



# NEW GENERATION INTELLIGENT ADIABATIC PRE-COOLING SYSTEM



HYBRID  
COOLING

**Reduce chiller energy  
consumption by  
up to 37 %**



**Increase chiller cooling  
capacity by  
up to 41%**



**Achieve 100%  
protection for  
the condensers**

For all types of air cooled condensers and cooling equipment  
[www.smartcooling.us](http://www.smartcooling.us)

**REDUCE CHILLER**  
Energy Consumption **UP TO**

**37%**

**INCREASE CHILLER**  
Cooling Capacity **UP TO**

**41%**

**PROTECT CHILLER**  
Condensers & Compressors

**100%**



“

Using new generation intelligent adiabatic pre-cooling system with cooling devices, two technologies are merged, which provide the highest performance indicators ensuring 100% safety to the condensers from environmental hazards and exposure to water, 'Smart Cooling™' components completely avert corrosion and limescale (calcium and mineral deposit) formation risks on the condensers.” We take full responsibility for every 'Smart Cooling™' component.

# WHAT IS “SMART COOLING™”?

‘Smart Cooling™’ reduces chiller energy consumption by up to 37%, increases the coefficient of cooling performance by up to 41% and protects chiller compressors, condensers and heat exchangers. **New generation intelligent adiabatic pre-cooling system** Kit is suitable for all types of air cooled water chillers, dry cooling condensers, heat exchangers, rooftop units, refrigeration units.



## INTELLIGENT ADIABATIC PRE-COOLING SYSTEM

- Provides condenser pre-cooling, cools down intake air by using new generation technologies.
- **Protects condensers** from rust, calcium and mineral deposit (limescale), dust, direct sun light.
- Our new generation intelligent controller analyses chiller load, gas pressure, air temperature, air humidity, fan algorithm.
- Provides 4 step water treatment: **No minereal deposit risk** on condensers and pipes.
- ‘Smart Cooling™’ is a modular system that provides easy installation with all chiller types and manufacturers.
- Unique technology provides: **Minimum water consumption**, with higher evaporation efficiency.
- ‘Smart Cooling™’ reduces gas pressure in chiller gas circuit, thus minimizing compressor load, increases COP, reduces energy consumption.



Chiller



‘Smart Cooling™’ system



Chiller + ‘Smart Cooling™’  
higher efficiency





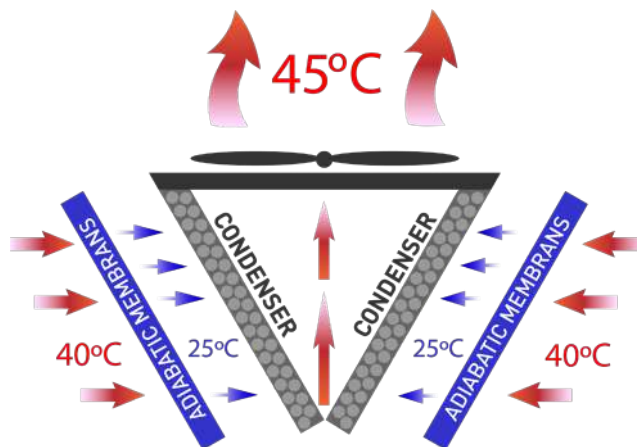
## 'SMART COOLING™' TECHNOLOGY

'Smart Cooling™' combines adiabatic evaporative pre-cooling process and mechanical cooling technology.

The intelligent adiabatic evaporative pre-cooling system 'Smart Cooling™' is mounted externally in front of condensers of a cooling equipment, thus the adiabatic process takes place before mechanical cooling process in the cooling equipment.

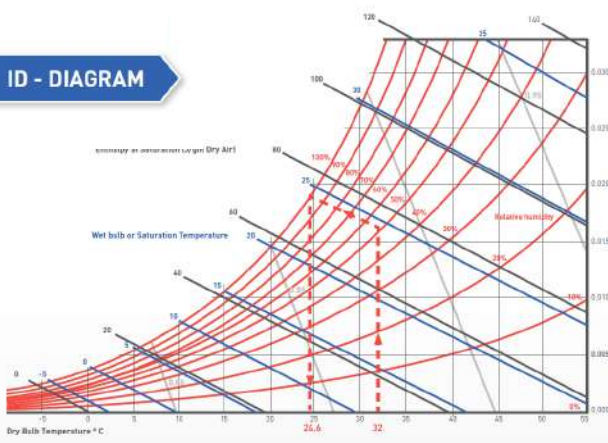
Using processed water 'Smart Cooling™' sprays very fine water mist, which evaporates instantly and: \*reduces the temperature of intake air in the condenser, \*speeds up the reduction of condensation temperature in the cooling circuit.

## HOW DOES IT WORK?



Smart Cooling adiabatic membrans

### ID - DIAGRAM



**“Higher chiller efficiency with lower energy consumption. New generation in adiabatic pre - cooling”**

30XA FLOODED COOLER PACKAGED AIR-COOLED CHILLER RATINGS TABLE - SI (count)

LCWT (C)	30XA UNIT SIZE	CONDENSER ENTERING AIR TEMPERATURE (C)											
		30			35			40			45		
		Cap. kW	Input Power (kW)	Cooler Flow Rate (l/s)	Cap. kW	Input Power (kW)	Cooler Flow Rate (l/s)	Cap. kW	Input Power (kW)	Cooler Flow Rate (l/s)	Cap. kW	Input Power (kW)	Cooler Flow Rate (l/s)
8	080	292.4	88.2	12.6	276.8	93.8	11.9	260.7	99.9	11.2	244.0	106.5	10.5
	090	322.1	90.1	13.8	310.0	97.2	13.3	297.4	105.1	12.8	284.0	113.7	12.2
	100	357.7	102.0	15.4	344.2	110.8	14.8	329.8	120.4	14.2	314.2	130.7	13.5
	110	388.6	112.1	16.7	373.4	121.7	16.0	357.4	132.6	15.4	340.6	144.6	14.6
	120	420.3	122.6	18.1	403.2	133.0	17.3	385.5	145.0	16.6	367.4	158.8	15.8
	140	503.0	138.9	21.6	485.5	151.2	20.9	467.0	164.6	20.1	447.3	179.1	19.2
	160	577.4	162.8	24.8	556.6	176.7	23.9	534.5	192.2	23.0	511.3	209.7	22.0
	180	647.1	179.8	27.8	625.5	195.4	26.9	602.8	212.4	25.9	579.0	230.7	24.9
	200	732.9	204.8	31.5	708.1	221.7	30.4	681.5	240.5	29.3	652.6	261.5	28.0
	220	795.9	228.3	34.2	769.2	248.9	33.1	740.7	267.7	31.8	709.9	291.0	30.5
	240	856.4	254.6	36.3	825.9	275.4	35.5	793.6	298.5	34.1	743.9	307.7	32.0
	260	947.3	265.5	40.7	915.4	288.2	39.3	882.2	313.2	37.9	846.5	341.1	36.4
	280	1012.0	286.1	43.5	977.0	310.3	42.0	940.3	337.3	40.4	901.8	366.9	38.7
	300	1081.5	311.6	46.5	1043.7	337.2	44.8	1003.8	365.6	43.1	947.2	380.2	40.7
	325	1161.2	326.2	49.9	1120.3	355.0	48.1	1078.0	386.8	46.3	1033.0	421.7	44.4
	350	1222.4	356.2	52.5	1179.2	386.9	50.7	1134.3	420.8	48.7	1057.5	444.8	45.4
	400	1442.9	427.5	62.0	1392.0	464.3	59.8	1338.2	505.0	57.5	1222.8	514.2	52.5
	450	1604.2	483.8	68.9	1547.4	526.4	66.5	1473.7	566.4	63.3	1238.9	524.6	52.8
	500	1716.1	527.6	73.7	1654.9	572.2	71.1	1568.1	611.8	67.4	1297.6	550.1	55.3

1

Reduces chiller energy consumption by up to 37%

2

Increases chiller cooling capacity by up to 41%

3

Protects chiller condensers and compressors

4

Increases the service life of chillers

5

Minimums water consumption

6

ROI -  
5 - 24 months



Moistening dry and hot air with evaporating water results in energy exchange, thus reducing air temperature.

## INTELLIGENT CONDENSER PROTECTION



NO MINERAL DEPOSIT RISK  
ON THE CONDENSERS



NO LEGIONELLA RISK IN  
THE WATER



100%  
CONDENSER PROTECTION

Chiller protection is one of the most important 'Smart Cooling™' elements.

'Smart Cooling™' provides: **Full condenser protection** from limescale (calcium and mineral deposit) formation, rust and direct sunlight.

'Smart Cooling™': **Protects cooling equipment** condensers and compressors from overheating.

It also enables the operation of cooling equipment in extreme environments, where ambient air temperatures reach as high as 55°C.

'Smart cooling™' **provide highest efficiency** and reduces the load on compressors and the runtime thereof, 'Smart Cooling™' ensures the fastest investment return in the industry.



[www.smartcooling.us](http://www.smartcooling.us)



1

## PUMP STATION MODUL

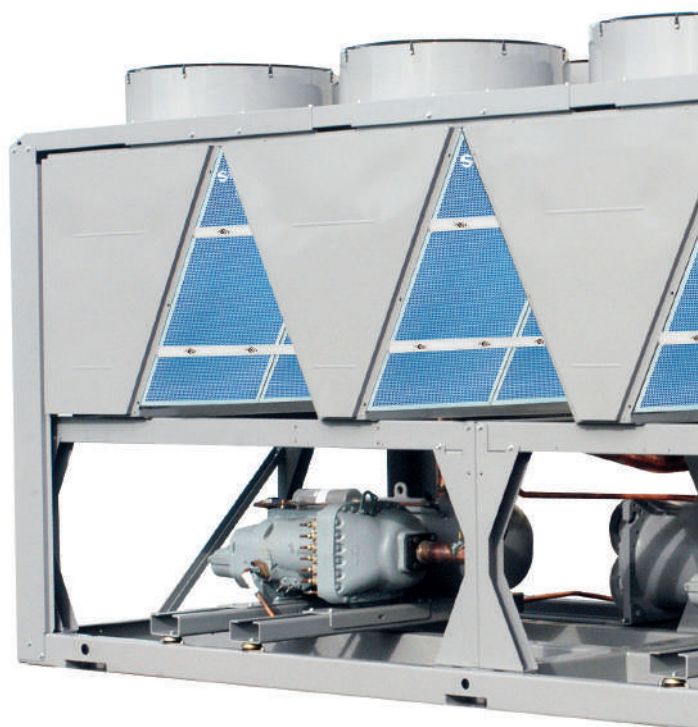
The high-pressure integral pumping station BY 70 – UV provides 70-140 bar of pressure within the 'Smart cooling™' panel system. The pumping station is housing for a specially developed high-pressure pump, valves, the electronics for the automated operation of system and a block of Ultra violet lamps. The UV lamps purify and sterilize the water to protect against bacteria, including Legionella.



2

## HIGH PRESSURE MISTING NOZZLES PANEL

Panels with misting nozzles are mounted externally in front of a condenser. Micro nozzles create a mist wall. The mist is sprayed in front of the condenser, the mist comes into contact with hot air and evaporates instantly (water that has not instantly evaporated settles on the membrane (pre filter) and continues to evaporate). When the water evaporates, the temperature of the condenser intake air is lowered. The cooled air is then fed into the condenser with the cooling fan.

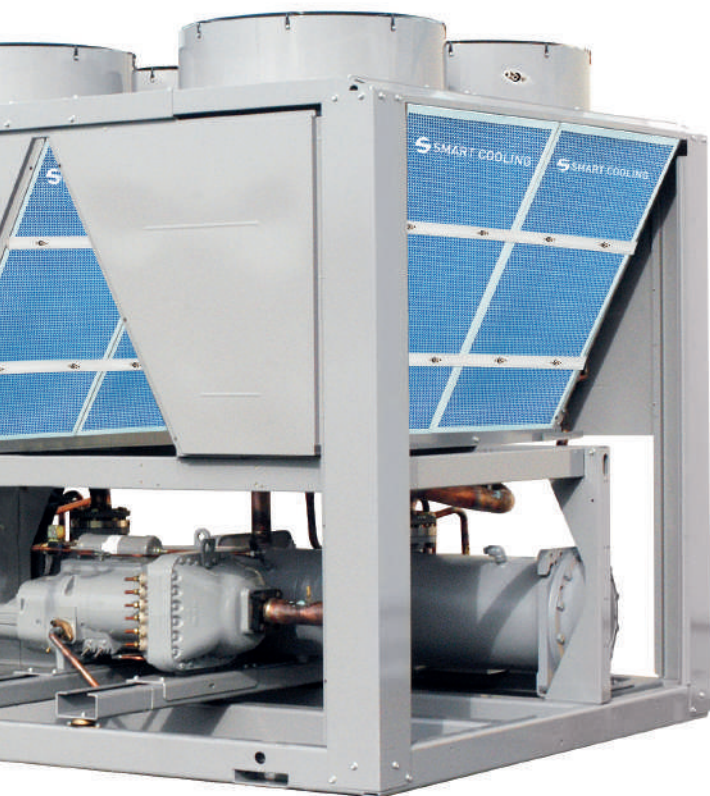


3

## CONDENSER PROTECTING MEMBRANE

The membrane (pre filter) protects the condenser from limescale (calcium and mineral) deposits, the membrane does not allow the water mist to come into direct contact with the condenser. Membrane captures water mist, direct sunlight, dirt. It is self cleaning. The special cell material does not create additional resistance to the air flow through the condenser.





6

## WATER RECIRCULATION MODULE

Water recirculation module ensures 100% water usage and recirculation. The recirculation unit accumulates the non-evaporated water, re-filters it and returns the water back to the adiabatic system.



4

## WATER TREATMENT MODULE

'Smart Cooling™' component has 4 stages of water purification: 1, calcium carbonate and minerals; 2, algae and bacteria including (legionella); 3, fine water treatment up to 5 microns. The water purification module ensures that the pipes and other components are protected from the formation of limescale on the surface.



NEW

PRO 1

5

## CONTROL UNIT INTELLIGENT ADIABATIC SYSTEM PROCESOR

PRO 1 has 7 steps of operation, which allows to use water efficiently at various air and chiller load parameters. The software adapts operating modes to all climatic zones. PRO 1 analyzes chiller load, analyzes outdoor air temperature and humidity HR%, processes this data and switches the adiabatic system on or off in such a way that provides the best efficiency.

The processor controls the operation of the adiabatic system in such a way as to spray the precise amount of water that can evaporate.





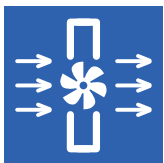
## **NO LIMESCALE (CALCIUM AND MINERAL DEPOSIT) FORMATION RISK ON THE CONDENSER**

Water before it gets used in the intelligent adiabatic evaporative pre-cooling system 'Smart Cooling™' is treated, changing the structure of calcium carbonate molecules so that it does not stick to surfaces and does not create limescale deposit.



## **NO LEGIONELLA RISK IN WATER MIST**

System is equipped with UV sterilizers thus providing that all bacteria (including legionella) in water is eliminated.



## **NO FANS PRESSURE DROP INCREASED DURABILITY**

Using 'Smart Cooling™' does not reduce airflow and does not create additional resistance, on the contrary, the cleanness of the heat emission radiators is preserved, thus ensuring low exit temperatures and reduced pressure in the whole system. In such a way, servicing frequency and the number of emergency calls are considerably reduced, which may have a direct influence on the maintenance budget, not to mention safety and durability. Pressure drop is 1-3%.



## **100% CONDENSER PROTECTION**

Condenser protection from deposits, dirt and direct sun rays is especially important for the cooling system. 'Smart Cooling™' protective membranes protect the condenser of the cooling equipment. The cleaner the condenser of the cooling equipment is, the better the heat exchange and heat removal from the condenser processes take place, therefore condenser protection is of great importance. Protection ensures cooling equipment longevity and higher efficiency (EER). Adiabatic panels ensure air pre-cooling and prevent cooling equipment from overheating.





# HIGHER COOLING EFFICIENCY

with lower energy consumption



HYBRID

## EASY TO SET-UP MODULAR SYSTEM

'Smart Cooling™' is delivered in a kit form, which can be installed both on new or already functioning cooling equipment, for any air conditioner or cooling equipment model or manufacturer. 'Smart Cooling™' is mounted externally in front of condensers of a cooling equipment, without any impacts or changes in the interior of the cooling equipment and no effect on the manufacturers warranties.



## INCREASED EQUIPMENT SERVICE LIFE

In addition to air-cooling the new intelligent adiabatic evaporative pre-cooling system 'Smart Cooling™' decreases the basic pressure in the compressor. Decrease of pressure and temperature essentially increases service life of the compressor. Since 'Smart Cooling™' considerably reduces excessively high discharge pressure and cooling cycle temperatures, the mechanical stress of the system is considerably reduced, which means safe exploitation and decreased need for maintenance.





MORE THAN 200 PROJECTS WITH 'SMART COOLING™'



**WWW.SMARTCOOLING.US**

UAE Distributor contacts

Tel: +971 4 551 2655

M: +971 557522966

Fax: +971 4 551 2554

Email : info@gerabenergy.com

Email: janis@gerabenergy.com

Address: 402, Building No.4, Emaar Square, Dubai, U.A.E.

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