

Water Baths Chillers





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SIRE can provide chillers with several different models and applications, but can also provide custom design engineering for your project. SIRE presence nationally and internationally in the concrete business has grown significantly in the last 20 years. If your concrete process is a very critical load, we recommend going with a modular chiller system to provide optimal redundancy. Contact Us, and an experienced concrete cooling engineer today.

Also, read below to learn some useful information regarding chiller sizing for concrete batch applications.

For concrete applications, your thermal load capacity needs to be the single most determining factor in your chiller buying decision. Air cooled chillers are normally installed for concrete cooling applications because of their ease of installation. Sometimes the container chillers with cooling towers if the required temperatures are above +25°C. Water cooled chillers can be installed as well with a cooling tower removing the heat from the water-cooled condenser.

Can also be used the container chiller with water evaporative condensers



(Barragem Foz Tua) Foz Tua dam



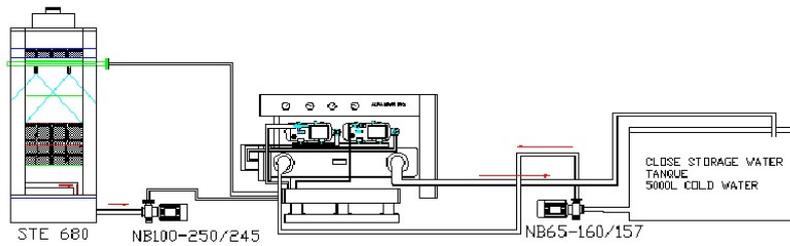
Evaporative condenser



Cooling tower sistem with shell and tube

There are water chillers available for cooling the fresh water from temperature 45 °C down to +4 °C. They are called containerized cold water plants, CTR or CTR. SCW

- Up to a daily production of 180 m³ max. cold water, are installed inside with 20-ft. containers corresponding to a daily concrete production between 200 and 1400 m³.



With cooling tower assemblage

- Up to a daily production of 450 m³ max cold water, they are installed inside of 40-ft. containers corresponding to a daily concrete production between 1400 and 2800 m³ depending on the actual water inlet temperature and the possible addition of water.

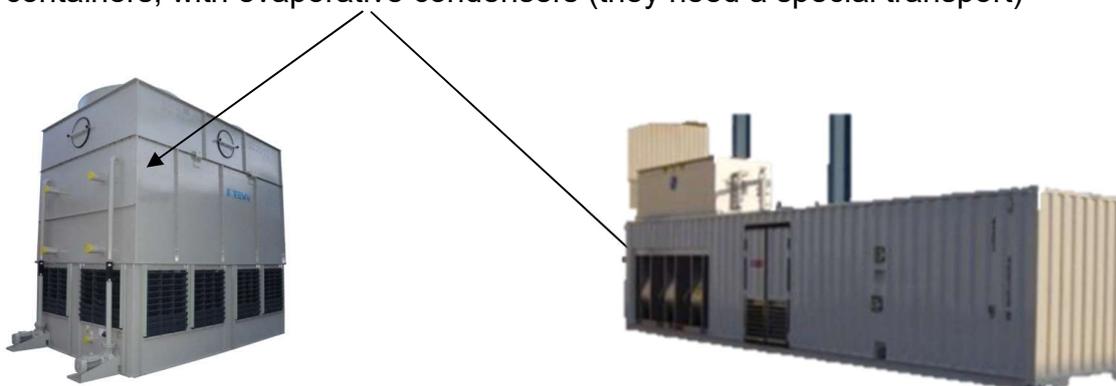
SIRE chillers are highly efficient using three-or four-stage cooling, hot-dipped galvanized evaporative condensers, stainless steel heat exchangers, gauges and panel board and at least two compressors. The power consumption is between 30% and 50% less than conventional water chillers. Each water chiller is equipped with an extra pump for re-circulating the cold water inside the tank through the chillers once the tank is full.

Our latest (450m3) containerized chillers are specially designed for cooling the mixing water for batching plants from 45 °C down to less than 4 °C. Using **evaporative condensers** and a 4-stage cooling system these new containerized chillers are superior to any common water chiller. We can also provide this central in 20ft, with evaporative cooling tower, like drawing above.

And these are the reasons:

An evaporative condensing system is superior to common air-cooled systems due to considerable differences in condensing pressures and temperatures. Furthermore, our system guarantees the automatic elutriation of the condenser with its self-effect. All our condensers are fully hot-dipped galvanized and protected against galvanic currents thus ensuring the longest possible life expectancy.

40Fts containers, with evaporative condensers (they need a special transport)



SHELL AND TUBE EVAPORATORS



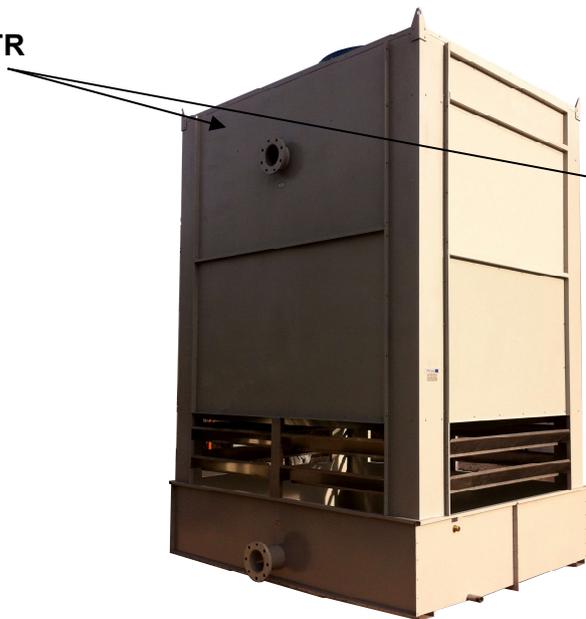
SHELL AND TUBE CONDENSERS

Water condensers

Of the same type of construction, Shell and tube, but in flooded regime

Are also mechanized and expanded in the same way as the evaporators, for operation they need an evaporative tower they are used with normal CTR with cooling tower

modo CTR



We use semi-hermetic compressors to make sure that our customers not only get one of the most reliable compressors in the world but also receive proper service and spare parts everywhere and at any given time.



Compressors with 4 stages or modulation in continuousness capacities

Cooling compressors

First cooling stage

Even under the most severe climatic conditions it is possible to cool water from practically any temperature down to 35 °C within an evaporative condenser without the use of a refrigeration compressor. Years of experience with concrete cooling equipment have shown that the water supply to a batching plant can reach temperatures of up to 45 °C during the summer, especially in the Gulf Countries.

This water is cooled down within the evaporative condenser to 35 °C, reducing the actual cooling capacity of the compressors by 25 %. Thus, this refrigeration capacity of the first stage is free of charge.

Second cooling stage

Furthermore, it is much more efficient (by 25 %) to produce refrigeration capacity at an evaporation temperature of +7 °C than at 0 °C. Therefore, the water is cooled from 35 °C to 12 °C in the heat exchanger of the second stage by the first compressor.

Four cooling stage inn screw compressors

Then in the 4 stage the water is cooled from 12 °C to 4 °C in the heat exchanger of the 4 stage by the second, we can also do 3 stages, provided by scroll compressors, with a very new central With CTR.SCW, this central is equipped with scroll compressors.



Second Type of chillers and compressors

A NEW CTR,SCW

A very new Chiller equipped with hermetic compressors scroll type

The switch and control board of all SIRE chiller plants is equipped with a high quality reliable PLC System. We developed a new visual display which is a self-explaining, comfortable and reliable way to operate ice plants and water chillers by pressing or touch panel. It is both manufactured strictly according to EU regulations and equipped with the best electrical components available in the market. The panel board is designed for tropical use.

Touch Panel



The installed the panel indicates all Alarm messages and provides a help and alarm option for easy troubleshooting. More over all pressure settings and temperature settings are done at the panel. All relevant alarms work conditions; gas pressions, water temperatures, and the water flow rate are indicated in the Panel. The water level in the cold water tank is adjustable and indicated at the panel. The PLC is equipped with an Ethernet and mod bus system, and network interface to realize a remote control if necessary.



SIRE controller

The package shall include microprocessor based controller, which should provide the following functions:

- Temperature control (heating, cooling);
- Freeze-up protection;
- Compressor starting delay;
- Operation of the fans and of the water pump;
- Selection of the compressor starting order;
- Protection against high and low refrigerant pressure as well as low flow (connection with relevant switches);

The electric panel board, contain; contactors, phase asymmetries and under voltage relay, (in some models) thermal protections, fuses, control circuit breakers, INT relays, switch breaker, and the microprocessor our PLC controller. The electrical panel is in a water proof enclosure system. SIRE has as control equipment, one of the most advanced types of Microprocessor (several).

This equipment in the series is based on some of the following items:

The controller, checking all the parameters, control systems, and functions of the unit, and protects whenever it is necessary.

The same where necessary provides all the functions of alarm that you are against it, the figures are usually visible on their monitors.

The programming system provides sophisticated means, for some of the functions described below:

System P + I or P

Control of adjustable temperature...

Several step points...

Control of water pumps...

Delays to the start of compressors (part. wending) conform capacity...

Starting in empty...

Control of capacity...

Selection of variable start of compressors...

Protection against high and low pressure, oil, ice, etc...

Display for reading codes, errors, failures...

remote controls when requested

Modbus system is possible

All kind of diagnostic codes

Monitoring of fuses control

And yet for some more advanced microprocessors, various types of connections including modems and other external systems (options)

all this facility depending for the kind of chiller selected.

SIRE provide to our costumer the possibility of cooperation to building all kind of chiller situation by client design and by their demand

SIRE Chiller capacity control

The system is prepared to give different work conditions in the chiller

1

Stepped capacity control with control at inlet

All compressors and the relevant capacity control steps will be proportionally positioned in the band. Increasing temperature values will cause the control steps to be subsequently input. Each step will be input according to the set delay times. The compressors will be started at the first entered capacity control stage. If special management of the first capacity control stage was selected, control will be effected according to the description in the dedicated section. In any event, the times for the capacity controls will be applied as described.

2

Stepped capacity control with control at outlet (for lower water temperatures)

A description of stepped capacity control of 4 compressors with four capacity control steps each:

Activation of compressors

if the water temperature measured by the probe located at the evaporator outlet exceeds the threshold of Control Set-point + Control Band the number of power stages will be increased - the power stages were input according to the set parameter known as "delay between power-up of different devices

3

Continuous capacity control

A maximum number of four compressors are managed, with continuous capacity control. The compressor's capacity is controlled by two relay outputs, which, when suitably controlled, enable compressor power to be increased or reduced, varying the capacity of the compression chamber. Compressor power is controlled by sending impulses to the outputs of the capacity control relays. These impulses command the compressor to be charged or discharged. These impulses are at a constant frequency, settable, and of variable duration between two minimum and maximum limits, also settable. As there is no acquisition regarding the absolute

position of the compressor 's capacity control valve, and, consequently, as no direct verification is possible of the power percentage input in the circuit, a time based control is run. With this control, when a set time threshold is reached, the compressor is considered fully charged/discharged and thus control of the capacity control impulses is suspended

Chilled Water Pump Control — Unit controls provide an output to control the chilled water pump(s). One contact closure to the chiller is all that is required to initiate the chilled water system.

Series Chiller Arrangements

Another energy-saving strategy is to design the system around chillers arranged in series. The actual savings possible with such strategies depends on the application dynamics and should be researched by consulting your SIRE chiller. Systems Solutions Representative and applying the SIRE System analyzer program. It is possible to operate a pair of chillers, more efficiently in a series chiller arrangement than in a parallel arrangement. It is also possible to achieve higher entering-to-leaving chiller differentials, which may, in turn, provide the opportunity for lower chilled water design temperature, lower design flow, and resulting installation and operational cost savings. The SIRE screw compressor also has excellent capabilities for “lift,” which affords an opportunity for savings on the evaporator water loop.

Cold Water Pumps



The water pump which is pumping the water from the evaporative condenser and evaporator through the condenser chiller, and through the plant evaporator to the cold-water tank This are included in our scope of delivery like you can see above.

All the connections are ready to work

Water filters are also in the envelope

The plant provides to the client, one pump master, one pump slave, that is assemble in booth circuits (condensers and evaporators)

All the collectors and pipes are made in stainless steel.

The water plant can be also provided by opinion with water pumps controlled by inverter

Pumps with inverter

By demand

Sub-cooling (opinion)

(only by opinion and for screw compressors)

Our containerized water plants are equipped with sub cooling facilities. That means the water inside the cold-water tank recirculate through the 3rd and 4th stage after it has reached its upper limit. In case of a warm cold water tank, it is possible to use all 3 evaporators to cool down the tank by sub cooling. That way, we guarantee that the water inside the cold-water tank always has the lowest possible temperature. The required sub cooling pump is include



Container Assembly

Our chillers are assembled in our new and latest installation facilities by the most experienced refrigeration technicians inside of a 20-ft or 40-ft container. This container is painted white on the inside and outside and equipped with lighting and an air-conditioning unit. Therefore, the doors of the container can be kept closed. This avoids that dust and humidity enter the machinery container. We use brand new containers only. The floor of the container inside is laid with cheered aluminum sheets, to avoid rust build-up on the floor. The water plant is assembled, piped, wired and pressure tested completely in our factory, prior to shipment.

The chillers plant can also be provided for acclimatization system inside, by axial air fan, or a fan coil with cold water provide by the chiller



Plug-in Units

FACILITY OF TRANSPORT AND MOVEMENT IN WORK AND OUTSIDE



Once power and water have been connected, the plant is ready for operation. All safety and control devices are properly adjusted so that the installation of the plant can be done within one day including commissioning. The same applies for the dismantling of the plant. Just connect our plant to the water and power supply as well as to the insulated cold water tank on site and the plant is ready to run. This is also very important for contractors who are changing their site quite frequently.

Electrical frame box and electric commands



Power energy Savings

Compared to conventional air-cooled water chillers (which are actually designed for air-conditioning purposes only) SIRE water plants have a **lower power consumption of up to 55%**. Since many years now the world community is trying to save the climate of our planet. With the Kyoto and Montreal protocols among others certain standards are set for the use of different refrigerants. In addition to that SIRE feels obliged not only to apply environmentally friendly refrigerants but also to design and manufacture economical, high efficient and long lasting products for the benefits of our customers.

These targets are achieved now in our new range of water chillers GREENLINE for the concrete cooling applications with the following measures:

- Environmental friendly refrigerants – R410A, 134A, 513B, R32, 1234ze
- Multi-stage systems
- 1 or 2 semi-hermetic screw compressors with optimum economizer performance
- Shell and tube evaporators) for high-efficiency heat transfer and to reduced refrigerant charge and easy clean



- stainless steel cooling towers for extended life expectancy and no corrosion

Used in chillers with 20ft or 40ft CTR



Or evaporative condensers:

Used in chillers with 20 and

In this case and situation, is normal to use the condenser inside of the container that means to get a special transport for this kind of containers. Normally the evaporative condenser can be higher than the container, because the space occupied inside. That is normally used in higher capacities of chillers,-

Air, cold water chiller can also be used
Or ever for hot climatic Countries this kind of chillers are not the best choice for the process



Various control systems for chillers CTR

Electronic devices



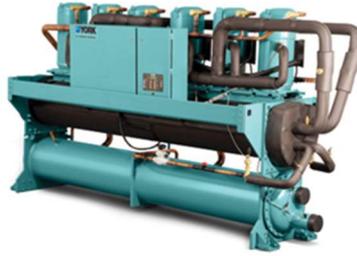
Electronic expansion valves

Electronic or thermostatic control with overheating capacity management control, with independent electronic chart, with signal emitted by probe and pressure transducer (in this case in the electronics)



CERTIFICADO

TÜV Rheinland Ibérica Inspection, Certification & Testing, S.A.



CHILLER CTR Model	CTWCS 80	CTWCS 120.2	CTWCS 140.2	CTWCS 200.4	CTRWS 250.4	CTWCS 300.6	CTWCS 360.6	CTRWS 480.6
Tons day	40	63	75	98	120	160	181	245
R.water flow volume M3/h	1,5	2,5	3	4,2	5,1	6,9	7,5	10
Cooling capacity kW	70	115	141	185	244	301,9	346	454
Coeficiente surplus	1,1	1,1	1,1	1,1	1,0	1,0	1,0	1,0
absorbed power kW 100%	19,1	31,9	34,5	51,8	67,6	89,9	99	115
COP	4,1	4,3	4,5	4,4	4,7	4,7	4,9	4,8
Type of container	20	20	20	20	40	40	40	40
type of condenser	evaporative	evaporative	evaporative	evaporative	evaporative	evaporative	evaporative	evaporative
CHILLER CAPACITY kW	80	121	151	188.9	244	302	372	459
Advised water tanque								
Total steps	1	2	2	4	4	6	6	6
price	42100€	49000€	52700	59670€	64300€	71200€	87000€	96900€



Model	CTWASP 6000.A	CTWASP 7500.A	CTWASP 9100.A	CTWASP 12000.A	CTWASP 13000.A	CTWASP 7500	CTWASP 1100	CTWASP 1300
Tons day	312	360	480	580	645			
R.water flow volume M3/h	13.5	15	20	29	38			
Cooling capacity kW	609	701	939	1115.1	1207			
Coeficiente surplus	1,0	1,1	1,0	1,0	1,0			
absorbed power kW 100%	190.4	214	281	322	355			
COP	4,1	4,1	3,9	3,9	3,7			
Type of container	40	40	40	40	40			
type of condenser	evaporative	evaporative	evaporative	evaporative	evaporative			
CHILLER CAPACITY kW	610	729	967	1117	1258			
Advised water tanque								
Total steps	4	4	4	4	4			
Price	143000€	153900€	166700€	184000€	197200€			



