ThermoKey®

Heat Exchange Solutions

Dry Coolers

Every detail, even the smallest one, is designed to achieve the best Dry Cooler solution which meets the customer needs.

ThermoKey offers over 180,000 Dry Cooler solutions

- **More than 7,000 models.**
- **12 types of wiring.**
- **More than 12 different types of fins and tubes material.**
- **More than 40 fan types.**
- **A wide range of fin spacing (from 1.6 mm to 4.5 mm).**
- **Various fin thickness.**

Software Archimede selects the best Dry cooler solution

(range from 6kW to 2219 kW)

YOU CAN DOWNLOAD THE SOFTWARE

scan the QR code or use the website link
www.thermokey.com/download/software

TKArchimede precision and reliability

CALCULATION FUNCTION

Entry working conditions (requested capacity, temperature and type of fluid, noise level and eventually other plant restrictions).

VERIFY FUNCTION

It is possible to verify the performances of each unit in one or more specific working conditions.

TKARCHIMEDE SELECTS THE UNITS ACCORDING TO THE PARAMETERS:

- main **fluids** present on the market;
- **altitude**, **humidity**, inlet air **temperature**;
- **fin** thickness (automatic adjustment of capacity);
- wide range of **accessories available**:

Wiring in the junction box, EC electrical panel, electrical panel with on/off fans regulation, step -or inverter-cut phase speed controller, repair switches, shock absorbers, flanges, casing with a specific colour, threaded or flanged connections and innovative adiabatic cooling systems.

TKArchimede uses the climate data of 537 cities in the world to offer

- Economic analysis: to check the pay-back time on investment (running costs).
- Energy analysis: to verify the energy consumption and the noise levels.

Every detail is designed to guarantee the best performances

LIFTING EYES

ThermoKey has designed the lifting eyes to ensure a correct and **easy handling of the dry cooler** in compliance with safety standards.

CROSS AND LONGITUDINAL SECTIONS OF EACH PART

Each fan module is separated from the other thanks to panels in order to **avoid air by-pass** and to **optimize the efficiency of the heat exchanger**. In this way the correct and **proportional functioning of each module is granted.**

COVERS ON HEADERS AND RETURN BEND SIDES

A protection cover on the headers side and a closing cover on the return bend side of the coil **avoid any damage** even to the most fragile parts.

PAINTED CASING

Standard painted casing with C4 protection-class, designed in galvanized steel which is oven painted with polyurethanic resins to guarantee a **perfect durability over time.**

NITROGEN FILLING WITH FLANGE AND COUNTERFLANGE

In order to **verify the correct pressure of the circuit**, the unit is supplied with nitrogen charge of about 3 bars, which can be checked on the manometer mounted in factory.

[OPTIONAL]

STAINLESS STEEL TUBES, FINS AND CASING

ThermoKey can also produce heat exchangers **completely in 304 or 316L stainless steel** for special applications (particularly aggressive environments) or fluids.

[OPTIONAL]

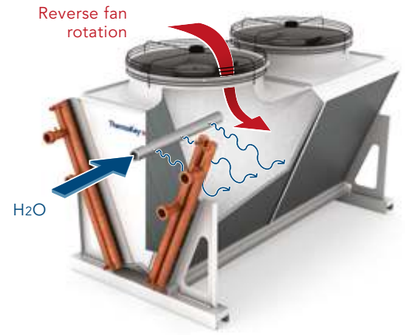
SELF-EMPTYING DRAINABLE SYSTEM

ThermoKey has designed a proper self-emptying drainable system during winter time to **avoid freezing risk of the finned pack.**

SCS [OPTIONAL]

SPRAY J CLEANING SYSTEM

On V-type units ThermoKey has designed a Cleaning System with internal nozzles which sprays water from the inside to the outside, in order to clean the heat exchanger.



[OPTIONAL]

THERMOKEY ADIABATIC COOLING SYSTEMS: HIGH EFFICIENCY TO MEET THE MOST DEMANDING CONDITIONS

AFS AIR FRESH SYSTEM

ThermoKey adiabatic cooling system equipped with special high-pressure nozzles which allows to compensate for the peaks of power to be dissipated, with minimum water consumption for maximum of 500 hours per year.

WFS WET FIN SYSTEM

ThermoKey hybrid cooling system which allows a complete flexibility of operation, working at low pressure (2-3 bars) and for a very high number of hours per year (up to 1000).

EPS EVAPORATIVE PANEL SYSTEM

The evaporative panel system completes ThermoKey offer for adiabatic cooling. Thanks to an homogeneous and adjustable distribution of water on the panels this system allows to reach a high saturation level and therefore an efficient capacity increase with low water consumption (hours per year 8000).

Dry Coolers range

POWER-LINE DRY COOLERS (1 FAN ROW)

Performance range: Capacity from **8 to 890 kW**
(ethylene glycol 35%, Tw1=40°C, Tw2=35°C, T1=25°C)

Fans Diameter Ø 500, 630, 800, 900, 1000 mm, AC or EC motor

Benefits
High efficiency geometry
Modular design, 1-10 fans
8 sound levels
Piping in copper or stainless steel AISI 304 or AISI 316L
Finned pack available in a wide range of materials
Complete range of accessories
Casing in galvanized steel, powder painted

POWER-LINE DRY COOLERS (2 FAN ROWS)

Performance range Capacity from **45 to 1123 kW**
(ethylene glycol 35%, Tw1=40°C, Tw2=35°C, T1=25°C)

Fans Diameter Ø 500, 630, 800, 900, 1000 mm, AC or EC motor

Benefits
High efficiency geometry
Modular design, 2-16 fans
8 sound levels
Piping in copper or stainless steel AISI 304 or AISI 316L
Finned pack available in a wide range of materials
Complete range of accessories
Casing in galvanized steel, powder painted

(*) **Standard conditions** - ΔT = 15k ethylene glycol 35%, Tw1=40°C, Tw2=35°C, T1=25°C

POWER-J DRY COOLERS (1 FAN ROW)

Performance range Capacity from **70 to 961 kW**
(ethylene glycol 35%, Tw1=40°C, Tw2=35°C, T1=25°C)

Fans Diameter Ø 800, 900, 1000 mm, AC or EC motor

Benefits
High efficiency geometry
Modular design, 2-7 fans
8 sound levels
Piping in copper or stainless steel AISI 304 or AISI 316L
Finned pack available in a wide range of materials
Complete range of accessories
AFS (Air Fresh System) o WFS (Wet Fin System), available upon request

POWER-J DRY COOLERS (2 FAN ROWS)

Performance range Capacity from **126 to 1585 kW**
(ethylene glycol 35%, Tw1=40°C, Tw2=35°C, T1=25°C)

Fans Diameter Ø 800, 900, 1000 mm, AC or EC motor

Benefits
High efficiency geometry
Modular design, 4-16 fans
8 sound levels
Piping in copper or stainless steel AISI 304 or AISI 316L
Finned pack available in a wide range of materials
Complete range of accessories
AFS (Air Fresh System), WFS (Wet Fin System) available upon request
Casing in galvanized steel, powder painted

SUPER POWER-J DRY COOLERS (2 FAN ROWS)

Performance range Capacity from **290 to 2219 kW**
(ethylene glycol 35%, Tw1=40°C, Tw2=35°C, T1=25°C)

Fans Diameter Ø 800, 900, 1000 mm, AC or EC motor

Benefits
Maximum performance, minimum footprint
High efficiency geometry
Modular design, 8-20 fans
8 sound levels
Piping in copper or stainless steel AISI 304 or AISI 316L
Finned pack available in a wide range of materials
Complete range of accessories
AFS (Air Fresh System) o WFS (Wet Fin System), available upon request

POWER-J (V-TOWER) DRY COOLER

Performance range Capacity from 290 to 2219 kW*

Fans Diameter Ø 800, 900, 1000 mm, AC or EC motor

Benefits
EPS (Evaporative Panel System)
Maximum performance, minimum footprint
High efficiency geometry
Modular design, 8-20 fans
8 sound levels
Piping in copper or stainless steel AISI 304 or AISI 316L
Finned pack available in a wide range of materials
Complete range of accessories

TKMICRO H_2O MODULAR LIQUID COOLER

Performance range Capacity for each module up to 120 kW*

Fans Diameter Ø 800 mm, AC or EC motor

Modules From 1 module on

Benefits
Modularity
Compactness (maximum length of 2245 mm)
Low installation costs
Regulation or partialisation of the whole unit
Lower enviromental impact
Less weight
Less fluid use
Easy-to-clean microchannel core
Core coating possibility in case of aggressive ambient

(*) **Standard conditions** - ethylene glycol 35%, Tw1=40°C, Tw2=35°C, T1=25°C

Adiabatic systems

AFS Air Fresh System

WFS Wet Fin System

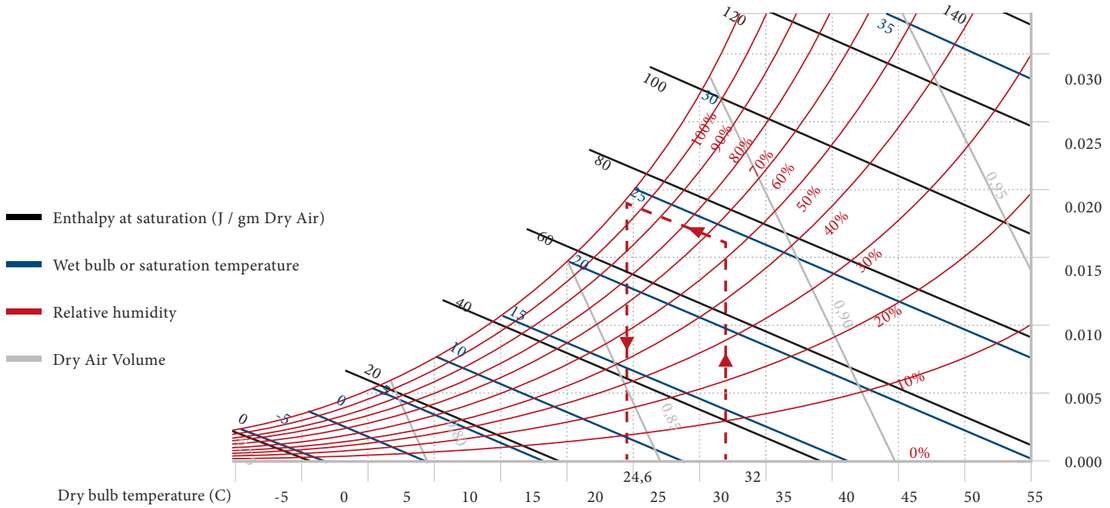
EPS Evaporative Panel System

The adiabatic system applied to Dry Coolers and large remote condensers are activated in order to increase the air relative humidity that passes through the heat exchanger so as to reduce the temperature and increase the heat exchange.

The physical principle is that of the latent heat of evaporation: when evaporating the water absorbs heat from the air entering in the heat exchanger and lowers its temperature.

ThermoKey has developed different adiabatic systems to be effective and efficient under certain environmental conditions.

Psichrometric diagram



Comparison chart

	AFS	WFS	EPS
MOIST AIR SATURATION	80%	100%	90%
STANDARD AIR TEMPERATURE REDUCTION	7K	10K	8K
WATER CONSUMPTION	LOW	MEDIUM	LOW
WATER TREATMENT	NECESSARY	NECESSARY	NOT NECESSARY
DIRECT ENERGY CONSUMPTION	HIGH	LOW	LOW
ENVIRONMENTAL INFLUENCE	HIGH	LOW	LOW
COIL PROTECTION	HYDROPHOBIC	DOUBLE-LAYER	NOT NECESSARY
FUNCTIONING HOURS	500/Y	1000/Y	CONTINUOUS
MAINTENANCE COSTS	LOW	LOW	LOW
CERTIFICATION	LEGIONELLA FREE	HYGIENIC	HYGIENIC

Operating modes of the adiabatic systems

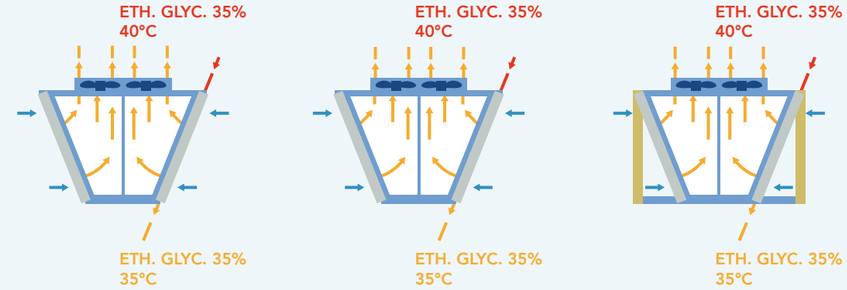
AFS AIR FRESH SYSTEM

WFS WET FIN SYSTEM

EPS EVAPORTIVE PANEL SYSTEM

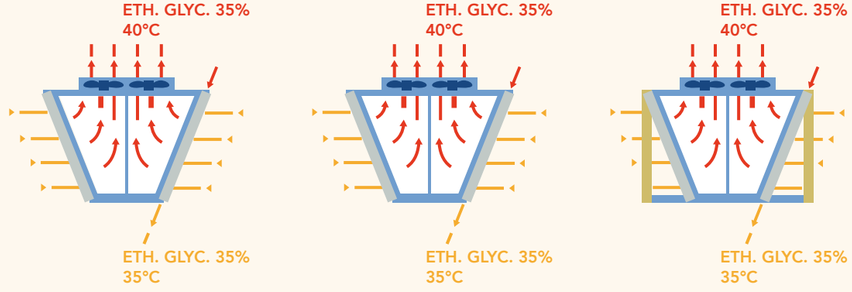
AMBIENT TEMPERATURE 8°C - 40%RH

DRY CONDITION
with low ambient temperature, below the switch-point temperature, with fans at minimum.



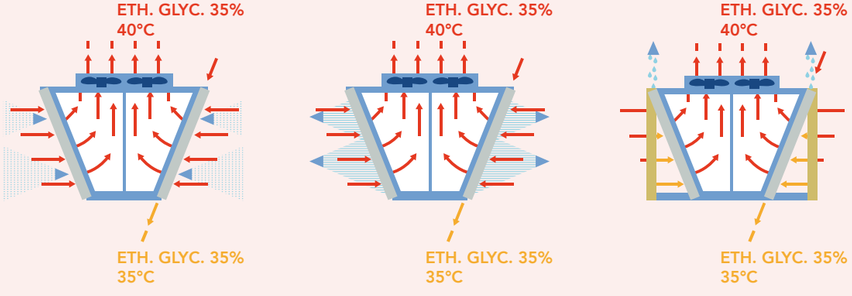
AMBIENT TEMPERATURE 20°C - 40%RH

DRY CONDITION
with high ambient temperature, below the switch-point temperature, with fans at maximum.



AMBIENT TEMPERATURE 37°C - 40%RH

WET CONDITION
with ambient temperature above the switch-point temperature. Fans at maximum to save water or fans in regulation to save energy.



SWITCH POINT* 28,2°C

SWITCH POINT* 25°C

SWITCH POINT* 27,2°C

(*) Fans at 1.100 RPM (Jumbo for fans 910 mm)

Anti-Legionella and hygiene certificate

LEGIONELLA

Legionella is a gram-negative bacillus, responsible for a severe infective disease called Legionnaires' disease. Legionella survives in water and mud and it is transmitted by air. Moreover it has been ascertained its transmission by the air conditioning central system.

The Legionnaires' disease is a pulmonary infection caused by the Legionella pneumophila bacterium, which name means exactly "Legionella lover of the lungs". The name Legionella was coined in 1976, after an epidemic which had spread throughout the participants to a gathering of the American legion at Bellevue Stratford Hotel in Philadelphia. In this occasion 221 people contracted this kind of previously unknown pneumonia and 34 of them died. The source of the contamination was identified in the air conditioning system of the hotel.

OUR SOLUTIONS TO PREVENT LEGIONELLA

Our solutions satisfy the requirements of the Standard VDI 2047 Part 2 (Securing hygienically sound operation of evaporative cooling systems), this standard lists the structural, technical and organizational requirements pertaining to hygienically sound operation; these requirements concern the planning, installation and operation including the required maintenance of evaporative cooling systems. Risks posed by, e.g. legionella, for employees and third parties will be minimized if these requirements are met.

ThermoKey has developed a system on "V-Dry coolers" and/or "V-Condensers" to work with an adiabatic system.

The AFS method employed makes use of adiabatic cooling with low water consumption by means of special nozzles developed to work with very high water pressures. The physical phenomena of the adiabatic cooling consists in creating an even diffusion of micro drops of water (Misting effect) through which is passing a current of air that will be cooled by the evaporation of the water.

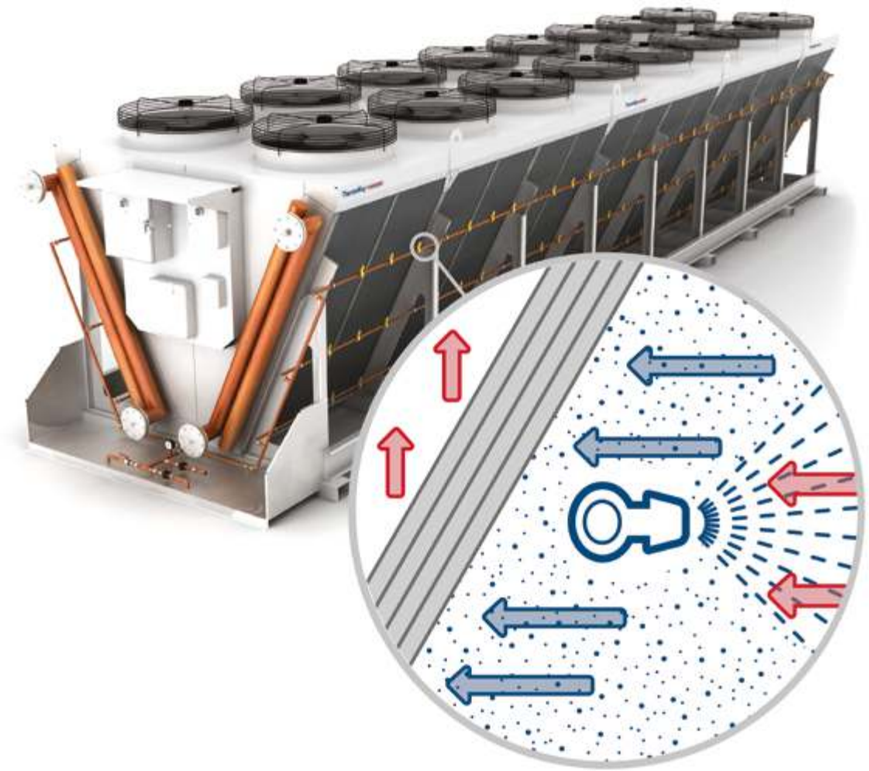
Water side:

The quality of the water supplied to the adiabatic system is tap water (according drinking water regulation). The special nozzles in the "AFS" combined with the high pressure of the water produce micro drops that are completely evaporated by the flow of air without leaving residues of water on the heat exchanger coils; no water is present in equipment and above all on the discharge of the fans or on the ground.
Water is present in the water distribution nozzles only during the "AFS" operation, the water distribution nozzles are emptied each time the "AFS" is not in use.
Taking this into account, there isn't legionella bacterium growth.

Air side:

The air inlet from the unit is going back to the ambient and is not used anyway for supplying air. Therefore no risk can be seen during operation.

AFS Adiabatic System certification

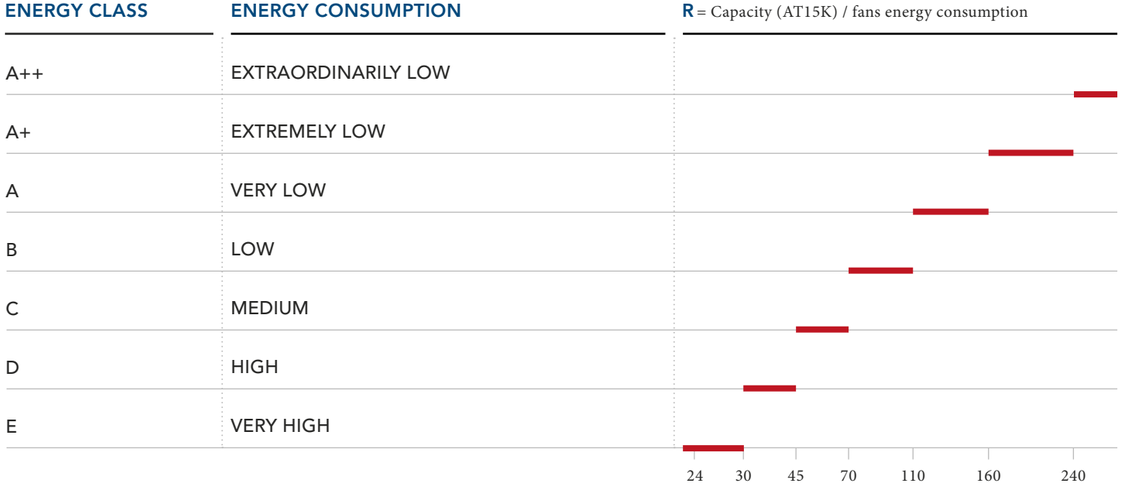


TÜV SÜD CERTIFIED

"With this "AFS" there is no standing water during continuous operation. Working according to the instruction manual we can state that ThermoKey "Air Fresh System" carries no danger in correlation with the risk of legionnaires` disease."

Flexibility in energy management

ThermoKey range of dry coolers gives the opportunity to select units with energy class up to A ++.
With ThermoKey Adiabatic System (AFS) or even better with ThermoKey Hybrid System (WFS) the customer can choose whether to privilege the consumption of water or electricity or vice versa.



FRAME AND COWLING

APPLICATION: to guarantee **maximum strength**, **solidity** and **resistance** to the external environment paying particular attention to the high-efficiency cowling use in order to reduce noise and electric fans cosumption.
The casing is provided in galvanized steel (FeZn 275) which is oven painted with polyurethanic resins (standard RAL 7035).

ACCESSORIES RANGE

A complete set of accessories is available on request including:

- cut phase speed controller, step speed controller and inverter speed controller;
- standard and special electrical panels which can be customized for specific applications;
- fins in different materials (aluminium, copper, double layer and hydrophobic);
- copper tubes and stainless steel pipe in AISI 304 or 316L for special applications;
- special motors: single phase for diameters 500 and 630 mm, with power at 60Hz, at different voltages and for high or low air temperature.

* Characters always present in the code

SJ * G * H * 2 * 3 * 80 * A - * Y 04 * V E I R A F (EC)

• CONFIGURATION

-	One-coil dry cooler
J	Double-coil dry cooler
SJ	Super double-coil drycooler
JV	Double-coil dry cooler suitable for container loading

• PRODUCT SERIES

W	Dry cooler with 32 and 42 geometry coils
G	Dry cooler with 46 geometry coils

• SOUND LEVEL

H	High
L	Low
Q	Quiet
R	Residential (ultra quiet)

• NUMBER OF FAN ROWS

• NUMBER OF FANS PER ROW

• FAN DIAMETER

50=500mm, 63=630mm, 80=800mm, 90=900mm, 10=1000mm

• CAPACITY LEVEL

A, B, C

• MODULE

-	Dry coolers with fans Ø 500 - Ø 630 - Ø 800
N	Dry coolers standard module
X	Dry coolers extended module
Z	Dry coolers super extended module

• FAN-MOTOR CONNECTION

D	Delta
Y	Star
M	Singlephase
-	EC working point (1, 2, 3, 4, 5, 6)

• NUMBER OF TUBES PER CIRCUIT

• AIR FLOW DIRECTION

H	Horizontal
V	Vertical

• WIRING

E	Junction box (for AC fans)
W1E	Electrical box (for EC fans)
W2E	Electrical box and switches – 1x2 - (for EC fans)
W3E	Electrical panel and fan fuse protection (for EC fans)
W	Electrical panel built to customer's specifications (for AC fans)
Q	Electrical panel and CE marking (for AC fans)
Q1E	Electrical panel and automatic switches (for EC fans)
Q2E	Electrical panel, automatic switches + speed controller (for EC fans)
Q3E	Electrical panel, automatic switches, speed controller + heaters (for EC fans)
Q4E	Electrical panel, automatic switches, speed controller + mounted switches 1x2- (for EC fans)

• REPAIR SWITCH

I	(available 3Pole, 6Pole and main switches)

• SPEED CONTROLLER WITH PROBE

R	Cut phase fan speed controller
G	Step fan speed controller
Z	Inverter fan speed controller
P	Special cut phase fan speed controller (on demand)
Eb	EC BASIC speed controller
Ep	EC PLUS speed controller

• SHOCK ABSORBERS

• ALUMINIUM PN10 SLIP-ON FLANGES

(stainless steel PN16 flanges available on request)

• FAN TYPE

-	AC fans
[EC]	EC fans

Applications

HVAC

used as external units in HVAC contribute to the optimization of air-conditioning systems in data centre, hospitals, hotels, theatres, etc.

COOLING | Data centre

The Dry Coolers have been specifically designed to provide the best and most efficient solution.

NEED controlling precisely the temperature of data centre servers to improve their efficiency.
CAPACITY REQUIRED total 6.1 MW.
SOLUTION **18 Dry Coolers model JGH2390CZ2/6QIEMAF(EC)(AFS)S** and **2 V-Type model JWQ1290A3/8QIEMAF(EC)(AFS)S** with electronic fans, adiabatic and self-cleaning system.

COOLING | Hospital

The Spital Thun hospital is part of a Switzerland hospital centre which provides medical assistance to 150,000 people among residents and tourists.

NEED cooling / climatisation hospital with low sound impact. Specific hygienic standards.
CAPACITY REQUIRED total 1,520KW very low noise.
SOLUTION **4 Superjumbo Dry Coolers model SJGR2790C3/4 EC ZAPLUS.**

AIR CONDITIONING | Hospital

Hospital in New Caledonia, with 82,000 m2 area, 635 rooms, 8 surgery rooms and 1 hall. Opening in 2015.

NEED perfect air-conditioning of the hospital under every weather condition.
CAPACITY REQUIRED total 13,056 kW, Sound Pressure 64dB(A) a 10m.
SOLUTION **12 pcs Power-J Dry cooler model JGH21090CQAF(EC)S** with 20 fans for each unit, CE electical panel, shock absorbers, flanges and double layer fins for aggressive environment.

AIR CONDITIONING | University clinic

The University of Klagenfurt is an innovative university in Klagenfurt which hosts more than 11,600 students.

NEED Dimensional restrictions for the installation of the units on the clinic's roof and low-noise plant.
CAPACITY REQUIRED total capacity 1,419,000 m3/h. Cooling capacity: 6000 kW.
SOLUTION **6 Super Power J Dry Coolers** with Wet Fin System (WFS) and AxiTops.

AIR CONDITIONING | Stadium

"Mordovia Arena" in Saransk guarantees additional comfort to organizers, sportsmen, participants and spectators during sport competitions.

NEED equipping the stadium technical rooms with air conditioning: medical stations, refreshment points, press conference rooms, mixed areas, children play rooms, toilets and changing rooms.
CAPACITY REQUIRED total 6184 kW.
SOLUTION 8 pcs **model JGH2590BZDQPAS**.

Applications

INDUSTRIAL

through the ambient air and a closed circuit - without wasting water - dry coolers dissipate the heat generated and not usable by production processes, power plants, engines and moulds.

ENERGY & PROCESS COOLING | Plastic plant

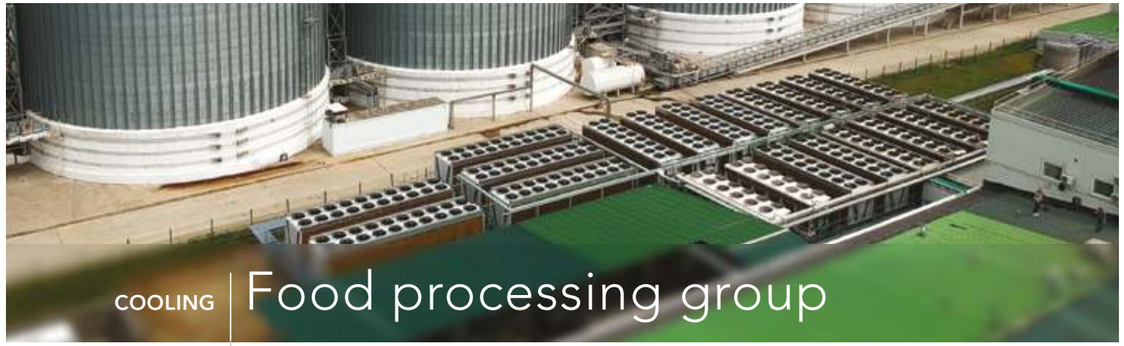
Plastic Plant Group specialized in the production of pipes in Russia.

NEED control of the temperature during the production of pipes.
CAPACITY REQUIRED total 1,500 kW.
SOLUTION **2 pcs Dry coolers GH2490BZDVQRAFS**. Added value: short delivery time and high-quality Dry coolers.

ENERGY & PROCESS COOLING | Steelworks

Steelworks in the Middle East planned to produce 1.500.000 t/y of billets and placed in a desert area.

NEED cooling down the fume treatment plants. Water consumption: 150 m^3/h (500 m^3/h in normal plants).
CAPACITY REQUIRED total 103,710 kW
SOLUTION **30 pcs Super Power-J Dry cooler model SJGH2910CDQF(INK)S** with self-emptying drainable configuration, CE electrical panel and flanges.



COOLING | Food processing group

International group leader in the processing of food products.

NEED guarantee the fluid temperature control at the requested maximum temperature thanks to adiabatic system (EPS). Specific hygienic standards.
CAPACITY REQUIRED total 16,565 kW.
SOLUTION **5 pcs SJGH21090CN/04Q2EAF(EC)(EPS)S – 6 pcs SJGH2890C1/04Q2EAF(EC)(EPS)**

ENERGY & PROCESS COOLING | Power plant

Seven Power is a new 824 MW gas-fired generation station at Uskmouth, near Newport South Wales.
Contractor: Siemens

NEED cooling down auxiliary circuits of Seven Power, a natural gas-fired power plant
CAPACITY REQUIRED total 824 MW
SOLUTION ThermoKey has provided SPX with **40 Dry coolers V-Shape**, model JGL1690BY/4EIFS

ENERGY & PROCESS COOLING | Thermonuclear industry

ITER (International Thermonuclear Experimental Reactor) is a nuclear fusion experimental reactor.

NEED to dispose 16/17 MW of thermal power and subsequent auxiliary systems by cooling down the glycoled water with a fluid delta temperature from 36° C to 21° C at 10° C environment temperature.
SOLUTION **8 units model SJGL2790CD/4AFS** of 2125kW each at the service of the cooling plant for the experiments.

Direction
Acrobatik
—
DC0422EN

We design customized products to meet every need

We at ThermoKey know that specific environments require specific solutions, we are happy to help you to identify the best solution to your needs.

Our technicians assist the customer in the choice

Our technical staff is at your complete disposal to identify the best heat exchanger for you. We individually analyze your specific needs and the environment in which the heat exchanger will be installed for your needs.

After sales

ThermoKey stays at your side throughout the product life cycle for spare parts replacement and technical assistance

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