TOPAZ NEO

ADIABATIC COOLER

TECHNICAL DOCUMENTATION

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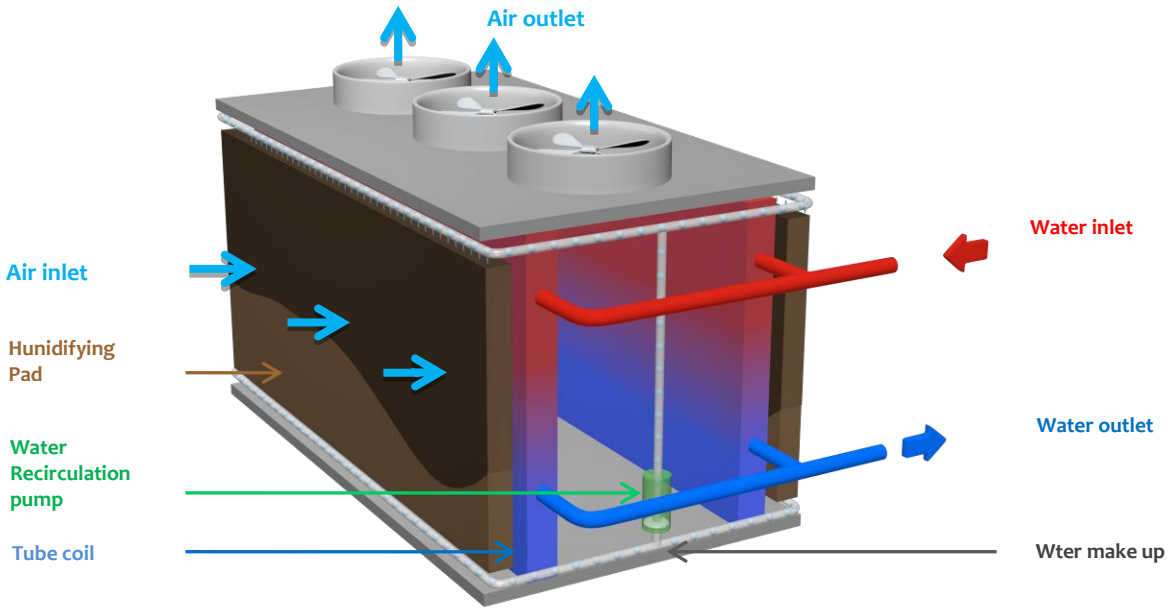
TOPAZ NEO Principle and operation

Principle

The **TOPAZ NEO** adiabatic cooler is a heat exchanger; calories / heat are rejected to atmosphere. An adiabatic cooler is a combination of dry cooler with an adiabatic precooling section.

This precooling section lowers ambient air temperature by evaporating water which is passed over the cooling / humidifying pads, specially designed for this purpose.

Adiabatic cooler operation



Dry mode

- The fluid is cooled in the dry tube coil by ambient air flow. The ambient air is drawn through the coils by fans mounted centrally on the top of the Cooler; the humidifying pads located in front of the coils are dry.

- The fan speed is controlled by an inverter depending on heat load to maintain the fluid outlet temperature.

- The warm air is then evacuated upwards.

Adiabatic mode

- When cooling in dry mode is not effective and the ambient temperature reaches a predetermined set point, the pads are saturated with water from the sump.

- The ambient air is cooled by evaporation when passing through the pads.

- This precooled air then passes through the tube coils and cools the fluid.

- The water which has not been evaporated on the pads is collected in a stainless steel collector and then flows to sump. As an option, it can be re-circulated with the make-up water from the sump to be re-distributed over the pads. The water saving is then significant and does not require water treatment, it is without risk of Legionella.

TOPAZ NEO General description and benefits

Range

TOPAZ NEO is available in a range of 55 different duties composed by:

- Single row motor fan set TM E09S
- Double row motor fan set TM E09D
- High series double row motor fan set TH E09D
- Drainable double row motor fan set TVM E09D

General description

The TOPAZ adiabatic cooler range includes:

- Two vertical heat exchanger tube coils,

- Two cooling / humidifying pads for pre cooling by evaporation,

- EC motors (Electronically Commutated): electronic Variation Speed Drive integrated to each motor,

- A low noise axial fan set,

The water distribution system for pre-cooling is as follows:

- Water make-up electro / solenoid valve,

- Motorised bleed off valve,

- One or two water recirculation pump(s).

Benefits

- No drift,
- No water spray in airflow,
- Elimination of legionella risk,
- The coils have been tested (sealing and pressure according to DESP), and their thermal performance have been certified EUROVENT certified by Friterm or Thermokar, both participating to Eurovent Certita Certification HECOILS program (www.eurovent-certification.com)
- No external fouling of the tube coils : extended life expectancy,
- No thermal performance decrease,
- No water treatment required,
- Very low water consumption,
- Easy maintenance due to vertical H shape of the tube coils : full access through the central door,
- Low operating costs,
- Optimized power consumption,
- Design for container transport : TM sigle row,
- Made in France.

TOPAZ NEO manufacturing details

Tube coils

In standard configuration, the coils are made of copper tubes ∅12mm and aluminium fins epoxy coated.

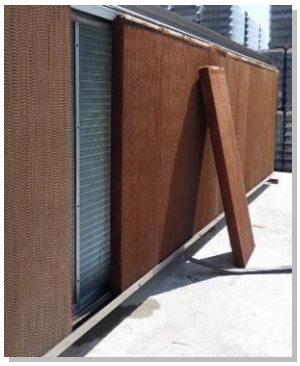
Tubes are sealless, expanded through the fins to ensure both optimized mechanical resistance and thermal conductivity.

The tube thickness varies with the cooler size from 0.30mm to 0.32mm, and the fin pitch is 2.1mm.

The coils are Eurovent certified by the manufacturers Friterm or Thermokar, who are participating to the Eurovent Certita Certification program HECOILS (www.eurovent-certification.com). The coils are tested under pressure up to 22 bars and have passed tests and certifications for thermal performance, sealing and pressure according to DESP.

Optionally, totally drainable non-freezing coils are proposed: TMV range. JACIR engineered tubes and coil arrangement enabling a complete drain under gravity (no compressed air injection needed). This option may be completed by an integrated automatic power and flow regulations

Pre-cooling by evaporation



The evaporation section is used to precool the ambient inlet air.
The cooling / humidifying media covers the whole air inlet section, on both sides of the unit.

The design and the choice of materials have proven to give best efficiency and long operating life, both in urban and industrial environments.

For a better integration in the architecture of the building, its color can be adapted on request, according to the needs.

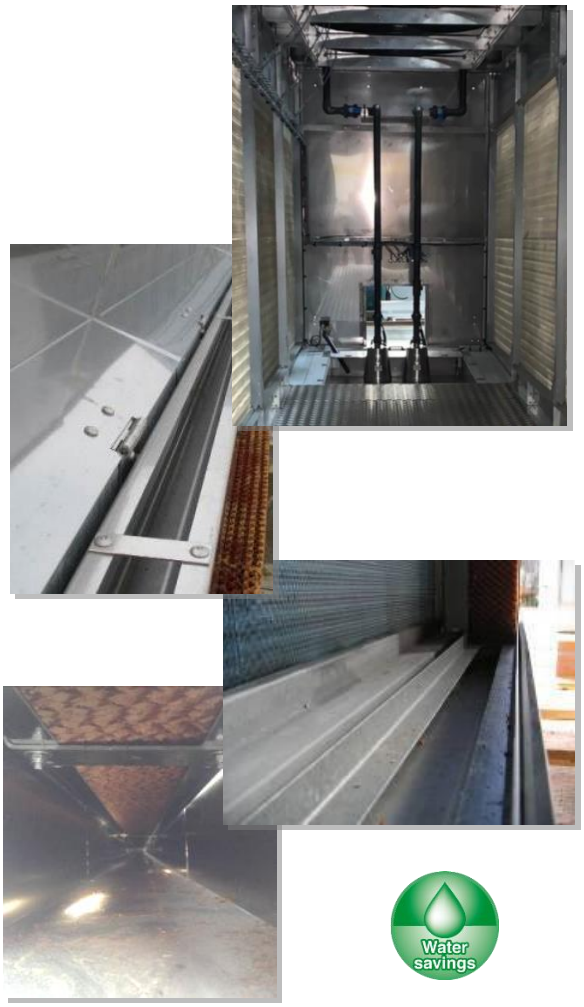
The cooling / humidifying pads are made of special cellulose, chemically treated to avoid moisture and to improve water absorbing characteristics.

Selected to simplify maintenance, the media pads are not directional.
It is easy to disassemble the cooling / humidifying pads, without tools or special access requirements.
To meet the environmental requirements of the site, an additional fixing frame is available as an option to fix a protection net on the medias (against insects, near forests, etc.)

Water distribution

The precooling circuit is activated when the fluid outlet temperature is higher than the set point. This wet / dry set point is around 23 °C in a continental climate, for a fluid outlet temperature of 27 °C. Collected water can be re-circulated without any bacteriological risk (temperature is below the level for bacterial growth): the water consumption is then divided by a factor of 3 during adiabatic mode operation.

The water distribution channels are entirely enclosed on the top in **Z-STEEL** stainless steel and do not require any pressure to operate. They are located outside the airflow and distribute water evenly onto the pads, in full safety.
Their “U” shape makes internal cleaning very easy, without any tools, handles are provided to aid removal.



Z-STEEL stainless steel channels collect the water which has not been evaporated. The water is then evacuated or can be sent to the sump for recirculation by means of one or two pumps , according the equipment size.

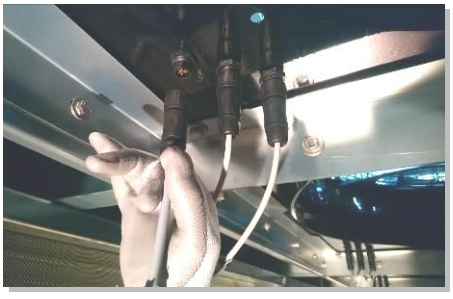
The water is then driven to a covered stainless steel sump: a level switch and control of the water level is secured by three level detectors. The water recirculation pump is serviced externally by an access hatch provided for this purpose and thus remains accessible when the cooler is in operation.

The system includes a drain valve that automatically opens to dump the water from the sump if the cooling section has been used during the previous 24 hours.

A drying cycle is incorporated which will drain the sump completely and will dry the pads and other items which come into contact with water by running the fans at high speed. This function minimises bacteria growth potential and prolongs pad life.
Optionally, a backup mode on the pump (s) is also available.

Groupes moto-ventilateurs

The motor fan sets draw the air through the pads, then through the tube coils.
Equipped with EC technology motors and directly coupled to low speed axial fans.
This combination offers both power efficiency and optimized sound level.
The blades are made of aluminumand are directly fitted to the motor rotor.
The motor fan coupling is direct and requires no maintenance.
Fast electrical connectors allow easy and safe maintenance..



EC motors (Electronically Commutated)

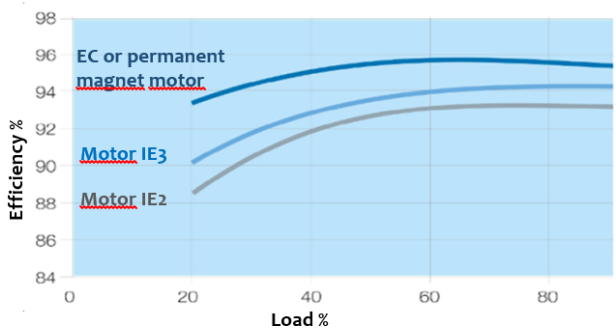
The TOPAZ NEO adiabatic cooler is a cutting edge technology and shows exceptional performance (efficiency over the ERP 2015 directive IE3 and efficiency near IE4). They are IP 55 insulation class, 380/ 400 V, 50/60Hz.
Choice of this technology is compliant to (UE) 327/2011 eco-conception rules.

This efficiency places the TOPAZ NEO range at the peak of energy efficiency, especially as the motors are always controlled by the inverter.

The motor runs cooler, is smaller and lighter compared to an asynchronous motor and has maintenance and handling benefits. Also, a lower temperature means long-lasting bearings (grease nipples directly on the motor), and insulation materials.

These motors have a low carbon footprint => power savings.
As an option, a backup mode on ventilation is also available: default activation of the fans at 100% in case of malfunction of the PLC.

Efficiency comparison



Values for indication only

Frequency drive

Installed as a standard across the whole range, there is one frequency drive per motor.
EC motor directly coupled to its axial fan and regulated by the frequency drive allows to offer an exceptional efficiency and cos phi, even in case of low speed variation.

Automaton

The **TOPAZ NEO** range is totally « Plug and Play »: the Schneider automaton equipped with HMI (Human Machine Interaction), allows frequency drive and precooling operation controls for full safe maintenance.

Here are some functions of the automaton:

-Digital monitoring including: pumps, drain valve, water sump make up valve, drain and dry pads mode control,

- Thermal load management

- Automatic drain control of the adiabatic system,

-Analog output for fan speed control with frequency drive,

- Analog output for fan speed control,

- Management of recirculating water levels,

- Switching to dry / wet mode of one or two media sides

(depending on model),

- Programming of the full draining (option),

- Internal clock to optimize the management of day and night sound levels

- Memory backup in case of power failure,

- Multi-line liquid crystal display of main parameters and alarms,

- User interface to modify the set points- Water re-circulation level

monitoring

In case of drainable Topaz neo TMV parallele installed on a same circuit, connections to the automaton will be necessary for the drain information share between all the units (connections customer supply)

Communication modes are optional: Ethernet, Modbus, LonWorks, or BACnet.

Intelligent accessibility

The **TOPAZ NEO** adiabatic cooler has been design with two main goals: thermal performance and ease of maintenance.
Therefore, the following technical features are incorporated:

The "H" arrangement of the cooler provides an ideal geometry for complete access to the mechanical equipment and to internal sides of the coils over the entire height.
Hinged access hatch also allows easy and immediate maintenance of pumps and strainers directly from the outside even during dry operation of the cooler.

Equipped with a mechanical shutter and its safety sensor, giving full opening without threshold to the inside of the cooler, the motor-fan units are safely dismountable from inside, on a non-slip aluminum tread plate for safe maintenance.

Accordingly, lifting equipment*, safety guards or walkways are not necessary to carry out maintenance.

As an option, a maintenance table with pulleys (or cylinders) specially designed for the TOPAZ NEO can be used to disassemble the motor-fan units from the inside of the device in complete safety.

Without effort or additional lifting means this device with wheels makes it possible to get down the motor-fan units from the roof of the cooler to the floor, then to remove it easily.

An insulation plate is then proposed, also as an option, in place of motor fan set during its maintenance to keep safe the performance.

Also, easy handling of the humidifying pads is possible, without any lifting/ handling tools.

Support and casing

Strong structure, the frame and the roof of **TOPAZ NEO** range are made of **SILVER STEEL**, except for the parts in contact with water and both end points of the cooler (external sides : adiabatic pre-cooling section), made of **Z-STEEL** stainless steel for its perfect resistance to corrosion.

As an option, the floor made of non-slip aluminum tread plate for safe maintenance may be removable for waterproof check.

TOPAZ NEO OPTIONS

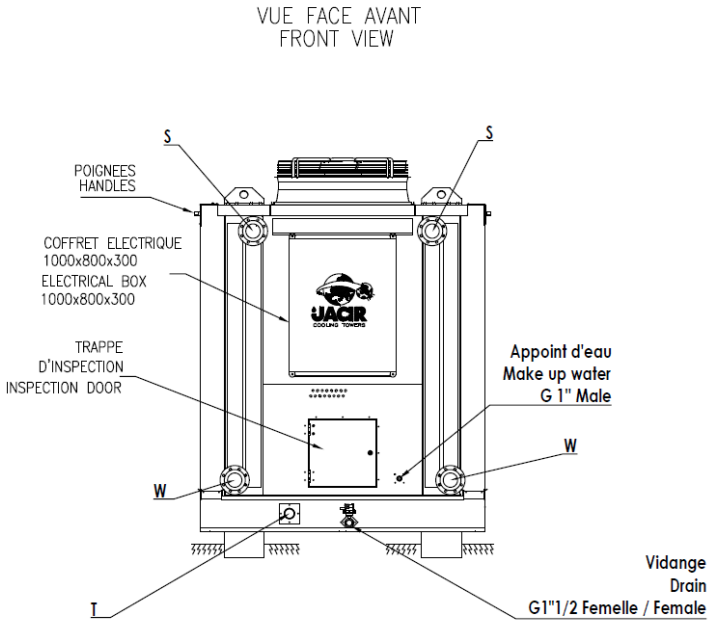
- Automatic power and flow regulations
- Integrated drain protection system for drainable Topaz NEO range TMV
- Automated drain monitoring for drainable coils
- Color choice of the medias for a good integration in architecture site
- Additional fixing frame to fix a protection on the medias (against insects, near forests, etc.)
- Backup mode on the pump (s)
- Backup mode on the motor fan set
- Automaton communication gateway Ethernet, Modbus, LonWorks, or BACnet.
- Maintenance table with pulleys (or cylinders) to disassemble the motor-fan units from the inside of the device in complete safety.
- insulation plate in place of motor fan set during its maintenance to keep safe the performance.
- Removable floor made of non-slip aluminum tread plate for safe maintenance for waterproof check.

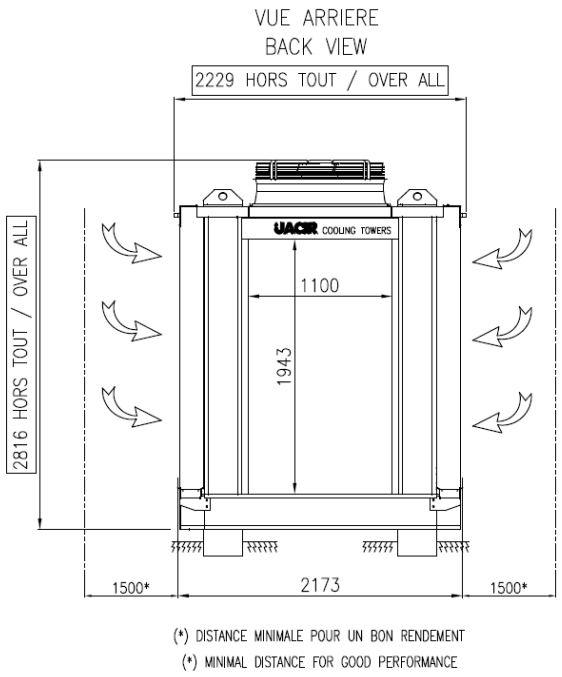
Technical characteristics TOPAZ NEO TM E09 S

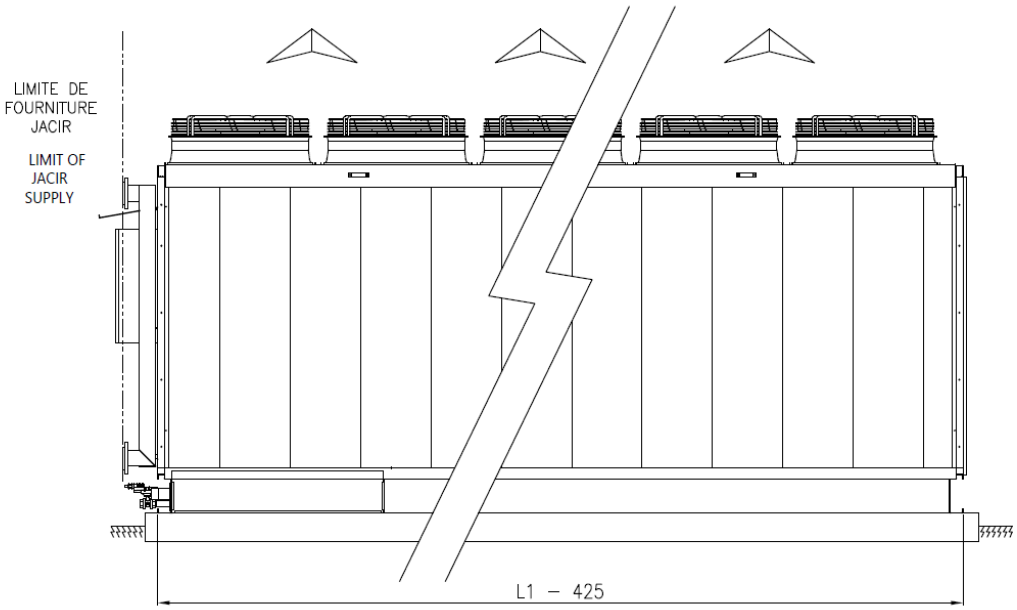
TOPAZ NEO		TM1 E09 S3 1722		TM2 E09 S3 2822		TM3 E09 S3 3922		TM4 E09 S3 5022		TM5 E09 S3 6122		TM6 E09 S3 7322	TM7 E09 S3 8422	TM8 E09 S3 9522	TM9 E09 S3 10622	TM10 E09 S3 11722	TM11 E09 S3 12822
		A	B	A	B	A	B	A	B	A	B	B	B	B	B	B	B
Nominal capacity max [1]	kW	89	104	180	204	271	307	356	417	453	514	623	695	805	915	1 024	1 134
Motor-fan	Qty / kW	1 x 3,2		2 x 3,2		3 x 3,2		4 x 3,2		5 x 3,2		6 x 3,2	7 x 3,2	8 x 3,2	9 x 3,2	10 x 3,2	11 x 3,2
Fan diameter	mm	910															
Motor absorbed power per unit	kW	4,7	4,8	7,4	7,6	10,2	10,5	12,9	13,3	15,7	16,1	19	21,8	24,6	27,5	30,3	33,2
Installed power per unit	kW	5,1	5,1	8,3	8,3	11,4	11,4	14,5	14,5	17,6	17,6	20,8	23,9	27	30,1	33,3	36,4
Inlet/outlet water connections (S/W)	DN	50		80		100				125							
Make up water flow (max) [2]	m3/h	0,3		0,4		0,6		0,7		0,9		1,15	1,3	1,5	1,6	1,7	1,8
Make up water flow connection (threaded male)	Inches (mm)	1" (26 x 34)															
Drain connection (threaded female)	Inches (mm)	1" 1/4 (33 x 42)															
Overflow connection mmale (T)	Inches (mm)	2" (50 x 60)										2" 1/2 (66 x 76)					
Weight empty	kg	900	940	1 310	1 440	1 720	1 940	2 320	2 840	2 685	3 305	3 770	4 390	4 880	5 370	5 970	6 570
Weight in operation	kg	1 320	1 400	1 815	1 855	2 310	2 620	3 120	3 780	3 565	4 345	4 910	5 780	6 340	6 990	7 770	8 550
Lenght overall (L1)	mm	1 705	1 705	2 815	2 815	3 925	3 925	5 035	5 035	6 145	6 145	7 255	8 365	9 475	10 585	11 695	12 805
Width overall	mm	2 229															
Height overall	mm	2 816															
Sound level [3]	dBA	58		61		61		63		64		64	65	65	66	66	66

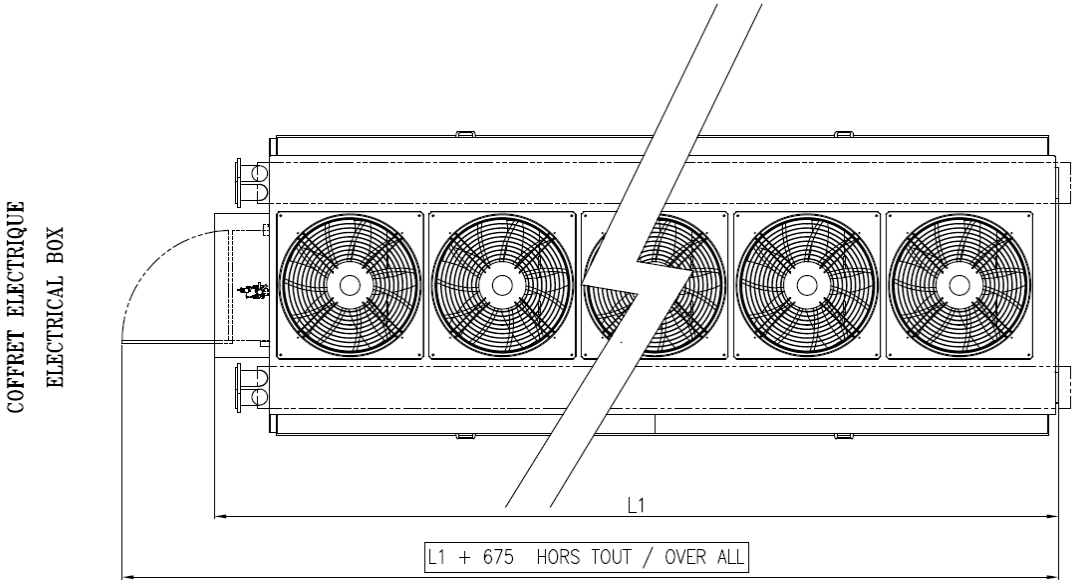
Notes : 1. Based on condensing temperature of 35°C/30°C and design ambient 35°C/22°C (dry / wet bulb)
2. Based on ambient conditions 31°C/21°C (dry/wet bulb) during humidifiation
3. Sound pressure level Lp at 15 m in free field, in 5 directions at 100% of the ventilation (+/- 2 dBA).

Drawings and dimensions TOPAZ NEO TM E09 S







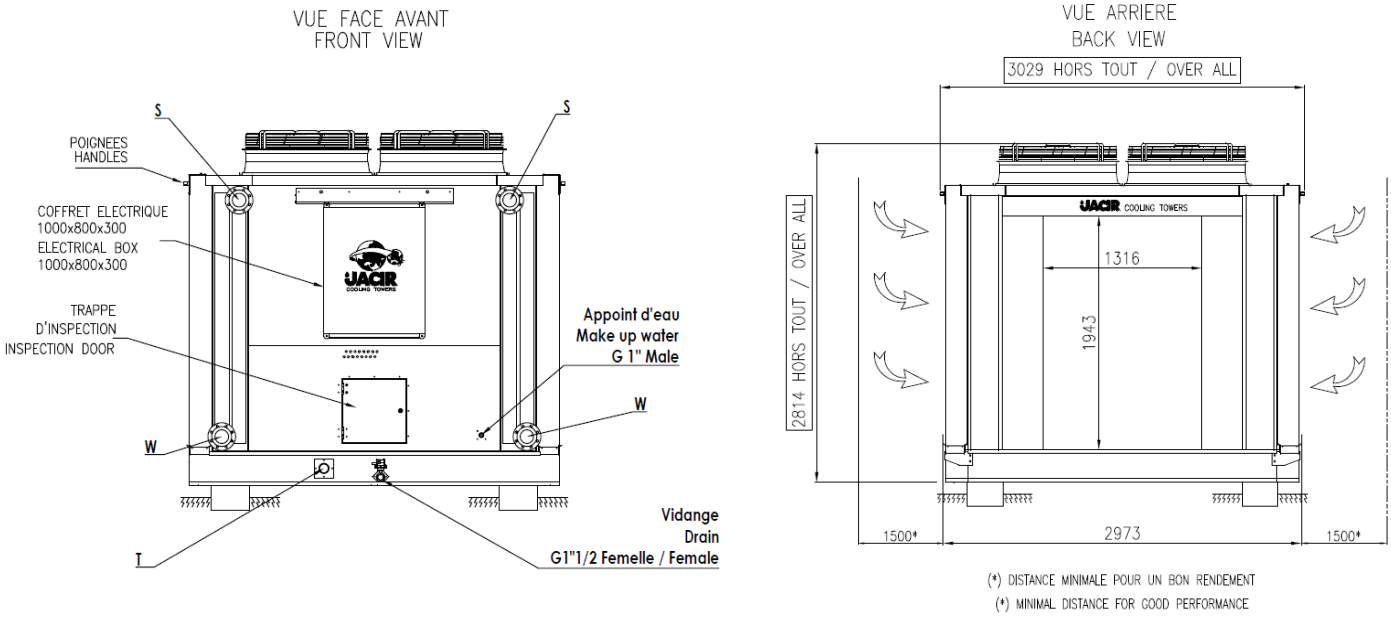


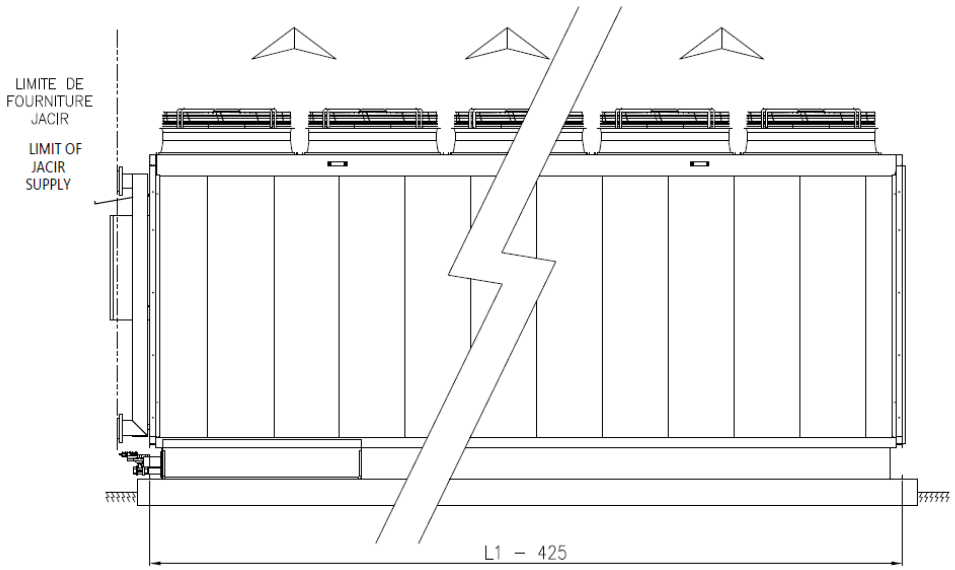
Technical characteristics TOPAZ NEO TM E09 D

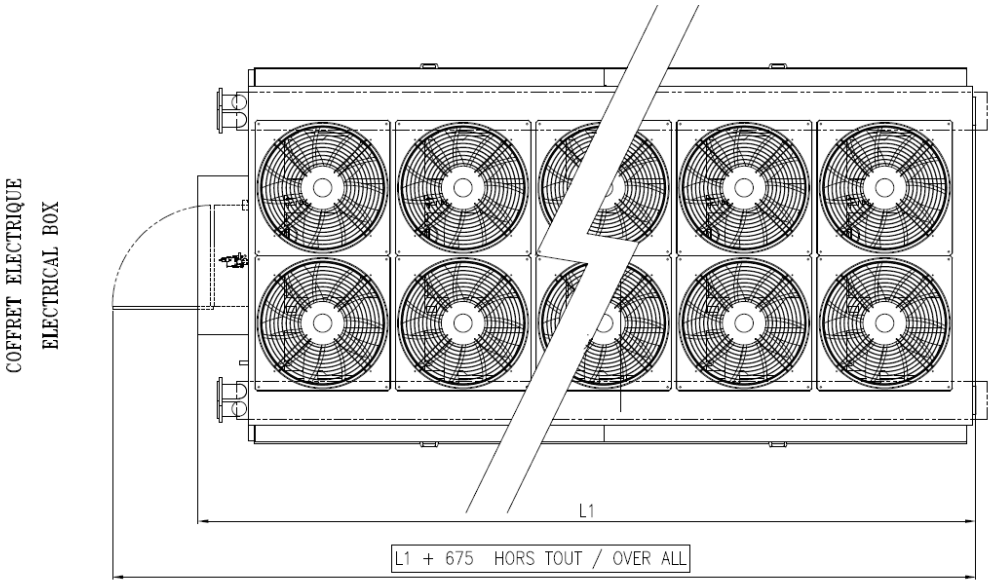
TOPAZ NEO		TM2 E09 D3 2830		TM3 E09 D3 3930		TM4 E09 D3 5030		TM5 E09 D3 6130	TM6 E09 D3 7330	TM7 E09 D3 8430	TM8 E09 D3 9530	TM9 E09 D3 10630	TM10 E09 D3 11730	TM11 E09 D3 12830
		A	B	A	B	A	B	B	B	B	B	B	B	B
Nominal capacity max [1]	kW	248	286	355	430	491	564	717	813	967	1 120	1 273	1 426	1 579
Motor-fan	Qty / kW	4 x 3,2		6 x 3,2		8 x 3,2		10 x 3,2	12 x 3,2	14 x 3,2	16 x 3,2	18 x 3,2	20 x 3,2	22 x 3,2
Fan diameter	mm	910												
Motor absorbed power per unit	kW	14,5	14,5	20,7	20,7	27	26,9	33,2	39,4	45,7	51,9	58,2	64,4	70,6
Installed power per unit	kW	14,5	14,5	20,8	20,8	27	27	33,3	39,5	45,8	52	58,3	64,5	70,8
Inlet/outlet water connections (S/W)	DN	80		100				125						
Make up water flow (max) [2]	m3/h	0.6		0.7		1		1.3	1.4	1.6	1.7	2	2.1	1.5
Make up water flow connection (threaded male)	inches (mm)	1" (26 x 34)												
Drain connection (threaded female)	inches (mm)	1" 1/4 (33 x 42)												
Overflow connection mmale (T)	inches (mm)	2" (50 x 60)							2" 1/2 (66 x 76)					
Weight empty	kg	1 380	1 600	2 080	2 400	2 780	3 200	4 000	4 800	5 600	6 400	7 200	8 000	8 800
Weight in operation	kg	1 950	2 200	2 880	3 300	3 850	4 400	5 500	5 800	7 700	8 800	9 900	11 000	12 100
Lenght overall (L1)	mm	2 815	2 815	3 925	3 925	5 035	5 035	6 145	7 255	8 365	9 475	10 585	11 695	12 805
Width overall	mm	3 029												
Height overall	mm	2 814												
Sound level [3]	dBA	64				65		66	67	67	68	68	69	69

Notes :
1. Based on condensing temperature of 35°C/30°C and design ambient 35°C/22°C (dry / wet bulb)
2. Based on ambient conditions 31°C/21°C (dry/wet bulb) during humidifiation
3. Sound pressure level Lp at 15 m in free field, in 5 directions at 100% of the ventilation (+/- 2 dBA).

Drawings and dimensions TOPAZ NEO TM E09 D





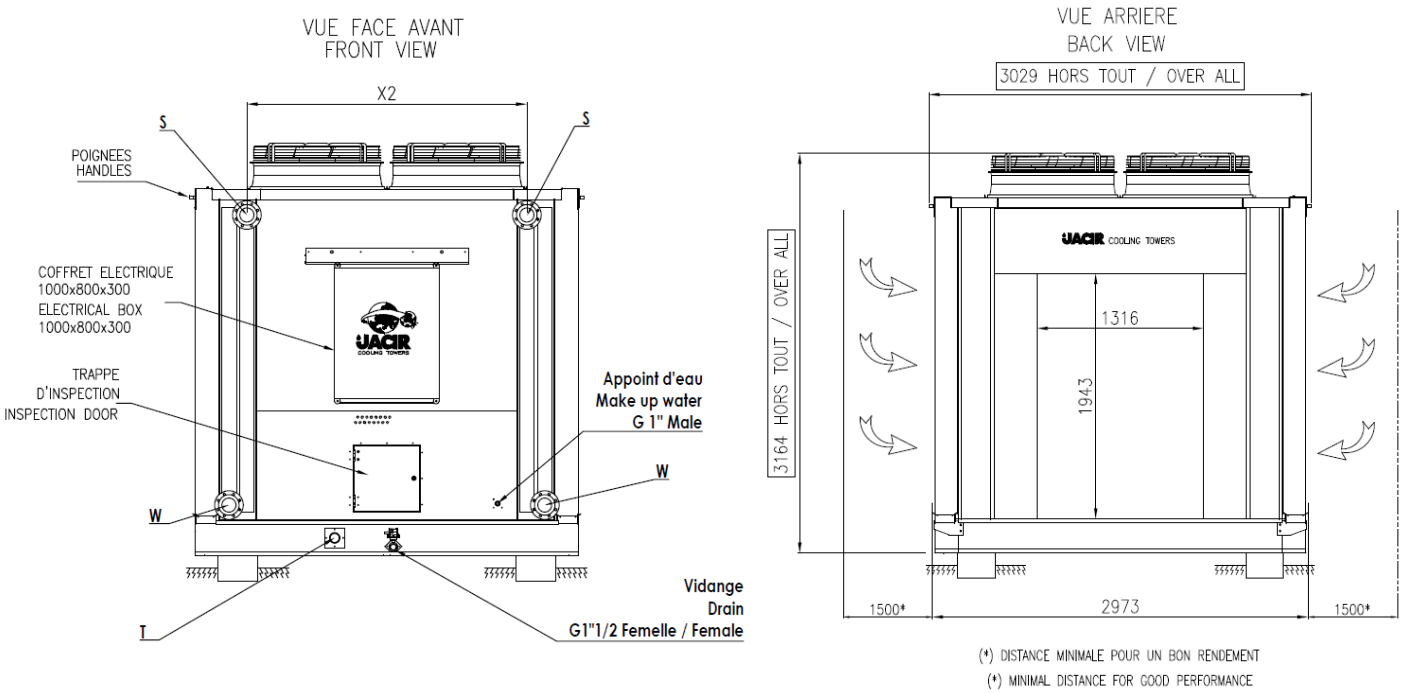


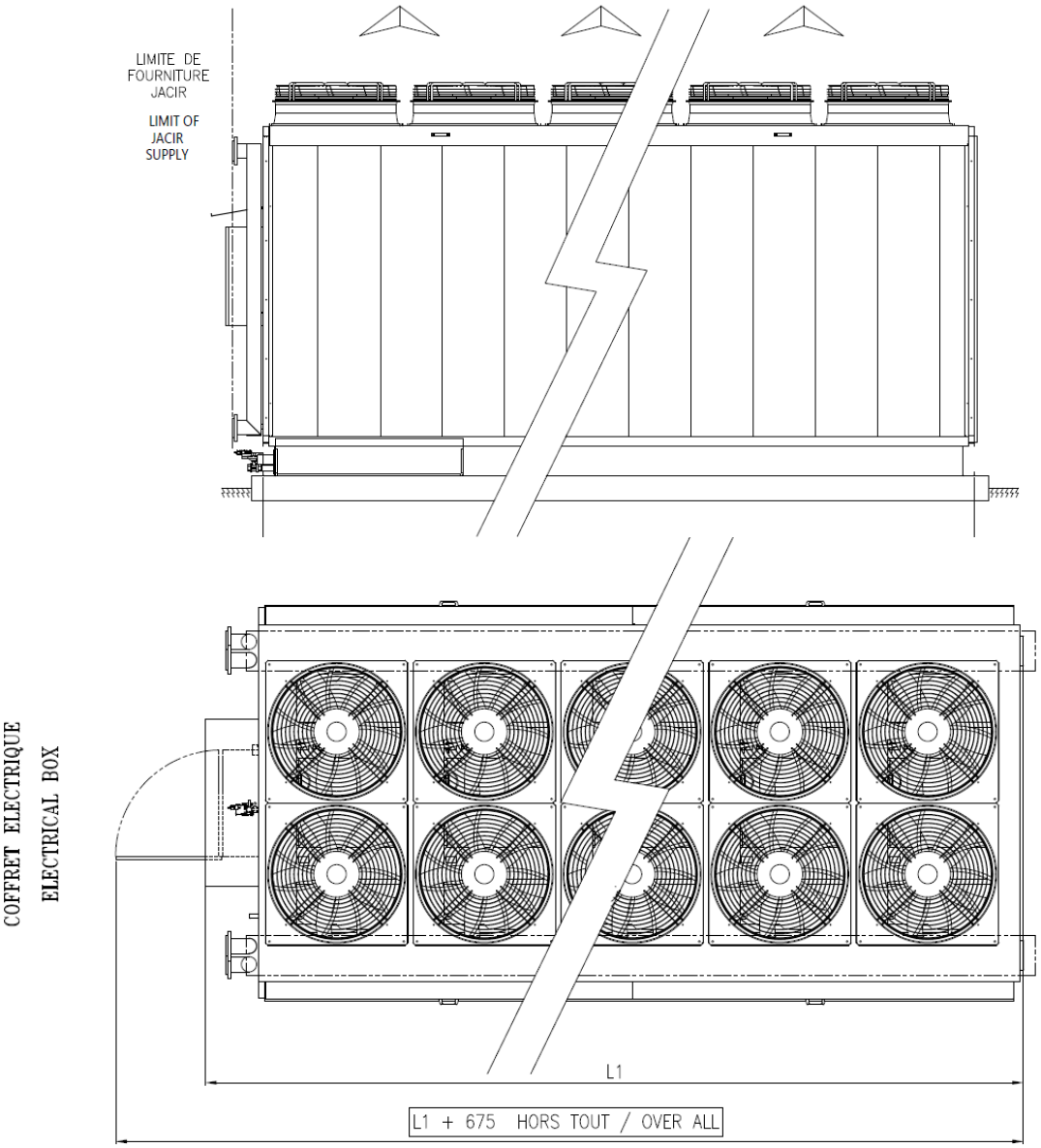
Technical characteristics TOPAZ NEO TH E09 D

TOPAZ NEO		TH2 E09 D3 2830		TH3 E09 D3 3930		TH4 E09 D3 5030		TH5 E10 D3 6130	TH6 E09 D3 7330	TH7 E09 D3 8430	TH8 E09 D3 9530	TH9 E09 D3 10630	TH10 E09 D3 11730	TH11 E09 D3 12830
		A	B	A	B	A	B	B	B	B	B	B	B	B
Nominal capacity max [1]	kW	276	317	395	476	543	626	796	902	1 073	1 243	1 413	1 583	1 769
Motor-fan	Qty / kW	4 x 3,2		6 x 3,2		8 x 3,2		10 x 3,2	12 x 3,2	14 x 3,2	16 x 3,2	18 x 3,2	20 x 3,2	22 x 3,2
Fan diameter	Mm	910												
Motor absorbed power per unit	kW	14,4	14,4	20,7	20,7	27	26,9	33,2	39,4	45,7	51,9	58,2	64,4	70,6
Installed power per unit	kW	14,5	14,5	20,8	20,8	27	27	33,3	39,5	45,8	52	58,3	64,5	70,8
Inlet/outlet water connections (S/W)	DN	80		100						125				
Make up water flow (max) [2]	m3/h	0.5		0.7		1		1.15	1.4	1.6	1.8	2	2.3	2.4
Make up water flow connection (threaded male)	inches (mm)	1" (26 x 34)												
Drain connection (threaded female)	inches (mm)	1" 1/4 (33 x 42)												
Overflow connection mmale (T)	inches (mm)	2" (50 x 60)							2" 1/2 (66 x 76)					
Weight empty	kg	1 480	1 715	2 230	2 580	2 980	3 430	4 290	5 150	6 010	6 870	7 720	8 580	9 440
Weight in operation	kg	2 090	2 360	3 090	3 540	4 130	4 720	5 900	6 220	8 260	9 440	10 610	11 800	13 000
Lenght overall (L1)	mm	2 815	2 815	3 925	3 925	5 035	5 035	6 145	7 255	8 365	9 475	10 585	11 695	12 805
Width overall	mm	3 029												
Height overall	mm	3 164												
Sound level [3]	dBA	63		64		66		66	67	68	68	68	69	69

Notes : 1. Based on condensing temperature of 35°C/30°C and design ambient 35°C/22°C (dry / wet bulb)
2. Based on ambient conditions 31°C/21°C (dry/wet bulb) during humidifiation
3. Sound pressure level Lp at 15 m in free field, in 5 directions at 100% of the ventilation (+/- 2 dBA).

Drawings and dimensions TOPAZ NEO TH E09 D



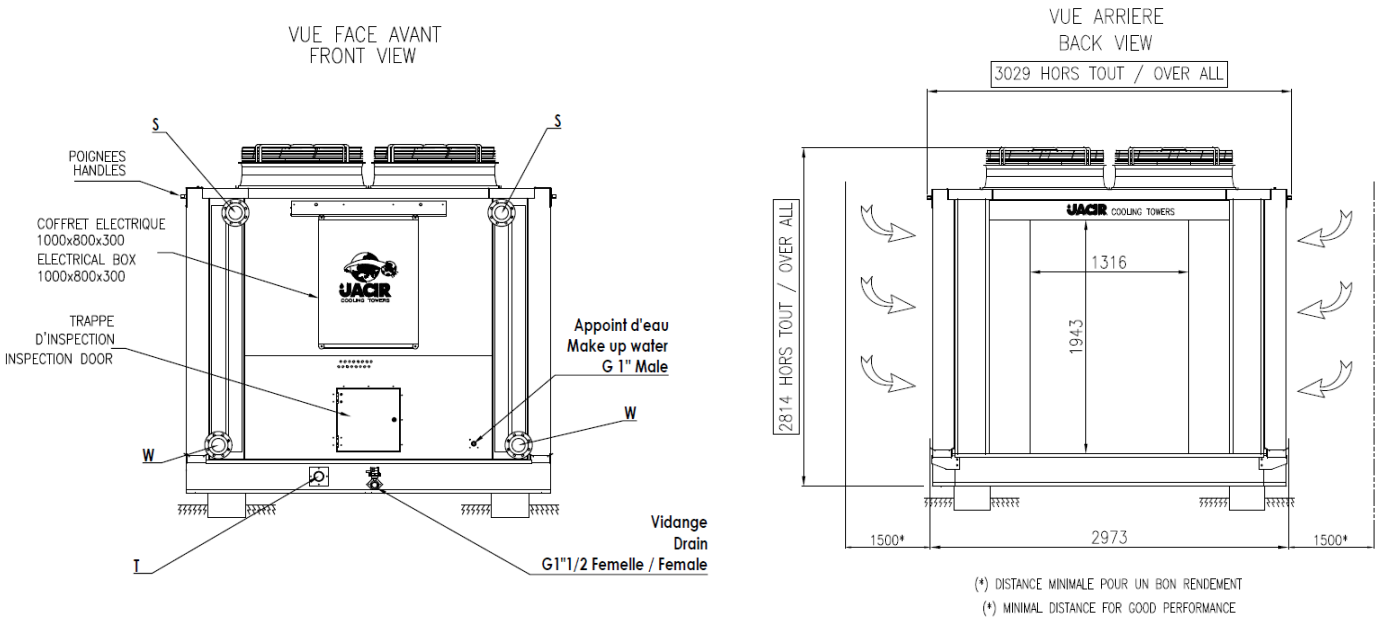


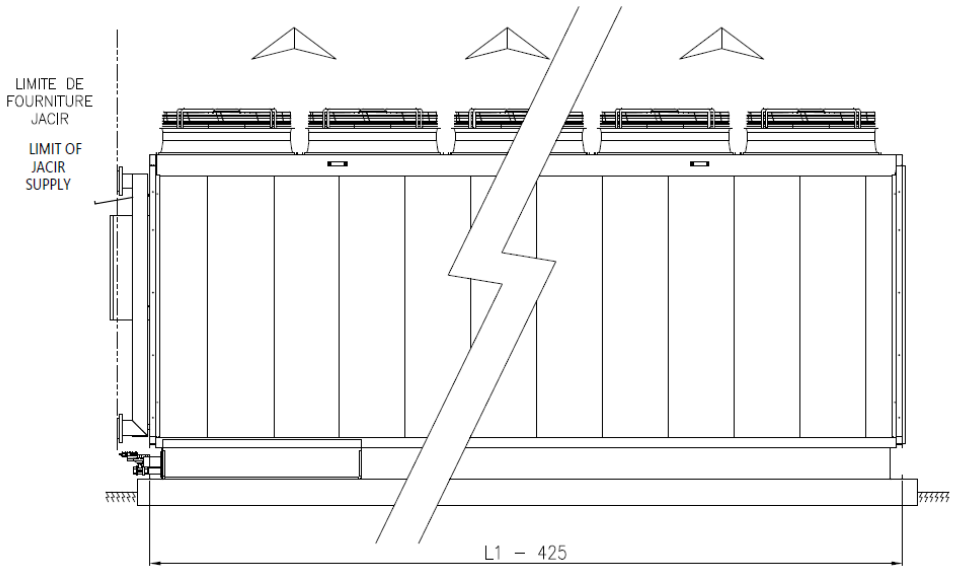
Technical characteristics TOPAZ NEO TMV E09 D

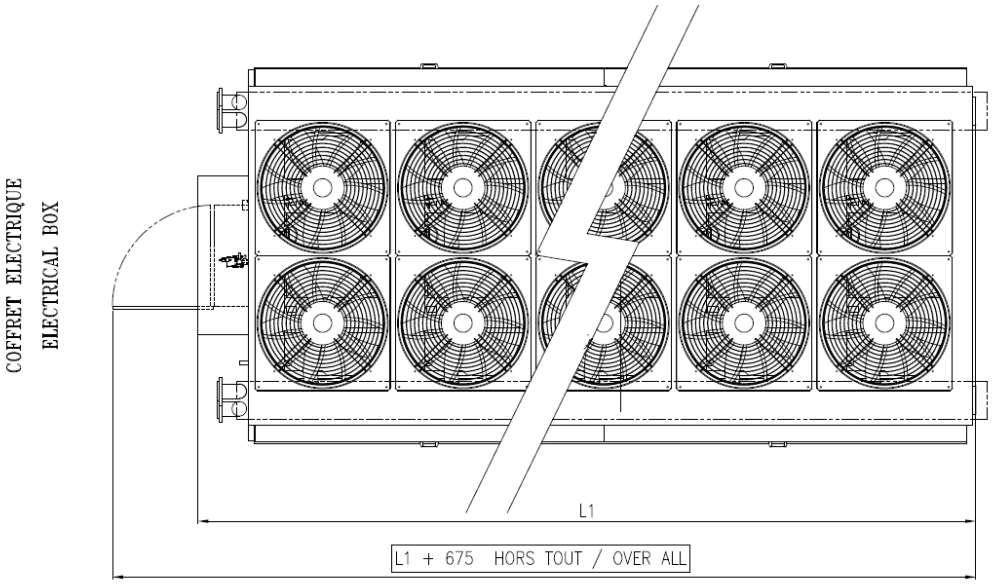
TOPAZ NEO		TMV2 E09 D3 2830 A	TMV2 E09 D3 2830 B	TMV3 E09 D3 3930 A	TMV3 E09 D3 3930 B	TMV4 E09 D3 5030 A	TMV4 E09 D3 5030 B	TMV5 E09 D3 6130 B	TMV6 E09 D3 7330 B	TMV7 E09 D3 8430 B	TMV8 E09 D3 9530 B	TMV9 E09 D3 10630 B	TMV10 E09 D3 11730 B	TMV11 E09 D3 12830 B
Nominal capacity max [1]	kW	195	251	306	384	410	442	585	675	807	907	1 020	1 112	1 027
Motor-fan	Qty / kW	4 x 3,2		6 x 3,2		8 x 3,2		10 x 3,2	12 x 3,2	14 x 3,2	16 x 3,2	18 x 3,2	20 x 3,2	22 x 3,2
Fan diameter	mm	910												
Motor absorbed power per unit	kW	13	14,5	18	20	21.5	27	32	37	44	49	55	56	55
Installed power per unit	kW	14,5	14,5	20,8	20,8	27	27	33,3	39,5	45,8	52	58,3	64,5	70,8
Inlet/outlet water connections (S/W)	DN	80		100				125						
Make up water flow (max) [2]	m3/h	0.6		0.7		1		1.3	1.4	1.6	1.7	2	2.1	2.2
Make up water flow connection (threaded male)	inches (mm)	1" (26 x 34)												
Drain connection (threaded female)	inches (mm)	1" 1/4 (33 x 42)												
Overflow connection mmale (T)	inches (mm)	2" (50 x 60)							2" 1/2 (66 x 76)					
Weight empty	kg	1 380	1 600	2 080	2 400	2 780	3 200	4 000	4 800	5 600	6 400	7 200	8 000	8 800
Weight in operation	kg	1 950	2 200	2 880	3 300	3 850	4 400	5 500	5 800	7 700	8 800	9 900	11 000	12 100
Lenght overall (L1)	mm	2 815	2 815	3 925	3 925	5 035	5 035	6 145	7 255	8 365	9 475	10 585	11 695	12 805
Width overall	mm	3 029												
Height overall	mm	2 814												
Sound level [3]	dBA	64				65		66	67	67	68	68	69	69

Notes : 1. Based on condensing temperature of 35°C/30°C and design ambient 35°C/22°C (dry / wet bulb)
2. Based on ambient conditions 31°C/21°C (dry/wet bulb) during humidifiation
3. Sound pressure level Lp at 15 m in free field, in 5 directions at 100% of the ventilation (+/- 2 dBA).

Drawings and dimensions TOPAZ NEO TVM E09 D

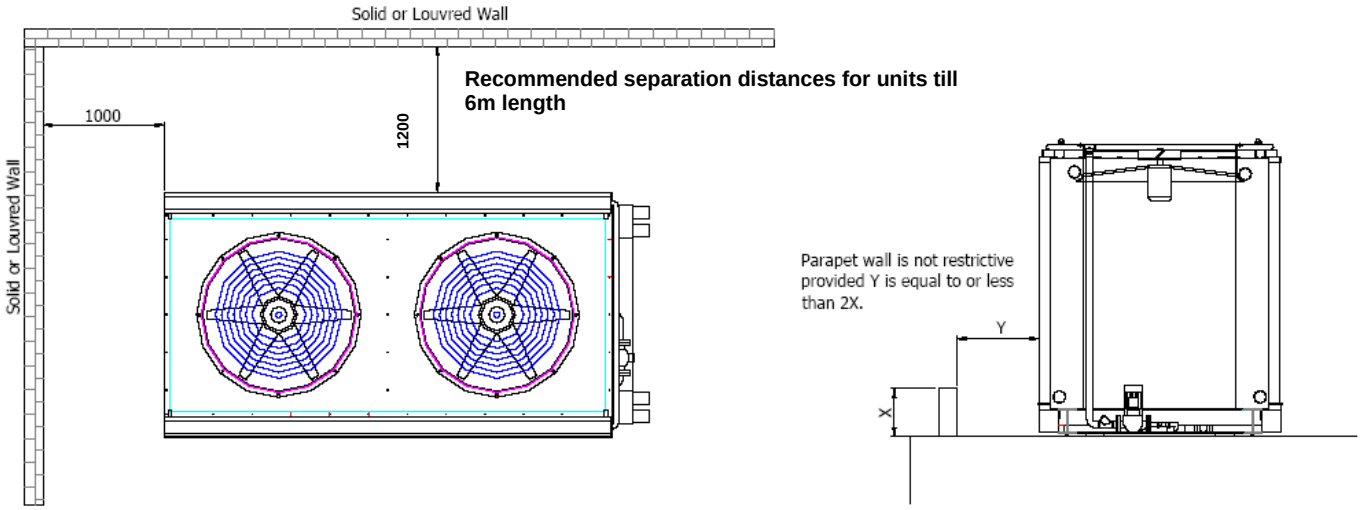






In site layout TOPAZ NEO

In order to achieve optimum thermal performance, the **TOPAZ NEO** adiabatic cooler must be installed according to the following criteria:
- Sufficient space left on both sides of the machine: minimum 1.2m (till 6m length) and minimum 1.5m (beyong 6m length) as per the sketches below; this will ensure that air will enter the coils efficiently to cool the fluid.
- In the case of a multiple cooler installation, it is important to consider the main wind direction; in order to avoid recirculation.
- The air outlet should be free from any obstacle.



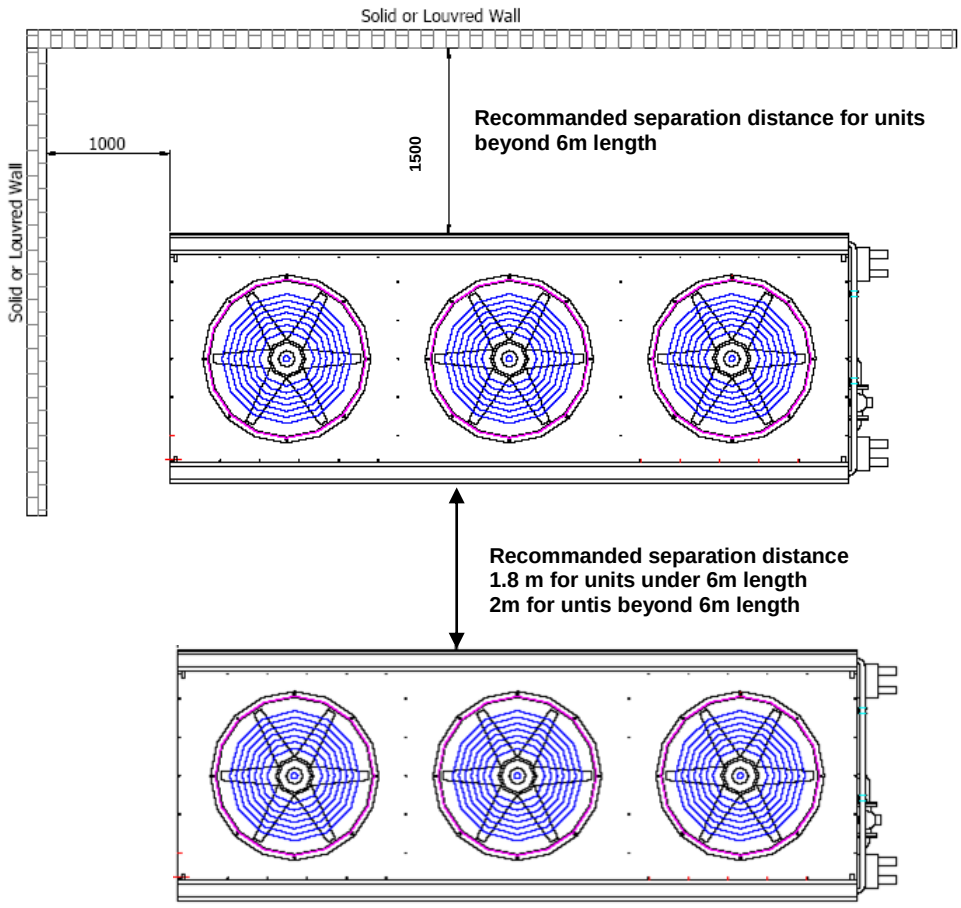
When **TOPAZ** units are located adjacent to buildings, walls or enclosures, the top of the fan discharge casing must be aligned with or higher than any adjacent structure.
Special care must be taken to avoid recycling of warm saturated discharge air by drifting into any ventilation inlets located nearby.
Consider and allow for future expansion.

The piping must also be provided with flexibility, to allow the vibrations and dilations.

The given dimensions are for indication and shall be considered as minimum distances.

Always consider specific requirements of the site to define position of the coolers.

For unusual requirements or detailed recommendations on location, please consult **Jacir**.



Prescription TOPAZ NEO

High performance adiabatic cooler, **JACIR** brand, **TOPAZ NEO**……. series will be designed to operate with a glycol content of …. %.

Adiabatic cooler will be selected according the following data:

Power to be dissipated:
Ambient air temperature of ……. °C, and a wet bulb temperature of ……
Temperature range from…….. C° to ……..C°
The sound pressure level will not be greater than ……. dB(A) at 10 meters, average in 5 directions.

Adiabatic cooler data **JACIR** brand **TOPAZ NEO** type ……

Tube coils

- ✓ EUROVENT certified coils
- ✓ The coils will be tested under pressure up to 22 bars and will have passed tests and certifications for thermal performance, sealing and pressure according to DESP.
- ✓ The coils will be vertically installed, in "H" configuration, in order to allow full access to the internal sides of the coils and to the mechanics, without intermediate wall, through a service entrance over the whole width and height of the equipement,
- ✓ Tube Coils will be made of copper tubing diameter 12mm and aluminium fins, epoxy coated,
- ✓ The tubes thickness will from 0.30mm to 0.32mm according equipment size,
- ✓ The coils will be tested hydraulically to 22 Bar,
- ✓ Tubes will be seamless and expanded through the fins to secure a mechanical resistance and optimized thermal conductivity,
- ✓ The seamless headers will be installed on a single side of the unit to make the internal access easier by a large service entrance.

Pre cooling by evaporation

- ✓ The pads will be made of cellulose, chemically treated in order to avoid moisture and to improve its absorbing characteristics ,
- ✓ The media pads are not directional, so that any side can be used,
- ✓ The cooling/ humidifying pads will cover the whole air inlet section, on the two sides of the unit,
- ✓ Removal of the pads is simple and does not require any tools or lifting equipment.

Water distribution

- ✓ The open water distribution channels will be designed for easy cleaning and will be made of Z-STEEL stainless steel , without external pressure regulation,
- ✓ The open water distribution channels will be placed out of the air flow, easily accessible under the hood without help of any tools,
- ✓ In order to significantly reduce water consumption in adiabatic mode, the Z-STEEL stainless steel headers will collect the non-evaporated water. The water will be sent to a stainless steel Z-STEEL sump. Water level regulation will be secured by and one or two selfpriming pumps,
- ✓ The system will include a drain valve, which will be automatically activated on a daily cycle,
- ✓ A full drain cycle, combined with full speed fan operation, will automatically dry the parts in contact with the water.

Prescription TOPAZ NEO

Motor fan sets

- ✓ The motor/ fan sets will be aligned in a single or a double row at the top of the unit. They will draw the air through the pads and tube coils. It will be composed by one motor per fan,
- ✓ EC technology motors (electronical commutation), will be IP 55 insulation class, 380/400 V, 50/60Hz, direct coupling requiring no maintenance, specially selected for a continuous running operation,
- ✓ Each motor will include its own frequency drive automaton driven,
- ✓ The motor/ fan sets will be completely removable from inside the unit for maintenance avoiding high walkways or lifting tool needs for operating staff security.

Control panel with automaton

- ✓ Schneider automaton will control EC motor fan speed and will activate the pre cooling mode,
- ✓ The TOPAZ NEO cooler will be delivered totally plug and play, with different communication languages as an option, and will be equipped with HMI (Human Machine Interface),
- ✓ As a standard, functions of the automaton will be as follows : general fault alarm, wet mode pad setting, drain valve position, water make up valve for the sump control, analogue output for fan speed control with frequency drive,
- ✓ Communication modes will be proposed as an option for TOPAZ remote monitoring .

Support frame and casing

- ✓ Topaz support and roof will be rigid and strong, made of SILVER-STEEL,
- ✓ The internal floor of the unit will be made of non-slip aluminum tread plate and will be removable in order to check easily the building terrace waterproof,
- ✓ All metallic parts in contact with water (adiabatic pre-cooling section) will be in Z-STEEL stainless steel,
- ✓ Internal access for unit maintenance and motor-fan set removal will be via a mechanical roller shutter door equipped with a safety switch, without any doorstep for ease of access to the whole height and width of the equipment,
- ✓ An access service door to the pump(s) and strainer will allow inspection and cleaning by the outside, without switch of the cooler.

Options

- ✓ Additional fixing frame to fix a protection on the medias (against insects, near forests, etc.)
- ✓ Color choice of the medias for a good integration in architecture site
- ✓ Backup mode on the pump (s)
- ✓ Backup mode on the motor fan set
- ✓ Automaton communication gateway Ethernet, Modbus, LonWorks, or BACnet
- ✓ Maintenance table with pulleys (or cylinders) to disassemble the motor-fan units from the inside of the device in complete safety
- ✓ insulation plate in place of motor fan set during its maintenance to keep safe the performance
- ✓ Removable floor made of non-slip aluminum tread plate for safe maintenance for waterproof check.

Prescription TOPAZ NEO drainable TMV

High performance adiabatic cooler, **JACIR** brand, **TOPAZ NEO**……. series will be designed to operate with a glycol content of …. %.

Adiabatic cooler will be selected according the following data:
Power to be dissipated:
Ambient air temperature of ……. °C, and a wet bulb temperature of ……
Temperature range from…….. C° to ……..C°
The sound pressure level will not be greater than ……. dB(A) at 10 meters, average in 5 directions.

Drainable and non freezing Adiabatic cooler data **JACIR** brand **TOPAZ NEO** type **TMV** ……

Tube coils

- ✓ EUROVENT certified coils
- ✓ The coils will be tested under pressure up to 22 bars and will have passed tests and certifications for thermal performance, sealing and pressure according to DESP.
- ✓ The coils will be vertically installed, in "H" configuration, in order to allow full access to the internal sides of the coils and to the mechanics, without intermediate wall, through a service entrance over the whole width and height of the equipement,
- ✓ Tube Coils will be made of copper tubing diameter 12mm and aluminium fins, epoxy coated,
- ✓ The tubes thickness will from 0.30mm to 0.32mm according equipment size,
- ✓ The coils will be tested hydraulically to 22 Bar,
- ✓ Tubes will be seamless and expanded through the fins to secure a mechanical resistance and optimized thermal conductivity,
- ✓ The seamless headers will be installed on a single side of the unit to make the internal access easier by a large service entrance.
- ✓ Geometrical configuration of drainable coils: engineered tubes and coil arrangement enabling a complete drain under gravity (no compressed air injection needed).
- ✓ An additional integrated automatic drain will secure power and flow regulations (it excludes fluids collection tank). An electrical heat tracing and antifreeze protection will be necessary for process main piping until the electrical valve.

Pre cooling by evaporation

- ✓ The pads will be made of cellulose, chemically treated in order to avoid moisture and to improve its absorbing characteristics ,
- ✓ The media pads are not directional, so that any side can be used,
- ✓ The cooling/ humidifying pads will cover the whole air inlet section, on the two sides of the unit,
- ✓ Removal of the pads will be simple and will not require any tools or lifting equipment.

Water distribution

- ✓ The open water distribution channels will be designed for easy cleaning and will be made of Z-STEEL stainless steel , without external pressure regulation,
- ✓ The open water distribution channels will be placed out of the air flow, easily accessible under the hood without help of any tools,
- ✓ In order to significantly reduce water consumption in adiabatic mode, the Z-STEEL stainless steel headers will collect the non-evaporated water. The water will be sent to a stainless steel Z-STEEL sump. Water level regulation will be secured by and one or two selfpriming pumps,
- ✓ The system will include a drain valve, which will be automatically activated on a daily cycle,
- ✓ A full drain cycle, combined with full speed fan operation, will automatically dry the parts in contact with the water.

Prescription TOPAZ NEO drainable TMV

Motor fan sets

- ✓ The motor/ fan sets will be aligned in a single or a double row at the top of the unit. They will draw the air through the pads and tube coils. It will be composed by one motor per fan,
- ✓ EC technology motors (electronical commutation), will be IP 55 insulation class, 380/400 V, 50/60Hz, direct coupling requiring no maintenance, specially selected for a continuous running operation,
- ✓ Each motor will include its own frequency drive automaton driven,
- ✓ The motor/ fan sets will be completely removable from inside the unit for maintenance avoiding high walkways or lifting tool needs for operating staff security.

Control panel with automaton

- ✓ Schneider automaton will control EC motor fan speed and will activate the pre cooling mode,
- ✓ The TOPAZ NEO cooler will be delivered totally plug and play, with different communication languages as an option, and will be equipped with HMI (Human Machine Interface),
- ✓ As a standard, functions of the automaton will be as follows : general fault alarm, wet mode pad setting, drain valve position, water make up valve for the sump control, analogue output for fan speed control with frequency drive,
- ✓ Communication modes will be proposed as an option for TOPAZ remote monitoring with drain share information for TOPAZ installed in series (parallel) .

Support frame and casing

- ✓ Topaz support and roof will be rigid and strong, made of SILVER-STEEL,
- ✓ The internal floor of the unit will be made of non-slip aluminum tread plate and will be removable in order to check easily the building terrace waterproof,
- ✓ All metallic parts in contact with water (adiabatic pre-cooling section) will be in Z-STEEL stainless steel,
- ✓ Internal access for unit maintenance and motor-fan set removal will be via a mechanical roller shutter door equipped with a safety switch, without any doorstep for ease of access to the whole height and width of the equipment,
- ✓ An access service door to the pump(s) and strainer will allow inspection and cleaning by the outside, without switch of the cooler.

Options

- ✓ Automated drain system: TOPAZ NEO drainable TMV
- ✓ Automated drain monitoring for coils drain
- ✓ Additional fixing frame to fix a protection on the medias (against insects, near forests, etc.)
- ✓ Color choice of the medias for a good integration in architecture site
- ✓ Backup mode on the pump (s)
- ✓ Backup mode on the motor fan set
- ✓ Automaton communication gateway Ethernet, Modbus, LonWorks, or BACnet
- ✓ Maintenance table with pulleys (or cylinders) to disassemble the motor-fan units from the inside of the device in complete safety
- ✓ insulation plate in place of motor fan set during its maintenance to keep safe the performance
- ✓ Removable floor made of non-slip aluminum tread plate for safe maintenance for waterproof check.