

# NEW GENERATION INTELLIGENT ADIABATIC PRE-COOLING SYSTEM



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 by **UP TO**

**37%**

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

**41%**

**PROTECT CHILLER**  
Condensers & Compressors

**100%**



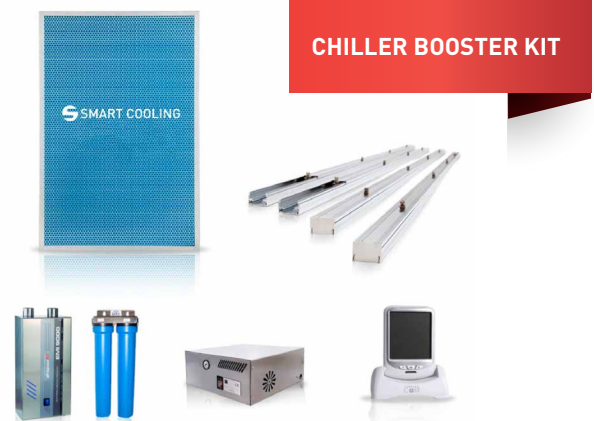
### **New generation in adiabatic pre-cooling**



Using new generation intelligent adiabatic pre-cooling system with cooling devices, two technologies are merged, providing the highest performance indicators. This ensures 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 risk 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 chillers, dry cooling condensers, heat exchangers, rooftop units and refrigeration units.



## INTELLIGENT ADIABATIC PRE-COOLING SYSTEM

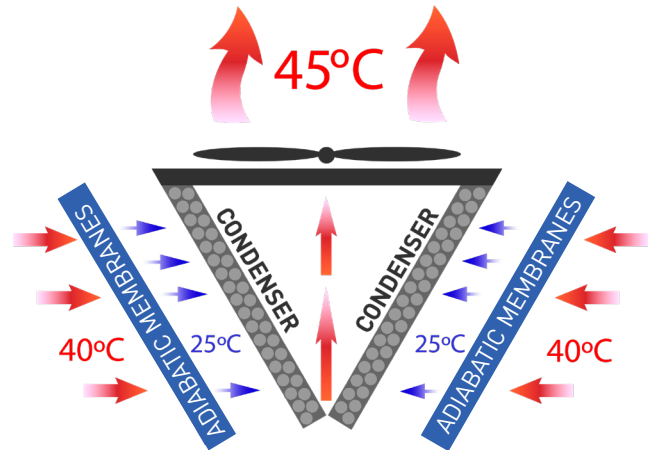
- Provides condenser pre-cooling, cools down intake air by using new generation technologies.
- 'Smart Cooling™' reduces gas pressure in chiller gas circuit, thus minimizing compressor load, increases COP, reduces energy consumption.
- **Protects condensers** from rust, calcium and mineral deposit (limescale), dust and direct sun light.
- Our new generation intelligent controller analyses chiller load, gas pressure, air temperature, air humidity, fan algorithm.
- Provides four step water treatment: **No mineral 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.



# HOW DOES IT WORK?

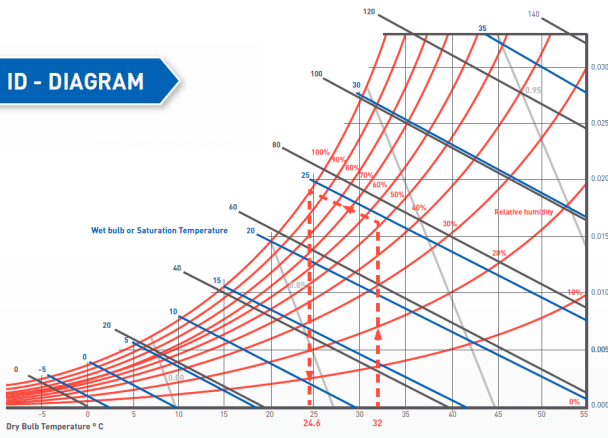
## 'SMART COOLING™' TECHNOLOGY

'Smart Cooling™' combines adiabatic evaporative pre-cooling process and condenser protection, mechanical air filtration. The intelligent adiabatic system 'Smart Cooling™' is mounted externally in front of condensers of the cooling equipment, thus the adiabatic process takes place before the mechanical cooling process in the cooling equipment. Using processed water 'Smart Cooling™' sprays very fine water mist, evaporates instantly. This reduces the temperature of condensation temperature in the cooling circuit.



Smart Cooling adiabatic membranes

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 INTAKE 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	246.9	33.1	740.7	267.7	31.8	709.9	291.0	30.5
	240	856.4	254.6	36.8	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	1033.9	421.7	44.4
	350	1224.4	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	

## FURTHER ADVANTAGES

- 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 Minimum water consumption
- 6 RETURN ON INVESTMENT- 5 - 24 months



'Smart Cooling™' in action. With an intelligent adiabatic pre-cooling system, chillers can work even in extreme conditions, delivering high efficiency with minimal water consumption.

## 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™' **provides highest efficiency** and reduces the load on compressors and the runtime thereof.

Smart Cooling™ ensures the fastest investment return in the industry.



## SMART COOLING COMPONENTS



1

### PUMP STATION MODULE

The high-pressure integral pump station BY 70 – UV provides 70-140 bar pressure within the 'Smart Cooling™' system. The pump station houses a specially developed high-pressure pump, valves, the electronics for the automated operation of the 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 NOZZLE 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.

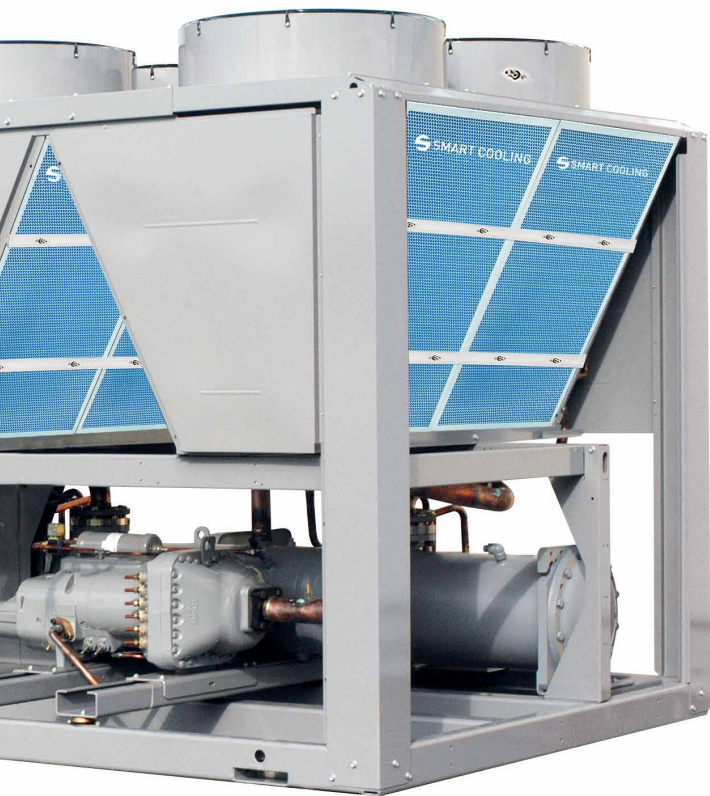


3

### 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.

## SMART COOLING COMPONENTS



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 SYSTEM

'Smart Cooling™' component has 4 steps of water purification: calcium carbonate and mineral elimination; protection against algae and bacteria, including (Legionella); 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 PROCESSOR

PRO 1 has seven 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.



## SECURITY / WARRANTY



### 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 with special biochemicals changing the structure of calcium carbonate molecules so that it does not stick to surfaces and does not create limescale deposit.



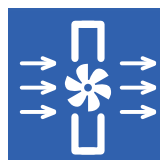
### NO LEGIONELLA RISK IN WATER MIST

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



### 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 condensers 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.



### FANS PRESSURE DROP IS 1-3%

Using 'Smart Cooling™' does not reduce airflow and does not create additional resistance. The cleanliness 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%.





# 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 cooling equipment, without any impacts or changes in the interior of the cooling equipment and no effect on the manufacturers warranties.

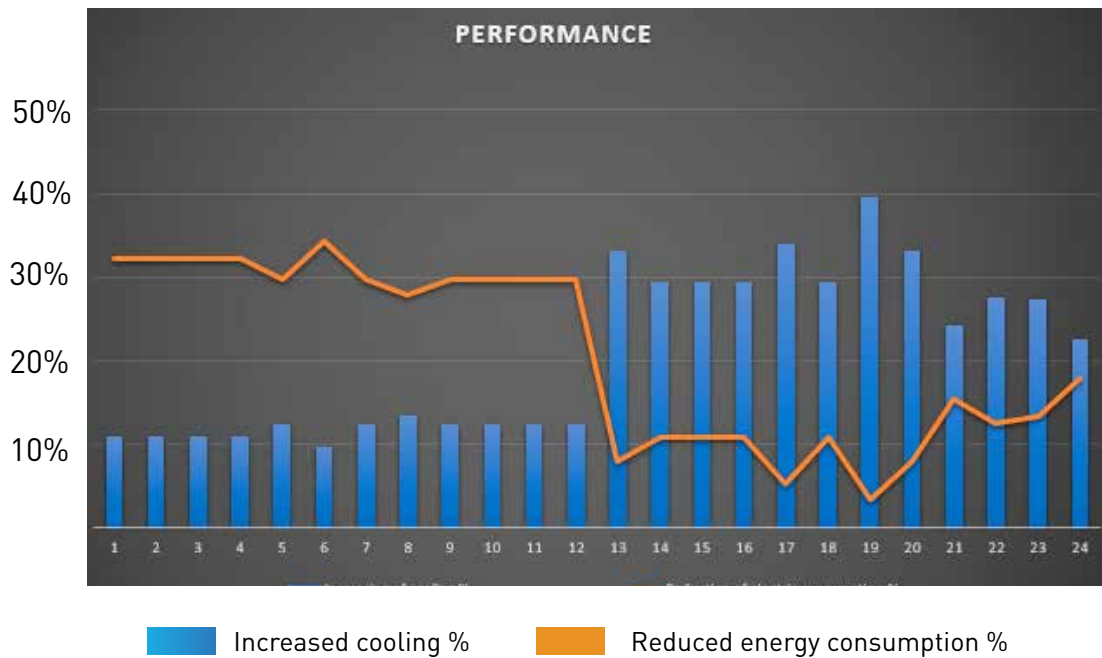


## INCREASED EQUIPMENT SERVICE LIFE

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.



# SMART INNOVATION IN ADIABATIC PRE-COOLING



**“Increases chiller performance (COP) and reduces energy consumption”.**

By using the precision simulation program, we accurately determine the expected results for each chiller.

Thanks to ‘Smart Cooling™’ high-precision calculations and hybrid cooling technology, chillers will provide the highest EER and COP ratings, which will significantly reduce energy consumption and costs.



**“Smart Cooling™” KIT is for chiller retrofit and for new chillers as well. One KIT is suitable for all types of air cooled chillers and condensers.**



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**INTELLIGENT • TESTED • SAFE**

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'SMART COOLING™' OPERATE IN 45 COUNTRIES



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Recognitions and awards:



Adiabatic system 'Smart Cooling™' can be installed on all condensers of all major manufacturers.

