Product Manual	KPMAC00606-09EN
	Date: **June 2009**
	Supersedes: **none**

Air cooled screw chillers

AWS
SE (Standard Efficiency) 184.2 ÷ 487.3
XE (Hihg Efficiency) 210.2 ÷ 515.3
PR (Premium Efficiency) 212.2 ÷ 378.2
Cooling capacity from 647 to 1858 kW
Refrigerant: R-134a

McQuay is participating in the Eurovent Certification Programme. Product are as listed in the Eurovent Directory of Certified Products and on the web site www .eurovent-certification. com

Features and benefits

Low operating cost

AWS is the result of careful design, aimed to optimizing the energy efficiency of the chillers, with the objective of bringing down operating costs and improving profitability, effectiveness and economical management.
The AWS chillers use the New very high efficiency McQuay single rotor screw compressor design, large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans, a single-pass pure conterflow shell&tube direct-expansion evaporator with low refrigerant pressure drops.

Low operating sound levels

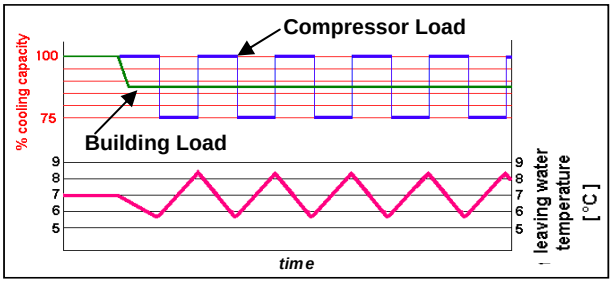
Very low noise levels both at full load and part load conditions are achieved by the latest compressor design that use a single main rotor with two adjacent rotating composite gaterotors making gas flow velocities and subsequent noise levels among the lowest available, by a unique new fan that moves large volume of air at exceptionally low sound levels and by the virtually vibration-free operation.

Outstanding reliability

The AWS chillers have two or three truly independent refrigerant circuits depending from the size, in order to assure maximum safety for any maintenance, whether planned or not. They are equipped with a rugged compressor design with advanced composite compressor gaterotors material, a proactive control logic and are full factory-run-tested to optimized trouble-free operation.

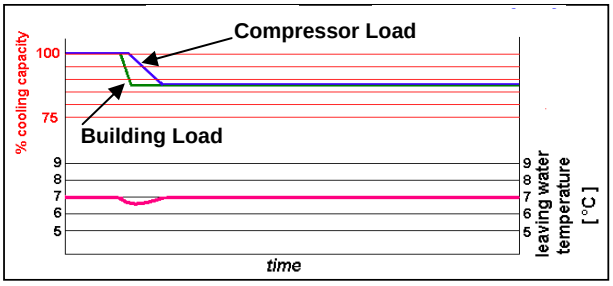
Infinite capacity control

Cooling capacity control is infinitely variable by means of a single screw asymmetric compressorcontrolled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12% (two compressor unit), down to 7% (three compressors units). This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided only with a stepless control.



ELWT fluctuation with steps capacity control (4 steps)

With a compressor load step control in fact, the compressor capacity, at partial loads, will be too high or too low compared to the building cooling load. The result is a decrease in chiller energy costs, particularly at the part-load conditions at which the chiller operates most of the time.



Units with stepless regulation offer benefits that the units with step regulation are unable to match. The ability to follow the system energy demand at any time and the possibility to provide steady outlet water temperature without deviations from the set-point, are the two points that allow you to understand how the optimum operating conditions of a system can be met only through the use of a unit with step-less regulation.

Superior control logic

The new MicroTech III controller provides an easy to use control environmental. The control logic is designed to provide maximum efficiency, to continue operation in unusual operating conditions and to provide a history of unit operation. One of the greatest benefits is the easy interface with LonWorks, Bacnet, Ethernet TCP/IP or Modbus communications.

Code requirements – Safety and observant of laws/directives

All AWS units are designed and manufactured in accordance with applicable selections of the following:

Rating of chillers	EN 12055
Construction of pressure vessel	Pressure Equipment 97/23/EC (PED)
Machinery Directive	98/37/EC
Low Voltage	2006/95/EC
Electromagnetic Compatibility	2004/108/EC
Electrical & Safety codes	IEC 60204–1 / EN 60335-2-40
Manufacturing Quality Stds	UNI – EN ISO 9001:2000

Certifications

All units manufactured by McQuay Italia S.p.A. are CE marked, complying with European directives in force, concerning manufacturing and safety. On request units can be produced complying with laws in force in non European countries (ASME, GOST, etc.), and with other applications, such as naval (RINA, etc.).

Versions

AWS is available in three different Efficiency Versions:

SE: Standard Efficiency
11 sizes to cover a range from 647 up to 1714 kW with an EER up to 2.93 and an ESEER up to 3.96 (data referred to Standard Noise)

XE: Hihg Efficiency
14 sizes to cover a range from 756 up to 1858 kW with an EER up to 3.29 and an ESEER up to 4.23 (data referred to Standard Noise)

PR: Premium Efficiency
7 sizes to cover a range from 821 up to 1390 kW with an EER up to 3.64 and an ESEER up to 4.53 (data referred to Standard Noise)

The EER (Energy Efficiency Ratio) is the ratio of the Cooling Capacity to the Power Input of the unit. The Power Input includes: the power input for operation of the compressor, the power input of all control and safety devices, the power input for fans.

The ESEER (European Seasonal Energy Efficiency Ratio) is a weighed formula enabling to take into account the variation of EER with the load rate and the variation of air inlet condenser temperature.

$$ESEER = A \times EER_{100\%} + B \times EER_{75\%} + C \times EER_{50\%} + D \times EER_{25\%}$$

	A	B	C	D
Coefficient	0.03 (3%)	0.33 (33%)	0.41 (41%)	0.23 (23%)
Air inlet condenser temperature	35°C	30°C	25°C	20°C

Sound Configuration

AWS is available in many different Sound level configurations:

ST: Standard Noise
Condenser fan rotating at 940 rpm, rubber antivibration on compressor

LN: Low Noise
Condenser fan rotating at 940 rpm, rubber antivibration on compressor, compressor sound enclosure.

XN: Extra Low Noise
Condenser fan rotating at 710 rpm, rubber antivibration on compressor, compressor sound enclosure.

General characteristics

Cabinet and structure

The cabinet is made of galvanized steel sheet and painted to provide a high resistance to corrosion. The base frame has eye-hook for lifting the unit with ropes for an easy installation. The weight is uniformly distributed along the profiles of the base and this facilitates the arrangement of the unit.

Screw compressors with integrated oil separator

The compressors are semi-hermetic, single-screw asymmetric type with gate-rotor (with the latest high-streght fibre reinforced star material). Each compressor has an asymmetric slide regulation managed by the unit controller for infinitely modulating capacity. An integrated high efficiency oil separator maximizes the oil separation.
Standard Start is Wye-delta (Y-Δ) type.

Ecological HFC 134a refrigerant

The compressors have been designed to operate with R-134a, ecological refrigerant with zero ODP (Ozone Depletion Potential) and very low GWP (Global Warming Potential) that means low TEWI (Total Equivalent Warming Impact).

Evaporator

The units are supplied with optimised shell and tubes evaporator pass that allows a perfect oil circulation and so a perfect oil return to the compressor. It is direct expansion with refrigerant inside the tubes and water outside (shell side) with carbon steel tube sheets, with straight copper tubes that are spirally wound internally for higher efficiencies, expanded on the tube plates. The external shell is covered with a 20mm closed cell insulation material. Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to PED approval. The evaporator water outlet connections are provided with Victaulic Kit (as standard).

Condenser coils

The condenser is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into McQuay lanced and rippled aluminium condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase in cooling capacity without increasing the power input.

Condenser coil fans

The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is glass reinforced resin and each fan is protected by a guard. Fan motor is thermally protected (as standard) by internal thermal motor and protected by circuit braker installed inside the electrical panel as a standard.The motors are IP54.

Electronic expansion valve

The unit is equipped with the most advanced electronic expansion valves to achieve precise control of refrigerant mass flow. As today's system requires improved energy efficiency, tighter temperature control, wider range of operating conditions and incorporate features like remote monitoring and diagnostics, the application of electronic expansion valves becomes mandatory. Electronic expansion valve proposes features that makes it unique: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, highly linear flow capacity, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.
EEXV strength point is the capacity to work with lower ΔP between high and low pressure side, than a thermostatic expansion valve. The electronic expansion valve allows the system to work with low condenser pressure (winter time) without any refrigerant flow problems and with a perfect chilled water leaving temperature control.

Refrigerant Circuit

Each unit has 2 or 3 independent refrigerant circuits and each one includes:

- Compressor with integrated oil separator
- Air Cooled Condenser
- Electronic exapansion valve
- Evaporator
- Discharge line shut off valve
- Liquid line shut off valve
- Suction line shut off valve (optional)
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High and low pressure transducers

Electrical control panel

Power and control are located in two sections of the main panel that is manufactured to ensure protection against all weather conditions. The electrical panel is IP54 and internally protected against accidental contact (IP20). The main panel is fitted with a main switch interlocked door.

Power Section

The power section includes compressors fuses, fan circuit breaker, fan contactors and control circuit transformer.

MicroTech III controller

MicroTech III controller is installed as standard; it can be used to modify unit set-points and check control parameters. A built-in display shows machine's operating status plus temperatures and pressures of water, refrigerant and air, programmable values, set-points. Device controls maximise chiller energy efficiency and reliability. A sophisticated software with predictive logic, select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions to maximise energy efficiency. The compressors are automatically rotated to ensure equal operating hours and number of starts.
MicroTech III protects critical components in response to external signals from its system sensors measuring: motor temperatures, refrigerant gas and oil pressures, correct phase sequence, pressure switches and evaporator. The input coming from the high pressure switch cuts all digital output from the controller in less than 50ms, this is an additional security for the equipment.
Fast program cycle (200ms) for a precise monitoring of the system. Floating point calculations supported for increased accuracy in P/T conversions.

Control section - main features

- Management of the compressor capacity slide and fans modulation.
- Chillers enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water cooled temperature regulation. Temperature tolerance = 0,1°C.
- Compressors and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressors working hours.
- Optimized management of compressors load.
- Fans management according to condensing pressure.

- Re-start in case of power failure (automatic / manual).
- Soft Load.
- Start at high evaporator water temperature.
- Return Reset.
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy recovery.

Safety device / logic for each refrigerant circuit

- High pressure (pressure switch).
- High pressure (transducer).
- Low pressure (transducer).
- Fans circuit braker.
- High compressor discharge temperature.
- High motor winding temperature.
- Phase Monitor.
- Low pressure ratio.
- High oil pressure drop.
- Low oil pressure.
- No pressure change at start.

System security

- Phase monitor.
- Low Ambient temperature lock-out.
- Freeze protection.

Regulation type

Proportional + integral + derivative regulation on the leaving water evaporator output probe.

Condensing pressure

Condensing pressure can be controlled in according to the entering air temperature to the condenser coil. The fans can be managed either with steps, or with a 0/10 V modulating signal or with a mixed 0/10V + Steps strategy to cover all possible operational conditions.

MicroTech III

MicroTech III built-in terminal has the following features.

- 164x44 dots liquid crystal display with white back lighting. Supports Unicode fonts for multi-lingual.
- Key-pad consisting of 3 keys.
- Push'n'Roll control for an increased usability.
- Memory to protect the data.
- General faults alarm relays.
- Password access to modify the setting.
- Application security to prevent application tampering or hardware usability with non-McQuay applications.
- Service report displaying all running hours and general conditions.
- Alarm history memory to allow an easy fault analysis.

Supervising systems (on request)

MicroTech III remote control

MicroTech III is able to communicate to BMS (Building Management System) based on the most common protocols as:

- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

Standard accessories (supplied on basic unit)

Wye-Delta Compressors starter (Y-D) – For low inrush current and reduced starting torque.

Double set-point – Dual leaving water temperature set-points.

Fans thermal overload relays – Safety devices against fan motor overloading in addition to the normal protection envisaged by the electrical windings.

Phase monitor – The phase monitor controls that phases sequence is correct and controls phase loss.

Evaporator Victaulic kit on water connection – Hydraulic joint with gasket for an easy and quick water connection.

20mm evaporator insulation.

Evaporator electric heater – Electric heater controlled by a thermostat to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.

Electronic Expansion Valve.

Discharge line shut off valves – Installed on the discharge port of the compressor to facilitate maintenance operation.

Outside ambient temperature sensor and reset of leawing water temperature set-point.

Hour run meter.

General fault – Alarm realy.

Set-point reset – The leaving water temperature set-point can be overwrited with the following options: 4-20mA from external source (by user); outside ambient temperature; evaporator water temperature Δt.

Demand limit – User can limit the load of the unit by 4-20mA signal or by network system

Alarm from external device – Microprocessor is able to receive an alarm signal from an external device (pump etc…). User can decide if this alarm signal will stop or not the unit.

Main switch interlock door

Emergency stop

Fans circuit breakers – Safety device against motor overloading and short circuit

Options (on request)

Total heat recovery – Produced with shell and tube heat exchangers to produce hot water up to +55° C.

Partial heat recovery – Produced with plate to plate heat exchangers installed between the compressor discharge and the condenser coil. These allow hot water to be produced up to a maximum temperature of 55°C.

Soft starter – Electronic starting device to reduce the mechanical stress during xompressor start-up.

Brine version – Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).

Compressor thermal overload relays – Safety devices against compressor motor overloading. This device together with internal motor protection (standard) guarantee the best safety system for compressor motor.

Under/Over Voltage – This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.

Ampere / Volt meter – Device installed inside the control box showing ampere and volt values

Capacitors for power factor correction – To increase the operating power factor of the unit at nominal operating conditions. The capacitors are “dry” self-regenerating type with over pressure disconnectiong safety device insulated with a no toxic dielectric mix with no PCB or PCT.

Current limit – To limit maximum absorbed current of the unit whenever is required

Fan speed regulation – To control the fan speed revolution for smooth operating control of the unit. This option improves the sound level of the unit during low ambient temperature operation.

Speedtrol – Continuous fan speed modulation on the first fan of each circuit. It allows the unit working with air temperature down to –18°C.

Condenser coil guards.

Compressor and evaporator area guards.

Cu-Cu condensing coils – To give better protection against corrosion by aggressive environments.

Cu-Cu-Sn condensing coils – To give better protection against corrosion in aggressive environments and by salty air.

Alucoat condensing coils – Fins are protected by a special acrylic paint with a high resistance to corrosion.

Evaporator Flow switch – Supplied separately to be wired and installed on the evaporator water piping (by the customer).

Suction line shut off valves – Installed on the suction port of the compressor to facilitate maintenance operation.

High pressure gauges.

Kit container.

Rubber type antivibration mounts – Supplied separately, these are positioned under the base of the unit during installation. Ideal to reduce the vibrations when the unit is floor mounted.

Spring type antivibration mounts – Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

Hydronic Kit (single water pump) (available only on 2 compressor sizes) – Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.

Hydronic Kit (twin water pumps) (available only on 2 compressor sizes) – Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.

Witness test – Every unit is always tested at the test bench prior to the shipment. On request, a second test can be carried out, at customer's presence, in accordance with the procedures indicated on the test form. (Not available for units with glycol mixtures).

Acoustic test – On request, a test can be carried out, at customer's presence, in accordance with the procedures indicated on the Noise Level chapter (Not available for units with glycol mixtures).

Evaporator right water connections (available only on 2 compressor sizes).

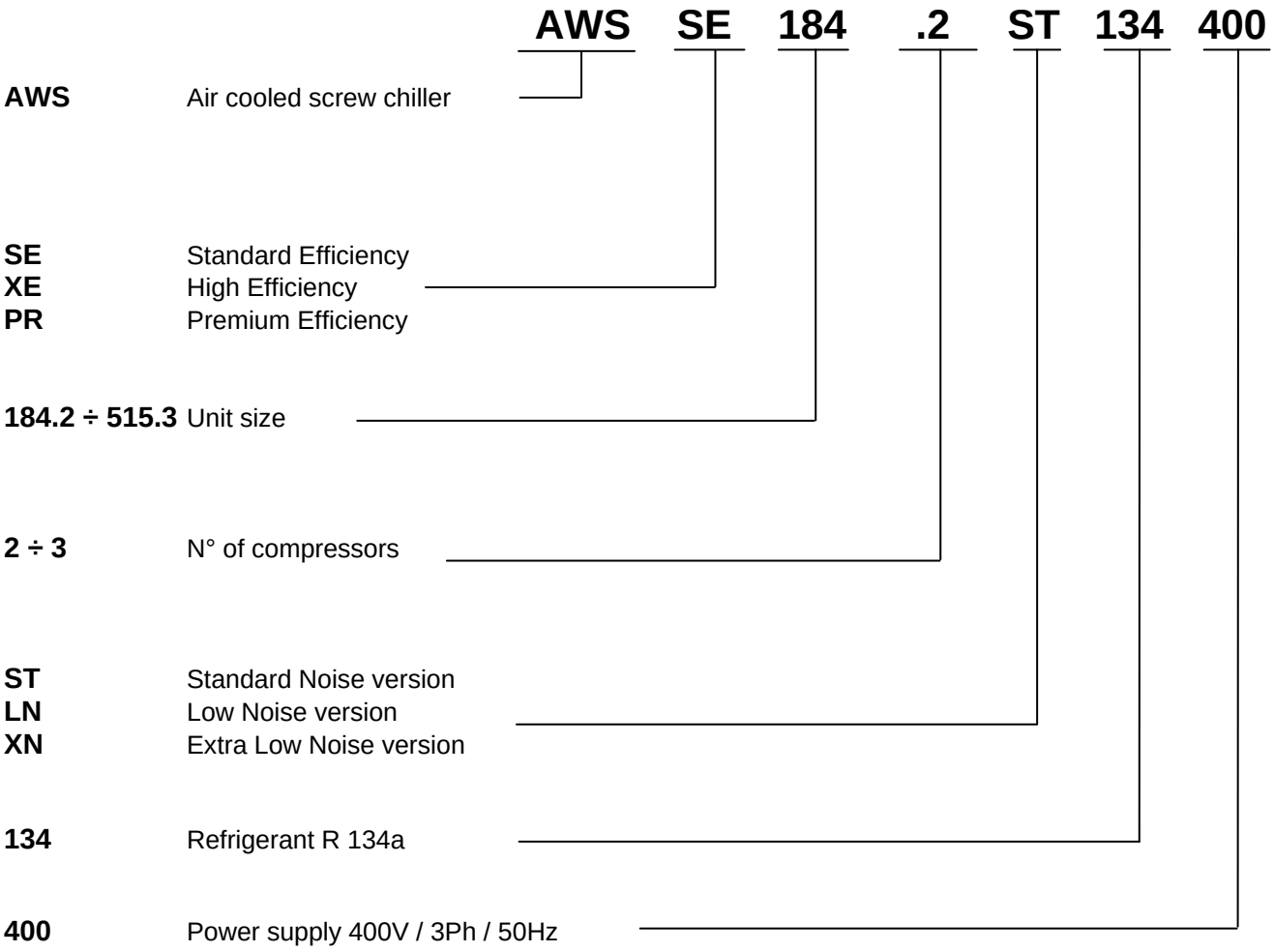
Evaporator flanged connections.

Refrigerant Recovery Unit – This option allows to stock refrigerant charge of 1 circuit for maintenance operation. Liquid receiver includes in/out shut-off valve and reliefe valve.

Compressors circuit breakers.

Ground fault protection – To shut down the entire unit if a ground fault condition is detected.

Nomenclature



Specifications AWS SE-ST & AWS SE-LN

TECHNICAL SPECIFICATIONS Version SE - ST / LN				184.2	212.2	237.2	260.2
Capacity	Cooling		kW	647	744	832	912
Capacity control	Type			Stepless			
	Minimum capacity		%	12.5	12.5	12.5	12.5
Unit power input	Cooling		kW	221	262	299	318
EER				2.93	2.84	2.78	2.87
ESEER				3.95	3.87	3.89	3.84
Casing	Colour			Ivory White			
	Material			Galvanized and painted steel sheet			
Dimensions	Unit	Height	mm	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285
		Depth	mm	6185	6185	6185	6185
Weight	Unit		kg	4608	4644	4645	5162
	Operating Weight		kg	4878	4884	4885	5402
Water heat exchanger	Type			Single Pass Shell&Tube			
	Water volume		l	270	240	240	240
	Nominal water flow rate	Cooling	l/s	30.90	35.56	39.74	43.60
	Nominal Water pressure drop	Cooling	kPa	79	72	59	69
	Insulation material			Closed cell			
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler			
Fan	Type			Direct propeller type			
	Drive			DOL			
	Diameter		mm	800	800	800	800
	Nominal air flow		l/s	53444	53444	53444	64133
	Model	Quantity		10	10	10	12
		Speed	rpm	920	920	920	920
		Motor input	W	1.75	1.75	1.75	1.75
Compressor	Type			Semi-hermetic single screw compressor			
	Oil charge		l	38	38	38	44
	Quantity			2	2	2	2
Sound level (ST)	Sound Power	Cooling	dBA	99.5	100.0	100.0	100.9
	Sound Pressure	Cooling	dBA	79.0	79.5	79.5	80.4
Sound level (LN)	Sound Power	Cooling	dBA	75.5	75.6	75.6	76.5
	Sound Pressure	Cooling	dBA	96.0	96.1	96.1	97.0
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a
	N. of circuits			2	2	2	2
Piping connections	Evaporator water inlet/outlet			168.3	168.3	168.3	168.3
Safety devices	High discharge pressure (pressure switch)						
Safety devices	High discharge pressure (pressure transducer)						
Safety devices	Low suction pressure (pressure transducer)						
Safety devices	Compressor motor protection						
Safety devices	High discharge temperature						
Safety devices	Low oil pressure						
Safety devices	Low pressure ratio						
Safety devices	High oil filter pressure drop						
Safety devices	Phase monitor						
Safety devices	Emergency stop button						
Safety devices	Water freeze protection controller						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						

TECHNICAL SPECIFICATIONS	Version SE - ST / LN			275.2	303.2	327.2	403.3
Capacity	Cooling		kW	967	1064	1152	1419
Capacity control	Type			Stepless			
	Minimum capacity		%	12.5	12.5	12.5	7
Unit power input	Cooling		kW	351	378	402	500
EER				2.76	2.82	2.86	2.84
ESEER				3.80	3.88	3.84	3.88
Casing	Colour			Ivory White			
	Material			Galvanized and painted steel sheet			
Dimensions	Unit	Height	mm	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285
		Depth	mm	6185	7085	7985	10185
Weight	Unit		kg	5463	5832	6032	8532
	Operating Weight		kg	5703	6064	6264	8936
Water heat exchanger	Type			Single Pass Shell&Tube			
	Water volume		l	240	232	232	404
	Nominal water flow rate	Cooling	l/s	46.21	50.85	55.04	67.78
	Nominal Water pressure drop	Cooling	kPa	77	65	75	60
	Insulation material			Closed cell			
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler			
Fan	Type			Direct propeller type			
	Drive			DOL			
	Diameter		mm	800	800	800	800
	Nominal air flow		l/s	64133	74822	85510	106888
	Model	Quantity		12	14	16	20
		Speed	rpm	920	920	920	920
		Motor input	kW	1.75	1.75	1.75	1.75
Compressor	Type			Semi-hermetic single screw compressor			
	Oil charge		l	50	50	50	75
	Quantity			2	2	2	3
Sound level (ST)	Sound Power	Cooling	dBA	101.1	101.5	101.7	102.9
	Sound Pressure	Cooling	dBA	80.6	80.6	80.6	81.0
Sound level (LN)	Sound Power	Cooling	dBA	76.6	76.8	76.9	77.2
	Sound Pressure	Cooling	dBA	97.1	97.6	98.1	99.1
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a
	N. of circuits			2	2	2	3
Piping connections	Evaporator water inlet/outlet			168.3	168.3	168.3	219.1
Safety devices	High discharge pressure (pressure switch)						
Safety devices	High discharge pressure (pressure transducer)						
Safety devices	Low suction pressure (pressure transducer)						
Safety devices	Compressor motor protection						
Safety devices	High discharge temperature						
Safety devices	Low oil pressure						
Safety devices	Low pressure ratio						
Safety devices	High oil filter pressure drop						
Safety devices	Phase monitor						
Safety devices	Emergency stop button						
Safety devices	Water freeze protection controller						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						

Note

For the best cost effective cooling capacity between 1152 (AWS SE 327.2 ST) and 1419 (AWS SE 403.3 ST) please referred to XE version.

TECHNICAL SPECIFICATIONS Version SE - ST / LN				435.3	461.3	487.3
Capacity	Cooling		kW	1538	1622	1714
Capacity control	Type			Stepless		
	Minimum capacity		%	7	7	7
Unit power input	Cooling		kW	551	580	618
EER				2.79	2.80	2.77
ESEER				3.90	3.87	3.78
Casing	Colour			Ivory White		
	Material			Galvanized and painted steel sheet		
Dimensions	Unit	Height	mm	2540	2540	2540
		Width	mm	2285	2285	2285
		Depth	mm	10185	11085	11085
Weight	Unit		kg	8544	8814	8814
	Operating Weight		kg	8936	9206	9206
Water heat exchanger	Type			Single Pass Shell&Tube		
	Water volume		l	392	392	392
	Nominal water flow rate	Cooling	l/s	73.50	77.51	81.89
	Nominal Water pressure drop	Cooling	kPa	62	68	86
	Insulation material			Closed cell		
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler		
Fan	Type			Direct propeller type		
	Drive			DOL		
	Diameter		mm	800	800	800
	Nominal air flow		l/s	106888	117577	117577
	Model	Quantity		20	22	22
		Speed	rpm	920	920	920
		Motor input	kW	1.75	1.75	1.75
Compressor	Type			Semi-hermetic single screw compressor		
	Oil charge		l	75	75	75
	Quantity			3	3	3
Sound level (ST)	Sound Power	Cooling	dBA	103.0	103.2	103.3
	Sound Pressure	Cooling	dBA	81.1	81.1	81.2
Sound level (LN)	Sound Power	Cooling	dBA	77.2	77.3	77.4
	Sound Pressure	Cooling	dBA	99.1	99.5	99.5
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a
	N. of circuits			3	3	3
Piping connections	Evaporator water inlet/outlet			219.1	219.1	219.1
Safety devices	High discharge pressure (pressure switch)					
Safety devices	High discharge pressure (pressure transducer)					
Safety devices	Low suction pressure (pressure transducer)					
Safety devices	Compressor motor protection					
Safety devices	High discharge temperature					
Safety devices	Low oil pressure					
Safety devices	Low pressure ratio					
Safety devices	High oil filter pressure drop					
Safety devices	Phase monitor					
Safety devices	Emergency stop button					
Safety devices	Water freeze protection controller					
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.					

ELECTRICAL SPECIFICATIONS	Version SE - ST / LN			184.2	212.2	237.2	260.2
Power Supply	Phase			3	3	3	3
	Frequency		Hz	50	50	50	50
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	614	662	663	921
	Nominal running current cooling		A	365	432	492	523
	Maximum running current		A	486	532	578	643
	Maximum current for wires sizing		A	535	585	636	707
Fans	Nominal running current in cooling		A	40	40	40	48
Compressor	Phase			3	3	3	3
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
	Maximum running current		A	205+205	210+266	267+267	252+320
	Starting method			Wye – Delta type (Y – Δ)			

ELECTRICAL SPECIFICATIONS	Version SE - ST / LN			275.2	303.2	327.2	403.3
Power Supply	Phase			3	3	3	3
	Frequency		Hz	50	50	50	50
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	975	1033	1035	1251
	Nominal running current cooling		A	574	624	668	823
	Maximum running current		A	700	772	844	1058
	Maximum current for wires sizing		A	770	849	928	1164
Fans	Nominal running current in cooling		A	48	56	64	80
Compressor	Phase			3	3	3	3
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
	Maximum running current		A	320+320	302+382	373+373	302+302+323
	Starting method			Wye – Delta type (Y – Δ)			

Notes
Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
Nominal current in cooling mode is referred to the following conditions: evaporator 12°C/7°C; ambient 35°C; compressors + fans current.
Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
Maximum unit current for wires sizing is based on minimum allowed voltage
Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

ELECTRICAL SPECIFICATIONS Version SE - ST / LN				435.3	461.3	487.3
Power Supply	Phase			3	3	3
	Frequency		Hz	50	50	50
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
Unit	Maximum starting current		A	1322	1368	1369
	Nominal running current cooling		A	908	959	1023
	Maximum running current		A	1122	1194	1258
	Maximum current for wires sizing		A	1234	1313	1384
Fans	Nominal running current in cooling		A	80	88	88
Compressor	Phase			3	3	3
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
	Maximum running current		A	387+305+327	381+381+285	382+382+361
	Starting method			Wye – Delta type (Y – Δ)		

Notes	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
	Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
	Nominal current in cooling mode is referred to the following conditions: evaporator 12°C/7°C; ambient 35°C; compressors + fans current.
	Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
	Maximum unit current for wires sizing is based on minimum allowed voltage
	Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

Specifications AWS SE-XN

TECHNICAL SPECIFICATIONS	Version SE - XN			184.2	212.2	237.2	260.2
Capacity	Cooling		kW	619	715	789	876
Capacity control	Type			Stepless			
	Minimum capacity		%	12.5	12.5	12.5	12.5
Unit power input	Cooling		kW	223	272	315	331
EER				2.77	2.62	2.51	2.65
ESEER				4.08	3.96	3.98	3.99
Casing	Colour			Ivory White			
	Material			Galvanized and painted steel sheet			
Dimensions	Unit	Height	mm	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285
		Depth	mm	6185	6185	6185	6185
Weight	Unit		kg	4888	4924	4925	5442
	Operating Weight		kg	5158	5164	5165	5682
Water heat exchanger	Type			Single Pass Shell&Tube			
	Water volume		l	270	240	240	240
	Nominal water flow rate	Cooling	l/s	29.57	34.15	37.71	41.83
	Nominal Water pressure drop	Cooling	kPa	73	67	53	64
	Insulation material			Closed cell			
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler			
Fan	Type			Direct propeller type			
	Drive			DOL			
	Diameter		mm	800	800	800	800
	Nominal air flow		l/s	41006	41006	41006	49207
	Model	Quantity		10	10	10	12
		Speed	rpm	715	715	715	715
		Motor input	kW	0.78	0.78	0.78	0.78
Compressor	Type			Semi-hermetic single screw compressor			
	Oil charge		l	38	38	38	44
	Quantity			2	2	2	2
Sound level (XN)	Sound Power	Cooling	dBA	71.0	71.5	71.5	72.0
	Sound Pressure	Cooling	dBA	91.5	92.0	92.0	92.5
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a
	N. of circuits			2	2	2	2
Piping connections	Evaporator water inlet/outlet			168.3	168.3	168.3	168.3
Safety devices	High discharge pressure (pressure switch)						
Safety devices	High discharge pressure (pressure transducer)						
Safety devices	Low suction pressure (pressure transducer)						
Safety devices	Compressor motor protection						
Safety devices	High discharge temperature						
Safety devices	Low oil pressure						
Safety devices	Low pressure ratio						
Safety devices	High oil filter pressure drop						
Safety devices	Phase monitor						
Safety devices	Emergency stop button						
Safety devices	Water freeze protection controller						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						

TECHNICAL SPECIFICATIONS	Version SE - XN			275.2	303.2	327.2	403.3
Capacity	Cooling		kW	922	1020	1112	1367
Capacity control	Type			Stepless			
	Minimum capacity		%	12.5	12.5	12.5	7
Unit power input	Cooling		kW	369	395	417	517
EER				2.50	2.59	2.67	2.64
ESEER				4.00	3.96	3.96	3.90
Casing	Colour			Ivory White			
	Material			Galvanized and painted steel sheet			
Dimensions	Unit	Height	mm	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285
		Depth	mm	6185	7085	7985	10185
Weight	Unit		kg	5743	6112	6312	8962
	Operating Weight		kg	5983	6344	6544	9366
Water heat exchanger	Type			Single Pass Shell&Tube			
	Water volume		l	240	232	232	404
	Nominal water flow rate	Cooling	l/s	44.05	48.75	53.11	65.32
	Nominal Water pressure drop	Cooling	kPa	70	60	70	57
	Insulation material			Closed cell			
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler			
Fan	Type			Direct propeller type			
	Drive			DOL			
	Diameter		mm	800	800	800	800
	Nominal air flow		l/s	49207	57408	65610	82012
	Model	Quantity		12	14	16	20
		Speed	rpm	715	715	715	715
		Motor input	kW	0.78	0.78	0.78	0.78
Compressor	Type			Semi-hermetic single screw compressor			
	Oil charge		l	50	50	50	75
	Quantity			2	2	2	3
Sound level (XN)	Sound Power	Cooling	dBA	72.5	72.6	72.7	72.9
	Sound Pressure	Cooling	dBA	93.0	93.5	93.8	94.8
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a
	N. of circuits			2	2	2	3
Piping connections	Evaporator water inlet/outlet			168.3	168.3	168.3	219.1
Safety devices	High discharge pressure (pressure switch)						
Safety devices	High discharge pressure (pressure transducer)						
Safety devices	Low suction pressure (pressure transducer)						
Safety devices	Compressor motor protection						
Safety devices	High discharge temperature						
Safety devices	Low oil pressure						
Safety devices	Low pressure ratio						
Safety devices	High oil filter pressure drop						
Safety devices	Phase monitor						
Safety devices	Emergency stop button						
Safety devices	Water freeze protection controller						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						

Note

For the best cost effective cooling capacity between 1112 (AWS SE 327.2 XN) and 1367 (AWS SE 403.3 XN) please referred to XE version.

TECHNICAL SPECIFICATIONS	Version SE - XN			435.3	461.3	487.3
Capacity	Cooling		kW	1471	1556	1623
Capacity control	Type			Stepless		
	Minimum capacity		%	7	7	7
Unit power input	Cooling		kW	576	603	647
EER				2.55	2.58	2.51
ESEER				3.87	3.90	3.83
Casing	Colour			Ivory White		
	Material			Galvanized and painted steel sheet		
Dimensions	Unit	Height	mm	2540	2540	2540
		Width	mm	2285	2285	2285
		Depth	mm	10185	11085	11085
Weight	Unit		kg	8974	9244	9244
	Operating Weight		kg	9366	9636	9636
Water heat exchanger	Type			Single Pass Shell&Tube		
	Water volume		l	392	392	392
	Nominal water flow rate	Cooling	l/s	70.28	74.32	77.57
	Nominal Water pressure drop	Cooling	kPa	57	63	78
	Insulation material			Closed cell		
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler		
Fan	Type			Direct propeller type		
	Drive			DOL		
	Diameter		mm	800	800	800
	Nominal air flow		l/s	82012	90213	90213
	Model	Quantity		20	22	22
		Speed	rpm	715	715	715
		Motor input	kW	0.78	0.78	0.78
Compressor	Type			Semi-hermetic single screw compressor		
	Oil charge		l	75	75	75
	Quantity			3	3	3
Sound level (XN)	Sound Power	Cooling	dBA	73.0	73.0	73.1
	Sound Pressure	Cooling	dBA	94.9	95.1	95.2
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a
	N. of circuits			3	3	3
Piping connections	Evaporator water inlet/outlet			219.1	219.1	219.1
Safety devices	High discharge pressure (pressure switch)					
Safety devices	High discharge pressure (pressure transducer)					
Safety devices	Low suction pressure (pressure transducer)					
Safety devices	Compressor motor protection					
Safety devices	High discharge temperature					
Safety devices	Low oil pressure					
Safety devices	Low pressure ratio					
Safety devices	High oil filter pressure drop					
Safety devices	Phase monitor					
Safety devices	Emergency stop button					
Safety devices	Water freeze protection controller					
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.					

ELECTRICAL SPECIFICATIONS	Version SE - XN			184.2	212.2	237.2	260.2
Power Supply	Phase			3	3	3	3
	Frequency		Hz	50	50	50	50
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	607	646	649	903
	Nominal running current cooling		A	370	449	518	546
	Maximum running current		A	472	518	564	626
	Maximum current for wires sizing		A	519	570	620	689
Fans	Nominal running current in cooling		A	26	26	26	31
Compressor	Phase			3	3	3	3
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
	Maximum running current		A	223+223	223+269	269+269	269+326
	Starting method			Wye – Delta type (Y – Δ)			

ELECTRICAL SPECIFICATIONS	Version SE - XN			275.2	303.2	327.2	403.3
Power Supply	Phase			3	3	3	3
	Frequency		Hz	50	50	50	50
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	975	1010	1021	1188
	Nominal running current cooling		A	606	653	694	853
	Maximum running current		A	683	752	822	1030
	Maximum current for wires sizing		A	752	828	904	1133
Fans	Nominal running current in cooling		A	31	36	42	52
Compressor	Phase			3	3	3	3
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
	Maximum running current		A	326+326	326+390	390+390	326+326+326
	Starting method			Wye – Delta type (Y – Δ)			

Notes	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
	Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
	Nominal current in cooling mode is referred to the following conditions: evaporator 12°C/7°C; ambient 35°C; compressors + fans current.
	Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
	Maximum unit current for wires sizing is based on minimum allowed voltage
	Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

ELECTRICAL SPECIFICATIONS	Version SE - XN			435.3	461.3	487.3
Power Supply	Phase			3	3	3
	Frequency		Hz	50	50	50
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
Unit	Maximum starting current		A	1288	1352	1355
	Nominal running current cooling		A	951	1001	1074
	Maximum running current		A	1094	1163	1227
	Maximum current for wires sizing		A	1203	1280	1350
Fans	Nominal running current in cooling		A	52	57	57
Compressor	Phase			3	3	3
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
	Maximum running current		A	390+326+326	390+390+326	390+390+390
	Starting method			Wye – Delta type (Y – Δ)		

Notes	
	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
	Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
	Nominal current in cooling mode is referred to the following conditions: evaporator 12°C/7°C; ambient 35°C; compressors + fans current.
	Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
	Maximum unit current for wires sizing is based on minimum allowed voltage
	Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

Specifications AWS XE-ST & AWS XE-LN

TECHNICAL SPECIFICATIONS Version XE - ST / LN				210.2	230.2	250.2	280.2	300.2
Capacity	Cooling		kW	756	830	889	1001	1074
Capacity control	Type			Stepless				
	Minimum capacity		%	12.5	12.5	12.5	12.5	12.5
Unit power input	Cooling		kW	233	253	278	307	338
EER				3.25	3.28	3.20	3.26	3.18
ESEER				4.02	4.11	4.02	4.11	4.05
Casing	Colour			Ivory White				
	Material			Galvanized and painted steel sheet				
Dimensions	Unit	Height	mm	2540	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285	2285
		Depth	mm	6185	7085	7085	7985	7985
Weight	Unit		kg	4915	5220	5220	6035	6335
	Operating Weight		kg	5155	5452	5452	6425	6725
Water heat exchanger	Type			Single Pass Shell&Tube				
	Water volume		l	240	232	232	390	390
	Nominal water flow rate	Cooling	l/s	36.10	39.67	42.49	47.82	51.32
	Nominal Water pressure drop	Cooling	kPa	67	64	72	65	74
	Insulation material			Closed cell				
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler				
Fan	Type			Direct propeller type				
	Drive			DOL				
	Diameter		mm	800	800	800	800	800
	Nominal air flow		l/s	64133	74822	74822	85510	85510
	Model	Quantity		12	14	14	16	16
		Speed	rpm	920	920	920	920	920
		Motor input	kW	1.75	1.75	1.75	1.75	1.75
Compressor	Type			Semi-hermetic single screw compressor				
	Oil charge		l	38	38	38	44	50
	Quantity			2	2	2	2	2
Sound level (ST)	Sound Power	Cooling	dBA	79.7	79.7	79.7	80.2	80.7
	Sound Pressure	Cooling	dBA	100.2	100.5	100.5	101.4	101.9
Sound level (LN)	Sound Power	Cooling	dBA	76.3	76.5	76.5	76.9	77.1
	Sound Pressure	Cooling	dBA	96.8	97.4	97.4	98.0	98.2
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a	R-134a
	N. of circuits			2	2	2	2	2
Piping connections	Evaporator water inlet/outlet			168.3	168.3	168.3	219.1	219.1
Safety devices	High discharge pressure (pressure switch)							
Safety devices	High discharge pressure (pressure transducer)							
Safety devices	Low suction pressure (pressure transducer)							
Safety devices	Compressor motor protection							
Safety devices	High discharge temperature							
Safety devices	Low oil pressure							
Safety devices	Low pressure ratio							
Safety devices	High oil filter pressure drop							
Safety devices	Phase monitor							
Safety devices	Emergency stop button							
Safety devices	Water freeze protection controller							
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.							

TECHNICAL SPECIFICATIONS	Version XE - ST / LN			325.2	360.2	375.3	387.3	425.3
Capacity	Cooling		kW	1196	1280	1334	1409	1526
Capacity control	Type			Stepless				
	Minimum capacity		%	12.5	12.5	7	7	7
Unit power input	Cooling		kW	364	400	414	437	474
EER				3.29	3.20	3.22	3.23	3.22
ESEER				4.14	4.02	4.18	4.23	4.19
Casing	Colour			Ivory White				
	Material			Galvanized and painted steel sheet				
Dimensions	Unit	Height	mm	2540	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285	2285
		Depth	mm	9785	9785	11085	11985	11985
Weight	Unit		kg	6965	6965	8120	8690	9560
	Operating Weight		kg	7339	7339	8592	9162	10391
Water heat exchanger	Type			Single Pass Shell&Tube				
	Water volume		l	374	374	472	472	831
	Nominal water flow rate	Cooling	l/s	57.13	61.18	63.76	67.34	72.90
	Nominal Water pressure drop	Cooling	kPa	45	51	80	88	72
	Insulation material			Closed cell				
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler				
Fan	Type			Direct propeller type				
	Drive			DOL				
	Diameter		mm	800	800	800	800	800
	Nominal air flow		l/s	106888	106888	117577	128266	128266
	Model	Quantity		20	20	22	24	24
		Speed	rpm	920	920	920	920	920
		Motor input	kW	1.75	1.75	1.75	1.75	1.75
Compressor	Type			Semi-hermetic single screw compressor				
	Oil charge		l	50	50	57	63	69
	Quantity			2	2	3	3	3
Sound level (ST)	Sound Power	Cooling	dBA	80.3	80.4	80.2	80.5	80.7
	Sound Pressure	Cooling	dBA	102.4	102.5	102.3	102.9	103.1
Sound level (LN)	Sound Power	Cooling	dBA	76.7	76.8	77.0	77.1	77.2
	Sound Pressure	Cooling	dBA	98.8	98.9	99.1	99.6	99.6
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a	R-134a
	N. of circuits			2	2	3	3	3
Piping connections	Evaporator water inlet/outlet			219.1	219.1	219.1	219.1	273.0
Safety devices	High discharge pressure (pressure switch)							
Safety devices	High discharge pressure (pressure transducer)							
Safety devices	Low suction pressure (pressure transducer)							
Safety devices	Compressor motor protection							
Safety devices	High discharge temperature							
Safety devices	Low oil pressure							
Safety devices	Low pressure ratio							
Safety devices	High oil filter pressure drop							
Safety devices	Phase monitor							
Safety devices	Emergency stop button							
Safety devices	Water freeze protection controller							
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.							

TECHNICAL SPECIFICATIONS Version XE - ST / LN				445.3	470.3	490.3	515.3
Capacity	Cooling		kW	1596	1685	1768	1858
Capacity control	Type			Stepless			
	Minimum capacity		%	7	7	7	7
Unit power input	Cooling		kW	504	533	561	590
EER				3.17	3.16	3.15	3.15
ESEER				4.17	4.16	4.13	4.13
Casing	Colour			Ivory White			
	Material			Galvanized and painted steel sheet			
Dimensions	Unit	Height	mm	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285
		Depth	mm	11985	12885	13785	14685
Weight	Unit		kg	9860	10135	10416	10686
	Operating Weight		kg	10691	10966	11266	11536
Water heat exchanger	Type			Single Pass Shell&Tube			
	Water volume		l	831	831	850	850
	Nominal water flow rate	Cooling	l/s	76.24	80.48	84.47	88.79
	Nominal Water pressure drop	Cooling	kPa	79	87	74	81
	Insulation material			Closed cell			
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler			
Fan	Type			Direct propeller type			
	Drive			DOL			
	Diameter		mm	800	800	800	800
	Nominal air flow		l/s	128266	138954	149643	160332
	Model	Quantity		24	26	28	30
		Speed	rpm	920	920	920	920
		Motor input	kW	1.75	1.75	1.75	1.75
Compressor	Type			Semi-hermetic single screw compressor			
	Oil charge		l	75	75	75	75
	Quantity			2	2	2	2
Sound level (ST)	Sound Power	Cooling	dBA	80.9	80.8	81.0	81.0
	Sound Pressure	Cooling	dBA	103.2	103.5	103.7	103.9
Sound level (LN)	Sound Power	Cooling	dBA	77.3	77.4	77.5	77.5
	Sound Pressure	Cooling	dBA	99.6	100.0	100.2	100.4
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a
	N. of circuits			3	3	3	3
Piping connections	Evaporator water inlet/outlet			273.0	273.0	273.0	273.0
Safety devices	High discharge pressure (pressure switch)						
Safety devices	High discharge pressure (pressure transducer)						
Safety devices	Low suction pressure (pressure transducer)						
Safety devices	Compressor motor protection						
Safety devices	High discharge temperature						
Safety devices	Low oil pressure						
Safety devices	Low pressure ratio						
Safety devices	High oil filter pressure drop						
Safety devices	Phase monitor						
Safety devices	Emergency stop button						
Safety devices	Water freeze protection controller						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						

ELECTRICAL SPECIFICATIONS	Version XE - ST / LN			210.2	230.2	250.2	280.2	300.2
Power Supply	Phase			3	3	3	3	3
	Frequency		Hz	50	50	50	50	50
	Voltage		V	400	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	638	683	684	952	997
	Nominal running current cooling		A	386	423	463	511	559
	Maximum running current		A	494	548	594	659	716
	Maximum current for wires sizing		A	543	603	653	725	788
Fans	Nominal running current in cooling		A	48	56	56	64	64
Compressor	Phase			3	3	3	3	3
	Voltage		V	400	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%	+10%
	Maximum running current		A	225+225	216+272	272+272	271+347	327+327
	Starting method			Wye – Delta type (Y – Δ)				

ELECTRICAL SPECIFICATIONS	Version XE - ST / LN			325.2	360.2	375.3	387.3	425.3
Power Supply	Phase			3	3	3	3	3
	Frequency		Hz	50	50	50	50	50
	Voltage		V	400	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	1043	1045	932	1182	1210
	Nominal running current cooling		A	608	668	690	729	787
	Maximum running current		A	796	860	895	960	1017
	Maximum current for wires sizing		A	876	946	985	1056	1119
Fans	Nominal running current in cooling		A	80	80	88	96	96
Compressor	Phase			3	3	3	3	3
	Voltage		V	400	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%	+10%
	Maximum running current		A	315+394	362+362	271+271 +261	260+260 +327	330+330 +261
	Starting method			Wye – Delta type (Y – Δ)				

Notes	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
	Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
	Nominal current in cooling mode is referred to the following conditions: evaporator 12°C/7°C; ambient 35°C; compressors + fans current.
	Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
	Maximum unit current for wires sizing is based on minimum allowed voltage
	Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

ELECTRICAL SPECIFICATIONS Version XE - ST / LN				445.3	470.3	490.3	515.3
Power Supply	Phase			3	3	3	3
	Frequency		Hz	50	50	50	50
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	1295	1344	1393	1420
	Nominal running current cooling		A	834	885	934	985
	Maximum running current		A	1074	1146	1218	1290
	Maximum current for wires sizing		A	1181	1261	1340	1419
Fans	Nominal running current in cooling		A	96	104	112	120
Compressor	Phase			3	3	3	3
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
	Maximum running current		A	330+330 +330	330+330 +381	381+381 +329	393+393 +393
	Starting method			Wye – Delta type (Y – Δ)			

Notes	
	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
	Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
	Nominal current in cooling mode is referred to the following conditions: evaporator 12°C/7°C; ambient 35°C; compressors + fans current.
	Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
	Maximum unit current for wires sizing is based on minimum allowed voltage
	Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

Specifications AWS XE-XN

TECHNICAL SPECIFICATIONS	Version XE - XN			210.2	230.2	250.2	280.2	300.2
Capacity	Cooling		kW	736	811	866	974	1041
Capacity control	Type			Stepless				
	Minimum capacity		%	12.5	12.5	12.5	12.5	12.5
Unit power input	Cooling		kW	235	254	281	309	343
EER				3.14	3.20	3.08	3.15	3.03
ESEER				4.29	4.36	4.23	4.34	4.24
Casing	Colour			Ivory White				
	Material			Galvanized and painted steel sheet				
Dimensions	Unit	Height	mm	2540	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285	2285
		Depth	mm	6185	7085	7085	7985	7985
Weight	Unit		kg	5195	5500	5500	6315	6615
	Operating Weight		kg	5435	5732	5732	6705	7005
Water heat exchanger	Type			Single Pass Shell&Tube				
	Water volume		l	240	232	232	390	390
	Nominal water flow rate	Cooling	l/s	35.17	38.74	41.36	46.54	49.76
	Nominal Water pressure drop	Cooling	kPa	64	64	72	65	74
	Insulation material			Closed cell				
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler				
Fan	Type			Direct propeller type				
	Drive			DOL				
	Diameter		mm	800	800	800	800	800
	Nominal air flow		l/s	49207	57408	57408	65610	65610
	Model	Quantity		12	14	14	16	16
		Speed	rpm	715	715	715	715	715
		Motor input	kW	0.78	0.78	0.78	0.78	0.78
Compressor	Type			Semi-hermetic single screw compressor				
	Oil charge		l	38	38	38	44	50
	Quantity			2	2	2	2	2
Sound level (XN)	Sound Power	Cooling	dBA	71.5	71.5	71.5	72.3	72.5
	Sound Pressure	Cooling	dBA	92.0	92.3	92.3	93.5	93.7
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a	R-134a
	N. of circuits			2	2	2	2	2
Piping connections	Evaporator water inlet/outlet			168.3	168.3	168.3	219.1	219.1
Safety devices	High discharge pressure (pressure switch)							
Safety devices	High discharge pressure (pressure transducer)							
Safety devices	Low suction pressure (pressure transducer)							
Safety devices	Compressor motor protection							
Safety devices	High discharge temperature							
Safety devices	Low oil pressure							
Safety devices	Low pressure ratio							
Safety devices	High oil filter pressure drop							
Safety devices	Phase monitor							
Safety devices	Emergency stop button							
Safety devices	Water freeze protection controller							
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.							

TECHNICAL SPECIFICATIONS Version XE - XN				325.2	360.2	375.3	387.3	425.3
Capacity	Cooling		kW	1168	1247	1303	1378	1486
Capacity control	Type			Stepless				
	Minimum capacity		%	12.5	12.5	7	7	7
Unit power input	Cooling		kW	365	404	416	438	479
EER				3.20	3.08	3.13	3.15	3.10
ESEER				4.38	4.25	4.25	4.34	4.26
Casing	Colour			Ivory White				
	Material			Galvanized and painted steel sheet				
Dimensions	Unit	Height	mm	2540	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285	2285
		Depth	mm	9785	9785	11085	11985	11985
Weight	Unit		kg	7245	7245	8550	9120	9990
	Operating Weight		kg	7619	7619	9022	9592	10821
Water heat exchanger	Type			Single Pass Shell&Tube				
	Water volume		l	374	374	472	472	831
	Nominal water flow rate	Cooling	l/s	55.78	59.56	62.25	65.85	70.98
	Nominal Water pressure drop	Cooling	kPa	45	51	80	88	72
	Insulation material			Closed cell				
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler				
Fan	Type			Direct propeller type				
	Drive			DOL				
	Diameter		mm	800	800	800	800	800
	Nominal air flow		l/s	82012	82012	90213	98414	98414
	Model	Quantity		20	20	22	24	24
		Speed	rpm	715	715	715	715	715
		Motor input	kW	0.78	0.78	0.78	0.78	0.78
Compressor	Type			Semi-hermetic single screw compressor				
	Oil charge		l	50	50	57	63	69
	Quantity			2	2	3	3	3
Sound level (XN)	Sound Power	Cooling	dBA	72.2	72.3	72.3	72.6	72.8
	Sound Pressure	Cooling	dBA	94.3	94.5	94.4	95.1	95.2
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a	R-134a
	N. of circuits			2	2	3	3	3
Piping connections	Evaporator water inlet/outlet			219.1	219.1	219.1	219.1	273.0
Safety devices	High discharge pressure (pressure switch)							
Safety devices	High discharge pressure (pressure transducer)							
Safety devices	Low suction pressure (pressure transducer)							
Safety devices	Compressor motor protection							
Safety devices	High discharge temperature							
Safety devices	Low oil pressure							
Safety devices	Low pressure ratio							
Safety devices	High oil filter pressure drop							
Safety devices	Phase monitor							
Safety devices	Emergency stop button							
Safety devices	Water freeze protection controller							
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.							

TECHNICAL SPECIFICATIONS Version XE - XN				445.33	470.3	490.3	515.3
Capacity	Cooling		kW	1550	1639	1722	1813
Capacity control	Type			Stepless			
	Minimum capacity		%	7	7	7	7
Unit power input	Cooling		kW	513	541	567	595
EER				3.03	3.03	3.04	3.04
ESEER				4.26	4.20	4.21	4.20
Casing	Colour			Ivory White			
	Material			Galvanized and painted steel sheet			
Dimensions	Unit	Height	mm	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285
		Depth	mm	11985	12885	13785	14685
Weight	Unit		kg	10290	10565	10846	11116
	Operating Weight		kg	11121	11396	11696	11966
Water heat exchanger	Type			Single Pass Shell&Tube			
	Water volume		l	831	831	850	850
	Nominal water flow rate	Cooling	l/s	74.07	78.32	82.30	86.61
	Nominal Water pressure drop	Cooling	kPa	79	87	74	81
	Insulation material			Closed cell			
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler			
Fan	Type			Direct propeller type			
	Drive			DOL			
	Diameter		mm	800	800	800	800
	Nominal air flow		l/s	98414	106616	114817	123018
	Model	Quantity		24	26	28	30
		Speed	rpm	715	715	715	715
		Motor input	kW	0.78	0.78	0.78	0.78
Compressor	Type			Semi-hermetic single screw compressor			
	Oil charge		l	75	75	75	75
	Quantity			2	2	2	2
Sound level (ST)	Sound Power	Cooling	dBA	72.9	72.9	73.0	73.0
	Sound Pressure	Cooling	dBA	95.3	95.6	95.7	95.9
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a
	N. of circuits			3	3	3	3
Piping connections	Evaporator water inlet/outlet			273.0	273.0	273.0	273.0
Safety devices	High discharge pressure (pressure switch)						
Safety devices	High discharge pressure (pressure transducer)						
Safety devices	Low suction pressure (pressure transducer)						
Safety devices	Compressor motor protection						
Safety devices	High discharge temperature						
Safety devices	Low oil pressure						
Safety devices	Low pressure ratio						
Safety devices	High oil filter pressure drop						
Safety devices	Phase monitor						
Safety devices	Emergency stop button						
Safety devices	Water freeze protection controller						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						

ELECTRICAL SPECIFICATIONS Version XE - XN				210.2	230.2	250.2	280.2	300.2
Power Supply	Phase			3	3	3	3	3
	Frequency		Hz	50	50	50	50	50
	Voltage		V	400	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	621	663	663	918	976
	Nominal running current cooling		A	391	425	470	517	570
	Maximum running current		A	477	528	574	637	694
	Maximum current for wires sizing		A	525	581	632	700	763
Fans	Nominal running current in cooling		A	31	36	36	42	42
Compressor	Phase			3	3	3	3	3
	Voltage		V	400	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%	+10%
	Maximum running current		A	223+223	223+269	269+269	269+326	326+326
	Starting method			Wye – Delta type (Y – Δ)				

ELECTRICAL SPECIFICATIONS Version XE - XN				325.2	360.2	375.3	387.3	425.3
Power Supply	Phase			3	3	3	3	3
	Frequency		Hz	50	50	50	50	50
	Voltage		V	400	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	1039	1041	901	1147	1206
	Nominal running current cooling		A	613	679	697	734	799
	Maximum running current		A	768	832	864	926	983
	Maximum current for wires sizing		A	845	915	951	1019	1082
Fans	Nominal running current in cooling		A	52	52	57	62	62
Compressor	Phase			3	3	3	3	3
	Voltage		V	400	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%	+10%
	Maximum running current		A	326+390	390+390	269+269 +269	269+269 +326	326+326 +269
	Starting method			Wye – Delta type (Y – Δ)				

Notes	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
	Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
	Nominal current in cooling mode is referred to the following conditions: evaporator 12°C/7°C; ambient 35°C; compressors + fans current.
	Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
	Maximum unit current for wires sizing is based on minimum allowed voltage
	Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

ELECTRICAL SPECIFICATIONS	Version XE - XN			445.3	470.3	490.3	515.3
Power Supply	Phase			3	3	3	3
	Frequency		Hz	50	50	50	50
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	1263	1308	1353	1370
	Nominal running current cooling		A	851	901	950	1001
	Maximum running current		A	1040	1110	1179	1248
	Maximum current for wires sizing		A	1144	1221	1297	1373
Fans	Nominal running current in cooling		A	62	68	73	78
Compressor	Phase			3	3	3	3
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
	Maximum running current		A	326+326 +326	326+326 +390	390+390 +326	390+390 +390
	Starting method			Wye – Delta type (Y – Δ)			

Notes	
	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
	Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
	Nominal current in cooling mode is referred to the following conditions: evaporator 12°C/7°C; ambient 35°C; compressors + fans current.
	Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
	Maximum unit current for wires sizing is based on minimum allowed voltage
	Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

Specifications AWS PR-ST & AWS PR-LN

TECHNICAL SPECIFICATIONS Version PR - ST / LN				221.2	243.2	266.2	290.2
Capacity	Cooling		kW	821	890	975	1074
Capacity control	Type			Stepless			
	Minimum capacity		%	12.5	12.5	12.5	12.5
Unit power input	Cooling		kW	225	249	274	301
EER				3.64	3.58	3.56	3.56
ESEER				4.44	4.50	4.41	4.53
Casing	Colour			Ivory White			
	Material			Galvanized and painted steel sheet			
Dimensions	Unit	Height	mm	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285
		Depth	mm	8885	8885	8885	9785
Weight	Unit		kg	6240	6240	6608	7218
	Operating Weight		kg	6822	6822	7619	8229
Water heat exchanger	Type			Single Pass Shell&Tube			
	Water volume		l	582	582	1011	1011
	Nominal water flow rate	Cooling	l/s	39.22	42.53	46.60	51.30
	Nominal Water pressure drop	Cooling	kPa	68	73	35	67
	Insulation material			Closed cell			
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler			
Fan	Type			Direct propeller type			
	Drive			DOL			
	Diameter		mm	800	800	800	800
	Nominal air flow		l/s	96199	96199	96199	106888
	Model	Quantity		18	18	18	20
		Speed	rpm	920	920	920	920
		Motor input	kW	1.75	1.75	1.75	1.75
Compressor	Type			Semi-hermetic single screw compressor			
	Oil charge		l	38	38	38	44
	Quantity			2	2	2	2
Sound level (ST)	Sound Power	Cooling	dBA	79.5	79.5	79.5	80.0
	Sound Pressure	Cooling	dBA	101.0	101.0	101.0	101.8
Sound level (LN)	Sound Power	Cooling	dBA	76.9	76.9	76.9	77.0
	Sound Pressure	Cooling	dBA	98.4	98.4	98.4	98.8
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a
	N. of circuits			2	2	2	2
Piping connections	Evaporator water inlet/outlet			219.1	219.1	273.0	273.0
Safety devices	High discharge pressure (pressure switch)						
Safety devices	High discharge pressure (pressure transducer)						
Safety devices	Low suction pressure (pressure transducer)						
Safety devices	Compressor motor protection						
Safety devices	High discharge temperature						
Safety devices	Low oil pressure						
Safety devices	Low pressure ratio						
Safety devices	High oil filter pressure drop						
Safety devices	Phase monitor						
Safety devices	Emergency stop button						
Safety devices	Water freeze protection controller						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						

TECHNICAL SPECIFICATIONS	Version PR - ST / LN			313.2	350.2	378.2
Capacity	Cooling		kW	1158	1279	1390
Capacity control	Type			Stepless		
	Minimum capacity		%	12.5	12.5	12.5
Unit power input	Cooling		kW	330	363	396
EER				3.51	3.52	3.51
ESEER				4.39	4.44	4.31
Casing	Colour			Ivory White		
	Material			Galvanized and painted steel sheet		
Dimensions	Unit	Height	mm	2540	2540	2540
		Width	mm	2285	2285	2285
		Depth	mm	9785	11085	11985
Weight	Unit		kg	7518	8059	8349
	Operating Weight		kg	8529	9022	9312
Water heat exchanger	Type			Single Pass Shell&Tube		
	Water volume		l	1011	963	963
	Nominal water flow rate	Cooling	l/s	55.31	61.12	66.41
	Nominal Water pressure drop	Cooling	kPa	77	67	77
	Insulation material			Closed cell		
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler		
Fan	Type			Direct propeller type		
	Drive			DOL		
	Diameter		mm	800	800	800
	Nominal air flow		l/s	106888	117577	128266
	Model	Quantity		20	22	24
		Speed	rpm	920	920	920
		Motor input	kW	1.75	1.75	1.75
Compressor	Type			Semi-hermetic single screw compressor		
	Oil charge		l	50	50	50
	Quantity			2	2	2
Sound level (ST)	Sound Power	Cooling	dBA	80.5	80.4	80.5
	Sound Pressure	Cooling	dBA	102.3	102.6	102.9
Sound level (LN)	Sound Power	Cooling	dBA	77.1	77.1	77.2
	Sound Pressure	Cooling	dBA	99.9	99.3	99.6
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a
	N. of circuits			2	2	2
Piping connections	Evaporator water inlet/outlet			273.0	273.0	273.0
Safety devices	High discharge pressure (pressure switch)					
Safety devices	High discharge pressure (pressure transducer)					
Safety devices	Low suction pressure (pressure transducer)					
Safety devices	Compressor motor protection					
Safety devices	High discharge temperature					
Safety devices	Low oil pressure					
Safety devices	Low pressure ratio					
Safety devices	High oil filter pressure drop					
Safety devices	Phase monitor					
Safety devices	Emergency stop button					
Safety devices	Water freeze protection controller					
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.					

ELECTRICAL SPECIFICATIONS Version PR - ST / LN				221.2	243.2	266.2	290.2
Power Supply	Phase			3	3	3	3
	Frequency		Hz	50	50	50	50
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	664	701	704	961
	Nominal running current cooling		A	384	420	461	506
	Maximum running current		A	518	564	610	675
	Maximum current for wires sizing		A	570	620	671	743
Fans	Nominal running current in cooling		A	72	72	72	80
Compressor	Phase			3	3	3	3
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
	Maximum running current		A	227+227	219+273	272+272	262+332
	Starting method			Wye – Delta type (Y – Δ)			

ELECTRICAL SPECIFICATIONS Version PR - ST / LN				313.2	350.2	378.2
Power Supply	Phase			3	3	3
	Frequency		Hz	50	50	50
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
Unit	Maximum starting current		A	1016	1074	1083
	Nominal running current cooling		A	551	609	665
	Maximum running current		A	732	804	876
	Maximum current for wires sizing		A	805	884	964
Fans	Nominal running current in cooling		A	80	88	96
Compressor	Phase			3	3	3
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
	Maximum running current		A	332+332	333+394	395+395
	Starting method			Wye – Delta type (Y – Δ)		

Notes	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
	Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
	Nominal current in cooling mode is referred to the following conditions: evaporator 12°C/7°C; ambient 35°C; compressors + fans current.
	Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
	Maximum unit current for wires sizing is based on minimum allowed voltage
	Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

Specifications AWS PR-XN

TECHNICAL SPECIFICATIONS	Version PR - XN			221.2	243.2	266.2	290.2
Capacity	Cooling		kW	809	875	956	1053
Capacity control	Type			Stepless			
	Minimum capacity		%	12.5	12.5	12.5	12.5
Unit power input	Cooling		kW	219	244	272	299
EER				3.70	3.58	3.51	3.52
ESEER				4.63	4.59	4.54	4.59
Casing	Colour			Ivory White			
	Material			Galvanized and painted steel sheet			
Dimensions	Unit	Height	mm	2540	2540	2540	2540
		Width	mm	2285	2285	2285	2285
		Depth	mm	8885	8885	8885	9785
Weight	Unit		kg	6520	6520	6888	7498
	Operating Weight		kg	7102	7102	7899	8509
Water heat exchanger	Type			Single Pass Shell&Tube			
	Water volume		l	582	582	1011	1011
	Nominal water flow rate	Cooling	l/s	38.65	41.81	45.69	50.30
	Nominal Water pressure drop	Cooling	kPa	66	70	34	65
	Insulation material			Closed cell			
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler			
Fan	Type			Direct propeller type			
	Drive			DOL			
	Diameter		mm	800	800	800	800
	Nominal air flow		l/s	73811	73811	73811	82012
	Model	Quantity		18	18	18	20
		Speed	rpm	715	715	715	715
		Motor input	kW	0.78	0.78	0.78	0.78
Compressor	Type			Semi-hermetic single screw compressor			
	Oil charge		l	38	38	38	44
	Quantity			2	2	2	2
Sound level (XN)	Sound Power	Cooling	dBA	71.2	71.2	71.2	71.7
	Sound Pressure	Cooling	dBA	92.7	92.7	92.7	93.4
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a	R-134a
	N. of circuits			2	2	2	2
Piping connections	Evaporator water inlet/outlet			219.1	219.1	273.0	273.0
Safety devices	High discharge pressure (pressure switch)						
Safety devices	High discharge pressure (pressure transducer)						
Safety devices	Low suction pressure (pressure transducer)						
Safety devices	Compressor motor protection						
Safety devices	High discharge temperature						
Safety devices	Low oil pressure						
Safety devices	Low pressure ratio						
Safety devices	High oil filter pressure drop						
Safety devices	Phase monitor						
Safety devices	Emergency stop button						
Safety devices	Water freeze protection controller						
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.						

TECHNICAL SPECIFICATIONS	Version PR - XN			313.2	350.2	378.2
Capacity	Cooling		kW	1132	1251	1359
Capacity control	Type			Stepless		
	Minimum capacity		%	12.5	12.5	12.5
Unit power input	Cooling		kW	330	364	396
EER				3.43	3.44	3.43
ESEER				4.50	4.53	4.51
Casing	Colour			Ivory White		
	Material			Galvanized and painted steel sheet		
Dimensions	Unit	Height	mm	2540	2540	2540
		Width	mm	2285	2285	2285
		Depth	mm	9785	11085	11985
Weight	Unit		kg	7798	8339	8629
	Operating Weight		kg	8809	9302	9592
Water heat exchanger	Type			Single Pass Shell&Tube		
	Water volume		l	1011	963	963
	Nominal water flow rate	Cooling	l/s	54.11	59.76	64.95
	Nominal Water pressure drop	Cooling	kPa	74	64	74
	Insulation material			Closed cell		
Air heat exchanger	Type			High efficiency fin and tube type with integral subcooler		
Fan	Type			Direct propeller type		
	Drive			DOL		
	Diameter		mm	800	800	800
	Nominal air flow		l/s	82012	90213	98414
	Model	Quantity		20	22	24
		Speed	rpm	715	715	715
		Motor input	kW	0.78	0.78	0.78
Compressor	Type			Semi-hermetic single screw compressor		
	Oil charge		l	50	50	50
	Quantity			2	2	2
Sound level (XN)	Sound Power	Cooling	dBA	72.0	72.0	72.0
	Sound Pressure	Cooling	dBA	93.8	94.1	94.4
Refrigerant circuit	Refrigerant type			R-134a	R-134a	R-134a
	N. of circuits			2	2	2
Piping connections	Evaporator water inlet/outlet			273.0	273.0	273.0
Safety devices	High discharge pressure (pressure switch)					
Safety devices	High discharge pressure (pressure transducer)					
Safety devices	Low suction pressure (pressure transducer)					
Safety devices	Compressor motor protection					
Safety devices	High discharge temperature					
Safety devices	Low oil pressure					
Safety devices	Low pressure ratio					
Safety devices	High oil filter pressure drop					
Safety devices	Phase monitor					
Safety devices	Emergency stop button					
Safety devices	Water freeze protection controller					
Notes	Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12°C/7°C; ambient 35°C.					

ELECTRICAL SPECIFICATIONS	Version PR - XN			221.2	243.2	266.2	290.2
Power Supply	Phase			3	3	3	3
	Frequency		Hz	50	50	50	50
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
Unit	Maximum starting current		A	638	676	680	932
	Nominal running current cooling		A	376	416	461	505
	Maximum running current		A	493	539	585	647
	Maximum current for wires sizing		A	542	593	643	712
Fans	Nominal running current in cooling		A	47	47	47	52
Compressor	Phase			3	3	3	3
	Voltage		V	400	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%	+10%
	Maximum running current		A	223+223	223+269	269+269	269+326
	Starting method			Wye – Delta type (Y – Δ)			

ELECTRICAL SPECIFICATIONS	Version PR - XN			313.2	350.2	378.2
Power Supply	Phase			3	3	3
	Frequency		Hz	50	50	50
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
Unit	Maximum starting current		A	989	1041	1052
	Nominal running current cooling		A	554	614	671
	Maximum running current		A	704	773	842
	Maximum current for wires sizing		A	774	851	927
Fans	Nominal running current in cooling		A	52	57	62
Compressor	Phase			3	3	3
	Voltage		V	400	400	400
	Voltage Tolerance	Minimum	%	-10%	-10%	-10%
		Maximum	%	+10%	+10%	+10%
	Maximum running current		A	326+326	390+326	390+390
	Starting method			Wye – Delta type (Y – Δ)		

Notes	Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
	Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
	Nominal current in cooling mode is referred to the following conditions: evaporator 12°C/7°C; ambient 35°C; compressors + fans current.
	Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
	Maximum unit current for wires sizing is based on minimum allowed voltage
	Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.

Operating limits

AWS SE – XE – PR

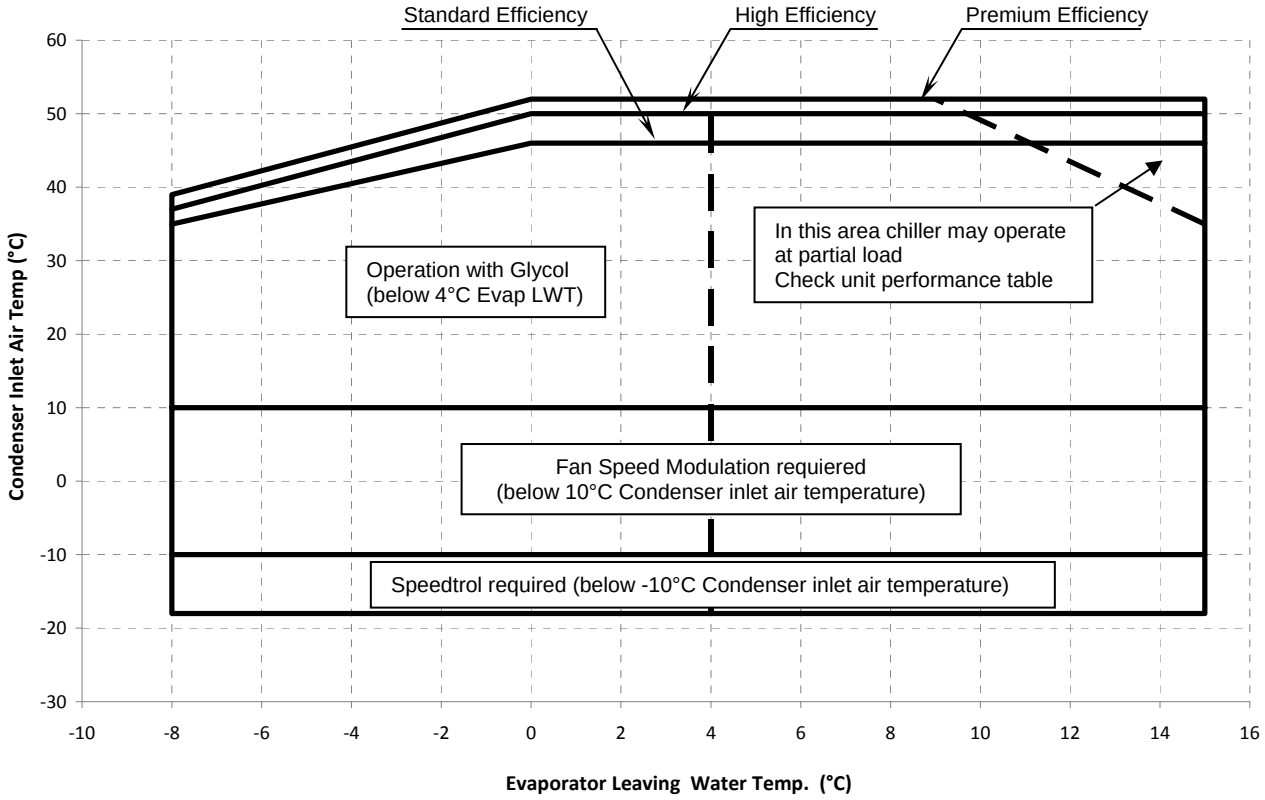


Table 1 – Operating limits

Max evaporator water ΔT	**°C**	8
Min evaporator water ΔT	**°C**	4

Table 2 – Evaporator fouling factors

Fouling factors $m^2°C$ / kW	Cooling capacity correction factor	Power input correction factor	EER correction factor
0.0176	1.000	1.000	1.000
0.0440	0.978	0.986	0.992
0.0880	0.957	0.974	0.983
0.1320	0.938	0.962	0.975

Table 3 – Altitude correction factors

Elevation above sea level (m)	0	300	600	900	1200	1500	1800
Barometric pressure (mbar)	1013	977	942	908	875	843	812
Cooling cap. correction factor	1.000	0.993	0.986	0.979	0.973	0.967	0.960
Power input correction factor	1.000	1.005	1.009	1.015	1.021	1.026	1.031

Table 4.1 – Minimum glycol percentage for low water temperature

Evaporator Leaving Water Temperatue °C	2	0	-2	-4	-6	-8
Ethylene glycol (%)	10	20	20	20	30	30
Propylene glycol (%)	10	20	20	30	30	30

Note: Minimum glycole percentage is referred to Evaporator leaving water temperature °C

Table 4.2 – Minimum glycol percentage for low air ambient temperature

Air Ambient Temperatue °C	-3	-8	-15	-23	-35
Ethylene glycol (%)	10%	20%	30%	40%	50%
Air Ambient Temperatue °C	**-3**	**-7**	**-12**	**-20**	**-32**
Propylene glycol (%)	10%	20%	30%	40%	50%

Note: Minimum glycole percentage is referred to Air Ambient Temperature °C

Table 5 – Correction factors for low evaporator leaving water temperature

Evaporator Leaving Water Temperatue °C	2	0	-2	-4	-6	-8
Cooling Capacity	0.842	0.785	0.725	0.670	0.613	0.562
Compressor Power Input	0.950	0.940	0.920	0.890	0.870	0.840

Note: correction factors have to be applied at working conditions: evaporator leaving water temperature 7°C

Table 6 – Correction factors for water and glycol mixture

	Ethylene Glycol %	10%	20%	30%	40%	50%
Ethylene Glycol	Cooling Capacity	0.991	0.982	0.972	0.961	0.946
	Compressor Power Input	0.996	0.992	0.986	0.976	0.966
	Flow Rate (same ΔT)	1.013	1.040	1.074	1.121	1.178
	Evaporator Pressure Drop	1.070	1.129	1.181	1.263	1.308

	PropyleneGlycol %	10%	20%	30%	40%	50%
Propylene Glycol	Cooling Capacity	0.985	0.964	0.932	0.889	0.846
	Compressor Power Input	0.993	0.983	0.969	0.948	0.929
	Flow Rate (same ΔT)	1.017	1.032	1.056	1.092	1.139
	Evapoarator Pressure Drop	1.120	1.272	1.496	1.792	2.128

How to use the Correction factors proposed in the previous tables

A) Mixture Water and Glycol --- Evaporator leaving water temperature > 4°C

- depending from the type and percentage (%) of glycol filled in the circuit (see table 4.2 and 6)
- multiply the Cooling Capacity, the Compressor Power Input by the Correction factor of Table 6
- starting from this new value of Cooling Capacity, calculate the Flow Rate (l/s) and the Evaporatore Pressure Drop (kPa)
- now multiply the new Flow Rate and the new Evaporator Pressure Drop by the Correction Factors of Table 6

Example

Unit Size: AWS SE 184.2 ST

Mixture: Water
Working condition: ELWT 12/7°C – Condenser inlet air temperature 35°C
- Cooling capacity: 647 kW
- Power input: 221 kW
- Flow rate (Δt 5°C): 30.90 l/s
- Evaporator pressure drop: 79 kPa

Mixture: Water + Ethylene Glycol 30% (for a winter air temperature up to -15°C)
Working condition: ELWT 12/7°C – Condenser inlet air temperature 35°C
- Cooling capacity: 647 x 0.972 = 629 kW
- Power input: 221 x 0.986 = 218 kW
- Flow rate (Δt 5°C): 30.05 (referred to 629 kW) x 1.074 = 32.27 l/s
- Evaporator pressure drop: 85 (referred to 32.27 l/s) x 1.181 = 100 kPa

B) Mixture Water and Glycol --- Evaporator leaving water temperature < 4°C
- depending from the type and percentage (%) of glycol filled in the circuit (see table 4.1 and 4.2 and table 6)
- depending from the evaporator leaving water temperature (see table 5)
- multiply the Cooling Capacity, the Compressor Power Input by the Correction factor of Table 5 and Table 6
- starting from this new value of Cooling Capacity, calculate the Flow Rate (l/s) and the Evaporatore Pressure Drop (kPa)
- now multiply the new Flow Rate and the new Evaporator Pressure Drop by the Correction Factors of Table 6

Example

Unit Size:	AWS SE 184.2 ST
Mixture:	Water
Standard working condition	ELWT 12/7°C – Condenser inlet air temperature 30°C
- Cooling capacity:	681 kW
- Power input:	205 kW
- Flow rate (Δt 5°C):	32.54 l/s
- Evaporator pressure drop:	87 kPa
Mixture:	Water + Glycol 30% (for a low evaporator leaving temperature of -1/-6°C)
Working condition:	ELWT -1/-6°C – Condenser inlet air temperature 30°C
- Cooling capacity:	681 x 0.613 x 0.972 = 406 kW
- Power input:	205 x 0.870 x 0.986 = 176 kW
- Flow rate (Δt 5°C):	19.40 l/s (referred to 406 kW) x 1.074 = 20.83 l/s
- Evaporator pressure drop:	39 kPa (referred to 20.83 l/s) x 1.181 = 46 kPa

Tabel 7 – Available fan static pressure correction factors

AWS SE-ST / LN --- AWS XE-ST / LN --- AWS PR-ST / LN

External Static Pressure (Pa)	0	10	20	30	40	50	60	70	80	90	100
Cooling Capacity (kW) correction factor	1,000	0.998	0.996	0.995	0.993	0.992	0.991	0.989	0.986	0.985	0.982
Compressors Power Input (kW) correction factor	1,000	1,004	1,009	1,012	1,018	1,021	1,024	1,027	1,034	1,039	1,045
Reduction of Max CIAT (°C)	1,000	-0.3	-0.5	-0.7	-1	-1.1	-1.3	-1.6	-1.8	2.1	-2.4

CIAT: Condenser Inlet Air Temperature

AWS SE-XN --- AWS XE-XN --- AWS PR-XN

External Static Pressure (Pa)	0	10	20	30	40	50	60	70
Cooling Capacity (kW) correction factor	1,000	0.996	0.991	0.985	0.978	0.970	0.954	0.927
Compressors Power Input (kW) correction factor	1,000	1.005	1.012	1.020	1.028	1.039	1.058	1.092
Reduction of Max CIAT (°C)	1,000	-0.3	-0.7	-1.1	-1.6	-2.2	-3.3	-5.1

CIAT: Condenser Inlet Air Temperature

Water content in cooling circuits

The cooled water distribution circuits should have minimum water content to avoid excessive compressors start and stop.
In fact, each time the compressor starts up, an excessive quantity of oil goes from the compressor sump and simultaneously there is a rise in the temperature of the compressor motor's stator due to the inrush current during the start-up. To prevent damage to the compressors, McQuay has envisaged the application of a device to limit frequent stops and restarts.
During the span of one hour there will be no more than 6 starts of the compressor. The plant side should therefore ensure that the overall water content allows a more constant functioning of the unit and consequently greater environmental comfort. The minimum water content per unit should be calculated with a certain approximation using this simplified formula:

For 2 compressors unit

M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressors unit
M (liters) = (0.0443 x ΔT(°C) + 1.6202) x P(kW)

where:
M = minimum water content per unit expressed in litres
P = cooling capacity of the unit expressed in kW
ΔT = evaporator entering / leaving water temperature difference expressed in °C

This formula is valid for:
- standard microprocessor parameters

For more accurate determination of quantity of water, it is advisable to contact the designer of the plant.

Standard ratings

AWS SE 184.2 ÷ 260.2 ST / LN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		42		44		46	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
184.2	4	653	182	624	196	592	211	554	227	538	233	521	240	502	247
	5	673	185	643	199	610	214	572	230	555	237	538	244	519	251
	6	693	188	662	202	628	218	590	234	573	241	555	248	536	255
	7	713	191	681	205	647	221	608	238	591	245	573	252	553	259
	8	733	194	701	209	666	224	626	241	609	248	590	256	570	263
	9	753	197	721	212	685	228	644	245	626	252	607	260	588	268
	10	774	200	741	215	704	231	662	249	644	256	625	264	605	272
	11	794	203	761	218	723	235	681	253	662	260	643	268	622	276
	12	815	206	781	222	743	238	700	257	681	264	660	272	639	280
	13	836	209	801	225	762	242	719	261	699	268	679	276	657	284
	14	857	212	821	228	782	246	737	264	718	272	697	280	663	284
	15	879	216	842	232	801	249	756	268	736	276	715	285	664	281
212.2	4	732	212	713	231	689	251	657	273	642	283	625	293	597	299
	5	752	215	732	234	707	254	675	277	659	287	642	297	605	299
	6	772	218	751	237	726	258	692	281	676	291	659	302	615	300
	7	792	222	771	241	744	262	710	285	693	295	673	305	624	301
	8	812	225	790	245	763	266	728	289	711	300	682	305	633	301
	9	833	228	810	248	782	270	746	294	729	304	692	306	642	302
	10	854	232	830	252	801	274	764	298	746	309	702	307	645	299
	11	875	235	851	256	821	278	782	303	762	312	712	308	647	297
	12	896	239	871	260	840	282	801	307	770	312	721	308	650	295
	13	918	243	892	264	860	286	819	312	781	313	730	309	653	292
	14	939	246	913	268	880	291	838	316	791	314	735	307	653	288
	15	961	250	934	272	900	295	852	319	801	315	736	304	654	285
237.2	4	825	241	801	262	770	285	729	310	710	321	688	333	621	323
	5	847	245	822	267	790	290	749	315	729	326	706	338	625	321
	6	869	249	844	271	811	295	768	321	748	332	707	335	623	316
	7	892	253	865	275	832	299	788	326	767	337	711	333	630	316
	8	914	258	887	280	852	304	807	331	786	342	710	329	631	312
	9	937	262	909	284	873	309	827	336	800	345	712	326	631	308
	10	960	266	931	289	894	314	847	342	800	342	720	326	637	306
	11	984	270	953	294	915	319	866	347	803	340	721	322	641	304
	12	1007	275	976	298	936	324	886	352	806	338	721	318	639	298
	13	1031	279	998	303	957	329	890	351	808	335	727	317	643	295
	14	1055	284	1021	308	979	335	894	349	809	331	726	312	646	292
	15	1079	289	1044	313	1000	340	896	346	815	330	730	310	648	289
260.2	4	899	257	875	279	845	304	806	331	787	342	766	355	723	358
	5	923	261	898	284	867	308	827	336	808	348	786	360	735	359
	6	947	265	921	288	890	313	849	341	829	353	807	365	747	360
	7	971	268	945	292	912	318	870	346	850	358	817	366	759	361
	8	996	273	969	297	935	322	892	351	871	363	830	367	770	362
	9	1021	277	993	301	958	327	914	356	892	369	839	367	773	359
	10	1046	281	1017	306	981	332	936	361	914	374	851	368	778	357
	11	1071	285	1042	310	1005	337	958	367	924	374	866	370	776	352
	12	1097	289	1066	315	1028	342	980	372	937	375	877	370	780	349
	13	1123	294	1091	320	1052	347	1002	378	949	377	882	368	786	347
	14	1149	298	1117	324	1076	352	1022	382	961	377	887	366	789	344
	15	1175	303	1142	329	1100	358	1035	383	973	378	891	364	790	340

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS SE 275.2 ÷ 403.3 ST / LN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		42		44		46	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
275.2	4	957	283	931	308	898	335	853	365	832	379	808	392	743	388
	5	983	287	955	312	921	340	875	371	853	384	829	398	748	386
	6	1008	291	980	317	944	345	897	377	874	390	850	404	751	383
	7	1033	296	1004	322	967	351	919	382	896	396	850	400	754	380
	8	1059	301	1029	327	991	356	941	388	918	402	855	399	757	376
	9	1085	305	1054	332	1014	361	963	394	939	408	853	394	758	371
	10	1111	310	1079	337	1038	367	986	400	961	414	856	390	764	369
	11	1138	315	1105	342	1062	373	1008	406	961	410	865	390	764	363
	12	1164	320	1130	348	1087	378	1031	412	965	407	866	385	769	361
	13	1191	325	1156	353	1111	384	1054	418	968	405	867	380	774	358
	14	1218	330	1182	359	1136	390	1071	422	971	401	873	378	778	354
	15	1246	335	1208	364	1160	396	1076	420	972	397	879	376	781	350
303.2	4	1049	305	1021	332	986	362	941	394	918	408	894	423	842	426
	5	1077	310	1048	337	1012	367	965	400	942	414	917	429	853	426
	6	1105	314	1075	342	1038	373	990	406	966	420	938	434	867	427
	7	1133	319	1103	347	1064	378	1014	412	990	427	950	435	879	428
	8	1162	324	1130	353	1091	384	1039	418	1015	433	964	436	892	429
	9	1191	329	1158	358	1117	389	1065	424	1039	439	978	438	896	425
	10	1220	334	1187	363	1144	395	1090	430	1061	444	992	439	899	422
	11	1250	339	1215	369	1172	401	1116	437	1073	444	1005	439	900	417
	12	1279	344	1244	374	1199	407	1141	443	1088	446	1018	440	904	413
	13	1310	349	1273	380	1226	413	1167	450	1102	447	1025	438	911	411
	14	1340	355	1302	386	1254	419	1187	453	1116	448	1026	433	914	407
	15	1371	360	1331	392	1282	426	1202	455	1130	448	1032	430	915	402
327.2	4	1131	326	1102	355	1067	386	1022	420	1000	435	975	451	947	468
	5	1160	330	1131	360	1095	391	1048	426	1026	442	1000	458	972	474
	6	1190	335	1161	365	1124	397	1075	432	1052	448	1026	464	997	481
	7	1221	340	1190	370	1152	402	1102	438	1078	454	1052	470	1022	488
	8	1252	344	1220	375	1181	408	1130	445	1105	460	1078	477	1023	483
	9	1283	349	1250	380	1210	414	1157	451	1132	467	1104	484	1029	481
	10	1314	354	1281	386	1239	420	1185	457	1159	473	1131	490	1033	478
	11	1346	359	1311	391	1268	426	1213	464	1186	480	1157	497	1037	474
	12	1378	365	1343	397	1298	432	1241	470	1214	487	1170	498	1040	470
	13	1410	370	1374	403	1328	438	1270	477	1242	494	1176	496	1041	465
	14	1443	375	1405	408	1358	444	1298	484	1270	500	1180	493	1050	463
	15	1476	381	1437	414	1389	451	1327	490	1298	507	1184	489	1050	457
403.3	4	1391	404	1355	440	1311	479	1253	522	1225	540	1194	560	1155	578
	5	1429	410	1392	447	1347	486	1287	529	1258	548	1226	568	1177	582
	6	1468	416	1429	453	1382	493	1321	537	1291	556	1258	576	1201	586
	7	1506	422	1467	460	1419	500	1355	545	1325	564	1291	584	1222	589
	8	1546	429	1505	467	1455	507	1390	552	1359	572	1319	590	1246	593
	9	1585	435	1544	473	1492	515	1425	560	1393	580	1345	595	1269	597
	10	1626	441	1583	480	1529	522	1461	569	1428	588	1367	598	1290	599
	11	1666	448	1622	488	1567	530	1496	577	1462	597	1392	602	1296	595
	12	1708	455	1662	495	1605	538	1532	585	1492	603	1417	606	1297	589
	13	1749	461	1702	502	1643	546	1568	594	1519	608	1445	611	1300	584
	14	1791	468	1743	509	1682	554	1605	602	1542	611	1469	615	1305	579
	15	1834	475	1783	517	1721	562	1642	611	1568	615	1474	610	1309	573

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS SE 435.3 ÷ 487.3 ST / LN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		42		44		46	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
435.3	4	1517	445	1475	484	1423	527	1354	574	1321	594	1284	616	1205	619
	5	1558	452	1515	492	1461	535	1390	583	1356	603	1318	625	1221	620
	6	1600	459	1556	499	1499	543	1426	591	1391	612	1353	634	1237	620
	7	1642	466	1596	507	1538	551	1463	600	1427	622	1371	636	1252	619
	8	1685	473	1637	515	1577	560	1500	610	1463	631	1382	634	1266	618
	9	1728	481	1679	523	1617	568	1537	619	1499	641	1399	634	1271	612
	10	1772	488	1721	531	1657	577	1574	628	1536	650	1414	634	1277	607
	11	1816	496	1763	539	1697	586	1612	638	1548	648	1429	633	1282	602
	12	1860	504	1806	548	1738	595	1650	648	1565	649	1443	631	1290	597
	13	1905	512	1849	556	1778	604	1689	657	1581	649	1453	628	1296	592
	14	1951	520	1893	565	1820	614	1718	663	1597	648	1460	623	1298	585
	15	1997	528	1936	574	1861	623	1732	662	1612	647	1468	620	1305	580
461.3	4	1598	468	1554	509	1501	554	1431	604	1397	625	1359	648	1275	650
	5	1641	475	1596	517	1541	562	1469	613	1434	635	1395	658	1292	650
	6	1685	482	1639	525	1581	571	1507	622	1471	644	1432	667	1308	650
	7	1729	489	1682	533	1622	580	1546	631	1509	654	1451	668	1324	648
	8	1774	497	1725	541	1664	588	1585	641	1547	663	1463	666	1339	646
	9	1819	504	1769	549	1705	597	1624	650	1585	673	1481	666	1353	643
	10	1865	512	1813	557	1747	606	1664	660	1624	683	1498	665	1373	644
	11	1911	520	1857	566	1790	615	1704	670	1637	680	1513	664	1385	640
	12	1958	528	1902	574	1833	625	1744	680	1655	681	1529	661	1404	639
	13	2005	536	1948	583	1876	634	1784	690	1673	680	1542	658	1423	638
	14	2053	544	1993	592	1919	644	1818	696	1690	679	1564	659	1440	637
	15	2101	553	2039	601	1963	653	1830	694	1706	677	1584	659	1444	631
487.3	4	1676	499	1631	543	1574	591	1499	645	1462	668	1422	693	1329	694
	5	1720	506	1674	551	1615	600	1537	654	1500	678	1459	703	1347	694
	6	1765	514	1717	559	1656	609	1576	664	1538	688	1490	710	1363	694
	7	1810	521	1760	568	1714	618	1615	674	1576	698	1509	712	1379	693
	8	1855	529	1804	576	1739	627	1655	684	1615	708	1522	710	1385	688
	9	1901	537	1849	585	1781	637	1694	694	1653	719	1540	711	1397	685
	10	1948	546	1893	594	1824	646	1735	704	1686	726	1557	710	1396	676
	11	1995	554	1938	603	1867	656	1775	715	1706	728	1573	709	1405	671
	12	2042	562	1984	612	1910	666	1816	726	1718	725	1585	706	1405	661
	13	2090	571	2030	621	1954	676	1856	736	1736	725	1593	701	1414	657
	14	2138	580	2076	631	1997	686	1884	741	1753	725	1595	693	1419	650
	15	2187	589	2123	641	2041	697	1903	742	1777	727	1603	689	1427	644

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS SE 184.2 ÷ 260.2 XN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		38		40		43		46	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
184.2	4	632	182	602	197	567	212	543	221	527	228	500	238	472	249
	5	651	186	619	200	584	216	560	225	543	232	516	243	487	254
	6	670	189	637	204	602	219	577	230	560	236	532	247	502	258
	7	689	192	656	207	619	223	594	234	577	241	548	251	508	258
	8	709	196	674	211	636	227	611	238	593	245	564	256	510	256
	9	727	199	693	215	654	231	628	242	610	249	581	261	511	254
	10	747	203	712	219	672	235	645	246	626	254	597	265	515	252
	11	766	206	730	222	690	240	662	250	643	258	613	270	515	249
	12	785	210	749	226	708	244	680	255	660	262	629	274	518	246
	13	805	213	767	230	725	248	697	259	677	267	646	279	520	244
	14	825	217	786	234	743	252	715	264	695	272	662	284	526	243
	15	845	221	805	238	761	257	732	268	712	276	671	285	528	239
212.2	4	716	217	693	237	664	259	642	273	625	283	597	299	495	271
	5	735	221	711	241	681	263	658	278	641	288	605	299	496	268
	6	754	225	730	245	698	268	674	283	655	292	615	300	499	266
	7	773	229	748	250	715	272	691	287	665	293	625	300	502	263
	8	793	233	766	254	732	277	707	292	673	294	635	300	506	261
	9	812	237	785	258	749	282	724	297	682	295	644	300	507	258
	10	832	241	803	263	767	287	734	299	692	296	655	301	511	255
	11	852	245	822	267	784	292	744	300	701	296	660	298	511	251
	12	871	250	841	272	802	297	752	300	712	298	665	295	516	250
	13	892	254	860	277	820	302	762	301	716	297	667	289	518	246
	14	912	259	879	282	835	305	773	303	715	293	671	286	523	245
	15	932	263	898	287	846	307	782	304	719	291	675	281	523	241
237.2	4	803	251	773	274	733	298	705	314	683	325	629	329	487	280
	5	824	256	793	279	752	304	723	320	688	324	634	326	491	277
	6	845	261	812	284	771	309	740	326	688	321	635	319	490	272
	7	866	266	832	289	789	315	758	332	692	319	643	317	494	269
	8	887	270	852	295	808	321	763	331	695	317	646	312	496	265
	9	908	276	872	300	827	327	767	329	697	314	649	306	499	262
	10	929	281	892	306	845	333	765	325	699	311	656	303	506	262
	11	950	286	912	311	864	339	768	322	705	310	657	296	508	258
	12	972	291	932	317	873	340	770	319	705	305	663	293	508	253
	13	994	297	952	323	876	338	776	318	710	303	668	289	515	253
	14	1015	302	972	329	879	336	776	314	709	298	673	285	515	248
	15	1037	308	992	335	881	333	782	313	713	296	677	281	521	247
260.2	4	879	264	850	288	813	314	786	332	765	344	723	358	597	324
	5	902	269	872	293	834	320	806	337	784	349	736	359	598	320
	6	925	273	894	298	855	325	826	343	795	350	748	360	602	317
	7	948	278	916	303	876	331	846	349	807	352	760	360	605	314
	8	971	283	938	309	896	337	866	355	818	354	772	359	607	310
	9	995	288	961	314	917	342	881	358	830	355	783	359	611	307
	10	1018	293	983	319	938	348	891	358	841	356	792	358	612	302
	11	1042	298	1006	325	959	354	902	360	852	356	795	352	619	301
	12	1066	303	1028	330	980	360	914	361	857	354	801	348	621	297
	13	1090	309	1051	336	1002	366	925	362	862	352	805	343	623	293
	14	1115	314	1074	342	1015	368	936	362	866	350	812	340	628	291
	15	1139	320	1097	348	1027	370	950	365	866	346	816	335	629	286

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS SE 275.2 ÷ 403.3 XN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		38		40		43		46	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
275.2	4	934	293	902	320	859	350	828	369	804	383	751	396	585	336
	5	958	299	924	326	880	356	848	376	823	390	758	392	585	330
	6	982	304	947	332	901	362	868	382	824	386	763	388	589	327
	7	1006	309	969	338	922	369	888	389	829	384	768	383	593	324
	8	1030	315	992	344	943	375	908	396	833	382	773	377	597	320
	9	1054	321	1015	350	964	382	918	397	837	379	776	370	600	316
	10	1078	326	1038	356	986	388	918	392	839	376	784	367	602	311
	11	1103	332	1061	362	1007	395	922	390	841	372	786	359	611	311
	12	1128	338	1084	369	1028	402	925	387	842	367	793	355	612	306
	13	1152	344	1107	375	1050	409	927	383	848	365	800	351	612	300
	14	1177	350	1130	382	1055	407	928	379	854	363	806	346	620	299
	15	1202	357	1153	389	1059	405	935	378	852	356	811	341	619	293
303.2	4	1026	315	992	343	949	375	917	396	892	411	842	427	689	382
	5	1052	320	1018	349	973	382	939	403	912	416	856	428	693	379
	6	1079	326	1043	355	996	388	962	409	923	417	870	428	697	375
	7	1106	331	1069	361	1020	395	985	416	937	419	884	428	701	371
	8	1133	337	1094	368	1044	401	1008	423	951	421	897	428	706	368
	9	1160	343	1120	374	1069	408	1023	425	964	422	909	427	708	362
	10	1188	349	1146	380	1093	415	1034	426	976	423	917	423	712	358
	11	1216	355	1172	387	1117	422	1048	428	989	423	921	416	715	354
	12	1243	361	1199	394	1142	429	1061	429	995	422	927	411	722	352
	13	1271	367	1225	401	1163	435	1074	430	997	417	936	408	724	347
	14	1300	374	1252	407	1178	437	1091	433	1002	415	941	402	730	344
	15	1328	381	1278	415	1193	439	1100	431	1007	411	945	395	730	338
327.2	4	1109	333	1076	363	1033	397	1001	419	977	435	935	460	792	431
	5	1137	338	1103	369	1059	403	1026	426	1001	442	959	467	795	427
	6	1166	344	1131	375	1085	410	1051	433	1026	449	982	474	803	425
	7	1195	350	1159	382	1112	417	1077	440	1050	456	1005	482	805	419
	8	1225	355	1187	388	1138	423	1102	447	1075	463	1029	489	812	417
	9	1254	361	1215	394	1165	430	1128	454	1100	471	1042	490	811	409
	10	1284	367	1244	401	1192	437	1153	461	1125	478	1049	485	817	406
	11	1314	373	1272	407	1219	445	1179	469	1137	479	1055	480	822	402
	12	1345	380	1301	414	1246	452	1205	476	1143	477	1060	473	826	397
	13	1375	386	1330	421	1273	459	1231	484	1148	474	1065	466	829	392
	14	1406	392	1360	428	1300	467	1258	492	1151	471	1075	462	832	387
	15	1437	399	1389	435	1328	474	1263	489	1154	467	1077	453	843	387
403.3	4	1363	413	1322	451	1268	492	1227	519	1197	539	1144	569	989	543
	5	1400	420	1357	458	1300	500	1259	528	1227	547	1172	577	994	538
	6	1437	427	1392	466	1334	509	1291	537	1258	556	1196	582	1000	534
	7	1474	434	1427	474	1367	517	1323	546	1287	564	1217	584	1006	529
	8	1511	442	1463	482	1401	526	1355	555	1309	568	1240	588	1010	524
	9	1549	449	1499	490	1435	535	1388	564	1333	573	1263	591	1013	517
	10	1587	457	1536	498	1469	544	1421	573	1355	577	1289	596	1021	513
	11	1626	465	1572	507	1503	553	1443	577	1378	581	1311	599	1028	509
	12	1665	473	1609	516	1538	562	1468	582	1404	587	1321	595	1028	500
	13	1704	481	1646	524	1573	572	1493	587	1427	591	1328	586	1033	495
	14	1743	489	1683	533	1608	581	1518	592	1433	587	1335	579	1041	491
	15	1783	498	1721	542	1637	588	1542	596	1440	584	1343	571	1044	484

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS SE 435.3 ÷ 487.3 XN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		38		40		43		46	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
435.3	4	1482	459	1431	501	1366	547	1318	577	1281	598	1211	626	977	551
	5	1521	467	1469	510	1401	556	1351	587	1313	608	1226	623	985	547
	6	1561	476	1506	519	1436	566	1384	597	1331	610	1244	622	992	542
	7	1600	484	1544	528	1471	576	1418	607	1345	610	1260	619	997	535
	8	1641	493	1582	537	1506	586	1452	618	1358	610	1276	616	1005	531
	9	1681	502	1620	547	1542	596	1475	622	1373	610	1291	612	1008	524
	10	1722	511	1658	557	1578	607	1489	622	1388	609	1305	609	1014	518
	11	1763	520	1697	567	1614	618	1502	622	1404	610	1313	601	1018	511
	12	1804	530	1736	577	1650	628	1518	622	1418	608	1324	594	1022	504
	13	1846	539	1775	587	1686	640	1532	621	1417	600	1330	585	1033	502
	14	1888	549	1814	598	1701	639	1549	621	1426	597	1339	577	1034	494
	15	1930	559	1853	609	1714	638	1566	622	1429	590	1346	568	1043	490
461.3	4	1562	481	1511	525	1444	573	1395	605	1358	627	1286	657	1071	590
	5	1604	489	1550	534	1481	583	1430	615	1392	638	1300	651	1088	590
	6	1645	498	1589	543	1518	593	1466	626	1411	639	1319	649	1102	588
	7	1687	507	1629	553	1556	603	1502	636	1423	637	1336	646	1101	578
	8	1729	515	1670	562	1593	614	1537	647	1440	638	1353	642	1114	577
	9	1772	525	1710	572	1631	624	1562	651	1457	637	1369	637	1120	571
	10	1815	534	1751	582	1669	635	1574	649	1472	636	1391	636	1124	564
	11	1858	543	1792	592	1707	646	1592	649	1487	634	1405	630	1127	556
	12	1902	553	1833	603	1745	657	1609	649	1508	636	1425	628	1129	548
	13	1946	563	1874	613	1784	668	1625	648	1521	632	1445	626	1138	544
	14	1990	573	1916	624	1803	669	1639	645	1541	633	1464	624	1141	536
	15	2034	583	1957	635	1815	666	1661	647	1552	628	1483	622	1152	534
487.3	4	1638	515	1583	563	1511	615	1458	649	1418	674	1336	702	1070	613
	5	1680	524	1623	572	1548	626	1494	660	1452	685	1351	697	1077	607
	6	1722	533	1663	582	1586	636	1529	672	1466	684	1369	696	1084	601
	7	1764	543	1703	592	1623	647	1565	683	1484	686	1387	693	1093	596
	8	1807	552	1744	603	1661	658	1601	695	1496	684	1404	690	1097	588
	9	1851	562	1784	613	1699	670	1621	697	1512	684	1423	689	1103	581
	10	1894	572	1826	624	1738	681	1639	698	1528	684	1427	676	1109	574
	11	1938	582	1867	635	1776	693	1657	699	1546	684	1439	669	1117	569
	12	1982	592	1908	646	1815	705	1674	700	1547	676	1443	655	1120	560
	13	2026	603	1950	657	1853	717	1690	699	1549	668	1456	649	1127	554
	14	2071	613	1992	669	1866	715	1705	698	1558	664	1465	639	1137	550
	15	2115	624	2033	680	1884	716	1709	691	1566	658	1472	629	1136	540

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS XE 210.2 ÷ 280.2 ST / LN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		48		50	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
210.2	4	734	189	715	206	694	223	667	242	624	267	606	276	587	285
	5	755	192	736	209	714	226	687	245	643	270	625	280	605	289
	6	777	194	757	212	735	230	707	249	662	274	643	284	623	293
	7	799	197	779	215	756	233	727	252	681	278	662	287	641	297
	8	820	200	800	218	777	236	747	256	700	282	681	291	660	301
	9	842	203	822	221	798	239	768	259	719	286	700	295	678	305
	10	864	206	843	224	819	243	788	263	739	290	719	300	692	308
	11	886	208	865	227	840	246	809	267	759	294	738	304	697	306
	12	908	211	887	230	861	249	829	270	778	298	758	308	700	305
	13	931	214	908	233	883	253	850	274	798	302	777	312	697	301
	14	953	217	931	236	904	256	871	278	818	306	797	316	705	300
	15	976	220	953	240	925	260	891	281	838	310	806	317	706	297
230.2	4	805	206	784	224	762	243	734	264	690	291	671	301	651	311
	5	829	209	808	227	784	247	756	267	710	295	691	305	671	315
	6	853	212	831	231	807	250	778	271	731	299	712	309	691	319
	7	877	214	855	234	830	253	800	274	752	303	732	313	711	323
	8	900	217	879	237	854	257	823	278	773	307	753	317	731	328
	9	923	220	902	240	877	260	845	282	795	311	774	321	751	332
	10	947	223	925	243	900	264	868	286	816	315	795	325	764	333
	11	971	226	948	246	923	267	891	290	838	319	817	330	777	334
	12	995	229	972	249	946	271	913	293	861	323	839	334	789	335
	13	1018	232	996	253	969	274	935	297	883	328	861	339	800	336
	14	1041	234	1019	256	992	278	958	301	905	332	880	342	812	336
	15	1064	237	1041	259	1015	281	981	305	926	336	893	343	823	336
250.2	4	864	226	842	246	817	267	786	289	736	320	715	331	692	342
	5	889	229	866	250	841	271	809	293	757	324	736	335	712	347
	6	915	233	891	253	865	274	832	297	779	329	757	340	733	352
	7	941	236	917	257	889	278	855	302	801	333	779	345	754	357
	8	964	239	942	260	914	282	879	306	823	338	800	349	775	361
	9	986	242	965	264	939	286	903	310	845	342	822	354	797	366
	10	1009	245	987	267	962	290	927	315	868	347	844	359	796	362
	11	1033	248	1010	270	984	294	951	319	891	352	866	364	801	361
	12	1056	251	1033	274	1006	297	972	323	914	357	889	369	804	358
	13	1080	254	1056	277	1029	301	994	327	938	362	912	374	807	355
	14	1103	257	1080	280	1051	305	1015	331	959	366	923	374	808	352
	15	1127	261	1103	284	1074	308	1038	335	980	371	927	372	809	348
280.2	4	972	249	946	271	917	294	881	319	824	351	801	363	775	376
	5	1001	253	974	275	944	298	908	323	849	356	825	368	799	381
	6	1031	257	1003	279	972	303	935	328	874	361	850	374	823	386
	7	1060	260	1032	283	1001	307	962	333	900	366	874	379	847	392
	8	1090	264	1062	288	1030	312	989	337	925	372	900	384	859	392
	9	1121	268	1092	292	1059	316	1017	342	952	377	925	389	874	393
	10	1151	272	1122	296	1088	321	1046	347	978	382	951	395	885	393
	11	1182	276	1152	300	1117	325	1074	352	1005	388	977	400	899	394
	12	1214	280	1183	304	1147	330	1102	357	1032	393	993	402	916	396
	13	1245	284	1214	309	1177	335	1131	362	1060	399	1009	403	929	396
	14	1276	288	1244	313	1207	339	1160	367	1087	404	1024	404	932	392
	15	1308	292	1275	318	1237	344	1189	373	1115	410	1039	405	938	390

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS XE 300.2 ÷ 375.3 ST / LN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		48		50	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
300.2	4	1045	274	1017	298	985	323	945	350	879	387	853	400	824	414
	5	1076	278	1048	302	1014	328	973	355	905	392	878	406	848	420
	6	1108	282	1078	307	1044	333	1001	361	932	398	904	411	873	426
	7	1139	286	1109	311	1074	338	1029	366	959	404	930	417	899	432
	8	1170	290	1141	316	1104	343	1058	371	986	410	956	423	906	430
	9	1202	295	1171	321	1135	348	1088	377	1013	415	983	429	905	425
	10	1234	299	1202	325	1165	353	1117	383	1041	421	1010	436	909	423
	11	1266	303	1234	330	1195	358	1147	388	1069	428	1038	442	913	419
	12	1297	308	1265	335	1226	363	1176	394	1097	434	1051	442	916	416
	13	1330	312	1296	340	1256	368	1205	399	1126	440	1056	440	925	414
	14	1362	317	1328	344	1287	374	1235	405	1153	446	1060	438	926	409
	15	1396	321	1360	349	1318	379	1264	411	1182	453	1064	434	925	404
325.2	4	1160	295	1130	322	1097	349	1057	378	991	417	964	431	934	446
	5	1194	299	1163	326	1130	354	1088	384	1021	423	994	437	963	452
	6	1228	303	1197	331	1163	359	1120	389	1051	429	1023	443	992	458
	7	1263	307	1231	335	1196	364	1152	394	1082	435	1053	449	1021	464
	8	1298	312	1266	340	1229	369	1184	400	1113	440	1083	455	1051	471
	9	1333	316	1300	344	1263	374	1217	405	1144	446	1114	461	1077	475
	10	1368	320	1335	349	1297	379	1250	410	1175	452	1145	467	1091	475
	11	1404	324	1370	354	1331	384	1283	416	1207	458	1176	474	1109	477
	12	1441	329	1406	359	1366	389	1316	422	1238	465	1207	480	1126	478
	13	1478	333	1442	363	1401	394	1350	427	1271	471	1238	486	1143	478
	14	1515	338	1478	368	1436	400	1384	433	1303	477	1262	489	1159	479
	15	1552	342	1515	373	1472	405	1418	439	1335	483	1276	489	1180	481
360.2	4	1245	324	1214	353	1177	383	1132	416	1058	459	1028	475	994	492
	5	1281	329	1248	358	1212	389	1165	422	1090	466	1059	482	1024	498
	6	1317	333	1284	363	1246	394	1198	428	1121	472	1089	488	1054	505
	7	1353	338	1319	368	1280	400	1232	434	1152	479	1120	495	1085	512
	8	1389	343	1355	374	1316	405	1265	440	1185	485	1152	502	1115	519
	9	1426	347	1391	379	1351	411	1299	446	1217	492	1183	509	1139	523
	10	1463	352	1427	384	1386	417	1333	452	1249	499	1215	516	1138	518
	11	1501	357	1464	389	1421	422	1368	458	1282	505	1247	523	1144	515
	12	1539	362	1501	395	1457	428	1402	464	1315	512	1279	530	1148	511
	13	1577	367	1539	400	1493	434	1437	471	1348	519	1312	537	1152	507
	14	1616	372	1577	406	1530	440	1471	477	1381	526	1327	537	1154	502
	15	1655	378	1615	411	1567	446	1507	484	1414	533	1324	531	1165	500
375.3	4	1297	336	1264	367	1229	398	1184	431	1110	476	1080	492	1046	510
	5	1333	341	1300	372	1264	403	1218	437	1143	482	1112	499	1078	516
	6	1370	346	1336	377	1299	408	1252	443	1176	489	1144	506	1110	523
	7	1407	350	1373	382	1334	414	1286	449	1209	495	1177	512	1141	530
	8	1444	355	1410	387	1371	420	1321	455	1242	502	1210	519	1173	537
	9	1482	360	1447	392	1407	425	1356	461	1275	509	1243	526	1206	544
	10	1520	364	1484	397	1443	431	1392	467	1309	515	1276	533	1222	545
	11	1559	369	1522	402	1480	436	1427	473	1343	522	1309	540	1232	543
	12	1598	374	1560	408	1517	442	1462	479	1377	529	1342	547	1247	543
	13	1638	379	1599	413	1554	448	1499	486	1411	536	1376	554	1261	542
	14	1678	384	1638	419	1592	454	1535	492	1446	543	1404	559	1274	541
	15	1719	390	1678	424	1631	460	1572	499	1480	550	1420	559	1290	541

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS XE 387.3 ÷ 470.3 ST / LN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		48		50	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
387.3	4	1369	355	1335	387	1299	420	1253	456	1179	504	1148	521	1113	540
	5	1407	360	1373	392	1335	426	1289	462	1213	510	1182	528	1146	546
	6	1445	364	1410	397	1372	431	1325	468	1247	517	1215	535	1180	554
	7	1484	369	1449	403	1409	437	1361	474	1282	524	1249	542	1213	561
	8	1523	374	1487	408	1447	443	1397	480	1316	530	1284	549	1247	568
	9	1562	379	1526	413	1485	448	1434	486	1351	537	1318	556	1275	572
	10	1602	384	1565	418	1523	454	1470	492	1387	544	1352	563	1297	575
	11	1643	389	1605	424	1561	460	1508	499	1422	551	1387	570	1322	578
	12	1684	394	1645	429	1601	466	1545	505	1458	558	1423	577	1346	581
	13	1726	399	1686	435	1640	472	1583	512	1494	565	1458	584	1371	584
	14	1768	404	1727	440	1680	478	1622	518	1530	572	1484	587	1394	586
	15	1810	409	1769	446	1720	484	1660	525	1567	579	1509	591	1415	587
425.3	4	1484	385	1446	419	1403	455	1349	493	1262	544	1226	563	1186	583
	5	1526	390	1488	425	1443	461	1388	500	1299	552	1262	571	1221	591
	6	1569	395	1530	431	1485	468	1428	507	1336	559	1299	579	1257	599
	7	1612	401	1572	437	1526	474	1468	514	1374	567	1336	587	1293	607
	8	1655	406	1614	443	1567	481	1508	521	1412	575	1373	595	1312	606
	9	1699	412	1657	449	1609	487	1548	528	1450	583	1411	603	1324	601
	10	1744	418	1701	455	1651	494	1588	535	1489	591	1449	611	1340	598
	11	1789	424	1745	462	1694	501	1629	543	1528	599	1487	619	1363	598
	12	1834	430	1789	468	1737	508	1671	550	1567	607	1512	622	1378	594
	13	1880	436	1834	474	1780	515	1712	558	1606	615	1530	620	1393	590
	14	1926	442	1879	481	1824	522	1754	566	1646	624	1548	617	1407	586
	15	1973	448	1925	488	1867	529	1796	573	1686	632	1571	617	1410	576
445.3	4	1555	409	1515	445	1469	483	1410	524	1316	579	1278	600	1235	621
	5	1599	415	1558	452	1511	490	1451	532	1354	587	1314	608	1271	629
	6	1642	420	1601	458	1553	497	1491	539	1392	596	1352	616	1307	638
	7	1686	426	1644	464	1596	504	1533	547	1431	604	1390	625	1344	647
	8	1731	432	1688	471	1638	511	1574	555	1470	612	1428	633	1345	640
	9	1776	438	1732	477	1680	518	1615	562	1510	621	1466	642	1353	637
	10	1821	444	1776	484	1723	525	1656	570	1550	630	1505	651	1360	633
	11	1868	451	1822	491	1767	533	1698	578	1589	638	1545	660	1365	628
	12	1915	457	1867	498	1811	540	1740	586	1629	647	1564	661	1369	622
	13	1962	463	1913	505	1855	548	1782	594	1668	656	1572	658	1371	615
	14	2010	470	1960	512	1900	555	1825	602	1708	665	1578	654	1383	613
	15	2058	477	2007	519	1945	563	1868	611	1749	674	1583	648	1382	604
470.3	4	1641	432	1599	471	1552	511	1493	555	1397	614	1357	635	1313	658
	5	1686	438	1644	478	1596	518	1535	563	1436	622	1396	644	1351	667
	6	1732	444	1689	484	1640	526	1577	570	1476	631	1435	653	1389	676
	7	1778	450	1734	491	1685	533	1620	578	1517	639	1474	661	1428	685
	8	1824	456	1780	497	1729	540	1664	586	1557	648	1514	670	1442	684
	9	1872	463	1826	504	1773	547	1707	594	1599	657	1554	679	1462	685
	10	1919	469	1873	511	1819	555	1750	602	1640	665	1595	688	1474	682
	11	1968	475	1920	518	1864	562	1793	610	1682	674	1636	698	1481	678
	12	2017	482	1968	525	1910	570	1838	618	1723	683	1664	701	1486	673
	13	2067	489	2017	532	1957	578	1882	627	1765	692	1684	703	1489	666
	14	2117	495	2065	540	2004	586	1927	635	1807	702	1704	703	1499	662
	15	2168	502	2115	547	2052	594	1973	644	1850	711	1718	701	1499	654

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS XE 490.3 ÷ 513.3 ST

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		48		50	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
490.3	4	1720	455	1677	496	1629	538	1567	584	1468	646	1427	669	1380	693
	5	1768	461	1724	503	1675	546	1612	592	1509	655	1468	678	1421	702
	6	1817	467	1772	510	1721	553	1657	600	1552	664	1509	687	1462	711
	7	1866	474	1820	516	1768	561	1702	608	1594	673	1551	696	1502	721
	8	1916	480	1869	523	1815	568	1747	617	1638	682	1593	705	1534	726
	9	1967	487	1919	531	1863	576	1793	625	1681	691	1636	715	1566	732
	10	2018	494	1969	538	1912	584	1839	634	1725	700	1679	724	1591	734
	11	2070	500	2020	545	1961	592	1886	642	1769	709	1722	734	1592	728
	12	2123	507	2071	553	2010	600	1934	651	1814	719	1762	742	1599	723
	13	2176	514	2123	560	2061	608	1982	660	1859	728	1796	748	1604	717
	14	2230	522	2176	568	2111	617	2030	669	1904	738	1829	753	1608	710
	15	2285	529	2229	576	2162	625	2079	678	1950	748	1854	755	1614	704
515.3	4	1807	479	1763	522	1713	567	1651	615	1549	681	1507	705	1458	730
	5	1857	485	1812	529	1761	574	1697	623	1592	690	1550	714	1502	740
	6	1908	492	1862	536	1809	582	1743	632	1636	699	1592	724	1544	749
	7	1960	498	1912	543	1858	590	1790	640	1681	708	1636	733	1586	759
	8	2012	505	1963	550	1908	598	1838	649	1726	717	1680	742	1629	769
	9	2065	512	2015	558	1958	606	1886	657	1771	727	1724	752	1673	779
	10	2119	519	2068	565	2009	614	1935	666	1817	736	1769	762	1706	784
	11	2173	526	2121	573	2061	622	1984	675	1863	746	1815	772	1705	776
	12	2228	533	2175	581	2112	630	2034	684	1910	756	1861	782	1713	772
	13	2284	540	2229	588	2165	639	2084	693	1958	766	1907	792	1720	766
	14	2340	547	2284	596	2218	647	2135	702	2006	776	1954	802	1725	759
	15	2397	555	2340	605	2272	656	2187	712	2054	786	1989	807	1728	752

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS XE 210.2 ÷ 280.2 XN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		48		50	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
210.2	4	722	189	701	206	677	224	646	243	595	270	551	269	474	253
	5	742	192	722	209	697	227	664	247	613	274	555	268	475	250
	6	763	195	742	212	716	231	683	251	630	278	558	266	475	246
	7	785	198	763	216	736	235	702	255	643	281	560	264	480	245
	8	806	201	784	219	756	239	721	259	643	278	562	261	484	243
	9	827	205	804	223	776	242	740	263	646	276	563	258	483	239
	10	848	208	825	227	796	246	759	268	649	274	568	257	486	236
	11	870	211	846	230	816	250	779	272	651	272	568	253	489	234
	12	891	215	867	234	837	254	798	276	652	269	572	252	491	231
	13	913	218	888	238	857	258	817	281	652	266	576	250	492	228
	14	934	222	909	241	877	262	837	285	657	265	573	245	500	228
	15	956	225	930	245	897	266	856	289	656	261	576	243	500	225
230.2	4	792	204	771	223	746	242	713	263	661	292	622	295	558	286
	5	815	207	793	226	767	246	734	268	681	297	633	296	564	285
	6	839	211	816	230	789	250	754	272	700	301	641	295	563	281
	7	862	214	839	233	811	254	775	276	709	301	654	297	567	279
	8	886	217	862	237	833	258	796	280	721	303	664	298	567	275
	9	908	221	885	241	856	262	818	285	732	304	664	294	570	272
	10	931	224	907	244	878	266	839	289	743	305	669	293	574	270
	11	954	227	930	248	900	270	861	294	754	305	670	289	576	267
	12	978	231	953	252	922	274	883	298	765	305	673	287	579	264
	13	1001	234	975	256	944	278	905	303	773	305	675	284	585	263
	14	1024	238	999	260	966	282	926	307	774	302	680	282	585	259
	15	1046	241	1020	263	989	287	947	312	778	300	682	279	586	256
250.2	4	849	226	826	246	798	268	761	292	701	324	641	320	546	297
	5	874	230	849	250	820	272	782	297	721	329	645	318	552	296
	6	898	234	873	254	842	277	803	301	741	334	643	314	553	292
	7	924	237	898	259	866	281	825	306	741	331	650	313	558	290
	8	948	241	922	263	889	286	847	311	746	330	652	310	556	284
	9	970	245	946	267	913	291	869	316	749	328	653	306	560	282
	10	993	248	968	271	937	295	892	321	752	325	659	304	563	279
	11	1015	252	990	275	959	300	915	326	754	322	658	299	566	275
	12	1038	256	1012	279	980	304	938	332	754	318	662	297	568	272
	13	1061	259	1034	283	1001	308	958	336	761	317	666	294	576	272
	14	1084	263	1056	287	1022	313	979	341	760	313	670	292	577	268
	15	1107	267	1079	291	1044	317	999	346	766	311	673	289	577	263
280.2	4	955	248	927	271	895	294	853	320	786	355	721	350	632	333
	5	983	253	955	275	921	299	877	325	798	356	734	351	637	330
	6	1012	257	982	280	947	304	903	331	812	357	746	351	641	328
	7	1041	261	1011	285	974	309	928	336	825	359	749	348	641	323
	8	1070	266	1039	290	1001	315	954	342	838	360	752	346	644	320
	9	1099	270	1068	294	1029	320	980	347	851	361	753	342	646	316
	10	1129	275	1096	299	1057	325	1006	353	864	361	758	339	650	313
	11	1159	279	1125	304	1084	331	1032	359	867	358	761	336	658	311
	12	1189	284	1155	309	1112	336	1059	365	872	356	764	333	657	306
	13	1219	289	1184	315	1140	342	1086	371	873	352	769	330	660	303
	14	1249	294	1213	320	1169	347	1112	377	877	349	770	326	666	301
	15	1280	299	1243	325	1197	353	1136	381	880	346	774	323	667	296

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS XE 300.2 ÷ 375.3 XN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		48		50	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
300.2	4	1026	275	995	300	958	326	910	355	833	394	726	372	617	344
	5	1056	280	1024	305	986	332	936	361	834	390	729	369	623	342
	6	1086	285	1053	310	1013	338	962	367	840	389	732	365	629	339
	7	1117	290	1083	316	1041	343	988	373	844	386	733	361	627	332
	8	1147	295	1113	321	1070	349	1015	380	848	384	740	359	631	329
	9	1177	300	1143	327	1099	355	1042	386	851	380	740	353	635	325
	10	1208	305	1172	332	1128	361	1069	392	852	376	746	351	637	321
	11	1239	310	1202	338	1156	367	1096	399	853	371	751	348	648	321
	12	1270	316	1232	344	1184	373	1124	406	860	369	756	344	649	316
	13	1300	321	1262	349	1213	380	1151	412	859	363	759	341	650	311
	14	1332	326	1292	355	1241	386	1178	419	864	361	762	337	659	310
	15	1363	332	1321	361	1270	392	1198	423	869	358	764	333	658	305
325.2	4	1141	293	1110	320	1073	348	1026	378	949	420	888	421	798	410
	5	1174	297	1142	325	1104	353	1055	384	977	426	904	423	799	405
	6	1208	302	1175	330	1136	359	1085	390	1002	431	920	424	805	403
	7	1241	307	1208	335	1168	365	1116	397	1016	432	935	425	811	400
	8	1276	312	1241	340	1199	370	1147	403	1032	433	946	424	812	394
	9	1310	317	1275	346	1232	376	1177	409	1049	435	954	422	815	390
	10	1344	322	1308	351	1264	382	1208	415	1065	436	952	417	822	387
	11	1379	327	1342	357	1297	388	1239	422	1080	437	958	414	824	383
	12	1414	332	1376	362	1329	394	1271	429	1095	437	957	408	829	379
	13	1450	338	1410	368	1362	400	1302	435	1103	435	965	406	828	373
	14	1486	343	1445	374	1396	407	1334	442	1104	430	968	401	837	371
	15	1522	348	1480	380	1429	413	1365	449	1109	427	969	396	840	367
360.2	4	1224	325	1190	354	1148	385	1095	420	1008	466	921	454	798	415
	5	1259	330	1224	360	1181	392	1125	426	1036	473	927	448	801	407
	6	1294	335	1258	366	1214	398	1156	433	1059	477	932	442	810	402
	7	1329	341	1292	372	1247	404	1188	440	1066	474	936	435	810	393
	8	1364	346	1327	378	1280	411	1220	447	1065	465	939	427	817	388
	9	1400	352	1361	384	1313	418	1251	454	1071	459	949	423	824	382
	10	1436	358	1396	390	1347	424	1283	462	1083	456	958	419	830	376
	11	1472	363	1431	396	1380	431	1315	469	1086	449	958	409	835	370
	12	1508	369	1466	402	1414	438	1347	476	1088	440	965	404	839	364
	13	1545	375	1502	409	1447	445	1379	484	1098	436	972	398	852	362
	14	1583	381	1537	415	1482	452	1411	491	1107	432	978	392	854	355
	15	1620	388	1574	422	1516	459	1444	499	1105	422	982	386	856	348
375.3	4	1276	334	1242	365	1201	397	1148	433	1062	480	991	482	871	460
	5	1311	340	1277	371	1235	404	1181	439	1093	488	1005	482	874	456
	6	1347	345	1312	376	1269	410	1213	446	1123	495	1019	482	874	449
	7	1384	350	1347	382	1303	416	1246	453	1139	496	1029	481	880	446
	8	1420	356	1383	388	1337	423	1279	460	1149	495	1033	477	889	443
	9	1457	361	1418	394	1372	429	1311	467	1163	495	1033	471	893	439
	10	1494	367	1454	400	1406	436	1345	474	1177	495	1041	468	897	434
	11	1531	373	1491	407	1441	442	1378	481	1189	495	1041	462	902	430
	12	1569	379	1527	413	1476	449	1412	489	1196	491	1049	459	907	425
	13	1607	385	1564	419	1512	456	1445	496	1204	489	1054	455	907	419
	14	1646	391	1602	426	1547	463	1479	504	1202	482	1057	450	910	413
	15	1685	397	1640	432	1583	470	1513	511	1208	479	1063	446	911	408

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS XE 387.3 ÷ 470.3 XN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		48		50	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
387.3	4	1348	352	1313	385	1272	419	1218	456	1131	507	1064	511	955	497
	5	1385	357	1350	390	1307	425	1252	463	1163	515	1087	514	959	492
	6	1423	363	1386	396	1343	432	1287	470	1185	517	1109	517	961	487
	7	1461	368	1423	402	1378	438	1321	477	1208	521	1126	518	966	482
	8	1499	374	1460	408	1414	445	1355	484	1232	525	1131	515	975	480
	9	1537	379	1498	414	1450	451	1390	491	1252	527	1133	510	975	473
	10	1576	385	1536	421	1487	458	1425	499	1278	531	1139	506	980	468
	11	1615	391	1574	427	1523	465	1460	506	1300	534	1140	500	987	464
	12	1655	397	1612	433	1561	472	1495	513	1311	532	1151	498	993	460
	13	1695	403	1652	440	1598	479	1530	521	1318	529	1153	493	990	452
	14	1736	409	1691	446	1636	486	1566	529	1314	522	1155	487	998	449
	15	1777	416	1731	453	1674	493	1602	536	1319	518	1162	483	1001	443
425.3	4	1459	385	1418	420	1368	457	1304	497	1202	552	1083	535	944	507
	5	1500	391	1458	426	1407	464	1341	505	1220	553	1097	535	946	501
	6	1541	397	1499	433	1446	472	1378	513	1231	551	1110	533	953	497
	7	1583	404	1539	440	1486	479	1416	521	1246	552	1114	528	960	492
	8	1625	410	1580	447	1525	487	1453	530	1261	551	1121	525	965	487
	9	1668	417	1621	455	1564	495	1491	538	1275	550	1122	518	972	483
	10	1711	424	1663	462	1604	502	1529	547	1288	549	1130	514	975	477
	11	1754	431	1705	469	1644	510	1567	555	1294	544	1136	510	980	471
	12	1798	438	1747	477	1685	519	1605	564	1300	540	1144	506	984	466
	13	1842	445	1790	485	1725	527	1644	573	1308	537	1148	501	982	458
	14	1886	452	1832	492	1766	535	1683	582	1307	529	1151	494	993	456
	15	1931	460	1876	500	1807	544	1721	591	1316	526	1155	489	993	448
445.3	4	1527	411	1483	448	1430	488	1360	532	1249	591	1088	558	933	520
	5	1570	418	1525	456	1469	496	1398	540	1259	589	1093	553	933	512
	6	1612	425	1567	463	1510	504	1435	549	1258	583	1096	547	941	508
	7	1655	432	1609	471	1550	513	1474	558	1265	579	1098	541	949	504
	8	1698	439	1650	478	1591	521	1512	567	1271	575	1110	538	956	499
	9	1741	446	1692	486	1631	529	1551	576	1275	570	1109	530	962	493
	10	1785	453	1734	494	1671	538	1590	585	1277	563	1118	526	966	487
	11	1830	461	1777	502	1711	546	1628	595	1278	556	1125	521	970	481
	12	1875	468	1820	510	1752	555	1667	604	1288	553	1132	517	972	474
	13	1920	476	1864	518	1794	564	1705	613	1298	550	1138	511	972	466
	14	1966	484	1908	527	1835	573	1744	623	1295	541	1143	505	986	465
	15	2012	492	1952	535	1877	582	1784	633	1302	536	1146	499	985	457
470.3	4	1612	434	1568	473	1514	515	1443	562	1329	625	1182	602	1013	561
	5	1657	441	1611	481	1555	524	1482	571	1349	627	1185	596	1014	553
	6	1701	448	1655	489	1597	532	1522	580	1362	626	1190	590	1020	547
	7	1746	455	1699	496	1639	541	1562	589	1374	625	1193	584	1029	543
	8	1791	462	1742	504	1682	549	1602	598	1377	619	1202	580	1037	538
	9	1837	469	1786	512	1724	558	1643	607	1382	614	1206	573	1044	532
	10	1883	477	1831	520	1766	566	1683	617	1386	609	1212	567	1045	524
	11	1930	485	1876	528	1809	575	1724	626	1388	602	1221	563	1049	517
	12	1977	492	1921	537	1852	584	1764	636	1396	597	1229	558	1057	513
	13	2025	500	1967	545	1896	593	1805	646	1407	594	1231	551	1059	505
	14	2073	509	2013	554	1940	603	1847	656	1404	585	1237	545	1068	501
	15	2121	517	2060	563	1984	612	1888	666	1413	580	1241	538	1067	493

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS XE 490.3 ÷ 515.3 XN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		48		50	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
490.3	4	1692	455	1646	497	1590	541	1517	590	1399	656	1278	647	1085	600
	5	1738	463	1692	505	1634	550	1558	599	1433	664	1279	641	1097	597
	6	1786	470	1737	513	1678	559	1600	609	1460	669	1285	636	1098	588
	7	1833	477	1784	521	1722	567	1643	618	1483	672	1290	630	1108	584
	8	1882	485	1831	529	1767	576	1686	628	1485	666	1293	623	1109	575
	9	1931	493	1878	538	1812	585	1728	638	1492	662	1298	616	1117	569
	10	1980	501	1926	546	1858	594	1771	647	1497	657	1310	613	1123	563
	11	2031	509	1974	555	1904	604	1815	657	1501	650	1308	603	1128	557
	12	2081	517	2023	564	1951	613	1859	668	1507	645	1317	598	1132	550
	13	2133	525	2072	573	1998	623	1903	678	1507	636	1325	593	1139	544
	14	2185	534	2122	582	2045	633	1948	688	1519	633	1332	587	1152	541
	15	2237	543	2172	591	2093	643	1993	699	1520	625	1338	581	1157	534
515.3	4	1778	478	1731	522	1674	569	1600	620	1479	690	1372	691	1165	641
	5	1827	485	1779	530	1720	578	1644	630	1521	701	1371	683	1178	638
	6	1877	493	1827	538	1766	586	1687	639	1561	711	1379	679	1180	629
	7	1927	501	1876	547	1813	595	1731	649	1592	717	1385	673	1191	625
	8	1977	509	1925	555	1860	605	1776	659	1592	710	1389	666	1189	614
	9	2029	517	1974	564	1907	614	1821	669	1600	707	1391	658	1198	608
	10	2081	525	2025	573	1955	623	1866	679	1607	702	1404	655	1205	602
	11	2133	533	2075	581	2004	633	1912	690	1612	696	1403	645	1211	595
	12	2186	542	2127	591	2053	643	1958	700	1615	689	1414	640	1216	588
	13	2240	550	2178	600	2102	653	2005	711	1617	681	1423	635	1220	580
	14	2294	559	2231	609	2152	663	2052	722	1630	677	1431	629	1238	579
	15	2349	568	2284	619	2202	673	2099	733	1628	667	1438	623	1239	570

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS PR 221.2 ÷ 290.2 ST / LN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		49		52	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
221.2	4	792	183	770	201	749	217	725	235	688	257	665	269	637	283
	5	817	186	794	203	772	220	748	238	710	260	686	273	659	286
	6	842	188	819	205	796	223	771	240	733	264	709	276	680	289
	7	868	190	844	208	821	225	795	243	756	267	731	279	702	293
	8	894	192	870	210	846	228	820	246	779	270	754	283	724	297
	9	920	195	896	213	871	231	844	249	803	273	777	286	747	300
	10	947	197	922	216	897	234	869	253	827	277	800	290	770	304
	11	975	199	949	218	924	237	895	256	851	280	824	293	793	307
	12	1002	202	977	221	951	240	921	259	876	284	848	297	816	311
	13	1030	204	1004	224	978	243	947	262	901	287	873	300	840	315
	14	1058	207	1032	227	1005	246	974	266	927	291	898	304	864	319
	15	1086	209	1060	229	1032	249	1000	269	953	294	923	308	889	322
243.2	4	860	202	836	221	813	240	786	259	744	284	718	298	686	313
	5	886	205	862	224	838	243	811	262	768	288	740	302	709	317
	6	913	207	888	227	864	246	836	265	792	291	764	305	732	321
	7	940	210	915	230	890	249	861	269	816	295	788	309	755	325
	8	968	213	942	232	917	252	887	272	841	299	812	313	768	326
	9	996	215	970	235	944	255	913	276	866	302	836	317	782	327
	10	1024	218	998	238	971	259	940	279	891	306	861	321	795	327
	11	1053	221	1026	241	999	262	966	283	917	310	886	325	808	328
	12	1082	224	1055	245	1027	265	994	287	943	314	911	329	821	328
	13	1111	227	1084	248	1055	269	1021	290	969	318	937	333	833	328
	14	1141	230	1113	251	1083	272	1049	294	996	322	963	338	841	327
	15	1171	232	1143	254	1112	276	1077	298	1023	326	989	342	843	325
266.2	4	942	223	916	243	889	263	858	285	810	312	779	328	743	344
	5	971	226	945	246	917	267	886	288	836	317	804	332	767	349
	6	1002	229	974	250	946	271	913	292	862	321	829	337	792	353
	7	1032	232	1004	253	975	274	941	296	888	325	855	341	810	356
	8	1064	235	1035	257	1005	278	970	300	915	329	881	346	816	354
	9	1095	239	1066	260	1036	282	999	304	943	334	908	350	813	351
	10	1128	242	1098	264	1066	286	1029	309	971	338	935	355	816	348
	11	1161	245	1130	268	1098	290	1059	313	999	343	963	359	818	345
	12	1195	249	1163	271	1130	294	1090	317	1028	348	990	364	827	345
	13	1229	253	1197	275	1162	298	1121	322	1057	353	1019	369	827	341
	14	1264	256	1231	279	1195	302	1152	326	1087	357	1048	374	826	337
	15	1299	260	1266	283	1228	307	1184	331	1117	362	1060	375	833	335
290.2	4	1037	245	1008	267	979	289	945	313	892	343	859	360	820	379
	5	1070	248	1040	271	1010	293	975	317	921	348	886	365	836	379
	6	1103	251	1073	274	1042	297	1006	321	949	353	914	370	851	380
	7	1136	254	1105	278	1074	301	1036	325	978	357	942	375	867	380
	8	1170	258	1139	282	1106	305	1068	330	1008	362	971	380	882	379
	9	1205	262	1173	285	1139	309	1100	334	1038	367	1000	385	897	379
	10	1241	265	1208	289	1173	314	1132	339	1069	372	1030	390	912	378
	11	1277	269	1243	293	1207	318	1165	343	1100	377	1060	395	923	376
	12	1314	273	1279	298	1242	322	1198	348	1131	382	1086	399	929	372
	13	1351	276	1316	302	1278	327	1233	353	1164	387	1103	399	930	366
	14	1388	280	1352	306	1314	332	1267	358	1196	392	1120	399	935	362
	15	1426	284	1389	310	1350	336	1302	363	1229	398	1137	398	939	357

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS PR 313.2 ÷ 378.2 ST / LN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		49		52	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
313.2	4	1120	267	1089	292	1057	316	1019	342	958	376	919	395	874	415
	5	1154	271	1123	296	1090	321	1050	347	988	381	949	400	882	412
	6	1189	275	1158	300	1124	325	1083	352	1019	386	978	405	888	409
	7	1225	279	1192	304	1158	330	1116	356	1050	392	1008	411	894	404
	8	1261	283	1228	308	1192	334	1149	361	1081	397	1039	417	898	399
	9	1298	286	1264	313	1227	339	1183	366	1113	402	1070	422	901	393
	10	1335	291	1301	317	1262	344	1217	372	1145	408	1101	428	912	390
	11	1374	295	1338	321	1299	348	1251	377	1178	414	1133	434	913	384
	12	1411	299	1376	326	1335	353	1286	382	1211	419	1156	437	922	380
	13	1449	303	1413	331	1372	358	1322	387	1244	425	1162	433	920	372
	14	1488	307	1451	335	1409	363	1358	393	1278	431	1166	428	927	368
	15	1528	312	1489	340	1446	368	1394	398	1313	437	1179	426	934	363
350.2	4	1237	295	1203	321	1167	348	1124	377	1057	414	1014	435	964	457
	5	1275	299	1241	326	1204	353	1160	382	1090	420	1046	441	973	455
	6	1315	303	1279	331	1241	358	1196	387	1124	426	1079	447	976	452
	7	1354	307	1318	335	1279	363	1232	393	1158	432	1112	453	976	448
	8	1395	312	1358	340	1318	368	1269	398	1194	437	1146	459	980	445
	9	1436	316	1398	345	1357	374	1307	404	1229	444	1181	465	983	441
	10	1478	321	1439	350	1397	379	1345	410	1265	450	1216	472	990	438
	11	1521	325	1481	355	1437	384	1384	415	1302	456	1251	478	990	433
	12	1564	330	1523	360	1478	390	1423	421	1338	462	1273	480	993	429
	13	1607	335	1565	365	1519	395	1463	427	1376	469	1278	478	1001	427
	14	1651	340	1608	370	1561	401	1503	433	1414	475	1282	475	1003	422
	15	1695	345	1652	375	1603	407	1544	440	1452	482	1285	471	1009	419
378.2	4	1344	321	1307	350	1268	379	1222	410	1149	451	1103	474	1049	498
	5	1386	325	1348	355	1308	385	1261	416	1185	457	1138	480	1058	496
	6	1428	330	1390	360	1349	390	1300	422	1222	464	1174	487	1065	494
	7	1470	334	1432	365	1390	396	1339	428	1260	470	1210	493	1062	488
	8	1514	339	1474	370	1431	401	1380	434	1298	477	1247	500	1067	485
	9	1558	344	1517	375	1473	407	1420	440	1336	483	1284	507	1070	481
	10	1603	349	1561	380	1516	412	1461	446	1375	490	1322	514	1082	479
	11	1649	354	1606	386	1559	418	1502	452	1414	496	1360	521	1082	474
	12	1694	359	1652	391	1603	424	1544	458	1454	503	1388	524	1081	468
	13	1740	364	1697	397	1648	430	1587	465	1494	510	1394	522	1090	465
	14	1787	369	1742	402	1692	436	1630	471	1535	517	1399	519	1097	462
	15	1834	374	1788	408	1736	442	1674	478	1576	524	1402	515	1104	458

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS PR 221.2 ÷ 290.2 XN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		49		52	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
221.2	4	782	176	760	193	738	210	712	228	671	251	645	264	615	278
	5	806	178	784	195	761	213	735	231	693	255	666	268	635	282
	6	830	181	808	198	785	216	758	234	714	258	687	271	656	286
	7	856	183	833	201	809	219	781	238	737	262	709	275	676	290
	8	881	186	858	204	833	222	804	241	759	266	730	279	697	293
	9	907	189	883	207	858	225	828	244	781	269	753	283	719	297
	10	934	192	909	210	883	229	852	248	804	273	775	287	741	302
	11	961	194	935	213	909	232	877	251	827	277	797	291	762	306
	12	987	197	962	216	935	235	902	255	851	281	820	295	773	306
	13	1015	200	989	219	961	239	927	259	875	285	843	299	771	300
	14	1042	203	1016	223	987	242	953	263	899	289	866	303	780	299
	15	1070	206	1043	226	1014	246	978	266	924	293	890	307	782	295
243.2	4	847	196	824	215	800	234	770	254	723	281	693	295	623	298
	5	873	199	850	218	825	237	794	258	745	285	715	299	635	299
	6	900	202	876	221	850	241	818	261	768	289	737	304	646	299
	7	926	205	902	225	875	244	843	265	791	293	759	308	652	297
	8	953	208	928	228	901	248	867	269	815	297	779	311	651	294
	9	981	212	955	232	927	252	893	273	839	301	789	311	656	292
	10	1009	215	982	235	953	256	918	277	863	306	802	312	660	290
	11	1037	218	1010	239	980	259	944	281	887	310	815	313	659	286
	12	1065	221	1038	242	1007	263	970	286	912	315	827	314	661	283
	13	1094	225	1066	246	1035	267	996	290	937	319	839	314	666	281
	14	1123	228	1094	250	1062	271	1023	294	962	324	855	316	667	278
	15	1152	232	1123	253	1090	275	1049	298	980	326	856	313	670	275
266.2	4	927	219	902	239	873	260	839	282	783	312	749	328	632	317
	5	956	222	930	243	901	264	864	286	807	316	772	333	635	314
	6	986	226	958	247	928	268	891	291	832	321	796	338	637	311
	7	1016	230	988	251	956	272	918	295	857	326	820	343	638	307
	8	1046	233	1017	255	985	277	945	300	882	331	825	341	644	306
	9	1077	237	1047	259	1014	281	972	305	908	336	830	340	643	301
	10	1109	241	1078	263	1043	286	1000	309	934	341	833	338	648	299
	11	1141	245	1109	267	1073	290	1029	314	961	346	836	335	653	296
	12	1173	249	1141	272	1104	295	1058	319	988	352	837	332	657	294
	13	1207	254	1173	276	1134	300	1087	325	1015	357	838	328	660	291
	14	1240	258	1206	281	1166	305	1117	330	1035	360	846	327	662	287
	15	1275	263	1239	286	1197	310	1147	335	1039	358	844	322	664	284
290.2	4	1021	240	993	262	962	285	924	310	863	342	825	360	711	342
	5	1053	244	1024	266	992	290	952	314	890	347	847	364	715	338
	6	1085	248	1055	271	1022	294	981	319	917	353	860	363	718	333
	7	1118	252	1087	275	1053	299	1010	324	944	358	875	364	723	329
	8	1151	256	1120	279	1084	304	1040	329	972	363	890	363	728	324
	9	1185	260	1153	284	1116	308	1070	334	1000	369	905	363	735	321
	10	1220	264	1186	288	1148	313	1101	340	1029	374	923	364	738	315
	11	1255	268	1220	293	1181	318	1132	345	1058	380	937	363	744	311
	12	1290	273	1255	298	1214	323	1164	350	1075	381	941	359	745	305
	13	1327	278	1290	303	1248	329	1196	356	1091	381	942	353	750	301
	14	1363	282	1326	308	1282	334	1228	362	1108	381	951	350	753	296
	15	1399	287	1361	313	1316	339	1261	367	1124	381	955	345	761	293

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

AWS PR 313.2 ÷ 378.2 XN

Unit size	ELWT (°C)	Condenser Inlet Air Temperature (°C)													
		25		30		35		40		46		49		52	
		Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)	Cc (kW)	Pi (kW)
313.2	4	1101	265	1071	290	1036	315	992	342	922	378	878	398	704	353
	5	1135	269	1104	294	1067	320	1022	347	950	384	899	401	706	346
	6	1169	274	1137	299	1100	325	1053	353	979	390	906	398	714	343
	7	1204	278	1171	304	1132	330	1084	358	1008	396	904	390	714	335
	8	1239	283	1205	309	1165	336	1116	364	1037	402	909	385	721	331
	9	1275	288	1240	314	1199	341	1147	370	1067	408	920	384	727	326
	10	1311	292	1275	319	1232	346	1179	376	1097	414	923	377	732	321
	11	1348	297	1311	324	1267	352	1212	382	1127	421	925	370	736	316
	12	1385	302	1347	330	1301	358	1244	388	1133	418	934	367	740	311
	13	1422	307	1383	335	1336	364	1278	394	1138	413	933	359	742	305
	14	1460	312	1419	340	1372	370	1311	400	1142	408	940	355	754	304
	15	1498	318	1456	346	1407	376	1345	407	1144	401	947	351	755	298
350.2	4	1216	292	1182	319	1143	347	1094	377	1017	416	969	438	758	398
	5	1254	297	1219	324	1178	352	1128	383	1048	423	988	440	764	395
	6	1292	302	1256	330	1214	358	1162	389	1080	429	991	438	768	391
	7	1331	307	1294	335	1251	364	1197	395	1112	436	993	434	771	386
	8	1371	312	1332	341	1288	370	1232	401	1144	443	997	431	773	381
	9	1411	317	1371	346	1325	376	1267	408	1177	450	1000	427	779	378
	10	1451	323	1410	352	1362	382	1303	414	1211	457	1002	423	783	374
	11	1493	328	1450	358	1401	388	1339	421	1241	462	1007	420	787	370
	12	1534	334	1491	364	1439	395	1376	428	1247	460	1012	416	790	365
	13	1576	339	1532	370	1479	401	1413	435	1246	456	1015	412	792	360
	14	1618	345	1573	376	1518	408	1451	442	1249	452	1022	409	799	358
	15	1661	351	1614	382	1558	415	1489	449	1251	448	1024	404	804	354
378.2	4	1322	318	1285	347	1243	378	1190	410	1106	453	1054	477	826	434
	5	1363	323	1325	353	1281	384	1226	417	1140	460	1079	481	836	432
	6	1404	329	1365	359	1320	390	1263	423	1174	468	1078	477	836	426
	7	1446	334	1406	365	1359	396	1301	430	1209	475	1084	474	844	423
	8	1488	339	1447	371	1399	403	1339	437	1244	482	1089	471	842	416
	9	1531	345	1488	377	1439	409	1377	444	1280	490	1093	467	848	412
	10	1574	351	1531	383	1480	416	1416	451	1317	497	1095	463	853	408
	11	1619	357	1574	389	1521	423	1455	458	1353	505	1096	457	857	403
	12	1663	363	1617	396	1562	429	1494	466	1360	503	1106	455	860	398
	13	1708	369	1661	402	1604	436	1534	473	1355	496	1104	449	862	393
	14	1753	375	1705	409	1647	444	1574	481	1358	492	1113	446	876	392
	15	1798	381	1749	415	1689	451	1615	488	1361	488	1120	442	876	386

Notes: Cc (cooling capacity) - Pi (unit power input) – ELWT (evaporator leaving water temperature – Δt 5°C).
Data are referred to 0,0176 m2 °C/kW evaporator fouling factor.

Evaporator water pressure drop

AWS SE - ST

Size	184.2	212.2	237.2	260.2	275.2	303.2
Cooling Capacity (kW)	647	744	832	912	967	1064
Water Flow (l/s)	30.90	35.56	39.74	43.60	46.21	50.85
Pressure Drop (kPa)	79	72	59	69	77	65

Size	327.2	403.3	435.3	461.3	487.3
Cooling Capacity (kW)	1152	1419	1538	1622	1714
Water Flow (l/s)	55.04	67.78	73.50	77.51	81.89
Pressure Drop (kPa)	75	60	62	68	86

Water flow and pressure drop referred to nominal codition: evaporator water in/out: 12/7°C – condenser air inlet: 35°C

AWS XE – ST

Size	210.2	230.2	250.2	280.2	300.2	325.2	360.2
Cooling Capacity (kW)	756	830	889	1001	1074	1196	1280
Water Flow (l/s)	36.10	39.67	42.49	47.82	51.32	57.13	61.18
Pressure Drop (kPa)	67	64	72	65	74	45	51

Size	375.3	387.3	425.3	445.3	470.3	490.3	515.3
Cooling Capacity (kW)	1334	1409	1526	1596	1685	1768	1858
Water Flow (l/s)	63.76	67.34	72.90	76.24	80.48	84.47	88.79
Pressure Drop (kPa)	80	88	72	79	87	74	81

Water flow and pressure drop referred to nominal codition: evaporator water in/out: 12/7°C – condenser air inlet: 35°C

AWS PR – ST

Size	221.2	243.2	266.2	290.2	313.2	350.2	378.2
Cooling Capacity (kW)	821	890	975	1074	1158	1279	1390
Water Flow (l/s)	39.22	42.53	46.60	51.30	55.31	61.12	66.41
Pressure Drop (kPa)	68	73	35	67	77	67	77

Water flow and pressure drop referred to nominal codition: evaporator water in/out: 12/7°C – condenser air inlet: 35°C

To determinate the pressure drop for different versions or at different working condition, please refer to the following formula:

$$PD_2\ (kPa) = PD_1\ (kPa) \times \left(\frac{Q_2\ (l/s)}{Q_1\ (l/s)} \right)^{1.8}$$

where:

PD_2 = Pressure drop to be determinate (kPa)
PD_1 = Pressure drop at nominal condition (kPa)
Q_2 = water flow at new working condition (l/s)
Q_1 = water flow at nominal condition (l/s)

How to use the formula: Example

The unit AWS SE 184.2 ST has been selected for working at the following conditions:
- evaporator water in/out : 11/6°C
- condenser air inlet: 46°C

The cooling capacity at these working conditions is: 536 kW
The water flow at these working conditions is: 25.61 l/s

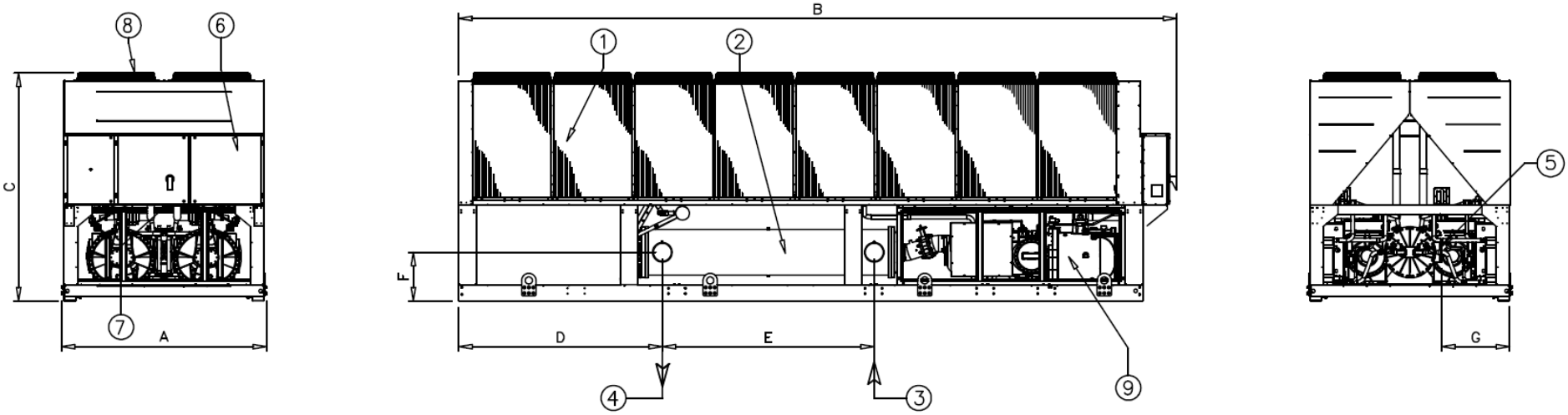
The pressure drop in these working condition will be:

$$\mathbf{PD_2}\ (\text{kPa}) = \mathbf{79}\ (\text{kPa})\ \mathbf{x}\ \left(\frac{\mathbf{25.61}\ (\text{l/s})}{\mathbf{30.90}\ (\text{l/s})} \right)^{\mathbf{1.8}}$$

$$\mathbf{PD_2}\ (\text{kPa}) = \mathbf{56}\ (\text{kPa})$$

NOTE - Important
If the calculated evaporator water pressure drop is below 10 kPa or above 100 kPa please contact the factory for dedicated evaporator.

Dimensions AWS (2 circuits)

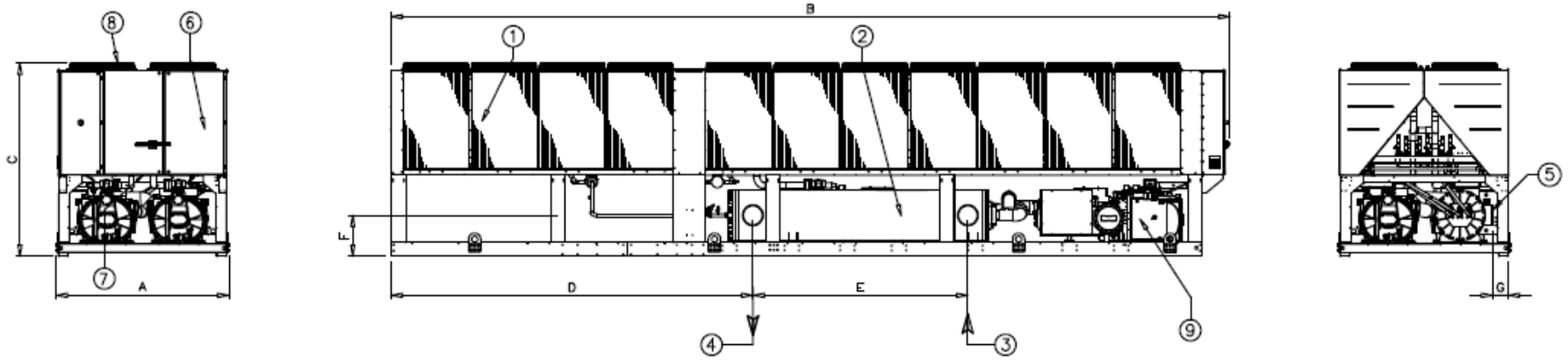


	Dimensions							
Size	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**Fans**
SE 184.2 ÷ 237.2 ST/XN	2285	6185	2540	450	2412	435	810	Nr 10
SE 260.2÷ 275.2 ST/XN	2285	6185	2540	450	2412	435	810	Nr 12
SE 303.2 ST/XN	2285	7085	2540	1350	2412	435	810	Nr 14
SE 327.2 ST/XN	2285	7985	2540	2250	2412	435	810	Nr 16
XE 210.2 ST/XN	2285	6185	2540	470	2412	435	810	Nr 12
XE 230.2 ÷ 250.2 ST/XN	2285	7085	2540	1370	2412	435	810	Nr 14
XE 280.2 ÷ 300.2 ST/XN	2285	7985	2540	2270	2360	540	760	Nr 16
XE 325.2 ÷ 360.2 ST/XN	2285	9785	2540	4070	2360	540	760	Nr 20
PR 221.2 ÷ 243.2 ST/XN	2285	8885	2540	2020	3510	540	760	Nr 18
PR 266.2 ST/XN	2285	8885	2540	2020	3440	540	685	Nr 18
PR 290.2 ÷ 313.2 ST/XN	2285	9785	2540	2920	3440	540	685	Nr 20
PR 350.2 ST/XN	2285	11085	2540	4205	3440	540	685	Nr 22
PR 378.2 ST/XN	2285	11985	2540	5105	3440	540	685	Nr 24

Legend

1 – Condenser Coil
2 – Water heat exchanger (evaporator)
3 – Evaporator water inlet
4 – Evaporator water outlet
5 – Victaulic connection
6 – Operating and control panel
7 – Slot for power and control connection
8 - Fan
9 - Compressor

Dimensions AWS (3 circuits)



Legend

1 – Condenser Coil
2 – Water heat exchanger (evaporator)
3 – Evaporator water inlet
4 – Evaporator water outlet
5 – Victaulic connection
6 – Operating and control panel
7 – Slot for power and control connection
8 - Fan
9 - Compressor

	Dimensions							
Size	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**Fans**
SE 403.3 ÷ 435.3 ST/XN	2285	10185	2540	4440	2360	540	285	Nr 20
SE 461.3 ÷ 487.3 ST/XN	2285	11085	2540	5340	2360	540	285	Nr 22
XE 375.3 ST/XN	2285	11085	2540	4780	2910	540	285	Nr 22
XE 387.3 ST/XN	2285	11985	2540	5680	2910	540	285	Nr 24
XE 425.3 ÷ 445.3 ST/XN	2285	11985	2540	5680	2840	540	210	Nr 24
XE 470.3 ST/XN	2285	12885	2540	6580	2840	540	210	Nr 26
XE 490.3 ST/XN	2285	13785	2540	7480	2840	540	210	Nr 28
XE 515.3 ST/XN	2285	14685	2540	8380	2840	540	210	Nr 30

Installation notes

Warning

Installation and maintenance of the unit must to be performed only by qualified personnel who have knowlwdge with local codes and regulations, and experience with this type of equipment. Must be avoided the unit installation in places that could be considered dangerous for all the maintenance operations.

Handling

Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base frame. Never allow the unit to fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base frame of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location

The units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

Space requirements

The units are air-cooled, then it is important to respect the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.
To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation.
Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity.
Moreover McQuay unique microprocessor has the ability to calculate the operating environment of the air cooled chiller and the capacity to optimize its performance staying on-line during abnormal conditions.
Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.
Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.
If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (fig.4). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. The microprocessor control is proactive in response "of design condition". In the case of single or compounded influeces restricting airflow to the unit, the microprocessor will act to keep the compressor(s) running (at reduced capacity) rather than allowing a shut-off on high discharge pressure.
When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (fig.3); strong wind could be the cause of air warm recirculation.
For other installation solutions, consult McQuay technicians.

The above recommended information are representative of general installation. A specific evaluation should be done by contractor depending on the case.

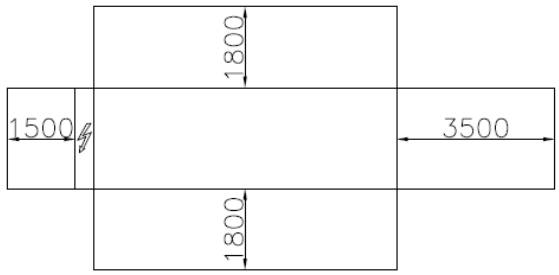


Fig.1

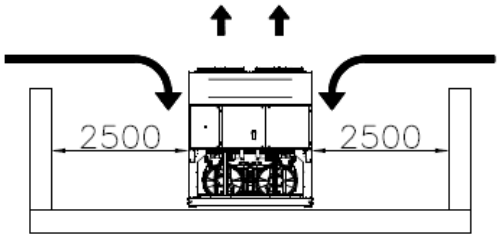


Fig. 2

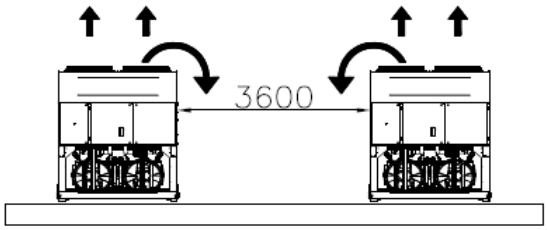


Fig. 3

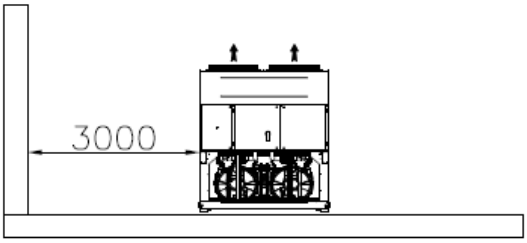


Fig. 4

Acoustic protection

When noise level must meet special requirements, it is necessary to pay the maximum attention to ensure the perfect insulation of the unit from the support base by applying appropriate vibration-dampening devices on the unit, on the water pipes and on the electrical connections.

Storing

The environment conditions have to be in the following limits:

Minimum ambient temperature:	-20°C
Maximum ambient temperature:	+57°C
Maximum R.H.:	95% not condensing

Specification

Technical Specification for Air Cooled Screw Chiller

GENERAL

The air cooled screw chiller will be designed and manufactured in accordance with following European directives:

Rating of chillers	**EN 12055**
Construction of pressure vessel	**PED**
Electrical codes	**IEC 204-1 CEI 44-5 Elect. & Safety Codes**
Machine Safety, Electrical Codes	**CEI – EN 60204 – 1 / EN 60335-2-40**
Machinery Directive	**98 / 37 / EC as modified**
Electromagnetic compatibility directive	**89 / 336 / EEC as modified**
Low-voltage Directive	**73 / 23 / EEC as modified**
Manufacturing Quality Standard	**ISO 9001:2000**

The unit will be tested at full load in the factory at the nominal working conditions and water temperatures. Before shipment a full test will be held to avoid any losses.
Chiller will be delivered to the job site completely assembled and charged with right refrigerant and oil quantity. Comply with the manufacturer instructions for rigging and handling equipment.

The unit will be able to start up and operate as standard at full load and outside air temperature from …. °C to …. °C with an evaporator leaving fluid temperature between …. °C and ….. °C

REFRIGERANT

Only HFC 134a will be accepted.

PERFORMANCE

- ✓ Number of air cooled screw chiller: .....
- ✓ Cooling capacity for single air cooled screw chiller: ..... kW
- ✓ Power input for single air cooled screw chiller in cooling mode: ..... kW
- ✓ Shell & tube heat exchanger entering water temperature in cooling mode: ..... °C
- ✓ Shell & tube heat exchanger leaving water temperature in cooling mode: ..... °C
- ✓ Shell & tube heat exchanger water flow: ..... l/s
- ✓ Nominal outside working ambient temperature in cooling mode: ..... °C
- ✓ Operating voltage range should be 400V ±10%, 3ph, 50Hz, voltage unbalance maximum 3%, without neutral conductor and shall only have one power connection point.

UNIT DESCRIPTION

Chiller shall include as standard not less than: two independent refrigerant circuits, semi-hermetic asymmetric type rotary single screw compressors, electronic expansion device (EEXV), refrigerant direct expansion shell & tube heat exchanger, air-cooled condenser section, R134a refrigerant, lubrication system, motor starting components, discharge line shut-off valve, control system and all components necessary for safe and stable unit operation.

Chiller will be factory assembled on a robust base-frame made of galvanized steel, protected by an epoxy paint.

NOISE LEVEL AND VIBRATIONS

Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed ……dB(A). The sound pressure levels must be rated in accordance to ISO 3744.

Other types of rating unacceptable. Vibration on the base frame should not exceed 2 mm/s.

DIMENSIONS

Unit dimensions shall not exceed following indications:

- ✓ unit length ..... mm,
- ✓ unit width ..... mm,
- ✓ unit height ..... mm.

CHILLER COMPONENTS

Compressors

- ✓ Semi-hermetic, single-screw asymmetric type with one main helical rotor meshing with two diametrical opposed gaterotors. The gaterotors' contact elements shall be constructed of composite material designed for extended life. Electrical motor shall be 2-pole, semi-hermetic, squirrel-cage induction type and cooled by suction gas.
- ✓ The oil injection shall be used in order to get high EER (Energy Efficiency Ratio) also at high condensing pressure and low sound pressure levels in each load condition.
- ✓ The compressor shall be provided with an integrated, high efficiency, mesh type oil separator and a built in oil filter
- ✓ Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not acceptable.
- ✓ Compressor cooling must be done by refrigerant liquid injection. External dedicated heat exchanger and additional piping to carry the oil from the compressor to heat exchanger and viceversa will be not accepted.
- ✓ The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- ✓ The compressor casing shall be provided with ports to realize economized refrigerant cycles.
- ✓ Compressor must be protected by temperature sensor for high discharge temperature and electrical motor thermistor for high winding temperature.
- ✓ The compressor shall be equipped with an electric oil heater.
- ✓ Compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

Cooling capacity control system

- ✓ Each unit will have a microprocessor for the control of compressor slide valve position.
- ✓ The unit capacity control shall be infinitely modulating, from 100% down to 25% for each circuit (from 100% down to 12,5% of full load for unit with 2 compressors and from 100% down to 7% of full load for unit with 3 compressors). The chiller shall be capable of stable operation to a minimum of 12,5% of full load without hot gas bypass.
- ✓ The system shall control the unit based on the leaving evaporator water temperature that shall be controlled by a PID (Proportional Integral Derivative) logic.
- ✓ Unit control logic shall manage the compressor slides to exactly match plant load request in order to keep constant the set point for delivered chilled water temperature.
- ✓ The microprocessor unit control shall detect conditions that approach protective limits and take self-corrective action prior to an alarm occurring. The system shall automatically reduce chiller capacity when any of the following parameters are outside their normal operating range:
    - o High condenser pressure
    - o Low evaporation refrigerant temperature

Evaporator

- ✓ The units shall be supplied with shell and tubes counter-flow heat exchanger with single refrigerant pass. It will be refrigerant direct expansion type with refrigerant inside the tubes and water outside (shell side). It will include carbon steel tube sheets, with straight copper tubes internally wound for higher efficiencies, expanded on the tube plates.

- ✓ The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (20-mm thick).
- ✓ The evaporator will have 2 or 3 circuits, one for each compressor and shall be single refrigerant pass.
- ✓ The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- ✓ Evaporator is manufactured in accordance to PED approval.

Condenser coil

- ✓ The condenser coils are constructed with internally finned seamless copper tubes having a "W" configuration and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins are given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.
- ✓ The coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency of 5-7% without increasing in energy consumption.
- ✓ The condenser coil shall be leak-tested and submitted to a pressure test with dry air.

Condenser fans

- ✓ The fans used in conjunction with the condenser coils, shall be propeller type with glass reinforced resin blades for higher efficiencies and lower noise. Each fan shall be protected by a fan guard.
- ✓ The air discharge shall be vertical and each fan must be coupled to the electrical motor, supplied as standard to IP54 and capable to work to ambient temperatures of - 20°C to + 65°C.
- ✓ They shall have as a standard a thermally protection by internal therma motor protection and protected by ciurcuit braker installed inside the electrical panel as a standard.

Refrigerant circuit

- ✓ The unit must have multiple independent refrigerant circuits.
- ✓ Each circuit shall include as standard: electronic expansion device piloted by unit’s microprocessor control, compressor discharge shut-off valve, replaceable core filter-drier, sight glass with moisture indicator and insulated suction line.

Condensation control

- ✓ The units will be provided with an automatic control for condensing pressure which ensures the working at low external temperatures down to - °C, to maintain condensing pressure.
- ✓ Compressor automatically unloads when abnormal high condensing pressure is detected to prevent the shutdown of the refrigerant circuit (shutdown of the unit) due to a high-pressure fault.

Low Noise unit options (on request)

- ✓ The unit compressors shall be connected with unit’s metal baseframe by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure and so to control the unit noise.
- ✓ The chiller shall be provided with an acoustically compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressors sound-proof enclosure shall be internally fitted with flexible, multi layer, high density materials.

Hydronic kit options (on request)

- ✓ The hydronic module shall be integrated in the chiller chassis without increasing its dimensions and include the following elements: centrifugal water pump with three-phase motor equipped with internal over-temperature protection, safety relief valve, filling kit.

- ✓ The water piping shall be protected against corrosion and equipped with drain and purge plugs. The customer connections shall be Victaulic connections. The piping shall be fully insulated to prevent condensation (pump insulation using polyurethane foam).
- ✓ A choice of four pump types shall be available:
    - o in-line single high-pressure pump or
    - o in-line dual high-pressure pump (only for unit without compressor sound proof cabinet) or
    - o in-line single low-pressure pump or
    - o in-line dual low-pressure pump (only for unit without compressor sound proof cabinet)

Control panel

- ✓ Field power connection, control interlock terminals, and unit control system should be centrally located in an electric panel (IP 54). Power and starting controls should be separate from safety and operating controls in different compartments of the same panel.
- ✓ Starting will be Wye-Delta type (Y-Δ).
- ✓ Operating and safety controls should include energy saving control; emergency stop switch; overload protection for compressor motor; high and low pressure cut-out switch (for each refrigerant circuit); anti-freeze thermostat; cut-out switch for each compressor.
- ✓ All of the information regarding the unit will be reported on a display and with the internal built-in calendar and clock that will switch the unit ON/OFF during day time all year long.
- ✓ The following features and functions shall be included:

    - leaving water temperature reset by controlling the water temperature Δt, by a remote 4-20mA DC signal or by controlling the external ambient temperature;
    - soft load function to prevent the system from operating at full load during the chilled fluid pulldown period;
    - password protection of critical parameters of control;
    - start-to-start and stop-to-start timers to provide minimum compressor off-time with maximum motor protection;
    - communication capability with a PC or remote monitoring;
    - discharge pressure control through intelligent cycling of condenser fans;
    - lead-lag selection by manual or automatically by circuit run hours;
    - double set point for brine unit version;
    - scheduling via internal time clock to allow programming of a yearly start-stop schedule accommodating weekends and holidays.

Optional High Level Communications Interface

Chiller must be able to communicate to BMS (Building Management System) based on the most common protocols as:

- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

McQuay partecipa al programma di Certificazione Eurovent. I prodotti interessati figurano nella Guida Eurovent dei Prodotti Certificati.

McQuay is participating in the Eurovent Certification Programme Product are as listed in the Eurovent Directory of Certified Products

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