



# WSAT-XSC 200H-360L

AIR-COOLED WATER CHILLER RATED FROM 510 TO 960 KW

SPINCHILLER represents the very latest step in the evolution of chiller units. Designed specifically to optimize efficiency at partial loads, units of the SPINCHILLER series offer lower energy consumption — under normal operating conditions — than any other chiller of similar rated capacity.



## WSAT-XSC 200H - 360L (R-410A)

Size	Cooling [kW]
200H	511
220H	558
230H	609
240H	647
270J	692
300L	748
315L	797
330L	860
345L	910
360L	965

The SPINCHILLER series signals a turning point in the development of this type of unit. It incorporates all the newest technology currently available, and is characterized by:

#### EFFICIENCY

thanks to special features of construction, the SPINCHILLER guarantees high energy efficiency, especially when operating under partial load conditions;

#### SELF-ADAPT CAPABILITY

evolved electronics ensure that the operating parameters of the chiller can be adapted to the load conditions of the overall system, optimizing power consumption, minimizing noise and extending the life of components;

#### RELIABILITY SCROLL

compressors and newly designed electronic controllers combine to give levels of reliability unattainable hitherto with conventional units of similar rated capacity

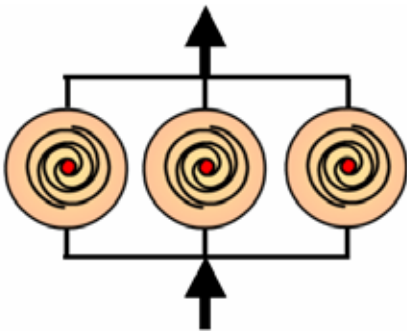
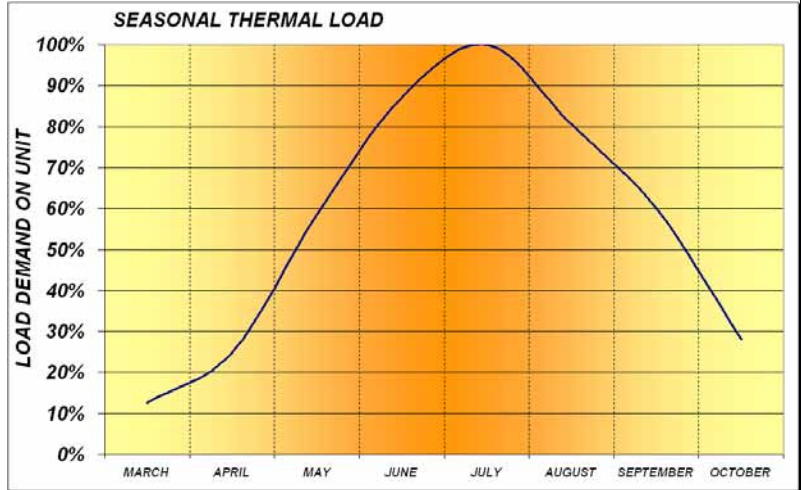
Clivet is participating in the EUROVENT Certification Programme "Liquid Chilling Packages". Products are listed in the EUROVENT Directory of Certified Products and in the site [www.eurovent-certification.com](http://www.eurovent-certification.com). Eurovent Chillers Certification Programme covers air cooled packaged chillers up to 600 kW and water cooled packaged chillers up to 1500 kW.



**CERTIFIED QUALITY SYSTEM UNI EN ISO 9001:2008**

**Comfort is a human right. Care for the environment is a human duty.**

The SPINCHILLER is an appliance of new conception, designed especially to operate with increasing efficiency as thermal load reduces, yet able to handle the maximum load demand whenever necessary. Because of significant diurnal and seasonal variations in load, chillers must operate for prolonged periods under partial load conditions. A SPINCHILLER unit always ensures conditions of maximum comfort coupled with ultra high efficiency for most of the system's working life, which means a big saving in electrical energy. This reflects the corporate policy of CLIVET, namely: offering fundamental and concrete solutions to help safeguard the well-being of people and their environment. By way of example, here is a seasonal thermal load graph relating to a multi-use building (shops, offices and apartments) located in the Milan area.

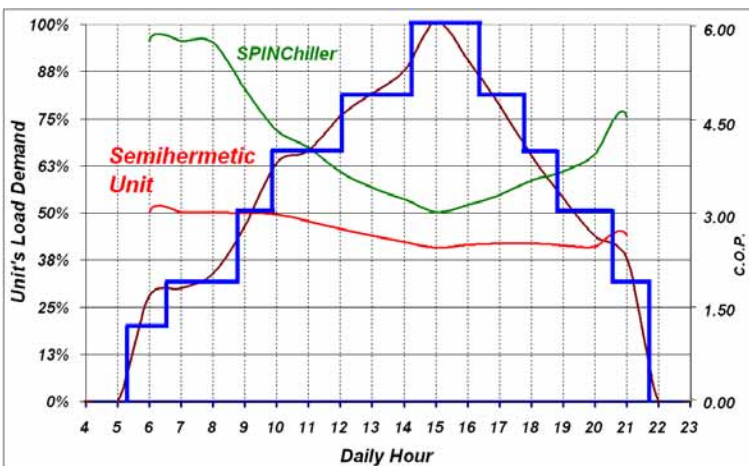
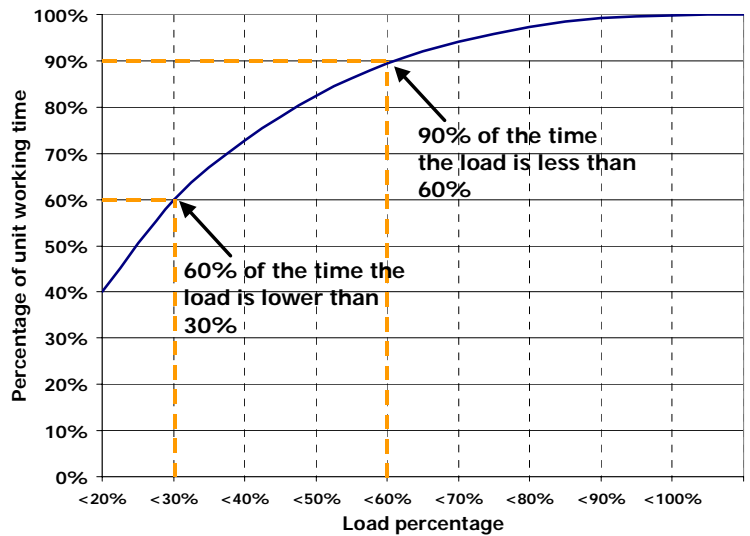


**MULTIPLE HIGH EFFICIENCY SCROLL COMPRESSORS IN THE SAME COOLING CIRCUIT**

A key aspect of the approach adopted in designing the SPINCHILLER is the notion of equipping a single cooling circuit with a battery of SCROLL compressors, rather than the conventional smaller number of bigger semi-hermetic compressors. This enables the unit to adapt perfectly to the system load by switching the available compressors in and out of operation progressively in response to the demand. The evolved control equipment used with SPINCHILLER units will optimize the activation sequence and balance the operating cycles of the compressors to maximum advantage.

**HIGH EFFICIENCY AT PARTIAL LOADS**

The unit in an air-conditioning system is selected on the basis of the maximum load the system is designed to handle. In practice however, maximum load conditions account only for a small percentage of the overall operating time, whereas the partial load operation is the true condition in which the unit had to operate. Simulation tests conducted in different buildings have shown that systems operate on average for 90% of total operating time with thermal load lower than 60%. Accordingly, operating efficiency under partial load conditions is a key consideration when selecting a chiller.

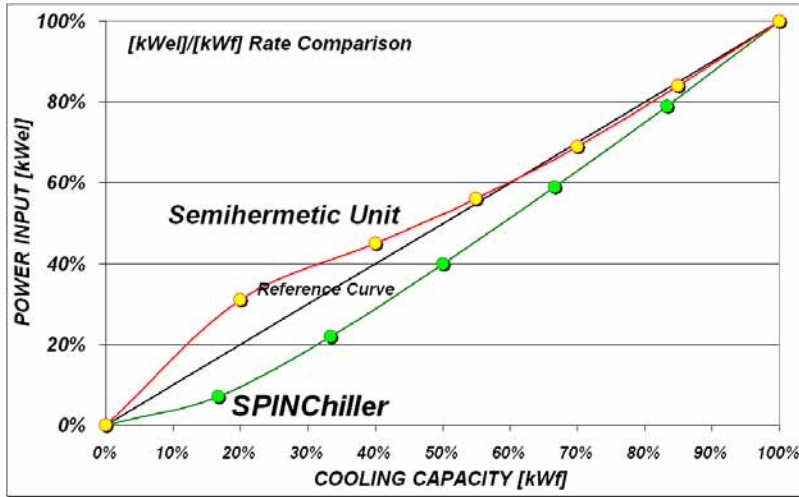


**RESPONSE TO CHANGING LOAD**

The higher efficiency of the SCROLL compressor and the special constructional features highlight the thermodynamic efficiency of the SPINchiller units. The graph to the side illustrates the extreme smoothness with which capacity delivered is adapted to the demand and shows how, even when not all the compressors are in operation, the efficiency of the SPINchiller remains higher than that of a conventional chiller, ACHIEVING EVEN DOUBLE THE EFFICIENCY WHEN OPERATING AT UNDER 50% LOAD. An advanced control system optimises the operating cycle and the rotation sequence of the compressors, significantly prolonging their service life. To obtain maximum efficiency, the electronic control activates the compressors according to the most favourable ratio between the heat exchange surfaces, so that the condensing and evaporation temperatures are always at the most beneficial values.

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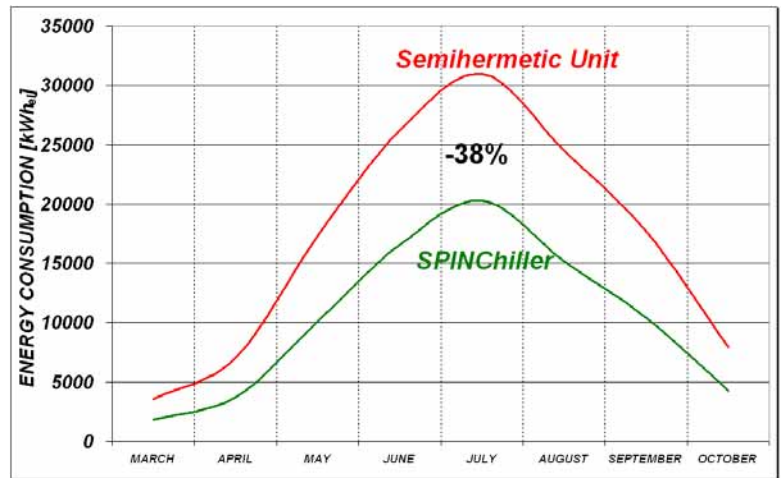
HIGHER EFFICIENCY GEARED TO OPTIMUM USE OF HEAT EXCHANGE SURFACES



In a traditional chiller operating at reduced load, the electrical power input is greater than the theoretical value (proportional to the cooling capacity delivered) due to friction and dispersion that affect the efficiency of the unit. The SPINCHILLER, on the other hand, consumes less power in percentage terms than the cooling capacity delivered thanks to the possibility of working with exchange surfaces that are oversized in all conditions when the maximum load is not required. This ensures extremely high EER values, higher than any other chiller in the same category.

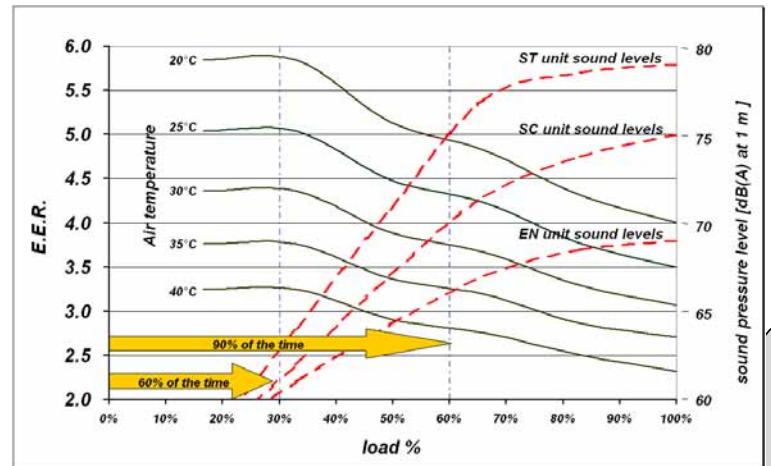
LOW OPERATING COSTS

Thanks to the various advantages already mentioned, a unit of the SPINCHILLER series can count on levels of efficiency much higher than those of a conventional chiller almost all of the time when in operation. Comparing the electrical power consumption of a SPINCHILLER with that of a conventional chiller of similar rated capacity — operating in the same system — the SPINCHILLER delivers a saving of around 38% over the season. These performance values, and unparalleled intrinsic reliability, make the SPINCHILLER an unbeatable option in terms both of pay back and of troublefree operation.



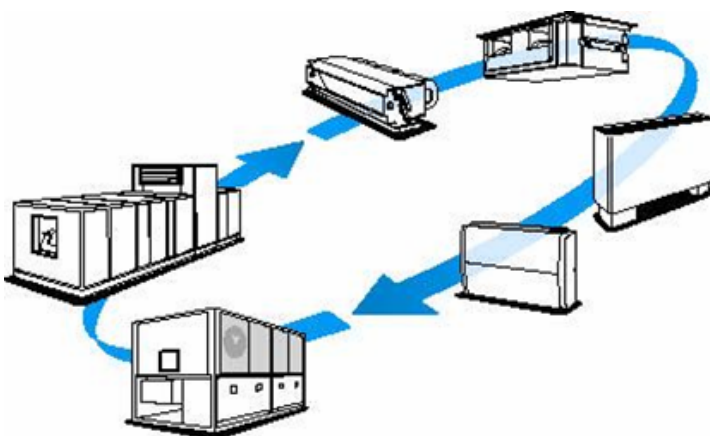
NOISE TOO IS LOAD-DEPENDENT

The electronic condensation control, included as standard on all SPINCHILLER units, is designed to adjust the speed of the fans automatically as the thermal load reduces. Given that the fans are the main source of noise in a chiller, this is a feature that brings important benefits, especially at night-time, when the demand on the system is less but sensitivity to noise is greatest. From the graph, it will be seen that for 90% of operating time, the sound pressure level is around 6-8 dB(A) lower than would be the case when operating at maximum load.



INTEGRATION INTO THE SYSTEM

The SPINchiller unit is able to communicate with other units of the CLIVETmaxi programme when installed and connected. All products of the CLIVETmaxi use the CLIVETtalk facility. This allows connected units to engage in a continuous exchange of information on ambient conditions, and on how to use the information. Each individual unit can control its own operating parameters natively, on the basis not only of the conditions impacting on it directly, but also of those affecting the entire installation. The result is an extremely high level of overall efficiency, as only a fully integrated system of components can deliver.



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**STANDARD UNIT SPECIFICATIONS**

**COMPRESSOR**

scroll compressor complete with: overload thermal protection, high refrigerant discharge temperature, rubber antivibration mounts, oil charge.  
A oil heater is automatically switched on at the compressor shut-down to prevent oil dilution by the refrigerant.

**STRUCTURE**

hot-galvanized and painted plate structure with pre-painted aluminium external panelling to ensure maximum weatherability. The uniform distribution of the weight of the unit is guaranteed by the base structure, made up of galvanized and painted plate section bars, and featuring holes to simplify the lifting and earthing of the unit.

**INTERNAL EXCHANGER**

Direct expansion exchanger with four independent circuits on the refrigerant side for each compressor. The tube bundle is removable and allows easy maintenance. The exchanger is made from a carbon steel shell. The high-efficiency tubes, anchored to the tube plate by mechanical expansion, are made from copper, fluted to increase heat exchange and studied to be used with the modern ecological refrigerants. In addition, complete with safety differential pressure switch on the water side, antifreeze heater to protect against the risk of ice, and closed-cell heat insulation that prevents the formation of condensate and heat exchange with the outside.

**EXTERNAL EXCHANGER**

heat exchange coil with aluminium fins and copper tubes in staggered rows. The coils are complete with integral subcooling circuit which assures the correct refrigerant feeding of the expansion valve. Available in different options as per optional list.

**FAN**

Helical fans with sickle-shaped blades with "Winglets" at the end, coupled directly to a three phase electric external rotor motor with thermal protection incorporated in version IP 54. Housed in aerodynamically shaped nozzles to increase efficiency and minimize noise levels. They are fitted with protective safety guard grilles.

**REFRIGERANT CIRCUIT**

the units are made with independent refrigerant circuits, each with:

- replaceable anti-acid solid cartridge dehydrator filter
- sight glass with moisture indicator
- electronic expansion valve (see details further on)
- high pressure switch
- low pressure switch
- low pressure safety valve
- high pressure safety valve
- compressor discharge shut-off valve

**ELECTRICAL PANEL**

the Power Section includes:

- main door lock isolator switch
- isolating transformer for auxiliary circuit power supply
- compressor circuit breaker
- fan overload circuit breakers
- compressor control contactor

- fan control contactors
  - phase-cutting fan speed control
- the control section includes:
- proportional + integral water temperature control
  - antifreeze protection
  - compressor overload protection and timer
  - self-diagnosis system with immediate display of the error code
  - compressor operating hour display
  - remote ON/OFF control
  - automatic compressor start rotation control
  - relay for remote cumulative fault signal
  - input for demand limit (absorbed power limit according to an external signal 0÷10V or 4÷20mA)
  - prealarm function for water anti-ice and high refrigerant gas pressure
  - display of the set values, the error codes and the parameter index
  - ON/OFF and alarm reset buttons
  - interface terminal with graphic display
  - Electronic for Elfo Control system (optional)

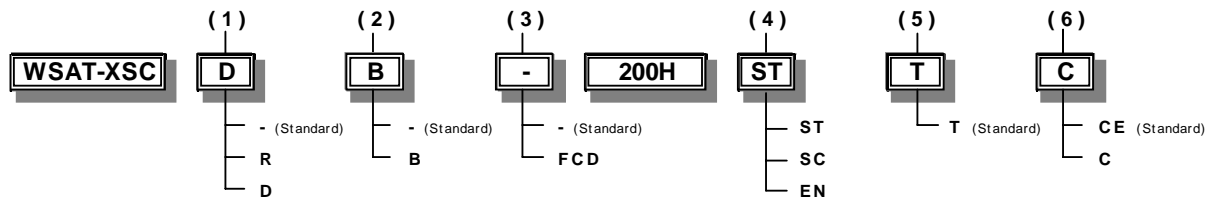
**ACCESSORIES**

- copper / copper condenser coils
- copper / aluminium condenser coils with acrylic lining
- steel mesh strainer to be mounted at the exchanger inlet. Should the filter not be installed in the water system, Clivet declines all responsibility and the warranty on the equipment automatically expires .
- condenser coil and service compartment protection grilles
- compressor suction shut-off valve
- high and low pressure gauges
- Hydro Pack (see page 8)
- Anti-ice electric heaters utility side for hydronic group
- phase monitor
- power factor correction capacitors (cosfi > 0.9)
- Free contacts for compressor state
- Soft starter
- microprocessor remote control module
- set point compensation with 4-20 mA or 0-10 V signal
- set point compensation with outside temperature probe
- set point compensation according to the outside enthalpy
- data logger (device for the acquisition of status and regulation values, as well as for recording the operation conditions in the surrounding of alarm events)
- spring antivibration mounts
- ECOBreeze (see page 7)
- Master-Slave function
- CAN/LON WORKS serial converter kit
- CAN/MODBUS serial converter kit

**TEST**

All the units are factory-tested in specific steps, before shipping them. After the approval, the moisture contents present in all circuits are analyzed, in order to ensure the respect of the limits set by the manufacturers of the different components.

**CONFIGURATION CODE**



**(1) ENERGY RECOVERY**

**Total energy recovery(R)**  
performed using braze-welded plate exchangers suitable for recovering 100% of the condensing heat for the production of hot water  
In addition, exchangers are complete with safety differential pressure switch on the water side, antifreeze heater to protect against the risk of ice.

**Partial energy recovery(D)**  
Performed using braze-welded plate exchangers suitable for recovering the desuperheating heat, up to a maximum of 20% of the total heat of the unit.  
In addition, exchangers are complete with antifreeze heater to protect against the risk of ice.

**(2) LOW TEMPERATURE**

**Water low temperature(B)**  
this version allows unit operation in the range of water and glycol mix temperatures between +4 and -8°C.  
Two Versions are available:

- Unit only for low temperatures
- Unit with double set-point operating set-point

(Please contact our Sales office for special conditions)

**(3) FREE COOLING**

**direct Free-cooling(FCD)**  
Version that allows to recovery free-cooling from ambient when the ambient air temperature is lower than the system outlet water temperature.

**(4) ACOUSTIC CONFIGURATION**

**Standard acoustic configuration(ST)**  
see description "STANDARD UNIT SPECIFICATIONS"  
**Acoustic configuration with compressor soundproofing(SC)**  
this configuration is obtained by inserting the compressors in a soundproof enclosure.  
**Extremely low noise acoustic configuration(EN)**  
this configuration is reached by inserting the compressor in an soundproofed enclosure and reducing the fan speed.

**(5) ENERGY EFFICIENCY**

**Energy efficiency for temperate climate(T)**  
standard

**(6) HEAT EXCHANGERS APPROVALS**

Heat exchangers approvals C = CLIVET (Internal Testing)(CLV)  
Heat exchangers approvals CE = PED (European Testing)(PED)

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## COMPATIBILITY OF WSAT-XSC OPTIONS

OPTIONS	DESCRIPTION	200H	220H	230H	240H	270J	300L	315L	330L	345L	360L
FCD + ST	Direct Free-cooling, Standard acoustic configuration,	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
FCD + SC	Direct Free-cooling, Acoustic configuration with compressor soundproofing,	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FCD + EN	Direct Free-cooling, Extremely low noise acoustic configuration,	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
FCD + B	Direct Free-cooling, Water low temperature,	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
FCD + D	Direct Free-cooling, Partial energy recovery,	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FCD + R	Direct Free-cooling, Total energy recovery,	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
FCD + CCCA	Direct Free-cooling, Copper / aluminium condenser coil with acrylic lining,	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
FCD + CCCC	Direct Free-cooling, Copper /copper condenser coil,	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
FCD + 2PM	Direct Free-cooling, Hydropack with 2 pumps,	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	✓	✓
FCD + 2PM + D	Direct Free-cooling, Hydropack with 2 pumps, Partial energy recovery	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	✓	✓
D + R	Partial energy recovery, Total energy recovery,	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
D + 2PM	Partial energy recovery, Hydropack with 2 pumps,	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R + 2PM	Total energy recovery, Hydropack with 2 pumps,	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
2PM + PUA2	Hydropack with 2 pumps, 2 poles type A pump,	✓	✓	✓	✓	✓	✓	✓	⊗	⊗	⊗
2PM + PUB2	Hydropack with 2 pumps, 2 poles type B pump,	✓	✓	✓	✓	✓	✓	✓	⊗	⊗	⊗
2PM + PUC2	Hydropack with 2 pumps, 2 poles type C pump,	⊗	⊗	✓	✓	✓	✓	✓	✓	✓	✓
2PM + PUD2	Hydropack with 2 pumps, 2 poles type D pump,	⊗	✓	✓	✓	✓	✓	✓	✓	✓	✓
2PM + PUM4	Hydropack with 2 pumps, 4 poles type M pump,	✓	✓	✓	✓	✓	✓	✓	✓	⊗	⊗
2PM + PUN4	Hydropack with 2 pumps, 4 poles type N pump,	✓	✓	✓	✓	✓	✓	✓	✓	⊗	⊗
2PM + PUO4	Hydropack with 2 pumps, 4 poles type O pump,	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2PM + PUP4	Hydropack with 2 pumps, 4 poles type P pump,	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FFCP + SFSTR	Power factor correction capacitors (cosfi > 0.9), Soft Start,	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗

**SOUND LEVELS**

**Acoustic configuration: Standard (ST)**

Size	Sound Power Level (dB)								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
200H	93	86	90	96	92	96	89	84	80	100
220H	98	87	90	100	94	92	86	82	80	100
230H	98	87	90	100	94	93	87	82	80	100
240H	99	88	91	101	95	93	87	83	81	101
270J	99	89	92	101	95	94	88	84	81	101
300L	100	89	92	102	96	94	88	84	81	102
315L	100	90	93	102	96	95	89	84	81	102
330L	100	90	93	102	96	95	89	85	82	102
345L	101	91	94	103	97	96	90	85	82	103
360L	101	91	94	103	97	96	90	85	82	103

Measures according to ISO 3744 regulations, with respect to the EUROVENT 8/1 certification.  
 the sound levels refer to the unit at full load, in the rated test conditions.  
 The sound pressure level refers to a distance of 1m from the external surface of the units operating in an open field.  
 data referred to the following conditions :  
 internal exchanger water = 12/7°C  
 outside air temperature 35°C  
 the sound levels EN version is valid within the operation limits relative to these acoustic versions; make reference to the noise data relative to SC version for higher external air temperature and in any case included within the operation limits of SC version.

**Acoustic configuration: compressors soundproofing (SC)**

Size	Sound Power Level (dB)								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
200H	87	82	90	94	85	89	83	79	75	95
220H	92	83	90	98	87	86	80	77	76	96
230H	92	83	90	98	87	86	80	77	76	96
240H	93	83	91	98	88	86	81	78	77	97
270J	94	85	92	99	89	87	82	79	77	98
300L	95	86	93	100	90	88	83	80	78	99
315L	95	86	94	101	90	88	83	80	78	99
330L	95	86	94	101	90	89	83	81	78	99
345L	96	87	95	101	91	89	84	81	79	100
360L	96	87	95	102	91	90	84	81	79	100

**Acoustic configuration: Extremely low noise (EN)**

Size	Sound Power Level (dB)								Sound pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
200H	90	81	82	88	80	86	78	77	70	90
220H	95	81	81	92	83	82	75	74	71	91
230H	95	81	81	92	83	82	75	74	71	91
240H	95	81	81	92	83	82	75	74	71	91
270J	95	82	82	92	83	83	75	75	71	91
300L	96	83	83	94	84	84	77	76	72	93
315L	97	84	84	94	85	84	77	77	72	93
330L	97	84	84	94	85	84	77	77	73	93
345L	98	85	85	95	86	85	78	78	73	94
360L	98	85	85	95	86	85	78	78	73	94

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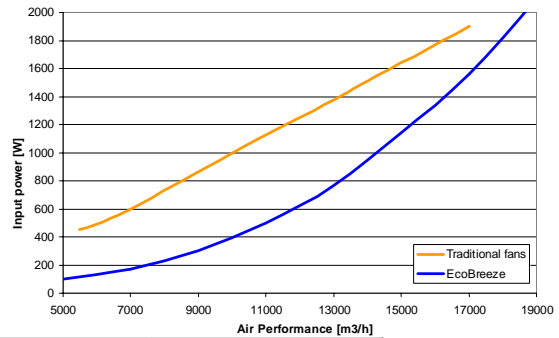
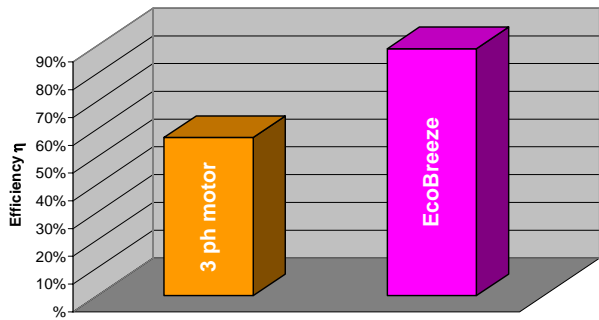
**Accessory: ECOBreeze**



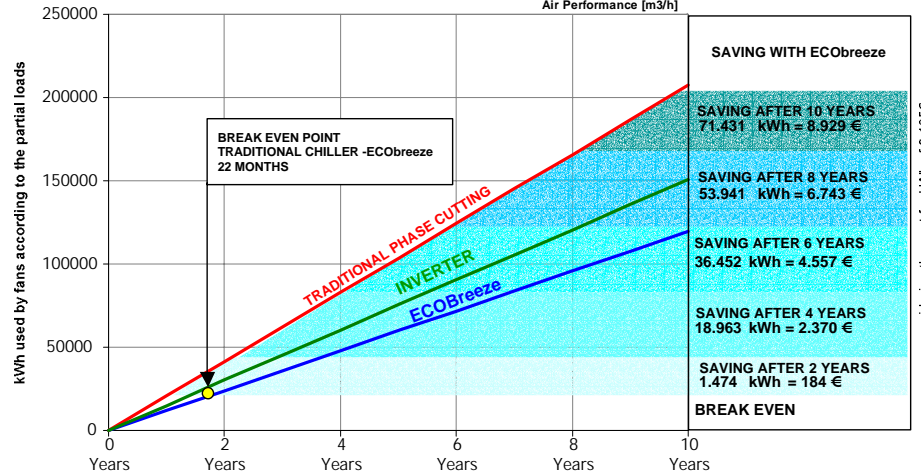
Within the range of air condensation-based products, Clivet introduces an innovative technology based on the deployment of fans driven by Brushless motors, completely electronically-controlled, characterised by extremely high efficiency and which allow a very advanced adjustment of fan speeds.

The ECOBreeze option envisages the utilisation of special fans driven by electrical Brushless motors. This technology envisages a permanent-magnets rotor, coupled with a very advanced magnetic field electronic switching control to the stator, directly integrated within the motor itself. A veritable "feather in the cap" is the electronic switching device that manages the precise and effective modulation of the fan's rotation speed and, therefore, of the fan's capacity. The management of this device is entrusted to the unit's general control system, thus assuring complete integration with the other refrigerating unit's components; this also allows the attaining of an exceptional overall efficiency. Furthermore, by integrating the control directly within the fan, one is guaranteed absolute suitability in the regulator/fan pair, differently from what is experienced in traditional systems. Finally, under particularly demanding or emergency conditions, for example should the environment temperature rise beyond the limits foreseen, before shutting the delivered power and/or setting the unit under alarm, the control device will detect the specific situation and will force the fans to a rotation speed beyond the nominal value, thus assuring an additional capacity of about 15% of the specified value. In this way, it is possible to assure the production of refrigerated water also when traditional units would be forced into alarm conditions.

**Electric motor intrinsic efficiency guarantees a consumption reduction in every operation conditions.**



The final result confirms that in comparison to the traditional three-phase induction motors, also with frequency and/or voltage governing, the internal losses within the iron are reduced by 60%, those of the copper by 40%, whereas the intrinsic consumption is about half of that of a traditional modulator (inverter, phase adjuster). The energy cutback, and therefore the money saved, under all operating conditions are truly remarkable and the initial investment is repaid in very few months. From that moment onwards the reduced operative costs turn directly into an economic gain for the user.



The graph is referred to the **WSAT-XSC 200H** unit (with 8 fans) installed in Milan - for 2.000 h/year of operation.

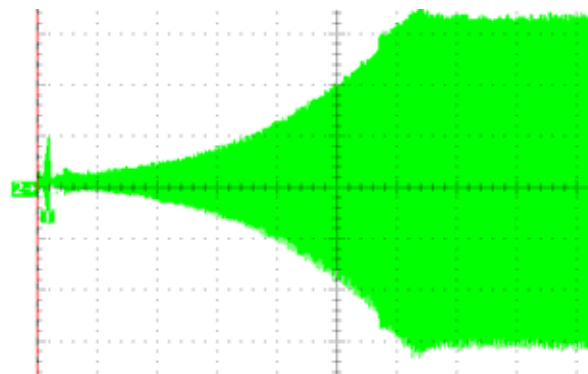
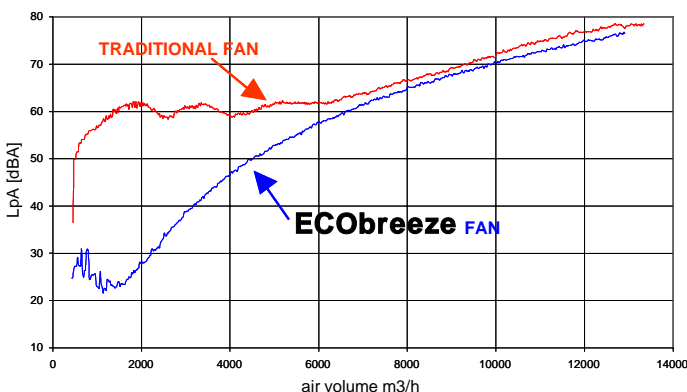
<b>WSAT-XSC</b>		200H	220H	230H	240H	270J	300L	315L	330L	345L	360L
PAY-BACK	Months	22									
Saving after 10 Years	kWh	71,431	89,267	89,267	89,267	107,132	107,132	116,064	124,997	133,929	142,862
	€ (0.125)	8,929	11,158	11,158	11,158	13,391	13,391	14,508	15,625	16,741	17,858
Using rate	h/Year	2'000									

**When fans turn at minimum necessary speed, noise emissions are reduced.**

In addition to this, a generalised reduction in noise emission is obtained, due to the effect of both the rotation speed which is always modulated to the most suitable value, in keeping with the operation conditions, and the technology deployed in the governing which doesn't induce particular frequencies and vibrations in the rotation.

**The start-up is progressive, without start absorption peaks.**

The current damping at start-up (see diagram) due to the control typology, but also to the absence of brushing contacts for the power supply to the rotor, drastically reduce the harmful stresses for the lifetime of the component. In the final analysis, the fan's life can be considered as practically unlimited (greater than 80,000 hours).



considering the cost for kWh of 0.125€

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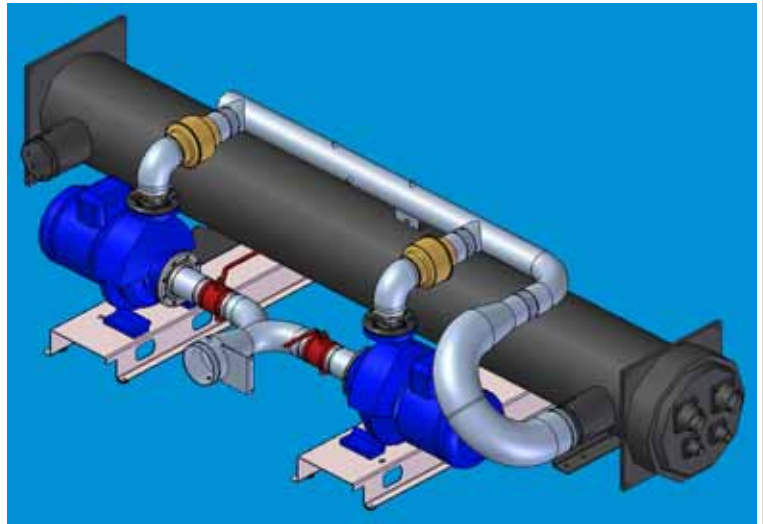
**Accessory: Hydropack**

**New concept of pumping station and reserve pump.**

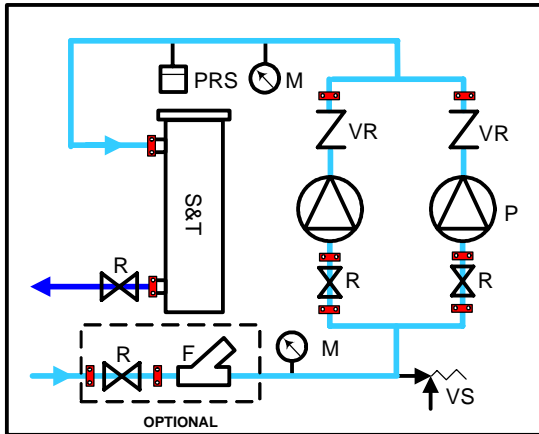
By equipping the refrigerating units with the Hydropack accessory, the necessary flow capacity/head are provided in different versions according to the plants potential.

Electric pumps with 2-pole motor (2950 rpm) for the versions ST/SC and electric pumps with 4-pole motors (1450 rpm) for the versions ST/SC/EN are available. The 4-pole option ensures a lower noise with lower max. useful head. More specifically, all main components (including the pre-setting of the connection to the system) are hydraulically connected through swift-latch connections instead of the traditional welding, flanging and threading, with obvious advantages for the user.

- They can be easily dismantled, affording an advantage in the inspection and maintenance operations.
- Work times are reduced by 90%.
- The deployment of specialised personnel is not necessary.
- The moving of single components is made very simple.
- Weight is reduced since at even piping dimensions the joints weigh half as much as the flanges.
- Utilisation of standard components that are available anywhere in the market.



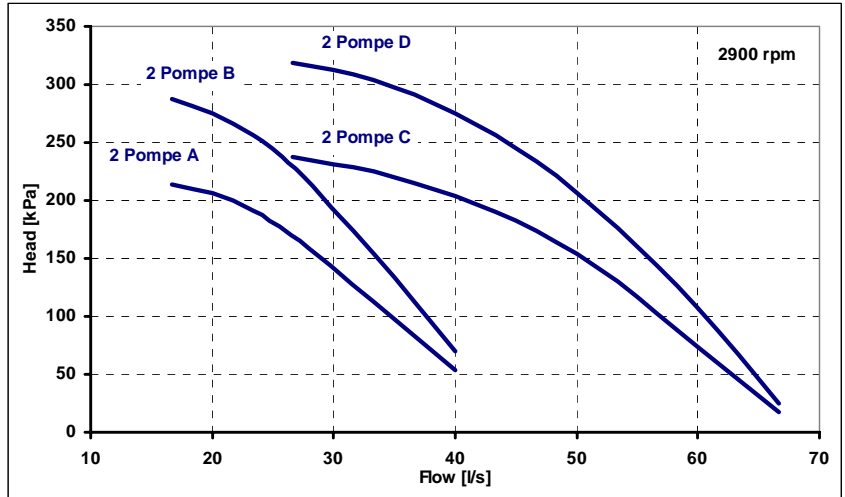
**CONNECTION SCHEME - PUMP GROUP**



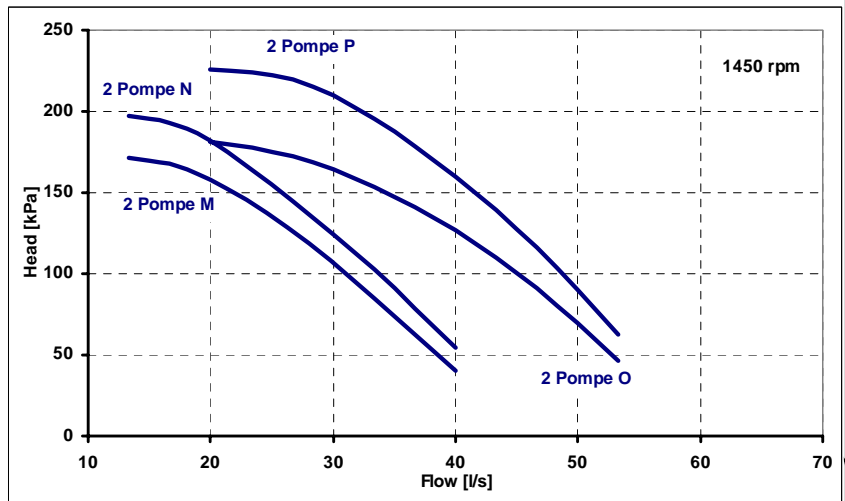
Multi pump hydronic group including:

- R=shut-off valves,
- F=steel mesh filter(optional),
- M=gauges,
- VS=safety valve(6 Bar),
- P=high efficiency single-structure and single-rotor electric pumps,
- VR=check valves,
- PRS= safety pressure switch (avoids pumps operation in case of water absence),
- PHE=evaporator
- kit including two blind plugs needed in case of pump removal for maintenance operations.

**HEAD DIAGRAM-FLOW RATE (2 POLE PUMP)**



**HEAD DIAGRAM- FLOW RATE (4 POLE PUMP)**



**ELECTRICAL DATA - SINGLE PUMP**

Hydropack		
Type	[kW]	[A]
A	8.0	17.0
B	11.0	23.0
C	15.0	31.0
D	22.0	44.0
M	8.0	17.4
N	11.0	24.8
O	11.0	24.8
P	15.0	31.6

Attention: the evaporator pressure drops have to be taken from the heads represented in these diagrams in order to obtain the available head values.

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### Standard electronic expansion valve

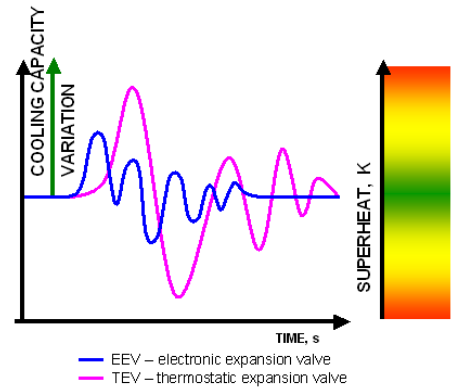
Efficiency is in the standard scope of supply as a result of the electronic expansion valve. This element optimizes the superheating in any load condition thus offering a large number of advantages which can be summed up as follows:

- Fast and precise action due to the microprocessor based control with PID algorithms and to the step-motor.
- High energetic efficiency in all conditions, thanks to the reduction of transients, in terms of amplitude and duration, following load variations.
- Extended operating limits of the unit concerning minimum partial load and minimum air temperature at condenser.
- Better operating conditions for the compressor, thanks to the lower discharge gas temperature and preventing liquid return and insufficient lubrication.
- Easy unit set-up, even in special application seen the flexibility of the valve and its control parameters .
- More responsible use of refrigerant as the overall quantity required is smaller.
- Enhanced reliability of the operation of refrigerant circuit due to simplification of its components, to the control of the maximum operating pressure (MOP) and to the individual alarm condition indication.



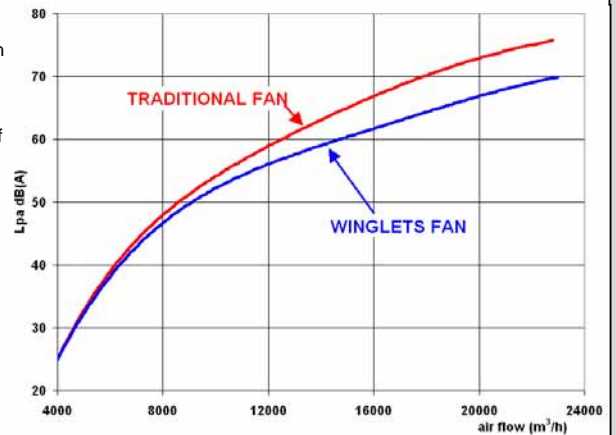
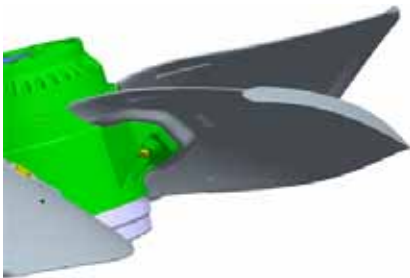
### Transient and effect on superheating

The instability of the superheating coming from the variation of the capacity supplied is reduced and is rapidly zeroed by the PID control and its fast reaction. This allows a steady operation, within the safety limits, around the most favorable value.



### New generation of fans

SPINchiller has a new axial-flow fan projected in the best European laboratories in collaboration with the builder. The result of the search allowed the development of the innovative "Winglets" airfoil-vane blade at the end of the blade. The development of these new blades allowed to get some important advantages both for the sound, with a media reduction of 6 dB (A), and for the energy with the consumption reduction of 10%.



### Seasonal efficiency=ESEER



ESEER: Guarantee in the performance means to be able to plan realistically the energy consumption and then the costs. The ESEER = European Seasonal Energy Efficiency Ratio, contrarily to the simple EER, is calculated as a combination of different operating conditions, which have been recently declared by Eurovent/CEN, in order to demonstrate the chiller efficiency while operating also in off-design conditions, normal in the mid-season.

	Conditions				
	Weight	Load (%)	Air	Water	
<b>a</b>	3	100	35	12 / 7	EERa = 2.76 x 0.03+
<b>b</b>	33	75	30	10.8 / 7	EERb = 3.64 x 0.33+
<b>c</b>	41	50	25	9.5 / 7	EERc = 4.62 x 0.41+
<b>d</b>	23	25	20	8.3 / 7	EERd = 5.49 x 0.23+
<b>ESEER = 4.44</b>					

- Calculation example referred to WSAT-XSC 200H SC unit.
- a,b,c,d, = partial load conditions and air temperature used for the ESEER calculation.
  - Weight % = space of time during which the unit works at the described conditions (used in the weighted sum).
  - Load % = partialization of the unit drop (referred to nominal capacity).
  - Air temperature = condensate coil intake air temperature.
  - Water temperature = evaporator water temperature.
  - EERa,b,c,d = EER calculated according to the partial load conditions

**Acoustic configuration: Standard (ST) / Compressors insulation (SC)**

**GENERAL TECHNICAL SPECIFICATIONS**

Size			200H	220H	230H	240H	270J	300L	315L	330L	345L	360L
<b>COOLING</b>												
Cooling capacity	1	kW	511	558	609	647	692	748	797	860	910	965
Compressor power input		kW	170	185	201	216	229	250	265	283	300	319
Total power input	2	kW	185	204	220	235	251	273	289	310	328	349
Heating capacity total recovery	3	kW	686	749	815	869	927	1005	1069	1151	1218	1293
Heating capacity partial recovery	3	kW	136	149	162	173	184	200	212	229	242	257
EER			2.76	2.73	2.77	2.75	2.75	2.74	2.76	2.78	2.78	2.76
ESEER			4.44	4.39	4.46	4.43	4.51	4.58	4.6	4.64	4.64	4.62
<b>COMPRESSOR</b>												
Type of compressors			SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL
No. of Compressors		Nr	8	8	8	8	10	12	12	12	12	12
Rated power (C1)		HP	50	55	55	60	60	75	75	75	75	90
Nominal Power (C2)		HP	50	55	55	60	60	75	75	75	90	90
Nominal Power (C3)		HP	50	55	60	60	75	75	75	90	90	90
Nominal Power (C4)		HP	50	55	60	60	75	75	90	90	90	92
Std Capacity control steps		Nr	8	8	8	8	10	12	12	12	12	12
Oil charge (C1)		l	10	12	12	11	11	20	20	20	20	17
Oil charge (C2)		l	10	12	12	11	11	20	20	20	17	17
Oil charge (C3)		l	10	12	11	11	20	20	20	17	17	17
Oil charge (C4)		l	10	12	11	11	20	20	17	17	17	17
Refrigerant circuits		Nr	4	4	4	4	4	4	4	4	4	4
<b>INTERNAL EXCHANGER</b>												
Type of internal exchanger	4		S&T	S&T	S&T	S&T	S&T	S&T	S&T	S&T	S&T	S&T
No. of internal exchangers		Nr	1	1	1	1	1	1	1	1	1	1
Water flow rate (Internal Exchanger)		l/s	24.4	26.7	29.1	30.9	33.1	35.7	38.1	41.1	43.5	46.1
internal exchanger pressure drop		kPa	57	69	55	62	65	76	59	67	58	64
Water content		l	125	114	222	222	207	207	184	184	225	225
<b>EXTERNAL SECTION FANS</b>												
Type of fans	5		AX	AX	AX	AX	AX	AX	AX	AX	AX	AX
Number of fans		Nr	8	10	10	10	12	12	13	14	15	16
Standard air flow		l/s	48565	57559	57559	57559	68393	68393	75440	79945	87170	91693
<b>CONNECTIONS</b>												
Water fittings			168.3	168.3	219.1	219.1	219.1	219.1	219.1	219.1	219.1	219.1
<b>NOISE LEVELS</b>												
Sound Pressure Level (10m)	6	dB(A)	68 (63)	68 (64)	68 (64)	69 (65)	69 (65)	69 (66)	70 (66)	70 (67)	70 (67)	71 (67)

- (1) data referred to the following conditions :  
internal exchanger water = 12/7°C  
external exchanger air intake 35°C
- (2) According to EUROVENT the Total Power Input does not consider the pump share, required to overcome the pressure drop for the solution circulation inside the exchangers.
- (3) recovery exchanger water=40/45°C
- (4) S&T = tube bundle
- (5) AX = axial-flow fan
- (6) The dates in brackets refer to SC configuration

**Acoustic configuration: Standard (ST) / Compressors insulation (SC)**

**OPERATING LIMITS (COOLING)**

Size			200H	220H	230H	240H	270J	300L	315L	330L	345L	360L
<b>EXTERNAL EXCHANGER</b>												
Max air intake temperature	1	°C	45	45	45	45	45	45	45	45	45	45
Max air intake temperature	2	°C	48	48	48	48	48	48	48	48	48	48
Min. air intake temperature	3	°C	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Min. air intake temperature	4	°C	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
Min. air intake temperature	5	°C	2	2	2	2	2	2	2	2	2	2
Min. air intake temperature	6	°C	11	11	11	11	11	11	11	11	11	11
<b>INTERNAL EXCHANGER</b>												
Max water inlet temperature		°C	23	23	23	23	23	23	23	23	23	23
Min. water outlet temperature	7	°C	5	5	5	5	5	5	5	5	5	5
Min. water outlet temperature	8	°C	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8

- data referred to the following conditions :  
internal exchanger water = 12/7°C  
difference between inlet / outlet water temperature = 5°C  
Warning: the still air condition is meant as absence of air flow to the unit. Any wind condition can let air pass through the condenser coil thus worsening the operating limits of the unit (see limits with air speed at 0,5 m/s & 1 m/s).
- Note: In any case, the unit should never be exposed to or operated, transported and/or stored at temperatures below -10°C.
- ATTENTION: IN CASE OF PREDOMINANT WINDS, WINDBREAK BARRIERS ARE NECESSARY.

- (1) Max inlet temperature - unit at full load
- (2) Max inlet air temperature - capacity-controlled unit with standard limit device
- (3) Min inlet air temperature - unit at full load and motionless ambient air
- (4) Min inlet air temperature - unit at partial load and motionless ambient air
- (5) Min inlet air temperature - unit at partial load and air speed of 0.5 m/s.
- (6) Min inlet air temperature - unit at partial load and air speed of 1 m/s.
- (7) standard unit  
external exchanger air intake 35°C
- (8) B = Low Temperature  
external exchanger air intake 35°C  
Fluid with ethylene glycol of 40%

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Acoustic configuration: Standard (ST) / Voltage: 400/3/50

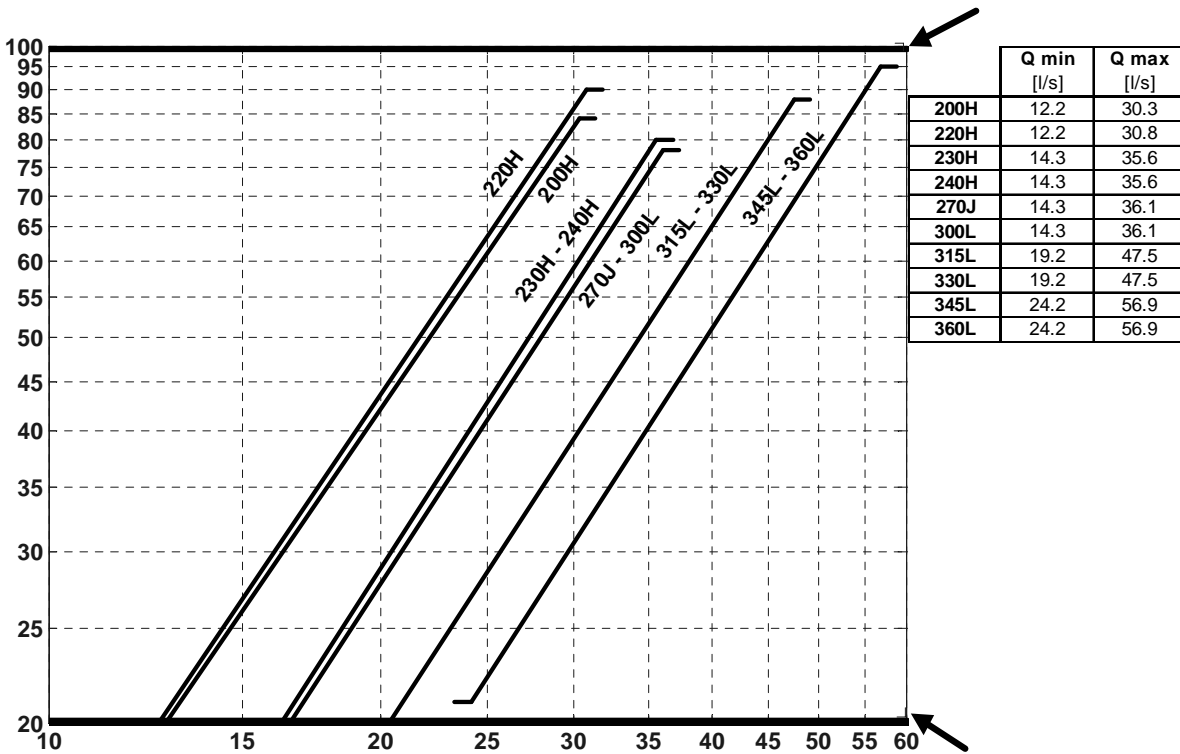
**ELECTRICAL DATA**

Size		200H	220H	230H	240H	270J	300L	315L	330L	345L	360L
<b>F.L.A. - FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS</b>											
F.L.A. - Total	A	425	478	492	505	589	665	689	713	737	761
<b>F.L.I. FULL LOAD POWER INPUT AT MAX ADMISSIBLE CONDITION</b>											
F.L.I. - Total	kW	257	281	294	307	344	378	399	420	441	462
<b>M.I.C. MAXIMUM INRUSH CURRENT</b>											
M.I.C. - Value	A	702	755	769	782	866	874	966	990	1014	1038

voltage unbalance: max 2 %  
power supply: 400/3/50 Hz +/-6%

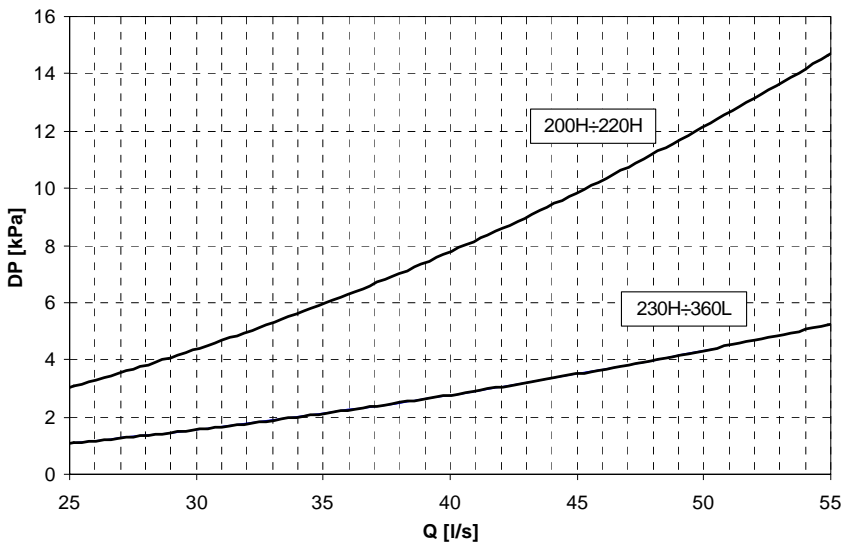
**EVAPORATOR PRESSURE LOAD: ST STANDARD - SC - EN**

EVAPORATOR PRESSURE DROP LIMIT. CAUTION: DO NOT USE OVER THIS LIMIT



EVAPORATOR PRESSURE DROP LIMIT. CAUTION: DO NOT USE UNDER THIS LIMIT

**ACCESSORIES**



**WATER FILTER**

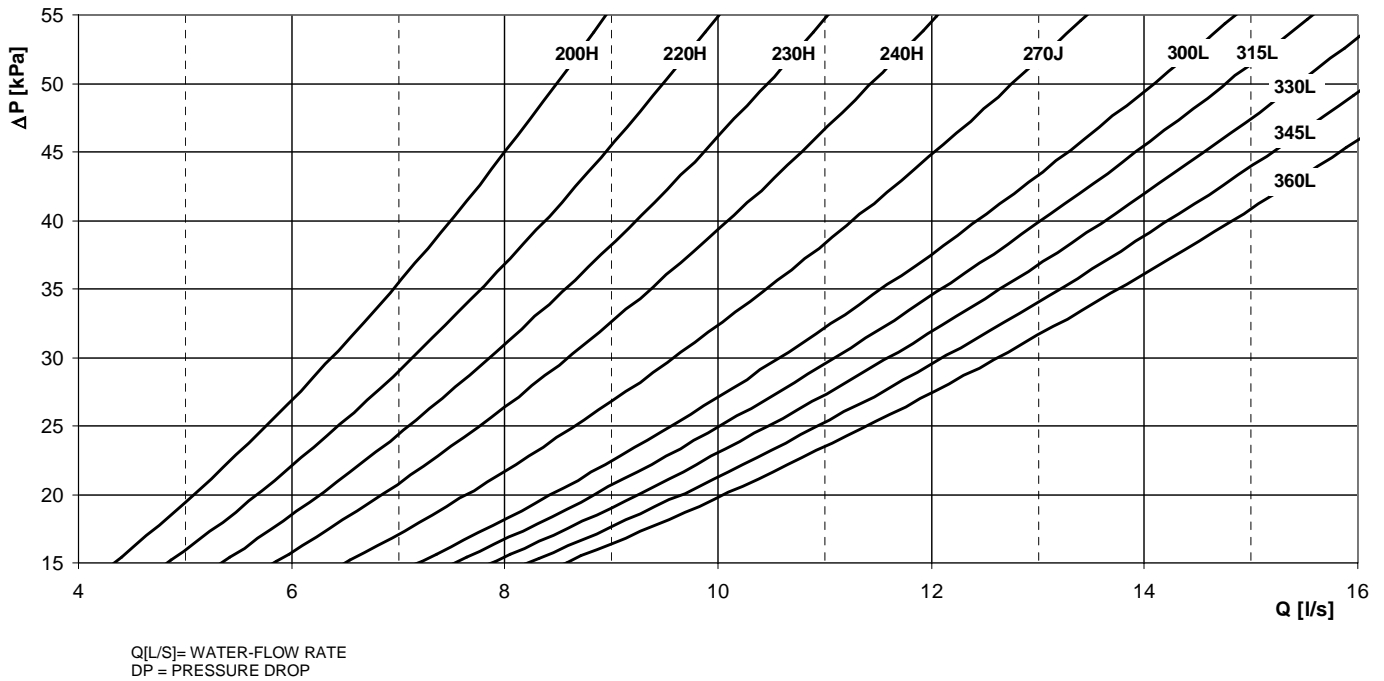
Pressure drop of the "water filter" accessory to be added to the pressure drop of the unit.

Q = water flow

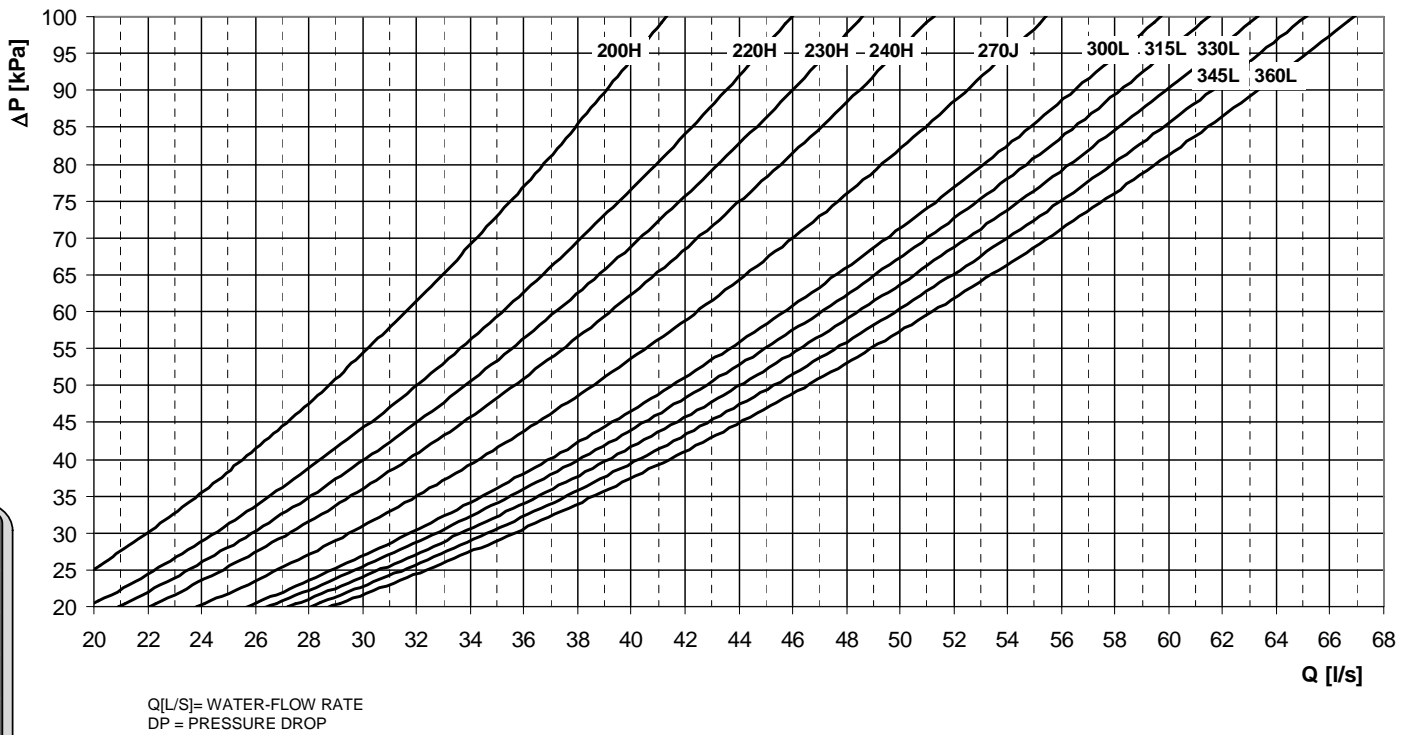
dP = pressure drop

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**EXCHANGER PRESSURE DROP PARTIAL ENERGY RECOVERY**



**EXCHANGER PRESSURE DROP TOTAL ENERGY RECOVERY**



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**ACOUSTIC CONFIGURATION: STANDARD (ST) / COMPRESSORS INSULATION (SC)**

**COOLING PERFORMANCE**

Size	To (°C)	EXTERNAL EXCHANGER AIR INTAKE TEMPERATURE (°C)													
		25		30		32		35		40		42		45	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
200H	5	537.7	139.8	510.1	153.5	499.0	159.2	482.4	167.8	454.7	182.5	443.6	188.6	426.8	197.8
	6	552.6	141.2	524.8	154.5	513.6	160.0	496.7	168.5	468.3	183.5	456.8	189.7	439.5	199.2
	7	567.9	142.6	539.7	155.7	528.3	161.2	511.1	169.7	482.1	184.7	470.3	190.9	452.6	200.5
	8	583.5	143.9	554.8	157.2	543.1	162.8	525.6	171.3	496.0	186.2	484.1	192.3	466.1	201.7
	9	599.5	145.1	569.9	159.1	558.1	164.8	540.2	173.4	510.2	187.9	498.2	193.9	480.0	202.8
	10	615.7	146.3	585.3	161.3	573.1	167.2	554.9	175.8	524.6	190.0	512.4	195.6	494.3	203.8
220H	5	574.4	151.6	546.1	166.6	534.6	172.8	517.4	182.2	488.5	198.2	476.8	204.7	459.2	214.6
	6	599.2	153.1	568.8	168.3	556.7	174.5	538.5	183.8	508.2	199.6	496.1	206.0	477.9	215.7
	7	621.1	154.8	589.5	170.0	576.9	176.1	558.0	185.4	526.4	201.1	513.7	207.4	494.8	216.9
	8	640.1	156.6	608.1	171.6	595.2	177.7	575.7	186.9	543.0	202.5	529.8	208.8	509.9	218.3
	9	656.3	158.6	624.6	173.3	611.6	179.3	591.9	188.4	558.1	203.9	544.3	210.2	523.3	219.8
	10	669.7	160.6	639.0	174.9	626.2	180.8	606.3	189.8	571.7	205.3	557.2	211.7	535.0	221.5
230H	5	623.5	165.2	594.2	181.1	582.2	187.5	564.1	197.2	533.2	213.8	520.6	220.5	501.6	230.6
	6	650.4	168.0	619.5	183.3	606.9	189.6	587.7	199.2	555.1	215.5	541.9	222.2	521.7	232.3
	7	674.3	170.3	642.0	185.3	628.8	191.5	608.8	200.9	574.7	217.1	560.8	223.8	539.8	233.9
	8	695.2	171.9	661.7	187.0	648.1	193.2	627.3	202.6	592.0	218.7	577.6	225.3	555.7	235.3
	9	713.2	172.9	678.7	188.3	664.6	194.6	643.3	204.1	606.9	220.2	592.1	226.7	569.6	236.6
	10	728.2	173.4	692.9	189.4	678.5	195.8	656.6	205.5	619.5	221.6	604.3	228.1	581.4	237.8
240H	5	661.0	177.4	630.2	194.6	617.7	201.5	598.7	211.9	566.3	229.4	553.2	236.4		
	6	688.5	181.1	657.1	197.4	644.1	204.0	624.4	214.0	590.5	231.1	576.6	238.0		
	7	713.7	183.8	681.0	199.6	667.6	206.1	647.0	216.0	611.5	232.9	597.0	239.9		
	8	736.5	185.5	702.2	201.3	688.1	207.8	666.5	217.8	629.5	234.9	614.3	241.9		
	9	757.0	186.1	720.5	202.5	705.6	209.2	683.0	219.4	644.4	236.9	628.7	244.1		
	10	775.1	185.7	736.0	203.0	720.2	210.1	696.4	220.9	656.2	239.1	640.0	246.5		
270J	5	723.4	188.2	686.9	206.2	672.0	213.6	649.4	225.1	610.9	244.9	595.2	253.0	571.4	265.5
	6	748.9	190.4	711.1	208.3	695.7	215.7	672.3	227.0	632.5	246.5	616.3	254.5	591.8	266.8
	7	771.2	192.4	732.0	210.2	716.1	217.6	692.0	228.8	651.0	248.2	634.4	256.1	609.2	268.2
	8	790.3	194.1	749.8	212.0	733.3	219.4	708.5	230.6	666.5	249.9	649.4	257.8	623.7	269.8
	9	806.0	195.5	764.3	213.7	747.4	221.1	721.9	232.4	678.8	251.7	661.4	259.6	635.1	271.5
	10	818.5	196.6	775.5	215.1	758.2	222.7	732.1	234.1	688.1	253.5	670.4	261.4	643.7	273.4
300L	5	787.3	204.6	745.1	224.8	728.0	233.1	702.0	245.9	658.1	267.9	640.3	276.9	613.3	290.8
	6	815.1	207.3	771.2	227.2	753.5	235.5	726.5	248.1	681.0	269.9	662.5	278.9	634.5	292.6
	7	838.9	209.7	793.9	229.5	775.7	237.7	747.9	250.2	700.9	271.9	681.7	280.8	652.7	294.5
	8	858.8	211.8	813.2	231.5	794.6	239.6	766.2	252.1	717.8	273.8	698.0	282.7	667.9	296.4
	9	874.8	213.7	829.1	233.3	810.3	241.4	781.4	253.9	731.7	275.6	711.3	284.6	680.0	298.3
	10	886.9	215.2	841.6	234.8	822.7	243.0	793.6	255.6	742.7	277.4	721.6	286.4	689.1	300.3
315L	5	835.1	217.7	793.9	238.1	776.9	246.7	750.7	259.9	705.5	282.9	686.9	292.5	658.4	307.3
	6	862.7	220.0	818.8	240.9	801.0	249.5	774.1	262.5	728.6	284.9	710.2	294.0	682.3	307.8
	7	888.7	222.2	843.1	243.3	824.7	251.8	796.9	264.8	750.3	286.7	731.5	295.6	703.1	309.2
	8	913.1	224.4	866.8	245.2	848.0	253.7	819.4	266.6	770.7	288.6	750.8	297.6	720.7	311.2
	9	935.9	226.6	890.1	246.7	870.9	255.1	841.3	268.0	789.7	290.4	768.2	299.7	735.2	313.9
	10	957.2	228.7	912.7	247.8	893.4	256.0	862.8	269.0	807.4	292.2	783.7	302.0	746.6	317.4

kWf = Cooling capacity in kW  
kWe = Compressor power input in kW  
To = Internal exchanger water outlet temperature in °C  
DT = difference between inlet / outlet water temperature = 5°C

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**ACOUSTIC CONFIGURATION: STANDARD (ST) / COMPRESSORS INSULATION (SC)**

**COOLING PERFORMANCE**

Size	To (°C)	EXTERNAL EXCHANGER AIR INTAKE TEMPERATURE (°C)													
		25		30		32		35		40		42		45	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
<b>330L</b>	5	895.7	233.8	852.8	255.7	835.0	264.8	807.7	278.8	760.6	303.0	741.1	313.0	711.3	328.4
	6	925.9	236.0	881.1	258.2	862.7	267.3	834.6	281.1	786.4	304.8	766.7	314.4	736.6	329.2
	7	954.1	238.4	907.6	260.7	888.6	269.7	859.7	283.4	810.2	306.7	790.0	316.2	759.3	330.5
	8	980.2	241.0	932.3	263.0	912.7	272.0	882.9	285.7	831.9	308.8	811.1	318.3	779.4	332.6
	9	1004	243.8	955.1	265.4	935.0	274.2	904.2	287.8	851.4	311.1	829.8	320.7	796.8	335.4
	10	1026	246.8	976.1	267.6	955.5	276.3	923.7	289.8	868.9	313.6	846.2	323.5	811.5	338.8
<b>345L</b>	5	936.8	246.8	889.9	270.4	871.2	280.0	843.3	294.6	796.9	319.3	778.5	329.4	750.8	344.7
	6	974.2	250.9	927.7	273.7	908.7	283.1	879.9	297.3	830.8	321.5	810.8	331.4	780.4	346.4
	7	1006	254.0	958.8	276.4	939.4	285.6	909.6	299.6	858.4	323.6	837.3	333.4	805.2	348.3
	8	1032	256.2	983.3	278.6	963.2	287.7	932.5	301.7	879.8	325.6	858.2	335.4	825.2	350.3
	9	1053	257.5	1001	280.1	980.3	289.3	948.6	303.5	895.0	327.6	873.3	337.5	840.5	352.6
	10	1068	257.9	1012	281.0	990.5	290.5	957.9	304.9	904.1	329.6	882.8	339.7	851.0	355.0
<b>360L</b>	5	990.4	263.2	941.1	288.3	921.6	298.5	892.6	313.9	845.0	339.8	826.1	350.3	798.1	366.1
	6	1030	267.8	981.8	291.9	962.3	301.8	932.5	316.7	881.7	342.1	861.1	352.4	829.6	368.0
	7	1064	271.2	1015	294.9	995.3	304.5	964.7	319.2	911.7	344.3	889.9	354.5	856.4	370.0
	8	1092	273.6	1042	297.2	1021	306.8	989.3	321.4	934.9	346.5	912.6	356.7	878.5	372.2
	9	1114	274.8	1061	298.7	1039	308.5	1006	323.3	951.3	348.6	929.2	358.8	895.8	374.4
	10	1131	274.9	1072	299.7	1049	309.7	1016	324.9	961.0	350.6	939.7	361.1	908.4	376.8

kWf = Cooling capacity in kW  
 kWe = Compressor power input in kW  
 To = Internal exchanger water outlet temperature in °C  
 DT = difference between inlet / outlet water temperature = 5°C

**Acoustic configuration: Extremely low noise (EN)**

**GENERAL TECHNICAL SPECIFICATIONS**

Size		200H	220H	230H	240H	270J	300L	315L	330L	345L	360L	
<b>COOLING</b>												
Cooling capacity	1	kW	493	535	575	615	665	721	761	819	862	925
Compressor power input		kW	181	197	214	232	242	267	282	303	318	338
Total power input	2	kW	192	210	227	245	258	282	299	320	337	358
Heating capacity total recovery	3	kW	679	737	795	853	913	992	1051	1129	1188	1272
Heating capacity partial recovery	3	kW	135	146	158	169	181	198	209	224	236	253
EER			2.57	2.55	2.53	2.52	2.58	2.55	2.55	2.55	2.56	2.58
ESEER			4.5	4.46	4.43	4.4	4.59	4.61	4.61	4.62	4.63	4.67
<b>COMPRESSOR</b>												
Type of compressors			SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL	SCROLL
No. of Compressors		Nr	8	8	8	8	10	12	12	12	12	12
Rated power (C1)		HP	50	55	55	60	60	75	75	75	75	90
Nominal Power (C2)		HP	50	55	55	60	60	75	75	75	90	90
Nominal Power (C3)		HP	50	55	60	60	75	75	75	90	90	90
Nominal Power (C4)		HP	50	55	60	60	75	75	90	90	90	92
Std Capacity control steps		Nr	8	8	8	8	10	12	12	12	12	12
Oil charge (C1)		l	10	12	12	11	11	20	20	20	20	17
Oil charge (C2)		l	10	12	12	11	11	20	20	20	17	17
Oil charge (C3)		l	10	12	11	11	20	20	20	17	17	17
Oil charge (C4)		l	10	12	11	11	20	20	17	17	17	17
Refrigerant circuits		Nr	4	4	4	4	4	4	4	4	4	4
<b>INTERNAL EXCHANGER</b>												
Type of internal exchanger	4		S&T	S&T	S&T	S&T	S&T	S&T	S&T	S&T	S&T	S&T
No. of internal exchangers		Nr	1	1	1	1	1	1	1	1	1	1
Water flow rate (Internal Exchanger)		l/s	23.6	25.6	27.5	29.4	31.8	34.3	36.4	39.1	41.2	44.2
internal exchanger pressure drop		kPa	55	66	50	57	62	71	55	63	54	61
Water content		l	125	114	222	222	207	207	184	184	225	225
<b>EXTERNAL SECTION FANS</b>												
Type of fans	5		AX	AX	AX	AX	AX	AX	AX	AX	AX	AX
Number of fans		Nr	8	10	10	10	12	12	13	14	15	16
Standard air flow		l/s	36432	42251	42251	42251	49942	49942	55926	59010	64571	67655
<b>CONNECTIONS</b>												
Water fittings			168.3	168.3	219.1	219.1	219.1	219.1	219.1	219.1	219.1	219.1
<b>NOISE LEVELS</b>												
Sound Pressure Level (10m)		dB(A)	58	59	59	59	59	60	61	61	61	62

- (1) data referred to the following conditions :  
internal exchanger water = 12/7°C  
external exchanger air intake 35°C
- (2) According to EUROVENT the Total Power Input does not consider the pump share, required to overcome the pressure drop for the solution circulation inside the exchangers.
- (3) recovery exchanger water=40/45°C
- (4) S&T = tube bundle
- (5) AX = axial-flow fan

**Acoustic configuration: Extremely low noise (EN)**

**OPERATING LIMITS (COOLING)**

Size		200H	220H	230H	240H	270J	300L	315L	330L	345L	360L
<b>EXTERNAL EXCHANGER</b>											
Max air intake temperature	1	°C	44	44	43	43	44	44	44	44	44
Max air intake temperature	2	°C	46	46	45	45	46	46	46	46	46
Min. air intake temperature	4	°C	-10	-10	-10	-10	-10	-10	-10	-10	-10
Min. air intake temperature	5	°C	-7	-7	-7	-7	-7	-7	-7	-7	-7
Min. air intake temperature	6	°C	2	2	2	2	2	2	2	2	2
Min. air intake temperature	7	°C	11	11	11	11	11	11	11	11	11
<b>INTERNAL EXCHANGER</b>											
Max water inlet temperature		°C	23	23	23	23	23	23	23	23	23
Min. water outlet temperature	8	°C	5	5	5	5	5	5	5	5	5
Min. water outlet temperature	9	°C	-8	-8	-8	-8	-8	-8	-8	-8	-8

data referred to the following conditions :  
internal exchanger water = 12/7°C  
difference between inlet / outlet water temperature = 5°C  
Warning: the still air condition is meant as absence of air flow to the unit. Any wind condition can let air pass through the condenser coil thus worsening the operating limits of the unit (see limits with air speed at 0,5 m/s & 1 m/s).  
Note: In any case, the unit should never be exposed to or operated, transported and/or stored at temperatures below -10°C.  
**ATTENTION: IN CASE OF PREDOMINANT WINDS, WINDBREAK BARRIERS ARE NECESSARY.**

- (1) Max inlet temperature - unit at full load
- (2) Inlet air Max Temperature - unit at full load with standard limit device
- For the sound levels in this operation condition please refer to the SC version data
- (4) Min inlet air temperature - unit at full load and motionless ambient air
- (5) Min inlet air temperature - unit at partial load and motionless ambient air
- (6) Min inlet air temperature - unit at partial load and air speed of 0.5 m/s.
- (7) Min inlet air temperature - unit at partial load and air speed of 1 m/s.
- (8) standard unit  
external exchanger air intake 35°C
- (9) B = Low Temperature  
external exchanger air intake 35°C  
Fluid with ethylene glycol of 40%

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**Acoustic configuration: Extremely low noise (EN) / Voltage: 400/3/50**

**ELECTRICAL DATA**

Size		200H	220H	230H	240H	270J	300L	315L	330L	345L	360L
<b>F.L.A. - FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS</b>											
F.L.A. - Total	A	425	478	492	505	589	665	689	713	737	761
<b>F.L.I. FULL LOAD POWER INPUT AT MAX ADMISSIBLE CONDITION</b>											
F.L.I. - Total	kW	257	281	294	307	344	378	399	420	441	462
<b>M.I.C. MAXIMUM INRUSH CURRENT</b>											
M.I.C. - Value	A	702	755	769	782	866	874	966	990	1014	1038

voltage unbalance: max 2 %  
power supply: 400/3/50 Hz +/-6%

**CORRECTION FACTOR FOR ANTIFREEZE SOLUTIONS**

% ethylene glycol by weight		5%	10%	15%	20%	25%	30%	35%	40%
Freezing temperature	°C	-2.0	-3.9	-6.5	-8.9	-11.8	-15.6	-19.0	-23.4
Safety temperature	°C	3.0	1.0	-1.0	-4.0	-6.0	-10.0	-14.0	-19.0
Cooling Capacity Factor	Nr	0.995	0.990	0.985	0.981	0.977	0.974	0.971	0.968
Compressor input Factor	Nr	0.997	0.993	0.990	0.988	0.986	0.984	0.982	0.981
Internal exchanger Glycol solution flow Factor	Nr	1.003	1.010	1.020	1.033	1.050	1.072	1.095	1.124
Pressure drop Factor	Nr	1.029	1.060	1.090	1.118	1.149	1.182	1.211	1.243

The correction factors shown refer to water and glycol ethylene mixes used to prevent the formation of frost on the exchangers in the water circuit during inactivity in winter.

**FOULING CORRECTION FACTOR**

m <sup>2</sup> °C/W	INTERNAL EXCHANGER	
	F1	FK1
0.44 x 10 <sup>(-4)</sup>	1.00	1.00
0.88 x 10 <sup>(-4)</sup>	0.97	0.99
1.76 x 10 <sup>(-4)</sup>	0.94	0.98

F1 = Cooling capacity correction factors  
FK1 = Compressor power input correction factor

**OVERLOAD AND CONTROL DEVICE CALIBRATION**

		OPEN	CLOSED	VALUE
High pressure switch	kPa	4050	3300	-
Low pressure switch	kPa	450	600	-
Low pressure switch (Brine)	bar	200	350	-
Antifreeze protection	°C	3.0	5.5	-
High pressure safety valve	kPa	-	-	4500
Low pressure safety valve	kPa	-	-	3000
Max no. of compressor starts per hour	Nr	-	-	10
High compressor discharge temperature safety thermo-	°C	-	-	120

**EXCHANGER OPERATING LIMITS**

	INTERNAL EXCHANGER		
	DPr (S - B)		DPw
	kPa		kPa
CLIVET (C)	4500	4500	2500
PED (CE)	4500	4500	2500

DPr = Maximum operating pressure on refrigerant side  
DPw = Maximum operating pressure on water side  
for different approvals contact our sales office

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**ACOUSTIC CONFIGURATION: EXTREMELY LOW NOISE (EN)**

**COOLING PERFORMANCE**

Size	To (°C)	EXTERNAL EXCHANGER AIR INTAKE TEMPERATURE (°C)													
		25		30		32		35		38		40		43	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
200H	5	525.0	148.8	496.9	163.0	485.6	168.9	468.6	177.7	451.5	186.6	440.1	192.6	422.9	201.8
	6	537.0	150.8	509.1	164.8	497.7	170.6	480.4	179.5	462.9	188.7	451.0	195.0	433.1	204.7
	7	550.7	152.6	522.6	166.4	511.1	172.2	493.5	181.2	475.5	190.5	463.3	197.0	444.7	206.9
	8	566.0	154.2	537.5	167.9	525.7	173.7	507.7	182.6	489.3	192.0	476.8	198.4	457.7	208.4
	9	583.1	155.6	553.7	169.3	541.7	175.0	523.2	183.8	504.4	193.1	491.6	199.4	472.1	209.2
	10	601.8	156.8	571.3	170.5	558.9	176.1	539.9	184.9	520.7	193.8	507.7	200.0	488.0	209.4
220H	5	554.7	161.5	525.1	177.2	513.4	183.6	495.8	193.3	478.3	203.1	466.6	209.6	449.2	219.6
	6	576.4	163.6	546.8	179.0	534.7	185.4	516.3	195.1	497.6	205.0	485.0	211.7	465.8	222.1
	7	596.3	165.8	566.5	180.9	554.1	187.1	535.0	196.8	515.3	206.8	501.8	213.6	481.1	224.1
	8	614.2	167.9	584.1	182.7	571.4	188.9	551.8	198.5	531.3	208.4	517.1	215.2	495.3	225.6
	9	630.1	169.9	599.7	184.6	586.8	190.7	566.6	200.1	545.5	209.9	530.9	216.5	508.2	226.8
	10	644.0	171.9	613.2	186.5	600.1	192.5	579.6	201.7	558.0	211.2	543.1	217.6	519.9	227.5
230H	5	597.5	176.7	567.9	192.8	555.8	199.4	537.2	209.4	518.3	219.6	505.4	226.4	485.8	236.9
	6	621.0	179.7	589.6	195.6	576.7	202.1	557.1	212.1	537.0	222.3	523.4	229.3	502.6	239.9
	7	642.2	182.4	609.5	198.0	596.0	204.5	575.5	214.4	554.5	224.6	540.2	231.6	518.5	242.3
	8	661.2	184.6	627.5	200.0	613.7	206.4	592.5	216.3	570.8	226.5	556.1	233.4	533.6	244.1
	9	677.9	186.5	643.8	201.7	629.7	208.0	608.1	217.7	585.9	227.8	570.8	234.7	547.7	245.3
	10	692.3	188.0	658.2	203.0	644.1	209.2	622.3	218.8	599.8	228.7	584.5	235.4		
240H	5	640.0	190.9	607.5	208.0	594.4	214.9	574.8	225.3	555.0	236.0	541.7	243.1	521.8	253.9
	6	663.6	195.1	630.6	211.5	616.9	218.3	595.9	228.8	574.2	239.7	559.4	247.1	536.7	258.5
	7	685.3	198.4	651.8	214.3	637.6	221.0	615.5	231.6	592.4	242.6	576.4	250.2	551.7	262.0
	8	705.1	200.8	671.0	216.4	656.4	223.1	633.6	233.6	609.6	244.7	592.9	252.3	566.9	264.3
	9	723.1	202.3	688.3	217.9	673.5	224.6	650.2	235.0	625.8	246.0	608.8	253.6	582.4	265.4
	10	739.2	202.9	703.7	218.7	688.7	225.3	665.4	235.7	641.0	246.4	624.1	253.9		
270J	5	697.1	201.8	662.3	219.6	647.5	227.1	624.5	238.8	600.4	251.0	583.7	259.4	557.7	272.4
	6	720.4	204.3	685.0	221.6	669.9	229.0	646.1	240.6	621.0	252.8	603.5	261.2	576.3	274.4
	7	741.1	206.6	704.9	223.5	689.3	230.8	664.7	242.4	638.7	254.6	620.6	263.1	592.1	276.5
	8	759.2	208.5	722.0	225.3	705.9	232.6	680.5	244.2	653.6	256.5	634.8	265.1	605.3	278.7
	9	774.7	210.2	736.3	227.0	719.7	234.3	693.4	246.0	665.6	258.5	646.2	267.3	615.8	281.1
	10	787.6	211.5	747.7	228.6	730.5	236.0	703.5	247.9	674.8	260.6	654.8	269.5	623.6	283.6
300L	5	762.4	220.6	722.8	240.2	705.8	248.5	679.1	261.6	650.9	275.3	631.2	284.9	600.5	299.8
	6	788.9	223.6	747.1	242.9	729.3	251.2	701.4	264.2	672.2	277.8	652.0	287.3	620.5	302.1
	7	811.8	226.3	768.8	245.3	750.3	253.5	721.3	266.5	690.8	280.2	669.5	289.9	636.4	305.0
	8	831.2	228.7	787.9	247.2	769.0	255.3	738.9	268.4	706.6	282.5	684.0	292.5	648.2	308.3
	9	846.9	230.8	804.6	248.6	785.3	256.7	754.0	270.1	719.7	284.7	695.2	295.2	656.0	312.1
	10	859.1	232.5	818.6	249.6	799.2	257.7	766.7	271.4	730.1	286.8	703.3	298.1	659.8	316.3
315L	5	803.7	234.2	763.2	254.5	746.3	263.0	720.2	276.3	693.1	290.0	674.6	299.5	646.0	314.2
	6	827.6	236.9	785.5	257.5	768.0	266.1	741.1	279.4	713.3	293.1	694.4	302.4	665.3	316.8
	7	850.6	239.5	807.0	260.3	789.0	268.8	761.2	282.1	732.6	295.7	713.0	305.0	683.1	319.3
	8	872.9	242.1	828.0	262.6	809.3	271.2	780.5	284.4	750.8	298.0	730.5	307.3	699.3	321.7
	9	894.3	244.6	848.2	264.7	828.9	273.1	799.1	286.2	768.1	299.9	746.9	309.3	714.1	323.8
	10	915.0	247.1	867.8	266.4	847.9	274.7	816.8	287.7	784.4	301.4	762.0	311.0	727.3	325.8

kWf = Cooling capacity in kW  
kWe = Compressor power input in kW  
To = Internal exchanger water outlet temperature in °C  
DT = difference between inlet / outlet water temperature = 5°C

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**ACOUSTIC CONFIGURATION: EXTREMELY LOW NOISE (EN)**

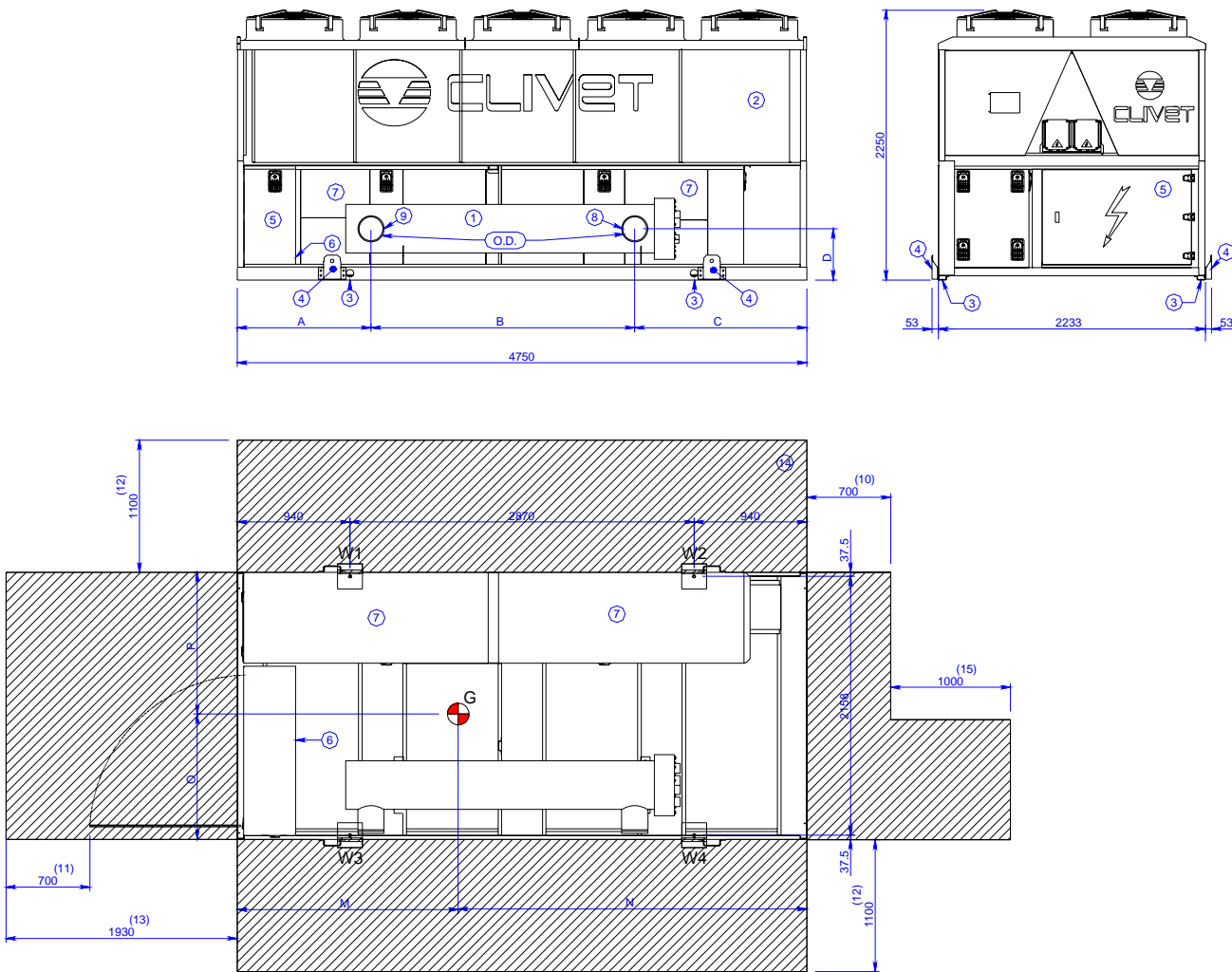
**COOLING PERFORMANCE**

Size	To (°C)	EXTERNAL EXCHANGER AIR INTAKE TEMPERATURE (°C)													
		25		30		32		35		38		40		43	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
<b>330L</b>	5	862.0	252.0	820.3	273.4	802.5	282.5	774.7	296.7	745.5	311.5	725.3	321.9	693.8	337.9
	6	887.0	254.8	843.5	276.5	825.2	285.6	796.9	299.8	767.4	314.6	747.1	324.8	715.7	340.5
	7	911.6	257.6	866.6	279.3	847.8	288.4	818.6	302.6	788.3	317.3	767.4	327.5	735.3	343.2
	8	935.7	260.4	889.5	281.8	870.0	290.9	839.8	305.0	808.2	319.8	786.5	330.0	752.8	345.9
	9	959.3	263.2	912.3	284.1	892.1	293.0	860.5	307.1	827.2	322.0	804.1	332.3	768.0	348.5
	10	982.5	265.9	934.8	286.0	914.0	294.8	880.8	308.8	845.3	323.9	820.4	334.4	781.1	351.1
<b>345L</b>	5	898.7	263.2	852.8	286.5	834.4	296.1	806.7	310.8	778.9	325.8	760.4	336.1	732.4	351.7
	6	931.3	267.1	883.9	290.8	864.9	300.3	836.5	314.8	808.1	329.4	789.1	339.2	760.7	354.1
	7	959.5	270.4	910.9	294.0	891.4	303.5	862.1	317.8	832.8	332.2	813.2	341.9	783.8	356.4
	8	983.3	273.0	933.9	296.2	913.9	305.6	883.6	319.9	853.1	334.3	832.6	344.0	801.6	358.7
	9	1003	275.1	952.7	297.4	932.3	306.7	901.0	320.9	869.0	335.6	847.3	345.6	814.1	360.9
	10	1018	276.5	967.5	297.7	946.6	306.8	914.1	321.1	880.4	336.2	857.3	346.7	821.5	363.1
<b>360L</b>	5	959.4	281.3	912.1	305.3	892.8	315.4	863.5	331.0	833.7	347.2	813.5	358.4	782.9	375.5
	6	994.4	285.3	946.4	309.4	926.7	319.5	896.7	334.9	866.0	350.8	845.2	361.6	813.4	378.3
	7	1025	288.7	975.9	312.7	955.7	322.7	924.8	338.0	893.0	353.7	871.4	364.4	838.2	380.9
	8	1050	291.6	1001	315.3	979.7	325.1	947.7	340.3	914.7	356.1	892.0	366.8	857.2	383.4
	9	1072	293.8	1020	317.0	998.8	326.7	965.6	342.0	931.0	357.8	907.2	368.8	870.5	385.8
	10	1088	295.5	1035	317.9	1013	327.6	978.3	342.8	942.0	359.0	916.9	370.3	878.0	388.0

kWf = Cooling capacity in kW  
 kWe = Compressor power input in kW  
 To = Internal exchanger water outlet temperature in °C  
 DT = difference between inlet / outlet water temperature = 5°C

DIMENSIONAL DRAWING

DIMENSIONS: WSAT-XSC 200H-220H-230H-240H



- (1) INTERNAL EXCHANGER (EVAPORATOR)
- (2) EXTERNAL EXCHANGER (CONDENSER)
- (3) HOLE TO HANG UNIT
- (4) LIFTING BRACKETS (REMOVABLE, IF REQUIRED, AFTER POSITIONING THE UNIT)
- (5) ELECTRICAL PANEL
- (6) POWER INPUT
- (7) SOUND PROOF ENCLOSURE ( ONLY IN THE EXPECTED VERSIONS)
- (8) INTERNAL EXCHANGER WATER INLET
- (9) INTERNAL EXCHANGER WATER OUTLET
- (10) MINIMUM DIMENSION FOR A SAFE PASSAGE.
- (11) MINIMUM DIMENSION FOR A SAFE PASSAGE WHEN THE DOOR OF THE ELECTRICAL SWITCHBOARD IS OPEN.
- (12) MINIMUM DIMENSION FOR A PROPER AIR FLOW TO THE CONDENSER COIL.
- (13) MINIMUM DIMENSION ON THE ELECTRICAL SWITCHBOARD SIDE.
- (14) CLEARANCE ACCESS RECOMMENDED
- (15) MINIMUM DIMENSIONS FOR TUBE BUNDLE EXTRACTION.
- (G) BARYCENTRE

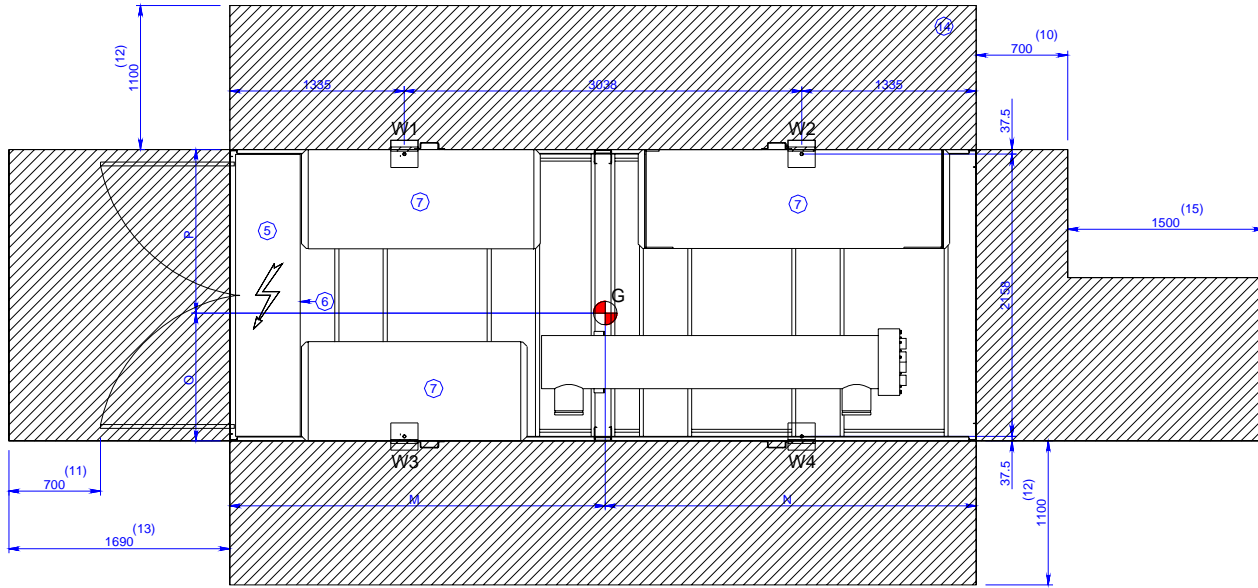
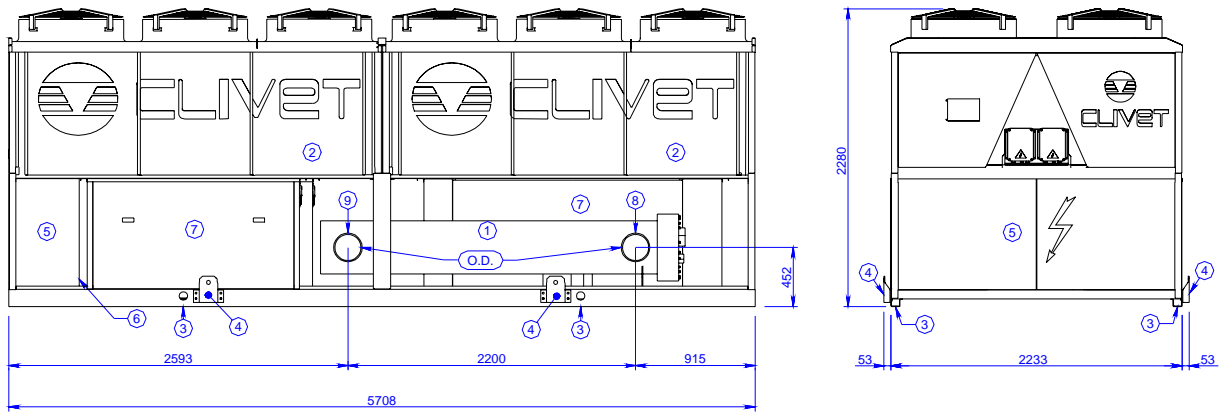
Size		ST				SC				EN			
		200H	220H	230H	240H	200H	220H	230H	240H	200H	220H	230H	240H
A	mm	1467	1467	1395	1395	1467	1467	1395	1395	1467	1467	1395	1395
B	mm	2250	2250	2200	2200	2250	2250	2200	2200	2250	2250	2200	2200
C	mm	1033	1033	1155	1155	1033	1033	1155	1155	1033	1033	1155	1155
D	mm	360	360	430	430	360	360	430	430	360	360	430	430
M	mm	2190	2193	2208	2213	2186	2190	2204	2209	2186	2190	2204	2209
N	mm	2560	2557	2542	2537	2564	2560	2546	2541	2564	2560	2546	2541
O	mm	1336	1343	1289	1285	1361	1366	1312	1309	1361	1366	1312	1309
P	mm	897	890	944	948	872	867	921	924	872	867	921	924
OD	mm	168.3	168.3	219.1	219.1	168.3	168.3	219.1	219.1	168.3	168.3	219.1	219.1
Length	mm	4750	4750	4750	4750	4750	4750	4750	4750	4750	4750	4750	4750
Depth	mm	2233	2233	2233	2233	2233	2233	2233	2233	2233	2233	2233	2233
Height	mm	2250	2250	2250	2250	2250	2250	2250	2250	2250	2250	2250	2250
W1	kg	1146	1216	1260	1260	1203	1272	1316	1316	1203	1272	1316	1316
W2	kg	995	1059	1094	1098	1044	1108	1143	1147	1044	1108	1143	1147
W3	kg	949	1000	1086	1089	975	1026	1112	1115	975	1026	1112	1115
W4	kg	797	843	920	927	816	862	939	946	816	862	939	946
Operating weight	kg	3887	4118	4360	4374	4038	4268	4510	4524	4038	4268	4510	4524
Shipping weight	kg	3754	4005	4139	4153	3903	4154	4288	4302	3903	4154	4288	4302

Particular accessories, executions or versions can bring about a great variation of the mass represented here. Please contact our Technical Department.

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**DIMENSIONAL DRAWING**

**DIMENSIONS: WSAT-XSC 270J**



- (1) INTERNAL EXCHANGER (EVAPORATOR)
- (2) EXTERNAL EXCHANGER (CONDENSER)
- (3) HOLE TO HANG UNIT
- (4) LIFTING BRACKETS (REMOVABLE, IF REQUIRED, AFTER POSITIONING THE UNIT)
- (5) ELECTRICAL PANEL
- (6) POWER INPUT
- (7) SOUND PROOF ENCLOSURE ( ONLY IN THE EXPECTED VERSIONS)
- (8) INTERNAL EXCHANGER WATER INLET
- (9) INTERNAL EXCHANGER WATER OUTLET
- (10) MINIMUM DIMENSION FOR A SAFE PASSAGE.
- (11) MINIMUM DIMENSION FOR A SAFE PASSAGE WHEN THE DOOR OF THE ELECTRICAL SWITCHBOARD IS OPEN.
- (12) MINIMUM DIMENSION FOR A PROPER AIR FLOW TO THE CONDENSER COIL.
- (13) MINIMUM DIMENSION ON THE ELECTRICAL SWITCHBOARD SIDE.
- (14) CLEARANCE ACCESS RECOMMENDED
- (15) MINIMUM DIMENSIONS FOR TUBE BUNDLE EXTRACTION.
- (G) BARYCENTRE

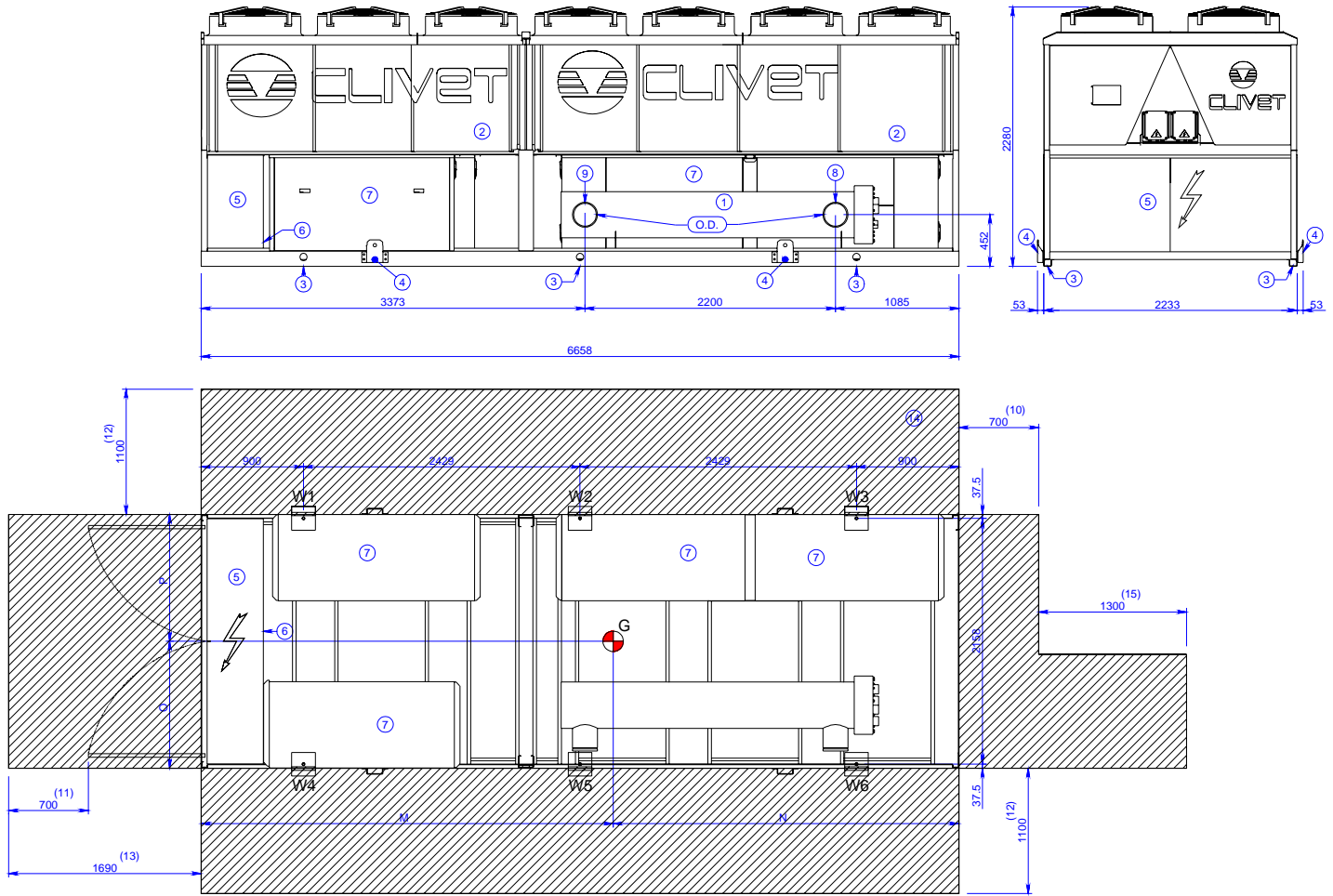
		ST	SC	EN
Size		270J	270J	270J
M	mm	2733	2724	2724
N	mm	2975	2984	2984
O	mm	1333	1337	1337
P	mm	900	896	896
OD	mm	219.1	219.1	219.1
Length	mm	5708	5708	5708
Depth	mm	2233	2233	2233
Height	mm	2280	2280	2280
W1	kg	1527	1595	1595
W2	kg	1421	1476	1476
W3	kg	1258	1309	1309
W4	kg	1152	1190	1190
Operating weight	kg	5358	5570	5570
Shipping weight	kg	5151	5363	5363

Particular accessories, executions or versions can bring about a great variation of the mass represented here. Please contact our Technical Department.

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DIMENSIONAL DRAWING

DIMENSIONS: WSAT-XSC 300L-315L-330L



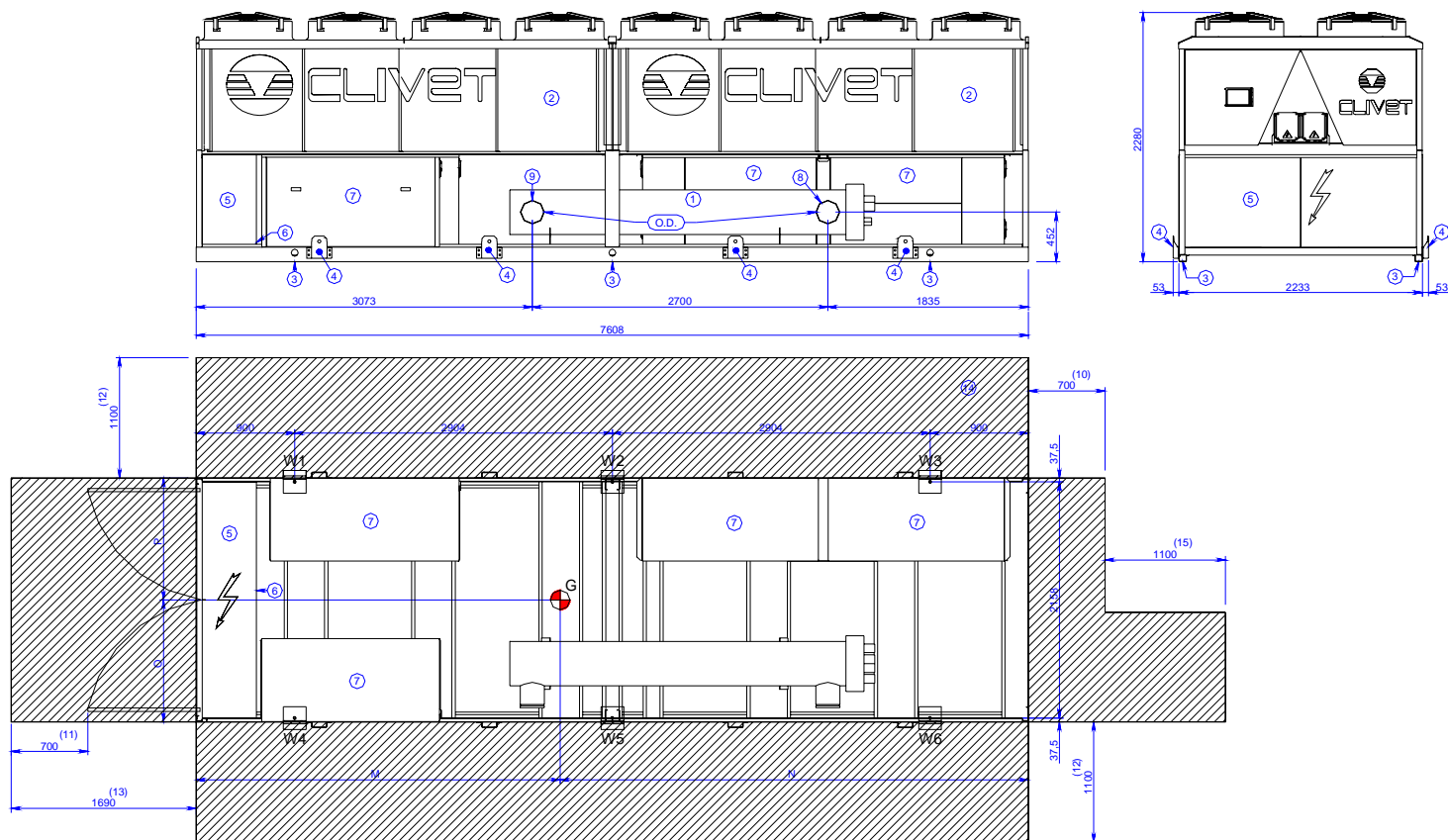
- (1) INTERNAL EXCHANGER (EVAPORATOR)
- (2) EXTERNAL EXCHANGER (CONDENSER)
- (3) HOLE TO HANG UNIT
- (4) LIFTING BRACKETS (REMOVABLE, IF REQUIRED, AFTER POSITIONING THE UNIT)
- (5) ELECTRICAL PANEL
- (6) POWER INPUT
- (7) SOUND PROOF ENCLOSURE ( ONLY IN THE EXPECTED VERSIONS)
- (8) INTERNAL EXCHANGER WATER INLET
- (9) INTERNAL EXCHANGER WATER OUTLET
- (10) MINIMUM DIMENSION FOR A SAFE PASSAGE.
- (11) MINIMUM DIMENSION FOR A SAFE PASSAGE WHEN THE DOOR OF THE ELECTRICAL SWITCHBOARD IS OPEN.
- (12) MINIMUM DIMENSION FOR A PROPER AIR FLOW TO THE CONDENSER COIL.
- (13) MINIMUM DIMENSION ON THE ELECTRICAL SWITCHBOARD SIDE.
- (14) CLEARANCE ACCESS RECOMMENDED
- (15) MINIMUM DIMENSIONS FOR TUBE BUNDLE EXTRACTION.
- (G) BARYCENTRE

Size	ST			SC			EN			
	300L	315L	330L	300L	315L	330L	300L	315L	330L	
M	mm	3246	3248	3246	3236	3237	3236	3236	3237	3236
N	mm	3412	3410	3412	3422	3421	3422	3422	3421	3422
O	mm	1217	1208	1205	1228	1220	1217	1228	1220	1217
P	mm	1016	1025	1028	1005	1013	1016	1005	1013	1016
OD	mm	219.1	219.1	219.1	219.1	219.1	219.1	219.1	219.1	219.1
Length	mm	6658	6658	6658	6658	6658	6658	6658	6658	6658
Depth	mm	2233	2233	2233	2233	2233	2233	2233	2233	2233
Height	mm	2280	2280	2280	2280	2280	2280	2280	2280	2280
W1	kg	963	966	974	1020	1024	1031	1020	1024	1031
W2	kg	1341	1354	1351	1408	1422	1419	1408	1422	1419
W3	kg	917	916	920	956	954	959	956	954	959
W4	kg	838	849	861	869	880	892	869	880	892
W5	kg	1166	1190	1195	1199	1223	1227	1199	1223	1227
W6	kg	798	805	813	814	821	829	814	821	829
Operating weight	kg	6023	6080	6114	6266	6324	6357	6266	6324	6357
Shipping weight	kg	5816	5895	5929	6060	6139	6173	6060	6139	6173

Particular accessories, executions or versions can bring about a great variation of the mass represented here. Please contact our Technical Department.

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**DIMENSIONS: WSAT-XSC 345L-360L**



- (1) INTERNAL EXCHANGER (EVAPORATOR)
- (2) EXTERNAL EXCHANGER (CONDENSER)
- (3) HOLE TO HANG UNIT
- (4) LIFTING BRACKETS (REMOVABLE, IF REQUIRED, AFTER POSITIONING THE UNIT)
- (5) ELECTRICAL PANEL
- (6) POWER INPUT
- (7) SOUND PROOF ENCLOSURE ( ONLY IN THE EXPECTED VERSIONS)
- (8) INTERNAL EXCHANGER WATER INLET
- (9) INTERNAL EXCHANGER WATER OUTLET
- (10) MINIMUM DIMENSION FOR A SAFE PASSAGE.
- (11) MINIMUM DIMENSION FOR A SAFE PASSAGE WHEN THE DOOR OF THE ELECTRICAL SWITCHBOARD IS OPEN.
- (12) MINIMUM DIMENSION FOR A PROPER AIR FLOW TO THE CONDENSER COIL.
- (13) MINIMUM DIMENSION ON THE ELECTRICAL SWITCHBOARD SIDE.
- (14) CLEARANCE ACCESS RECOMMENDED
- (15) MINIMUM DIMENSIONS FOR TUBE BUNDLE EXTRACTION.
- (G) BARYCENTRE

Size	ST		SC		EN		
	345L	360L	345L	360L	345L	360L	
M	mm	3657	3667	3648	3658	3648	3658
N	mm	3951	3941	3960	3950	3960	3950
O	mm	1193	1189	1205	1201	1205	1201
P	mm	1040	1044	1028	1032	1028	1032
OD	mm	219.1	219.1	219.1	219.1	219.1	219.1
Length	mm	7608	7608	7608	7608	7608	7608
Depth	mm	2233	2233	2233	2233	2233	2233
Height	mm	2280	2280	2280	2280	2280	2280
W1	kg	996	996	1055	1055	1055	1055
W2	kg	1553	1564	1613	1623	1613	1623
W3	kg	863	873	904	914	904	914
W4	kg	904	909	937	942	937	942
W5	kg	1411	1428	1433	1450	1433	1450
W6	kg	784	797	803	816	803	816
Operating weight	kg	6511	6567	6745	6800	6745	6800
Shipping weight	kg	6286	6341	6520	6575	6520	6575

Particular accessories, executions or versions can bring about a great variation of the mass represented here. Please contact our Technical Department.

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