvesting (ice dropping from the evaporator).

The ice machines are **continuous** when there is no change on the regime to harvest the ice, they freeze all the time.

ICE TECH ice machines produce different types of ice or ice cubes:

Spray system: System that produces the ice using an horizontal evaporator (comprised by the goblets where the water forms the ice cube). It uses a water pump to move the water. Cyclical machine.



SS S



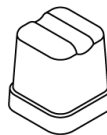
14cc

SS M



23/30cc

SS L



51 cc

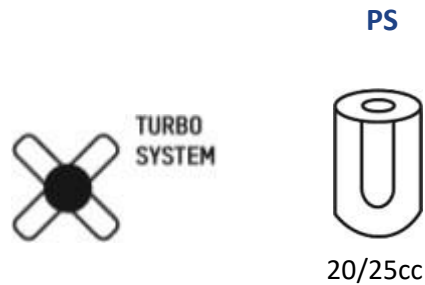
SS XL



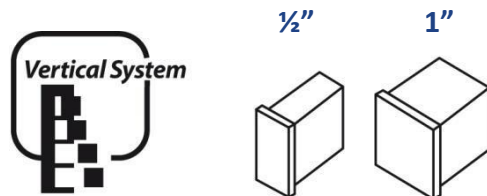
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Machines by type of ice

Palette system: System that produces the ice using an horizontal evaporator, where the water is push upwards to the evaporator by a turbine and palettes. Cyclical machine. It does not use a water pump.

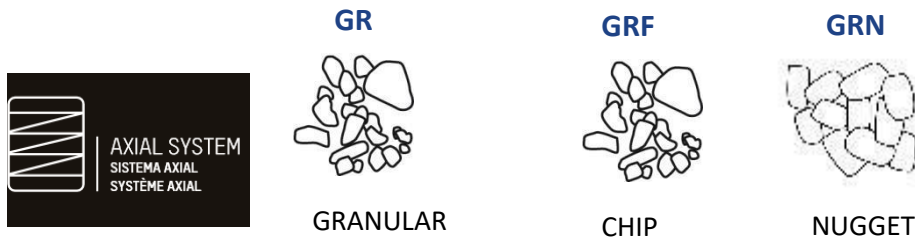


Vertical system: System that produces the ice using a vertical evaporator. Used in the half and full dice ice. Cyclical machine



Machines by type of ice






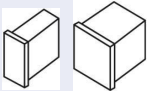


Axial system (GR/GRF/GRN): System that produces the ice using a cylindrical evaporator, with an auger that scratches the ice from the evaporator walls. It generates a granular or nugget ice. It does not use a water pump



Axial system (SC): System that produces an ice using a cylindrical evaporator, an auger takes off the ice from the evaporator walls. The ice is dry, thin, flake type, and subcooled. Continuous machine. It uses a water pump.



Machines by type of ice

ICE TYPE		WATER INJECTION TYPE	EVAPORATOR	WATER PUMP	ICETECH MACHINE
SS S		SPRAY	HORIZONTAL	YES	SS 25
SS M		SPRAY	HORIZONTAL	YES	SS
SS L		SPRAY	HORIZONTAL	YES	SS
SS XL		SPRAY	HORIZONTAL	YES	SS
PS	 20cc.	PALETTES	HORIZONTAL	NO	PS
DICE / ½ DICE		SPRAY	VERTICAL	YES	FD/HD
GRANULAR/ NUGGET		AXIAL (WITH AUGER)	TUBULAR	NO	CD/ GR/ GRF / GRN
FLAKE		AXIAL (WITH AUGER)	TUBULAR	YES	SC

Machines by type of ice

SS



SS M



SS L



SS XL



PS



FD/HD MEDIO DADO



FD/HD DADO



CS/GR



GRN

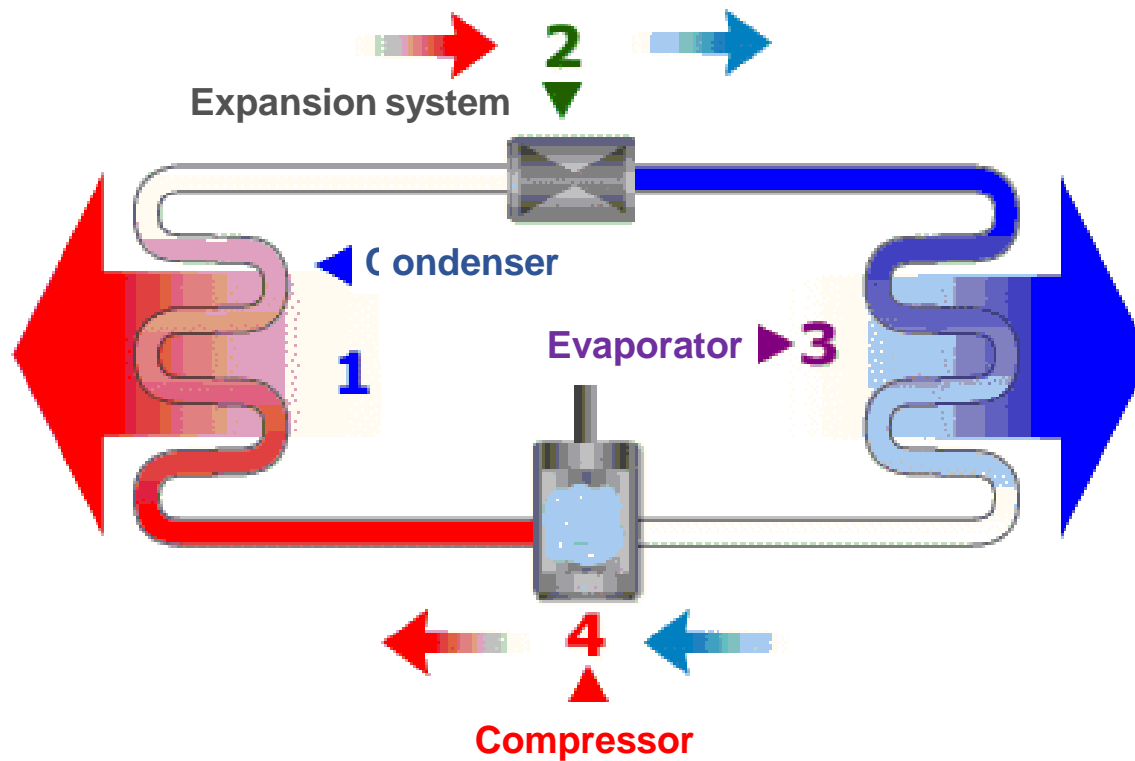


SC



Refrigeration system

The refrigeration system, in charge of cooling down the water until becomes ice, it has the next principal elements:



Compressor and condenser

Compressor and condenser

- ✓ The condenser and the compressor are elements from the refrigeration system of the ice machines. Their function is to allow the machine to generate cold to form the ice and to produce heat to help harvesting the ice cubes. The compressor compresses the refrigerant gas that has the heat extracted from the water, to transfer that heat to the ambient using the condenser.
- ✓ In the granular ice machines (GR) and the flake ice units (Scala), there is no need to produce heat to harvest the ice. Those are continuous machines, ice is formed in the evaporator wall and scratch to detach from the wall.



Air vs water condenser

Water condenser

- ✓ Water is used to refrigerate.
- ✓ The machines condensed using water have a high water consumption, they need water to make the ice and to refrigerate the condenser.
- ✓ Sometimes it has a fan to help with the refrigeration.



Air condenser

- ✓ Air is used to refrigerate.
- ✓ The water consumption in the air condensed units is much lower, it only need water to make the ice.
- ✓ It always have a fan.



Remote condenser

Remote condenser

- ✓ Sometimes the machines do not have a condenser, those are remote units, and the condenser is out of the unit, is installed separately from the machine.
- ✓ It will be always air condensed.
- ✓ A refrigeration installation need to be done (piping, valves, ...) to connect the machine and the remote condenser.
- ✓ The models are the RC manufactured at ICETECH (Remote Condenser). The condenser is purchased from an outside supplier and the condenser is assembled and finished in the factory with a chassis.



RC Remote condenser

Condensing unit

Condensing unit (U/C):

- ✓ It is a part of the machine, includes the condenser, compressor, and some other elements (valves, piping, pressure switches, etc.).
- ✓ According to the condenser that they have, it can be water or air condensing units.



U/C Water



U/C Air

Remote condensing unit

Remote condensing unit (U/C):

- ✓ In ice makers generator or Split units, the condensing unit is not in the machine, they do not have a compressor or a condenser.
- ✓ The client can buy a remote condensing unit or not, depending on the installation of the units. That is explained in the *Ice makers generators or split*
- ✓ A refrigeration installation needs to be done (piping, insulation, valves, etc.) to connect the ice machine and the remote U/C.



U/C Silensys



U/C Bitzer

Evaporator

The evaporator is where the ice is formed, through the irrigation of water on its surface. Depending on the unit we have the next types of evaporators:

- **HORIZONTAL:** Ice cube units, with the type of ices Alfa, Gala, Delta, Super Star, Super Star Plus.
- **VERTICAL:** Evaporator for half and full dice ice, Spika units.
- **FINGER TYPE:** Quasar evaporator, with a 'central hole'.
- **TUBULAR:** Evaporator for the granular ice of the Ice Queen and the flake ice from the Scala.



Horizontal



Vertical



Tubular (GR)



Tubular (SC)

Compact vs remote unit

Compact machines:

- ✓ In these units, the condensing unit (compressor and condenser) are integrated inside the machine, being a part of it. The condenser can be air or water.
- ✓ When the unit has an air condenser, it is indicated in the machine name with an A (*air*).
- ✓ When the unit has a water condenser, it is indicated in the machine name with a W (*water*).

Remote machines:

- ✓ These machines do not include the condenser, it is apart. They do have the compressor inside.
- ✓ To function properly, these machines need a remote condenser, therefore an order of a remote machine always have to include a remote condenser.
- ✓ The remote condenser is always an air one.
- ✓ These machines usually are installed in places with poor ventilation, to allow the condenser use fresh air from the exterior. It also allows to prevent the hot air inside the local.
- ✓ By not having a condenser, they are more light than the compact ones.
- ✓ A refrigeration installation needs to be done (piping, valves, etc.) to connect the unit and the remote condenser.
- ✓ In the SC machines, the remote unit does not include the condensing unit (nor the compressor or the condenser).

Ice maker generator or Split

Ice maker generator or Split:

- ✓ These units do not have the condensing unit, it comes apart. They do not have the compressor and the condenser.
- ✓ These machines usually are installed in places with poor ventilation or to avoid the noise generated by the condenser and compressor. It also allows to prevent the hot air inside the local.
- ✓ By not having a condenser and a compressor, they are more light than the compact and remote ones.
- ✓ There are two installation possibilities:
 1. Machines connected to a cold generation station
 - Sold without the remote U/C.
 2. Without a cold generation station
 - Sold with a remote U/C.
 - A refrigeration installation needs to be done (piping, insulation, valves, etc.) to connect the unit and the remote condenser.

SC machines

Compact SC:

- ✓ A Scala machine with a condensing unit integrated inside the machine (compressor and condenser), all in the same base.



Split SC

- ✓ It is a SC ice maker, without the condensing unit.

Split CO₂ SC

- ✓ Like the above but using CO₂ as refrigerant. Condensing unit not included. Keep in mind ICETCH does not sell CO₂ condensing units.



SC machines

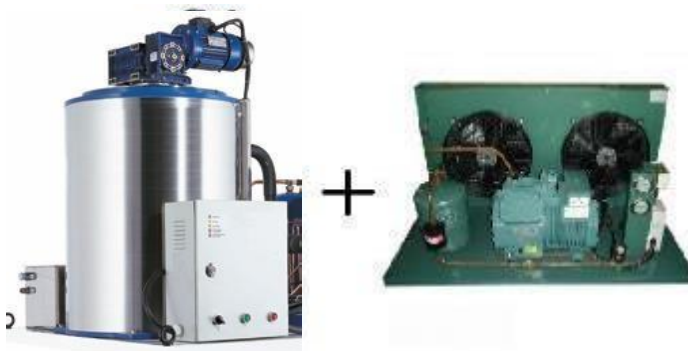
Remote SCU/C (Split SC + Remote U/C)

- ✓ It is a ice maker Split Scala, with a remote condensing unit (U/C), to be installed apart. 2 independent packages.
- ✓ From the SC 400 until the 2000, SILENSYS condensing units are used:



SC 400 SPLIT + U/C SIL 2480Z
SC 600 SPLIT + U/C SIL 2511Z
SC 1000 SPLIT + U/C SIL 2516Z
SC 1500 SPLIT + U/C SIL 2532Z
SC 2000 SPLIT + U/C SIL 2544Z

- ✓ From the SC 3000, BITZER condensing units are used:



SC 3000 SPLIT + U/C USBB1200
SC 5000 SPLIT + U/C USBB2500
SC 10T SPLIT + U/C USBB4000

- ✓ Keep in mind ICETECH does not sell remote condensing units for SC higher than 10 tons.

SC machines

Split SC + Remote U/C

- ✓ On request, it is possible to supply a Split SC, with compressor and condenser apart. It will be 3 independent packages.
- ✓ Some clients also ask for a specific compressor, condenser, condensing unit, all on request.
- ✓ In addition, we have the models for boats and inland, using sea water (it needs a lower evaporating temperature) to make the ice, or with fresh water on a boat. Those are special models, more expensive, all made of stainless steel. We also have water condensers to work with sea water to use with these units.



GR machines

Compact GR:

- ✓ It is an GR machine with the condensing unit integrated inside the machine (compressor and condenser). The condenser can be water or air



GR Split

- ✓ It is a GR generator, without the condensing unit.

GR Split CO₂

- ✓ Like the above, but using CO₂ as refrigerant. Without the condensing unit.
- ✓ Keep in mind ICETECH does not sell CO₂ condensing units.



GR machines

Generator GR 550, 850:

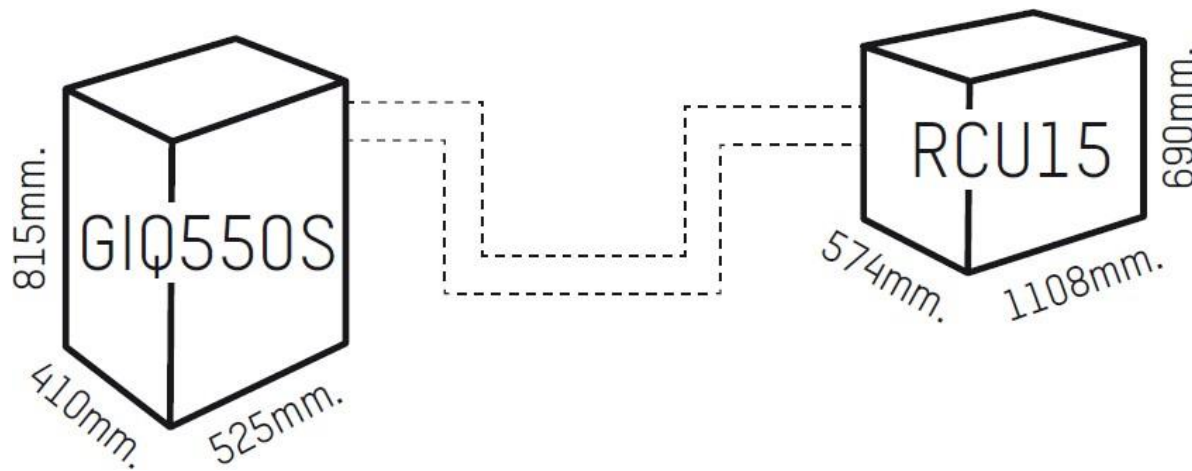
- ✓ It is an GR machine, without the compressor and condenser. It has to work with a cold generation station (normally for supermarkets). We have de R404A version, 550 and 850 kg, and also de CO₂ version, 850 kg. They have an AC/DC drive and an expansion valve controlled by an automat



GR machines

GR Split + Remote U/C

- ✓ An ice maker generator, or GR Split, with the remote U/C, to be installed apart. It will be 2 installations.
- ✓ Possible combinations:
 - GR 550 SPLIT + Remote U/C RCU15
 - GR 1100 SPLIT + Remote U/C RCU30



GR machines

Remote GR + Remote condenser

- ✓ It is a model not included in the catalog. Around 600 units have been sold, 220V/60Hz, to our Mexican client Criotec.
- ✓ It is a remote GR machine without condenser, with a remote condenser, to be installed apart. It will be 2 installations.
- ✓ Possible combinations:
 - REMOTE GR 550 + RC5S REMOTE CONDENSER



SS400 machine

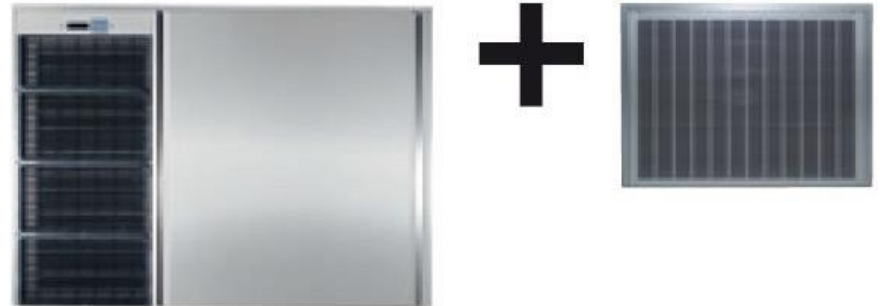
Compact SS400:

- ✓ SS400 machine with the condensing unit (compressor and condenser) integrated. The condenser can be air or water.



Remote SS400

- ✓ SS400 machine without the condenser. It has also a remote condenser to be installed apart, maximum 15 meters.
- ✓ It will be 2 installations.
- ✓ Possible combinations:

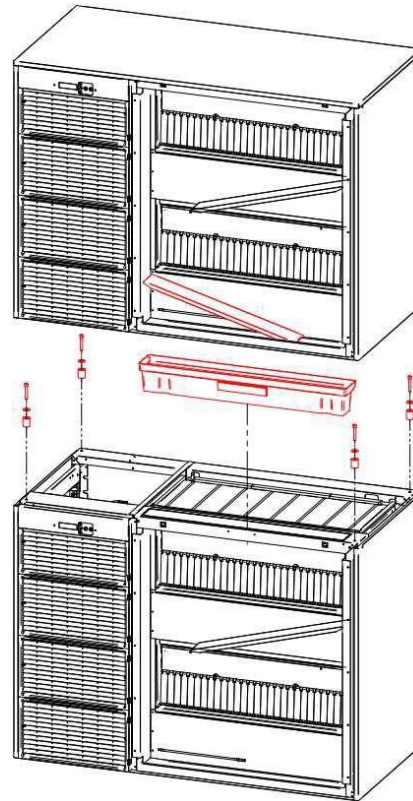


➤ REMOTE SS400 + REMOTE CONDENSER RC10S

SS400 machine

Stackable SS400:

- ✓ It is possible to stack two SS400 units, one on top of the other.
- ✓ In these case, the client needs a stack kit with the machines, that have a ramp for the ice and some other elements.



FD/HD machine

Compact FD/HD:

- ✓ It is a machine with the condensing unit integrated (compressor and condenser). The condenser can be water or air.



Remote FD/HD

- ✓ It is a machine without the condenser. It also have a remote condenser to be installed apart.
- ✓ It will be 2 intallations.
- ✓ Possible combinations:

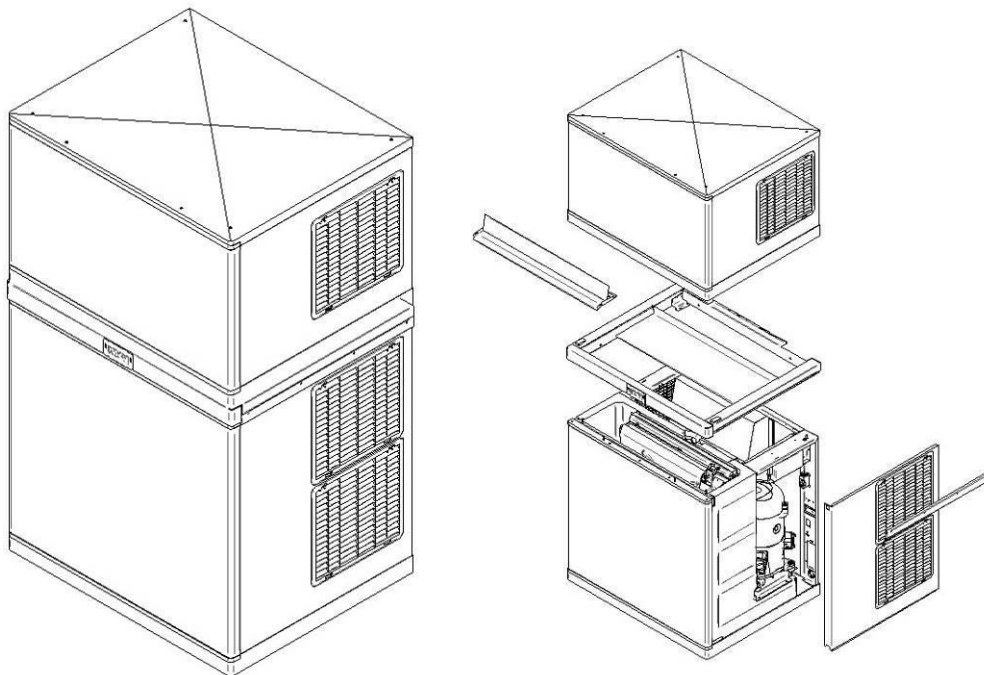


- REMOTE FD/HD220 + REMOTE CONDENSER RC5S
- REMOTE FD/HD410 + REMOTE CONDENSER RC10S

FD/HD machine

FD/HD Stackable:

- ✓ It is possible to stack 2 FD/HD units, one on top of the other.
- ✓ In these case, the client needs a stack kit with the machines, that have a ramp for the ice and some other elements.



Modular vs undercounter machines

Modular machines:

Machines without an integrated stock bin.

They usually need a bin to stock the produced ice, usually placed below the ice maker. The clients can buy the bins manufactured by ICE TECH or from other suppliers.

To stock the ice, some other options are available, such as mobile carts or cold storage rooms.

For most of our family units, the models that start with a M are the modular ones: SS400, SS150, FD/HD.



Undercounter machines:

Machines with a stock bin integrated to allow stocking the produced ice.

Installed normally in catering, under the counter (like a dishwasher).



