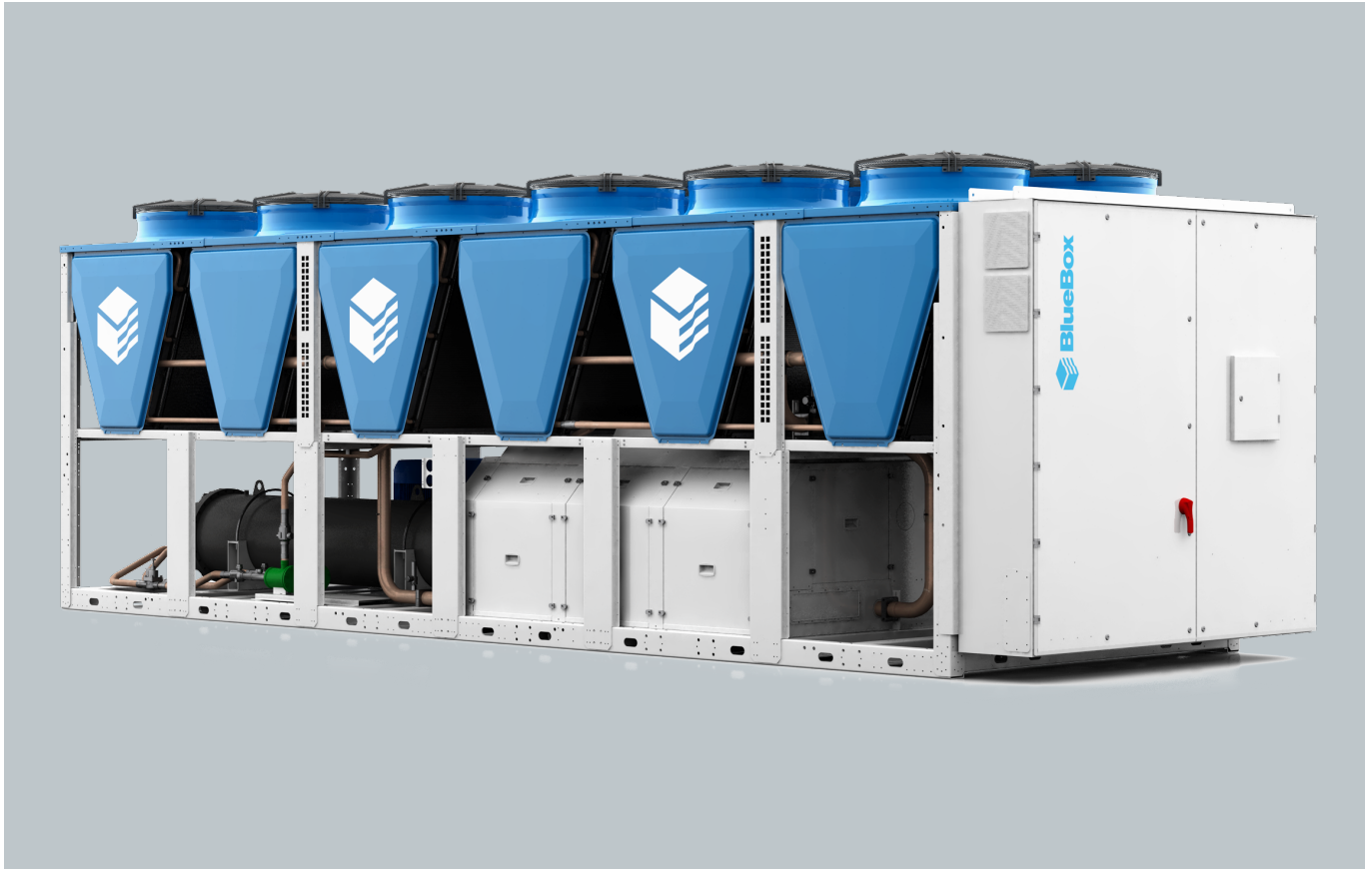


# Kappa SKY

260÷1360 kW



## General

High efficiency, single and double circuit chillers featuring screw compressors with variable compression ratio and an inverter for capacity modulation

## Configurations

**Xi:** high efficiency, unit with full inverter compressors

**Xh:** high efficiency, unit with hybrid compressors

**Si:** compact dimensions, unit with full inverter compressors

**Sh:** compact dimensions, unit with hybrid compressors

**/LN:** low noise version

**SLN:** super low noise version

**/HAT:** for high external air temperature

**/DS:** featuring a desuperheater

**/DC:** with total recovery

## Strengths

- ▶ High efficiency and compact dimensions
- ▶ Non-flammable refrigerant R513A, with GWP=573
- ▶ Versatile application: water temperature up to 23°C. Operation in a wide range of environmental conditions.
- ▶ Reduced noise levels, low noise and super low noise versions
- ▶ BlueThink advanced control with integrated web server. Multilogic function and Blueye® supervision system. (options)
- ▶ Flowzer: energy optimization on water side (options)
- ▶ Conforming with **Ecodesign Reg. 2281 tier 2**

**BlueBox**   
by Swegon



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## **Kappa SKY**

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# Kappa SKY

## PRODUCT DESCRIPTION

Kappa SKY is a range of inverter-controlled screw compressor chillers for the generation of refrigerated water from -8°C up to 23°C with external temperatures ranging between -20°C and 50°C.

The Kappa SKY range is available with 4 efficiency levels (Xi, Si and Xh, Sh) and 3 noise emission levels (base version, LN and SLN). Units from the Xi and Xh series are designed for max. seasonal efficiency. The Si and Sh models provide for excellent efficiency and very high compactness; they are specifically designed for retrofit solutions where significant restrictions exist as regards unit transport and housing. All the refrigerant circuits featured in the Xi and Si ranges fit an AC inverter-controlled screw compressor that is designed to modulate the demand for cold. The Xh and Sh ranges feature a hybrid solution where the inverter-controlled circuit and the variable screw compressor are combined with another circuit featuring a screw compressor with step adjustment.

## REFRIGERANT

Refrigerant R513A (GWP=573\*) standard.

The refrigerant consists in a blend of R134a (44%) and R1234yf (56%), with temperature glide equal to 0.

R513A is classified as a non hazardous fluid (Group 2 fluid under PED).

It is also included in Class A1 under the ASHRAE Standard 34:

- non-toxic;
- non-flammable.

The excellent GWP value may be an advantage in projects where:

- min. targets are adopted for the containment of the environmental footprint;
- it is possible to receive incentives or other benefits that are applicable in some countries or are connected to specific plant design criteria.

This also goes to the benefit of unit installation, commissioning and maintenance as it reduces the overall management costs.

(\* ) GWP (AR5), pursuant to IPCC V, evaluated over a span of 100 years.

## BODY

The body is modular with a load-bearing frame, made of galvanized sheet-iron coated with polyester powder RAL 5017/7035 which makes it highly resistant to weather conditions. All screws and bolts are stainless steel.

There are yellow lifting brackets at the base of the unit to allow lifting with lifting beam.

All the units are monobloc type.

## COMPRESSORS

Units fit innovative screw compressors with a variable compression ratio, which ensure optimised operation under all operating conditions.

The new position of the slide valve contributes to changing the compressor internal geometry, thus optimising the purge pressure in function of the ambient conditions. The BlueThink controller constantly monitors the evaporating and condensing temperatures of the unit and changes the compression ratio of the compressors to obtain the maximum achievable efficiency.

The compressors in use are designed according to an exclusive BlueBox specification in order to achieve maximum efficiency both under partial and full load conditions.

## Xi version (full inverter)

Units in Xi version are available in single and double circuit configuration. Each circuit fits a semi-hermetic screw compressor with variable compression ratio. Each circuit also features an AC inverter for continuous capacity reduction of the refrigeration demand from each compressor from 25 up to 100%, thus achieving a min. control step of 12.5% in double circuit units. The capacity reduction of the entire unit is always continuous, from the minimum capacity reduction step, based on the number of compressors, up to 100%. The variation of the compression ratio caused by the sliding of the internal slide valve, in combination with capacity reduction of the refrigeration demand by the inverter, allows for the maximisation of the energy efficiency of the unit in all operating conditions.

In addition to managing capacity modulation, BlueThink also controls all safety devices so that the compressor can operate within its operating limits at all times and simultaneously safeguard its operation and reliability. Compressor lubrication is ensured by the pressure difference between the delivery and the suction lines, thanks to the regulation action performed by BlueThink.

All the compressors are fitted with check valve on delivery side, metal mesh filter on suction side and electronic protection with temperature sensors directly inserted in the windings and on the delivery pipe.

Startup in compressors featuring an inverter is of the "Direct On Line" type with an inverter-controlled acceleration ramp that minimises inrush currents.

In addition to the obvious energy savings arising from greater efficiency, the use of a full inverter unit also brings advantages in terms of installation:

- For these units, the  $\cos\phi$  (power factor) is always greater than 0.95, therefore making external power factor correction systems unnecessary.
- The maximum inrush current of the unit is always lower than its maximum absorbed current (calculated in the worst operating condition), therefore making the power cables and line protection devices less onerous.

All the compressors are fitted as standard with crankcase heater and discharge valve.

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### Si version (full inverter)

Units in Si version are available in double circuit configuration. Each circuit fits a semi-hermetic screw compressor with variable compression ratio. Each circuit also features an AC inverter for continuous capacity reduction of the refrigeration demand from each compressor from 25 up to 100%, thus achieving a min. control step of 12.5% in double circuit units. The capacity reduction of the entire unit is always continuous, from the min. capacity reduction step up to 100%. The variation of the compression ratio caused by the sliding of the internal slide valve, in combination with capacity reduction of the refrigeration demand by the inverter, allows for the maximisation of the energy efficiency of the unit in all operating conditions.

In addition to managing capacity modulation, BlueThink also controls all the safety devices so that the compressor can operate within its operating limits at all times and simultaneously safeguard its operation and reliability. Compressor lubrication is ensured by the pressure difference between the delivery and the suction lines, thanks to the regulation action performed by BlueThink.

All the compressors are fitted with check valve on delivery side, metal mesh filter on suction side and electronic protection with temperature sensors directly inserted in the windings and on the delivery pipe.

Startup in compressors featuring an inverter is of the "Direct On Line" type with an inverter-controlled acceleration ramp that minimises inrush currents.

In addition to the obvious energy savings arising from greater efficiency, the use of a full inverter unit also brings advantages in terms of installation:

- For these units, the  $\cos\phi$  (power factor) is always greater than 0.95, therefore making external power factor correction systems unnecessary.
- The maximum inrush current of the unit is always lower than its maximum absorbed current (calculated in the worst operating condition), therefore making the power cables and line protection devices less onerous.

All the compressors are fitted as standard with crankcase heater and discharge valve.

### Xh and Sh versions (hybrid circuits)

Units in Xh and Sh version are available in double, hybrid circuit configuration. The first circuit fits a semi-hermetic screw compressor with variable compression ratio. The first circuit also features an AC inverter for continuous capacity reduction of the compressor refrigeration demand from 25 up to 100%, thus achieving a min. control step of 12.5% in double circuit units.

The second circuit fits a semi-hermetic screw compressor with stepped capacity reduction. The capacity reduction of the entire unit is always continuous, from the min. capacity reduction step up to 100%. The variation of the compression ratio caused by the sliding of the internal slide valve, in combination with capacity reduction of the refrigeration demand by the inverter, allows for the maximisation of the energy efficiency of the unit in all operating conditions.

difference between delivery and suction.

All the compressors are fitted with check valve on delivery side, metal mesh filter on suction side and electronic protection with temperature sensors directly inserted in the windings and on the delivery pipe.

All the compressors are fitted as standard with crankcase heater and discharge valve.

### SOURCE-SIDE HEAT EXCHANGER

The exchangers are made with microchannel aluminium coils.

Thanks to continuous research in the alloys field, and sophisticated production methods, microchannel coils are made using specific aluminium alloys for the tubes and for the fins. This allows the effects of galvanic corrosion to be drastically reduced to always ensure protection of the tubes that confine the refrigerant. Tubes and fins are also subjected to SilFLUX coating processes (or equivalent) or have zinc added to further increase their corrosion resistance.

The use of microchannel coils, as opposed to conventional copper/aluminium coils, reduces the total weight of the unit and reduces the refrigerant charge.

The V-shaped arrangement of the coils enables them to be protected from hail and makes the unit compact. It also guarantees an increase in the air intake surface, and leaves ample space for distribution of the components of the refrigerant circuit and the hydraulic circuit.

Options are available for installation in environments with a particularly aggressive atmosphere or in coastal or highly industrialized areas. See section: "Description of accessories".

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## FANS

The fans are axial fans, directly coupled to a three-phase 6-pole electric motor, with integrated thermal overload protection (Klixon®) and IP 54 protection rating.

The fan includes the shroud, designed to optimize its efficiency and reduce noise emission to a minimum, and the safety guard.

The control manages the speed of the fans through a phase cutting speed adjuster, in order to optimize the operating conditions and efficiency of the unit.

The fan speed regulator is supplied standardly.

This control also has the effect of reducing the noise level of the unit: in fact, the typical conditions under which the control will be modulating the speed of the fans are those of the night, spring and autumn.

For units equipped with EC fans (option), the same function is carried out using the electronically commutated motor of the fans.

## USER-SIDE HEAT EXCHANGER

The exchanger is a dry-expansion shell-and-tube exchanger.

It is sized to maximize the efficiency of the unit by keeping the overall dimensions and the refrigerant charge down to a minimum.

The exchanger consists of a steel shell insulated with a shell made of closed-cell foam material, while the tube bundle is made with copper tubes.

On the hydraulic connections of the heat exchanger, there are pipe taps for the differential pressure switch, and wells for the temperature probes.

The evaporator is standardly supplied with an antifreeze heater, which is wrapped around the shell, and it is heat insulated.

## REFRIGERANT CIRCUIT

Each refrigerant circuit of the basic unit comprises:

- discharge valve for each compressor
- shut-off valve in the liquid line
- charging valves
- liquid sight glass
- replaceable solid cartridge dehydrator filter
- electronic expansion valve
- pressure transducers for reading the high and low pressure values and relevant evaporating and condensing temperatures
- high pressure switches and safety valves.

The pipes of the circuit and the exchanger are insulated with extruded closed-cell expanded elastomer that is resistant to UV rays.

Compared to the mechanical expansion valve, the electronic expansion valve allows machine stability to be reached more quickly and better superheating control to maximize the use of the evaporator in all load conditions. This also acts as shut-off valve on the liquid line, as it closes during compressor stops, so preventing dangerous refrigerant migration.

## ELECTRICAL CONTROL PANEL

The electrical control panel is made in a painted galvanized sheet-iron box with forced ventilation and IP54 protection rating. The electrical control panel of the basic unit comprises:

- main disconnect switch
- fuses to protect the compressors, fans and auxiliary circuits
- compressor contactors
- fan contactors
- phase monitor
- potential-free general alarm contacts
- single potential free operating contacts
- external air temperature probe
- a regulation controller with a display;
- Capacitive backup battery for electronic expansion valve
- an AC inverter for each refrigerant circuit (full inverter unit), one single AC inverter (hybrid units).

All the electrical cables inside the panel are numbered and the terminal board dedicated to the customer's connections is colored orange so that it can be quickly identified in the panel.

## CONTROL BLUETHINK

### Main controller functions

The regulation controller is designed for the following functions:

- water temperature control, with control of the water leaving the user-side exchanger
- freeze protection
- compressor timings
- automatic rotation of compressor starting sequence
- recording of the log of all machine inputs, outputs and states
- automatic rotation of compressor starting sequence
- recording of the alarm log
- digital input for general ON/OFF
- RS485 serial port with Modbus protocol
- Ethernet serial port with Modbus protocol and integrated web server preloaded web page

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For further details on available functions and on displayed information, you can refer to the specific documentation of the control.

By default, the serial connections present as standard are enabled only for reading from BMS. Enabling of writing from BMS is to be requested when ordering.

### **Main functions of the webserver**

The BlueThink controller is standardly supplied with a web server, access to which is gained with an authentication password.

The web page is designed to carry out the following functions (some of these are available only for users with an advanced access level):

- display of the main functions of the unit such as unit serial n°, size, refrigerant
- display of the general status of the machine: water inlet and outlet temperatures, outside air temperature, evaporating and condensing pressures, suction and discharge temperatures
- display of the status of compressors, fans, pumps, electronic expansion valves
- display in real time of the graphs of the main quantities
- display of the graphs of logged quantities
- display of alarm log
- management of users on several levels
- remote ON/OFF
- remote set point change
- remote time band change
- to view instant data relating to current absorption, power and out-of-sync events as well as electricity consumption (where the Energy Meter accessory is fitted).

### **Human Machine Interface (Display)**

The control has a graphic display that allows the following information to be displayed:

- water inlet and outlet temperature
- set temperature and differential set points
- description of alarms
- hour meter of operation and number of start-ups of the unit, the compressors and the pumps (if present)
- high and low pressure values, and relevant condensing and evaporating temperatures
- external air temperature
- superheating at compressor suction.
- to view instant data relating to current absorption, power and out-of-sync events as well as electricity consumption (where the Energy Meter accessory is fitted).

## **TESTING**

All the units are factory-tested and supplied complete with oil and refrigerant.

## **CONTROLS AND SAFETY DEVICES**

All the units are fitted with the following control and safety components:

- high pressure switch with manual reset
- high pressure safety device with automatic reset, for a limited number of occurrences, managed by the controller
- low pressure safety device with automatic reset and limited tripping managed by the controller
- high pressure safety valve
- antifreeze probe at outlet of each evaporator
- water differential pressure switch installed at the factory
- overtemperature protection for compressors and fans

## **CERTIFICATIONS AND REFERENCE STANDARDS**

The manufacturer has implemented and keeps the Management Systems listed below and it is certified against them:

- Quality Management System according to standard UNI EN ISO 9000;
- Environmental Management System according to standard UNI EN ISO 14000;
- Health and Safety Management System according to standard BS OHSAS 18000 (as converted into UNI EN ISO 45000).

These management systems ensure that the company puts in place any and all actions and initiatives to define and monitor the standards defined by its Management, which are stated in its Quality, Environmental and Safety policies.

To meet the safety requirements, the unit was designed and manufactured in compliance with the directives and product regulations below:

- PED Directive: safety criteria to be followed when designing pressure equipment;
- Machinery Directive: safety criteria to be followed when designing machinery;
- Low Voltage Directive: safety criteria to be followed when designing electrical machine parts;
- Electromagnetic Compatibility Directive: electromagnetic compatibility criteria to be followed when designing electrical machine parts;
- WEEE Directive: criteria for product management at the end of its life cycle as waste with a view to environmental protection.

The units are manufactured, tested and checked with reference to the European standards specified in the Declaration of CE Conformity, in accordance with the requirements and procedures of our Quality System.



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## VERSIONS

The Kappa SKY family is characterised by different versions which differ from one another by the levels of efficiency, compactness and noise. Each model is designed for optional coupling of the EC fans, thus further improving the efficiency levels of the unit.

### Xi / Xh

Units in Xi and Xh version require the use of a larger number of condensing coils in order to increase the ratio between the exchange surfaces and the compressor potential capacity, which enables achieving max. efficiency under all load conditions.

The Xi models (full inverter) achieve maximum efficiency at partial loads (SEER) thanks to the use of AC inverters on both circuits and the use of compressors with a variable compression ratio (Vi).

The Xh models (hybrid circuits) contain 2 refrigerant circuits, where one circuit is provided with an AC inverter with a variable Vi screw compressor and the other circuit has a stepless compressor. The Xh models have max. efficiency performances at full load (EER) and, at the same time, maintain excellent seasonal efficiency (SEER).

### Xi SLN / Xh SLN

The Kappa SKY Xi units (full inverter) and the Xh units (hybrid circuits) are also available in super low noise version (SLN).

Sound-proof compressor compartments are used (see description of /LN option) together with fans featuring a speed regulator and reduced air flow rate. The speed reduction of the fans is such that, under nominal operating conditions, the air flow rate and noise level are lower than those of the basic version of the unit.

### Si / Sh

Units in Si version (full inverter) and Sh version (hybrid circuits) are compact machines and provide for high refrigerant performances, and they maintain excellent performance coefficients both at full and partial load.

The Si models (full inverter) grant high efficiency, including at partial loads (SEER), thanks to the use of AC inverters on all circuits and the use of compressors with variable compression ratio (Vi).

The Sh models (hybrid circuits) contain 2 refrigerant circuits, where one circuit is provided with an AC inverter with a variable Vi screw compressor and the other circuit has a stepless compressor. The Sh models (hybrid circuits) perform at max. efficiency at full load (EER) and, at the same time, maintain excellent seasonal efficiency (SEER).

### /DC: unit with total recovery condenser

In addition to the set-up of a chiller only unit, /DC units comprise:

- a heat recovery condenser for recovering 100% of the condensation heat on each refrigerant circuit. The exchanger is a brazed plate heat exchanger; for multi-circuit units, the heat exchangers are to be manifolded outside the unit (by the customer)
- temperature probe at the inlet of each recovery exchanger
- liquid receiver for each refrigerant circuit with system for emptying the refrigerant from the condensing coil
- potential free contact in the electrical control panel for activation of recovery.

When required by the system, through the closing of a contact, the control automatically manages activation of recovery. Recovery management is carried out through a control on the temperature of the return water. The control also automatically manages safety deactivation of recovery if the condensing pressure becomes too high, and changes to using the condensing coils.

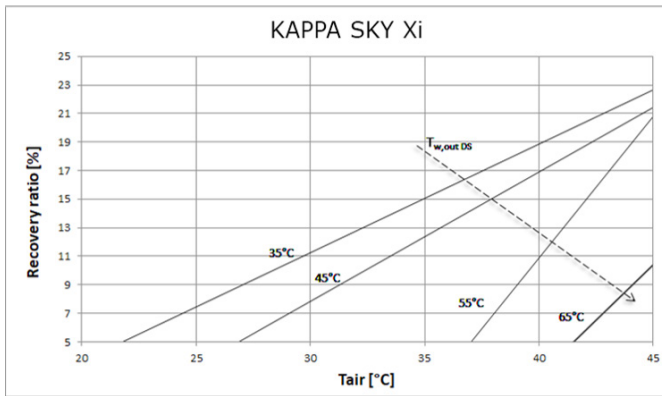
### /DS: unit with desuperheater

In addition to the set-up of a chiller only unit, /DS units comprise (for each refrigerant circuit) an exchanger for condensation heat recovery of up to 20% (depending on size, version and operating conditions), placed in series with the condensing coils. The exchanger is a braze-welded plate heat exchanger. For multi-circuit units, the exchangers are to be manifolded outside the unit (by the customer).

Two illustrative graphs are shown below in which, as the ambient temperature changes, ( $T_{air}$ ) and as the temperature of the water leaving the heat recovery heat exchanger changes, ( $T_{w,out DS}$ ), the percentage of recovered heat is shown as an indication (Recovery ratio).

The percentage of recovered heat is calculated as the ratio between recovered thermal power to the desuperheater and the thermal power released by the condenser under nominal conditions, that is, evaporator inlet/outlet water temperature 12/7°C.

In the following graph, a constant temperature delta of 5°C between water inlet and outlet at the heat recovery heat exchanger has been considered.



### /LN: silenced unit

In the unit with the /LN option, all the compressors are enclosed in fully soundproofed compartments with sound absorbing panels and soundproofing material placed in-between them.

### /HAT: unit for high external air temperatures

The unit fitted with this accessory adopts an electrical control panel made using specific components to withstand high temperatures, special cables and oversize protection parts.

This accessory extends the operating limits of the unit in terms of max. external air temperature.

This accessory guarantees operation with external air temperature up to 46°C.

The /HAT accessory is compatible with versions Xi and Xh.

The /HAT accessory is not compatible with SLN versions.

The /HAT accessory is not compatible with Si Sh versions.

For higher temperatures, a set-up with air conditioning of the electrical control panel is necessary; the unit works in capacity reduction mode. The feasibility of this set-up must be assessed: please contact our sales department.

## HYDRAULIC MODULES

The units may be equipped with a pre-installed hydraulic module featuring single propeller centrifugal pumps with intake and delivery flanges on the line.

The pumps fit a high efficiency motor type IE3.

An inverter may be connected to the pumps in order to achieve accurate thermodynamic regulation and to minimise energy consumption (refer to the Flowzer accessories).

All units can be fitted with hydraulic module in various configurations:

- /1P: hydraulic module with one pump
- /2P: hydraulic module with two pumps
- /1PS: hydraulic module with one pump and a buffer tank (in sizes where provided)
- /2PS: hydraulic module with two pumps and a buffer tank (in sizes where provided)

All the above-mentioned modules are fitted with pumps that have a head value between 100 and 150 kPa.

The following are also available:

- Modules /1PM, /2PM, /1PMS and /2PMS are fitted with pumps that have a boosted head value between 200 and 250 kPa.

Hydraulic modules with one pump have:

- one pump
- a gate valve on the delivery side of the pump
- an expansion vessel

Hydraulic modules with two pumps have:

- two pumps
- a check valve on the delivery side of each pump
- a gate valve on the outlet of the delivery manifold
- an expansion vessel

In the version with 2 pumps, these are always with one on standby while the other is working. Switching over between the pumps is automatic and is done by time (to balance the hours of operation of each one) or in the event of failure.

Hydraulic modules with tank also have:

- a gate valve at the inlet of the pump or the suction manifold
- a tank with drain valve and air valve

Refer to the table showing the configuration compatibility to check whether specific set-ups are available.

# TECHNICAL SPECIFICATIONS

## KAPPA SKY Xi

			25.1	31.1	34.1	43.1	51.2	59.2	66.2	74.2
<b>KAPPA SKY Xi (R134a)</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	255	305	342	439	510	587	664	740
Total absorbed power	(1)	kW	81	98	113	143	163	197	217	250
EER	(1)		3,14	3,11	3,02	3,06	3,12	2,97	3,05	2,96
EER energy class (Eurovent)	(1)		A	A	B	B	A	B	B	B
<b>Compressors</b>										
Compressors/Circuits		n°/n°	1/1	1/1	1/1	1/1	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	25	25	25	25	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	38	45	45	60	75	75	90	90
Refrigerant charge (CuAl)		kg	49	59	61	79	99	101	120	123
<b>Fans</b>										
Quantity		n°	5	6	6	8	10	10	12	12
Total air flow rate		m³/h	97000	116000	116000	155000	194000	194000	233000	233000
<b>User-side heat exchanger</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	43,9	52,5	58,9	75,6	87,8	101	114,3	127,4
Head loss (A35; W7)	(1)	kPa	32	37	33	35	36	33	27	33
<b>Noise levels</b>										
Sound power lev.	(3)	dB(A)	96	97	98	98	99	100	100	101
Sound pressure lev.	(4)	dB(A)	64	65	66	66	67	68	68	69
Sound power lev. LN vers.	(3)	dB(A)	92	93	94	94	95	96	96	97
Sound pressure lev. LN vers.	(4)	dB(A)	60	61	62	62	63	64	64	65
<b>Dimensions and weight</b>										
Length	(5)	mm	3956	3956	3956	5105	6252	6252	7401	7401
Depth	(5)	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	2800	3003	3036	3738	4782	4884	5450	5535

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xi

			81.2	89.2	95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xi (R134a)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	804	905	953	1033	1134	1247	1343
Total absorbed power	(1)	kW	264	297	320	336	357	401	434
EER	(1)		3,04	3,04	2,97	3,07	3,17	3,1	3,09
EER energy class (Eurovent)	(1)		B	B	B	B	A	A	B
<b>Compressors</b>									
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	105	120	120	135	150	165	165
Refrigerant charge (CuAl)		kg	141	161	161	186	200	219	223
<b>Fans</b>									
Quantity		n°	14	16	16	18	20	22	22
Total air flow rate		m³/h	272000	310000	310000	349000	388000	427000	427000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	138,4	155,8	164	177,8	195,2	214,6	231,1
Head loss (A35; W7)	(1)	kPa	28	35	38	33	37	40	48
<b>Noise levels</b>									
Sound power lev.	(3)	dB(A)	102	102	103	103	104	105	105
Sound pressure lev.	(4)	dB(A)	70	69	70	70	71	72	72
Sound power lev. LN vers.	(3)	dB(A)	98	98	99	99	100	101	101
Sound pressure lev. LN vers.	(4)	dB(A)	66	65	66	66	67	68	68
<b>Dimensions and weight</b>									
Length	(5)	mm	8549	9698	9698	10846	11995	13144	13144
Depth	(5)	mm	2260	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	6088	7339	7339	7959	8536	9168	9342

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xi SLN

			25.1	31.1	34.1	43.1	51.2	59.2	66.2	74.2
<b>KAPPA SKY Xi SLN (R513A)</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	243	296	330	421	494	566	628	702
Total absorbed power	(1)	kW	88	105	123	156	176	216	237	275
EER	(1)		2,76	2,81	2,68	2,69	2,8	2,62	2,64	2,55
EER energy class (Eurovent)	(1)		C	C	D	D	C	D	D	D
<b>Compressors</b>										
Compressors/Circuits		n°/n°	1/1	1/1	1/1	1/1	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	25	25	25	25	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	38	45	45	60	75	75	90	90
Refrigerant charge (CuAl)		kg	49	59	61	79	99	101	120	123
<b>Fans</b>										
Quantity		n°	5	6	6	8	10	10	12	12
Total air flow rate		m³/h	75000	90000	90000	120000	150000	150000	180000	180000
<b>User-side heat exchanger</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	42	51	57	72	85	97	108	121
Head loss (A35; W7)	(1)	kPa	31	35	31	33	34	31	25	31
<b>Noise levels</b>										
Sound power lev.	(3)	dB(A)	89	90	91	91	92	93	93	94
Sound pressure lev.	(4)	dB(A)	57	58	59	59	60	61	61	62
<b>Dimensions and weight</b>										
Length	(5)	mm	3956	3956	3956	5105	6252	6252	7401	7401
Depth	(5)	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	2970	3173	3206	3908	5122	5224	5790	5875

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories. In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xi SLN

			81.2	89.2	95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xi SLN (R513A)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	754	836	897	984	1063	1187	1260
Total absorbed power	(1)	kW	289	314	347	368	388	436	475
EER	(1)		2,6	2,66	2,58	2,67	2,73	2,72	2,65
EER energy class (Eurovent)	(1)		D	D	D	D	C	C	D
<b>Compressors</b>									
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	105	120	120	135	150	165	165
Refrigerant charge (CuAl)		kg	141	161	161	186	200	219	223
<b>Fans</b>									
Quantity		n°	14	16	16	18	20	22	22
Total air flow rate		m³/h	210000	240000	240000	270000	300000	330000	330000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	130	144	154	169	183	204	217
Head loss (A35; W7)	(1)	kPa	26	33	36	31	35	37	45
<b>Noise levels</b>									
Sound power lev.	(3)	dB(A)	95	95	96	96	97	98	98
Sound pressure lev.	(4)	dB(A)	63	62	63	63	64	65	65
<b>Dimensions and weight</b>									
Length	(5)	mm	8549	9698	9698	10846	11995	13144	13144
Depth	(5)	mm	2260	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	6508	7819	7819	8439	9136	9768	9942

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories. In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xh

			51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Xh (R513A)</b>								
<b>Cooling (A35; W7)</b>								
Refrigeration capacity	(1)	kW	503	588	642	720	807	856
Total absorbed power	(1)	kW	167	209	219	252	275	287
EER	(1)		3,01	2,81	2,93	2,85	2,93	2,98
EER energy class (Eurovent)	(1)		B	C	B	C	B	B
<b>Compressors</b>								
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	75	75	90	90	105	120
Refrigerant charge (CuAl)		kg	99	101	120	123	141	161
<b>Fans</b>								
Quantity		n°	10	10	12	12	14	16
Total air flow rate		m³/h	194000	194000	233000	233000	272000	310000
<b>User-side heat exchanger</b>								
Quantity		n°	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	87	101	110	124	139	147
Head loss (A35; W7)	(1)	kPa	35	33	26	32	28	33
<b>Noise levels</b>								
Sound power lev.	(3)	dB(A)	98	100	99	101	102	102
Sound pressure lev.	(4)	dB(A)	66	68	67	69	70	69
Sound power lev. LN vers.	(3)	dB(A)	94	96	95	97	98	98
Sound pressure lev. LN vers.	(4)	dB(A)	62	64	63	65	66	65
<b>Dimensions and weight</b>								
Length	(5)	mm	6252	6252	7401	7401	8549	9698
Depth	(5)	mm	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	4851	4975	5490	5735	6338	7389

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xh

			95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xh (R513A)</b>							
<b>Cooling (A35; W7)</b>							
Refrigeration capacity	(1)	kW	926	1050	1098	1235	1327
Total absorbed power	(1)	kW	322	353	362	410	449
EER	(1)		2,87	2,97	3,03	3,01	2,95
EER energy class (Eurovent)	(1)		C	B	B	B	B
<b>Compressors</b>							
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	120	135	150	165	165
Refrigerant charge (CuAl)		kg	161	186	200	219	223
<b>Fans</b>							
Quantity		n°	16	18	20	22	22
Total air flow rate		m³/h	310000	349000	388000	427000	427000
<b>User-side heat exchanger</b>							
Quantity		n°	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	159	181	189	212	228
Head loss (A35; W7)	(1)	kPa	38	33	36	39	47
<b>Noise levels</b>							
Sound power lev.	(3)	dB(A)	102	102	103	104	103
Sound pressure lev.	(4)	dB(A)	69	69	70	71	70
Sound power lev. LN vers.	(3)	dB(A)	98	98	99	100	99
Sound pressure lev. LN vers.	(4)	dB(A)	65	65	66	67	66
<b>Dimensions and weight</b>							
Length	(5)	mm	9698	10846	11995	13144	13144
Depth	(5)	mm	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	7519	8174	8621	9423	9708

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.



## KAPPA SKY Xh SLN

			51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Xh SLN (R513A)</b>								
<b>Cooling (A35; W7)</b>								
Refrigeration capacity	(1)	kW	476	554	619	687	751	813
Total absorbed power	(1)	kW	171	219	225	264	286	296
EER	(1)		2,78	2,52	2,75	2,6	2,62	2,74
EER energy class (Eurovent)	(1)		C	D	C	D	D	C
<b>Compressors</b>								
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	75	75	90	90	105	120
Refrigerant charge (CuAl)		kg	99	101	120	123	141	161
<b>Fans</b>								
Quantity		n°	10	10	12	12	14	16
Total air flow rate		m³/h	150000	150000	180000	180000	210000	240000
<b>User-side heat exchanger</b>								
Quantity		n°	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	82	95	107	118	129	140
Head loss (A35; W7)	(1)	kPa	35	33	26	32	28	33
<b>Noise levels</b>								
Sound power lev.	(3)	dB(A)	91	93	92	94	95	95
Sound pressure lev.	(4)	dB(A)	59	61	60	62	63	62
<b>Dimensions and weight</b>								
Length	(5)	mm	6252	6252	7401	7401	8549	9698
Depth	(5)	mm	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	5191	5315	5830	6075	6758	7869

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories. In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xh SLN

			95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xh SLN (R513A)</b>							
<b>Cooling (A35; W7)</b>							
Refrigeration capacity	(1)	kW	879	980	1040	1170	1263
Total absorbed power	(1)	kW	335	366	374	424	466
EER	(1)		2,62	2,67	2,78	2,75	2,71
EER energy class (Eurovent)	(1)		D	D	C	C	C
<b>Compressors</b>							
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	120	135	150	165	165
Refrigerant charge (CuAl)		kg	161	186	200	219	223
<b>Fans</b>							
Quantity		n°	16	18	20	22	22
Total air flow rate		m³/h	240000	270000	300000	330000	330000
<b>User-side heat exchanger</b>							
Quantity		n°	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	151	169	179	201	217
Head loss (A35; W7)	(1)	kPa	38	33	36	39	47
<b>Noise levels</b>							
Sound power lev.	(3)	dB(A)	95	95	96	97	96
Sound pressure lev.	(4)	dB(A)	62	62	63	64	63
<b>Dimensions and weight</b>							
Length	(5)	mm	9698	10846	11995	13144	13144
Depth	(5)	mm	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	7999	8774	9221	10023	10308

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories. In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Si

			51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Si (R513A)</b>								
<b>Cooling (A35; W7)</b>								
Refrigeration capacity	(1)	kW	489	562	650	710	790	865
Total absorbed power	(1)	kW	176	215	234	271	283	308
EER	(1)		2,77	2,61	2,77	2,61	2,79	2,8
EER energy class (Eurovent)	(1)		C	D	C	D	C	C
<b>Compressors</b>								
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	60	60	75	75	90	105
Refrigerant charge (CuAl)		kg	79	79	99	99	120	141
<b>Fans</b>								
Quantity		n°	8	8	10	10	12	14
Total air flow rate		m³/h	155000	155000	194000	194000	233000	272000
<b>User-side heat exchanger</b>								
Quantity		n°	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	84	97	112	122	136	149
Head loss (A35; W7)	(1)	kPa	34	30	25	31	26	34
<b>Noise levels</b>								
Sound power lev.	(3)	dB(A)	99	100	100	101	102	102
Sound pressure lev.	(4)	dB(A)	67	68	68	69	70	69
Sound power lev. LN vers.	(3)	dB(A)	95	96	96	97	98	98
Sound pressure lev. LN vers.	(4)	dB(A)	63	64	64	65	66	65
<b>Dimensions and weight</b>								
Length	(5)	mm	5105	5105	6252	6252	7401	8549
Depth	(5)	mm	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	3738	3738	4782	4782	5450	6088

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Si

			95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Si (R513A)</b>							
<b>Cooling (A35; W7)</b>							
Refrigeration capacity	(1)	kW	931	1006	1105	1233	1312
Total absorbed power	(1)	kW	339	358	379	426	461
EER	(1)		2,74	2,81	2,91	2,89	2,84
EER energy class (Eurovent)	(1)		C	C	B	C	C
<b>Compressors</b>							
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	105	120	135	150	150
Refrigerant charge (CuAl)		kg	141	161	186	200	200
<b>Fans</b>							
Quantity		n°	14	16	18	20	20
Total air flow rate		m³/h	272000	310000	349000	388000	388000
<b>User-side heat exchanger</b>							
Quantity		n°	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	160	173	190	212	226
Head loss (A35; W7)	(1)	kPa	36	31	36	38	46
<b>Noise levels</b>							
Sound power lev.	(3)	dB(A)	103	103	104	105	105
Sound pressure lev.	(4)	dB(A)	70	70	71	72	72
Sound power lev. LN vers.	(3)	dB(A)	99	99	100	101	101
Sound pressure lev. LN vers.	(4)	dB(A)	66	66	67	68	68
<b>Dimensions and weight</b>							
Length	(5)	mm	8549	9698	10846	11995	11995
Depth	(5)	mm	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	6088	7339	7959	8536	8536

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories. In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Sh

			51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Sh (R513A)</b>								
<b>Cooling (A35; W7)</b>								
Refrigeration capacity	(1)	kW	482	572	627	707	783	843
Total absorbed power	(1)	kW	171	218	223	260	282	292
EER	(1)		2,81	2,62	2,81	2,71	2,77	2,88
EER energy class (Eurovent)	(1)		C	D	C	C	C	C
<b>Compressors</b>								
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	60	60	75	75	90	105
Refrigerant charge (CuAl)		kg	79	79	99	99	120	141
<b>Fans</b>								
Quantity		n°	8	8	10	10	12	14
Total air flow rate		m³/h	155000	155000	194000	194000	233000	272000
<b>User-side heat exchanger</b>								
Quantity		n°	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	83	98	108	122	135	145
Head loss (A35; W7)	(1)	kPa	33	30	24	30	26	32
<b>Noise levels</b>								
Sound power lev.	(3)	dB(A)	98	100	99	101	102	102
Sound pressure lev.	(4)	dB(A)	66	68	67	69	70	69
Sound power lev. LN vers.	(3)	dB(A)	94	96	95	97	98	98
Sound pressure lev. LN vers.	(4)	dB(A)	62	64	63	65	66	66
<b>Dimensions and weight</b>								
Length	(5)	mm	5105	5105	6252	6252	7401	8549
Depth	(5)	mm	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	4651	4775	4851	4851	5490	6338

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Sh

			95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Sh (R513A)</b>							
<b>Cooling (A35; W7)</b>							
Refrigeration capacity	(1)	kW	918	1030	1073	1194	1287
Total absorbed power	(1)	kW	329	359	367	415	455
EER	(1)		2,79	2,86	2,92	2,87	2,82
EER energy class (Eurovent)	(1)		C	C	B	C	C
<b>Compressors</b>							
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	105	120	135	150	150
Refrigerant charge (CuAl)		kg	141	161	186	200	200
<b>Fans</b>							
Quantity		n°	14	16	18	20	20
Total air flow rate		m³/h	272000	310000	349000	388000	388000
<b>User-side heat exchanger</b>							
Quantity		n°	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	158	177	185	205	221
Head loss (A35; W7)	(1)	kPa	36	32	34	38	45
<b>Noise levels</b>							
Sound power lev.	(3)	dB(A)	102	102	103	104	103
Sound pressure lev.	(4)	dB(A)	69	69	70	71	70
Sound power lev. LN vers.	(3)	dB(A)	98	98	99	100	99
Sound pressure lev. LN vers.	(4)	dB(A)	65	65	66	67	66
<b>Dimensions and weight</b>							
Length	(5)	mm	8549	9698	10846	11995	11995
Depth	(5)	mm	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	6338	7389	8174	8621	8621

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xi

			25.1	31.1	34.1	43.1	51.2	59.2	66.2	74.2
<b>KAPPA SKY Xi (R134a)</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	255	305	342	439	510	587	664	740
Total absorbed power	(1)	kW	81	98	113	143	163	197	217	250
EER	(1)		3,14	3,11	3,02	3,06	3,12	2,97	3,05	2,96
EER energy class (Eurovent)	(1)		A	A	B	B	A	B	B	B
<b>Compressors</b>										
Compressors/Circuits		n°/n°	1/1	1/1	1/1	1/1	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	25	25	25	25	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	38	45	45	60	75	75	90	90
Refrigerant charge (CuAl)		kg	49	59	61	79	99	101	120	123
<b>Fans</b>										
Quantity		n°	5	6	6	8	10	10	12	12
Total air flow rate		m³/h	97000	116000	116000	155000	194000	194000	233000	233000
<b>User-side heat exchanger</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	43,9	52,5	58,9	75,6	87,8	101	114,3	127,4
Head loss (A35; W7)	(1)	kPa	32	37	33	35	36	33	27	33
<b>Noise levels</b>										
Sound power lev.	(3)	dB(A)	96	97	98	98	99	100	100	101
Sound pressure lev.	(4)	dB(A)	64	65	66	66	67	68	68	69
Sound power lev. LN vers.	(3)	dB(A)	92	93	94	94	95	96	96	97
Sound pressure lev. LN vers.	(4)	dB(A)	60	61	62	62	63	64	64	65
<b>Dimensions and weight</b>										
Length	(5)	mm	3956	3956	3956	5105	6252	6252	7401	7401
Depth	(5)	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	2800	3003	3036	3738	4782	4884	5450	5535

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xi

			81.2	89.2	95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xi (R134a)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	804	905	953	1033	1134	1247	1343
Total absorbed power	(1)	kW	264	297	320	336	357	401	434
EER	(1)		3,04	3,04	2,97	3,07	3,17	3,1	3,09
EER energy class (Eurovent)	(1)		B	B	B	B	A	A	B
<b>Compressors</b>									
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	105	120	120	135	150	165	165
Refrigerant charge (CuAl)		kg	141	161	161	186	200	219	223
<b>Fans</b>									
Quantity		n°	14	16	16	18	20	22	22
Total air flow rate		m³/h	272000	310000	310000	349000	388000	427000	427000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	138,4	155,8	164	177,8	195,2	214,6	231,1
Head loss (A35; W7)	(1)	kPa	28	35	38	33	37	40	48
<b>Noise levels</b>									
Sound power lev.	(3)	dB(A)	102	102	103	103	104	105	105
Sound pressure lev.	(4)	dB(A)	70	69	70	70	71	72	72
Sound power lev. LN vers.	(3)	dB(A)	98	98	99	99	100	101	101
Sound pressure lev. LN vers.	(4)	dB(A)	66	65	66	66	67	68	68
<b>Dimensions and weight</b>									
Length	(5)	mm	8549	9698	9698	10846	11995	13144	13144
Depth	(5)	mm	2260	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	6088	7339	7339	7959	8536	9168	9342

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.



## KAPPA SKY Xi SLN

			25.1	31.1	34.1	43.1	51.2	59.2	66.2	74.2
<b>KAPPA SKY Xi SLN (R134a)</b>										
<b>Cooling (A35; W7)</b>										
Refrigeration capacity	(1)	kW	245	293	325	420	489	558	634	702
Total absorbed power	(1)	kW	84	100	118	149	168	206	225	262
EER	(1)		2,91	2,93	2,75	2,81	2,91	2,7	2,81	2,67
EER energy class (Eurovent)	(1)		B	B	C	C	B	C	C	D
<b>Compressors</b>										
Compressors/Circuits		n°/n°	1/1	1/1	1/1	1/1	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	25	25	25	25	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	37,5	45	45	60	75	75	90	90
Refrigerant charge (CuAl)		kg	49	59	61	79	99	101	120	123
<b>Fans</b>										
Quantity		n°	5	6	6	8	10	10	12	12
Total air flow rate		m³/h	75000	90000	90000	120000	150000	150000	180000	180000
<b>User-side heat exchanger</b>										
Quantity		n°	1	1	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	42,2	50,5	56	72,3	84,2	96,1	109,1	120,8
Head loss (A35; W7)	(1)	kPa	31	35	31	33	34	31	25	31
<b>Noise levels</b>										
Sound power lev.	(3)	dB(A)	89	90	91	91	92	93	93	94
Sound pressure lev.	(4)	dB(A)	57	58	59	59	60	61	61	62
<b>Dimensions and weight</b>										
Length	(5)	mm	3956	3956	3956	5105	6252	6252	7401	7401
Depth	(5)	mm	2260	2260	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	2970	3173	3206	3908	5122	5224	5790	5875

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories. In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xi SLN

			81.2	89.2	95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xi SLN (R134a)</b>									
<b>Cooling (A35; W7)</b>									
Refrigeration capacity	(1)	kW	765	848	900	985	1078	1188	1272
Total absorbed power	(1)	kW	274	299	330	349	370	416	452
EER	(1)		2,79	2,83	2,72	2,82	2,91	2,85	2,81
EER energy class (Eurovent)	(1)		C	C	C	C	B	C	C
<b>Compressors</b>									
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	105	120	120	135	150	165	165
Refrigerant charge (CuAl)		kg	141	161	161	186	200	219	223
<b>Fans</b>									
Quantity		n°	14	16	16	18	20	22	22
Total air flow rate		m³/h	210000	240000	240000	270000	300000	330000	330000
<b>User-side heat exchanger</b>									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	131,7	146	154,9	169,5	185,5	204,5	218,9
Head loss (A35; W7)	(1)	kPa	26	33	36	31	35	37	45
<b>Noise levels</b>									
Sound power lev.	(3)	dB(A)	95	95	96	96	97	98	98
Sound pressure lev.	(4)	dB(A)	63	62	63	63	64	65	65
<b>Dimensions and weight</b>									
Length	(5)	mm	8549	9698	9698	10846	11995	13144	13144
Depth	(5)	mm	2260	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	6508	7819	7819	8439	9136	9768	9942

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories. In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xh

			51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Xh (R134a)</b>								
<b>Cooling (A35; W7)</b>								
Refrigeration capacity	(1)	kW	497	590	642	721	800	853
Total absorbed power	(1)	kW	159	199	208	240	262	273
EER	(1)		3,12	2,96	3,08	3	3,05	3,12
EER energy class (Eurovent)	(1)		A	B	B	B	B	A
<b>Compressors</b>								
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	75	75	90	90	105	120
Refrigerant charge (CuAl)		kg	99	101	120	123	141	161
<b>Fans</b>								
Quantity		n°	10	10	12	12	14	16
Total air flow rate		m³/h	194000	194000	233000	233000	272000	310000
<b>User-side heat exchanger</b>								
Quantity		n°	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	85,6	101,5	110,5	124,1	137,7	146,9
Head loss (A35; W7)	(1)	kPa	35	33	26	32	28	33
<b>Noise levels</b>								
Sound power lev.	(3)	dB(A)	98	100	99	101	102	102
Sound pressure lev.	(4)	dB(A)	66	68	67	69	70	69
Sound power lev. LN vers.	(3)	dB(A)	94	96	95	97	98	98
Sound pressure lev. LN vers.	(4)	dB(A)	62	64	63	65	66	65
<b>Dimensions and weight</b>								
Length	(5)	mm	6252	6252	7401	7401	8549	9698
Depth	(5)	mm	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	5191	5315	5830	6075	6758	7869

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xh

			95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xh (R134a)</b>							
<b>Cooling (A35; W7)</b>							
Refrigeration capacity	(1)	kW	932	1037	1095	1220	1317
Total absorbed power	(1)	kW	307	336	344	390	427
EER	(1)		3,03	3,08	3,18	3,12	3,08
EER energy class (Eurovent)	(1)		B	B	A	A	B
<b>Compressors</b>							
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	120	135	150	165	165
Refrigerant charge (CuAl)		kg	161	186	200	219	223
<b>Fans</b>							
Quantity		n°	16	18	20	22	22
Total air flow rate		m³/h	310000	349000	388000	427000	427000
<b>User-side heat exchanger</b>							
Quantity		n°	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	160,4	178,5	188,5	209,9	226,6
Head loss (A35; W7)	(1)	kPa	38	33	36	39	47
<b>Noise levels</b>							
Sound power lev.	(3)	dB(A)	102	102	103	104	103
Sound pressure lev.	(4)	dB(A)	69	69	70	71	70
Sound power lev. LN vers.	(3)	dB(A)	98	98	99	100	99
Sound pressure lev. LN vers.	(4)	dB(A)	65	65	66	67	66
<b>Dimensions and weight</b>							
Length	(5)	mm	9698	10846	11995	13144	13144
Depth	(5)	mm	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	7999	8774	9221	10023	10308

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xh SLN

			51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Xh SLN (R134a)</b>								
<b>Cooling (A35; W7)</b>								
Refrigeration capacity	(1)	kW	477	559	613	684	761	816
Total absorbed power	(1)	kW	163	208	214	251	273	282
EER	(1)		2,92	2,68	2,86	2,72	2,78	2,89
EER energy class (Eurovent)	(1)		B	D	C	C	C	C
<b>Compressors</b>								
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	75	75	90	90	105	120
Refrigerant charge (CuAl)		kg	99	101	120	123	141	161
<b>Fans</b>								
Quantity		n°	10	10	12	12	14	16
Total air flow rate		m³/h	150000	150000	180000	180000	210000	240000
<b>User-side heat exchanger</b>								
Quantity		n°	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	82,1	96,3	105,5	117,7	131	140,5
Head loss (A35; W7)	(1)	kPa	35	33	26	32	28	33
<b>Noise levels</b>								
Sound power lev.	(3)	dB(A)	91	93	92	94	95	95
Sound pressure lev.	(4)	dB(A)	59	61	60	62	63	62
<b>Dimensions and weights**</b>								
Length	(5)	mm	6252	6252	7401	7401	8549	9698
Depth	(5)	mm	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	5191	5315	5830	6075	6758	7869

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories. In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Xh SLN

			95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xh SLN (R134a)</b>							
<b>Cooling (A35; W7)</b>							
Refrigeration capacity	(1)	kW	886	987	1044	1163	1248
Total absorbed power	(1)	kW	320	348	355	403	444
EER	(1)		2,76	2,83	2,94	2,88	2,81
EER energy class (Eurovent)	(1)		C	C	B	C	C
<b>Compressors</b>							
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	120	135	150	165	165
Refrigerant charge (CuAl)		kg	161	186	200	219	223
<b>Fans</b>							
Quantity		n°	16	18	20	22	22
Total air flow rate		m³/h	240000	270000	300000	330000	330000
<b>User-side heat exchanger</b>							
Quantity		n°	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	152,5	169,9	179,7	200,1	214,9
Head loss (A35; W7)	(1)	kPa	38	33	36	39	47
<b>Noise levels</b>							
Sound power lev.	(3)	dB(A)	95	95	96	97	96
Sound pressure lev.	(4)	dB(A)	62	62	63	64	63
<b>Dimensions and weights**</b>							
Length	(5)	mm	9698	10846	11995	13144	13144
Depth	(5)	mm	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	7999	8774	9221	10023	10308

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Si

			51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Si (R134a)</b>								
<b>Cooling (A35; W7)</b>								
Refrigeration capacity	(1)	kW	495	567	647	719	786	872
Total absorbed power	(1)	kW	168	205	223	258	270	294
EER	(1)		2,94	2,76	2,9	2,78	2,91	2,96
EER energy class (Eurovent)	(1)		B	C	B	C	B	B
<b>Compressors</b>								
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	75	75	90	90	105	120
Refrigerant charge (CuAl)		kg	99	101	120	123	141	161
<b>Fans</b>								
Quantity		n°	8	8	10	10	12	14
Total air flow rate		m³/h	155000	155000	194000	194000	233000	272000
<b>User-side heat exchanger</b>								
Quantity		n°	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	85,2	97,6	111,4	123,8	135,3	150,1
Head loss (A35; W7)	(1)	kPa	34	30	25	31	26	34
<b>Noise levels</b>								
Sound power lev.	(3)	dB(A)	99	100	100	101	102	102
Sound pressure lev.	(4)	dB(A)	67	68	68	69	70	69
Sound power lev. LN vers.	(3)	dB(A)	95	96	96	97	98	98
Sound pressure lev. LN vers.	(4)	dB(A)	63	64	64	65	66	65
<b>Dimensions and weight</b>								
Length	(5)	mm	5105	5105	6252	6252	7401	8549
Depth	(5)	mm	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	3738	3738	4782	4782	5450	6088

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Si

			95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Si (R134a)</b>							
<b>Cooling (A35; W7)</b>							
Refrigeration capacity	(1)	kW	926	1017	1116	1230	1324
Total absorbed power	(1)	kW	323	342	362	406	440
EER	(1)		2,86	2,97	3,08	3,02	3
EER energy class (Eurovent)	(1)		C	B	B	B	B
<b>Compressors</b>							
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	120	135	150	165	165
Refrigerant charge (CuAl)		kg	161	186	200	219	223
<b>Fans</b>							
Quantity		n°	14	16	18	20	20
Total air flow rate		m³/h	272000	310000	349000	388000	388000
<b>User-side heat exchanger</b>							
Quantity		n°	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	159,4	175	192,1	211,7	227,9
Head loss (A35; W7)	(1)	kPa	36	31	36	38	46
<b>Noise levels</b>							
Sound power lev.	(3)	dB(A)	103	103	104	105	105
Sound pressure lev.	(4)	dB(A)	70	70	71	72	72
Sound power lev. LN vers.	(3)	dB(A)	99	99	100	101	101
Sound pressure lev. LN vers.	(4)	dB(A)	66	66	67	68	68
<b>Dimensions and weight</b>							
Length	(5)	mm	8549	9698	10846	11995	11995
Depth	(5)	mm	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	6088	7339	7959	8536	8536

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.



## KAPPA SKY Sh

			51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Sh (R134a)</b>								
<b>Cooling (A35; W7)</b>								
Refrigeration capacity	(1)	kW	483	568	625	700	782	839
Total absorbed power	(1)	kW	162	207	212	247	268	277
EER	(1)		2,98	2,74	2,94	2,83	2,91	3,02
EER energy class (Eurovent)	(1)		B	C	B	C	B	B
<b>Compressors</b>								
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	75	75	90	90	105	120
Refrigerant charge (CuAl)		kg	99	101	120	123	141	161
<b>Fans</b>								
Quantity		n°	8	8	10	10	12	14
Total air flow rate		m³/h	155000	155000	194000	194000	233000	272000
<b>User-side heat exchanger</b>								
Quantity		n°	1	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	83,1	97,8	107,6	120,6	134,6	144,4
Head loss (A35; W7)	(1)	kPa	33	30	24	30	26	32
<b>Noise levels</b>								
Sound power lev.	(3)	dB(A)	98	100	99	101	102	102
Sound pressure lev.	(4)	dB(A)	66	68	67	69	70	69
Sound power lev. LN vers.	(3)	dB(A)	94	96	95	97	98	98
Sound pressure lev. LN vers.	(4)	dB(A)	62	64	63	65	66	65
<b>Dimensions and weight</b>								
Length	(5)	mm	5105	5105	6252	6252	7401	8549
Depth	(5)	mm	2260	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	4651	4775	4851	4851	5490	6338

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

## KAPPA SKY Sh

			95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Sh (R134a)</b>							
<b>Cooling (A35; W7)</b>							
Refrigeration capacity	(1)	kW	914	1020	1080	1205	1297
Total absorbed power	(1)	kW	313	341	348	394	433
EER	(1)		2,92	2,99	3,1	3,05	2,99
EER energy class (Eurovent)	(1)		B	B	A	B	B
<b>Compressors</b>							
Compressors/Circuits		n°/n°	2/2	2/2	2/2	2/2	2/2
Minimum capacity reduction step	(2)	%	12,5	12,5	12,5	12,5	12,5
Refrigerant charge (MCHX)		kg	120	135	150	165	165
Refrigerant charge (CuAl)		kg	161	186	200	219	223
<b>Fans</b>							
Quantity		n°	14	16	18	20	20
Total air flow rate		m³/h	272000	310000	349000	388000	388000
<b>User-side heat exchanger</b>							
Quantity		n°	1	1	1	1	1
Water flow rate (A35; W7)	(1)	m³/h	157,3	175,5	185,9	207,3	223,3
Head loss (A35; W7)	(1)	kPa	36	32	34	38	45
<b>Noise levels</b>							
Sound power lev.	(3)	dB(A)	102	102	103	104	103
Sound pressure lev.	(4)	dB(A)	69	69	70	71	70
Sound power lev. LN vers.	(3)	dB(A)	98	98	99	100	99
Sound pressure lev. LN vers.	(4)	dB(A)	65	65	66	67	66
<b>Dimensions and weight</b>							
Length	(5)	mm	8549	9698	10846	11995	11995
Depth	(5)	mm	2260	2260	2260	2260	2260
Height	(5)	mm	2440	2440	2440	2440	2440
Operating weight (MCHX)	(5)	kg	6338	7389	8174	8621	8621

(MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils)

- (1) Outside air temperature 35°C; evaporator inlet-outlet water temperature 12/7°C. Values compliant with standard EN 14511
- (2) Approximate value. The minimum capacity reached by the unit depends on the operating conditions. The value shown may not be suitable for calculating the minimum volume of water: to do this, consult the "Minimum water content in the system" section.
- (3) Unit operating at rated capacity, with no accessories of any kind - external air temperature 35°C and water input/output temperature from/to heat exchanger and user equal to 12/7°C. Values taken by measurements made in accordance with standard ISO 3744 and the Eurovent certification programme, where applicable. Binding values See NOISE LEVELS section.
- (4) Values obtained from the sound power level (conditions: note 3), related to a distance of 10 m from the unit in free field with directivity factor Q=2. Non-binding values See NOISE LEVELS section.
- (5) The data refers to standard unit with no accessories In particular, the introduction of some accessories such as copper / aluminum coils, hydraulic modules or recovery exchangers may result in an increase in weight that may exceed 10%. For more details, refer to the specific drawing of the selected configuration and to the "Dimensional Diagrams" section.

# ECODESIGN

## INTRODUCTION

The Ecodesign/ErP Directive (2009/125/EC) lays down new standards for more efficient energy use.

The Directive contains various regulations; as regards chiller products and heat pumps, the regulations of interest are the following:

- Regulation 2013/813, for small heat pumps ( $P_{\text{design}} \leq 400$  kW)
- Regulation 2016/2281, for chillers and heat pumps with  $P_{\text{design}} > 400$  kW
- Regulation 2013/811, for heat pumps with  $P_{\text{design}} \leq 70$  kW.

The figure below schematically illustrates the correspondence between product and reference energy ratio.

The last-mentioned regulation (2013/811) regards the labelling (Ecolabel certification) of small heat pumps.

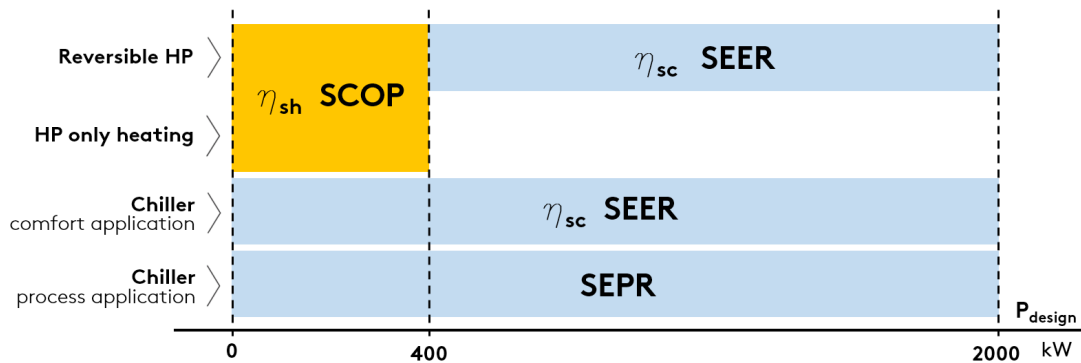
The other two regulations (2013/813 and 2016/2281) set seasonal efficiency targets that the products must comply with to be sold and installed in the European Union (essential requirement for CE marking).

These efficiency limits are defined through ratios, which are respectively:

- $\eta_{\text{sh}}$  (SCOP), with reference to regulation 2013/813
- $\eta_{\text{sc}}$  (SEER) for comfort applications and SEPR for process applications, with reference to regulation 2016/2281.

As regards regulation 2016/2281, with effect from 1st January 2021, the required minimum efficiency limit will be raised (Tier 2) from the current threshold (Tier 1).

The figure below schematically illustrates the correspondence between product and reference energy ratio.



Some notes and clarifications:

For comfort applications, regulation 2016/2281 sets the  $\eta_{\text{sc}}$  (SEER) ratio in two different operating conditions:

- SEER calculated with machine inlet/outlet water temperature of 12/7°C (low temperature application),
- SEER calculated with machine inlet/outlet water temperature of 23/18°C (medium temperature application).

The minimum efficiency requirement is the same, but can be met at condition 12/7°C or at condition 23/18°C, depending on the application envisaged for the machine.

Regulation 2013/813 distinguishes two different types: at low temperature and at medium temperature.

The following refer to the application at low temperature: (low temperature application) all heat pumps whose maximum delivery temperature for heating purposes is lower than 52°C with source at temperature of -7°C and -8°C wet bulb (air-water unit) or inlet 10°C (water-water unit), at the reference design conditions for an average climate. For these, the efficiency ratio is "low temperature application" (outlet water temperature 35°C).

For all the other heat pumps, the efficiency ratio is related to "medium temperature application" (outlet water temperature 55°C).

The ratios must be calculated according to the reference European heating season in average climatic conditions.

The minimum efficiency requirements set by the regulations are indicated below.

REGULATION 2016/2281, comfort application

TYPE OF UNIT		MINIMUM REQUIREMENT			
		Tier 1		Tier 2 (2021)	
SOURCE	Pdesign	$\eta_{sc}$ [%]	SEER	$\eta_{sc}$ [%]	SEER
air	< 400kW	149	3,8	161	4,1
air	$\geq$ 400kW	161	4,1	179	4,55
water	< 400kW	196	5,1	200	5,2
water	$\geq$ 400kW and < 1500kW	227	5,875	252	6,5
water	$\geq$ 1500kW	245	6,325	272	7

REGULATION 2016/2281, process application

TYPE OF UNIT		MINIMUM REQUIREMENT	
		Tier 1	Tier 2 (2021)
SOURCE	Pdesign	SEPR	SEPR
air	< 400kW	4,5	5
air	$\geq$ 400kW	5	5,5
water	< 400kW	6,5	7
water	$\geq$ 400kW and < 1500kW	7,5	8
water	$\geq$ 1500kW	8	8,5

The conformity of the product must be checked according to the type of application, whether comfort or process, and at the required outlet water temperature.

The two schematic tables below, respectively for comfort application and for process application, indicate the reference of the required conformity according to the type of product and the set point temperature (reference to regulations 2016/2281 and 2013/813).

Important note: for mixed comfort and process applications, the reference application for conformity is the comfort application.

## COMFORT APPLICATION

PRODUCT	OUTLET WATER TEMPERATURE	COMPLIANCE INDEX	REGULATION
<b>Chiller</b>	< 18°C	SEER/η <sub>sc</sub> low temperature application	2016/2281
	≥ 18°C	SEER/η <sub>sc</sub> medium temperature application	2016/2281
<b>Heat pumps (reversible and only heating) P<sub>design</sub> ≤ 400kW</b>		SCOP/η <sub>sh</sub>	2013/813
<b>Reversible heat pumps P<sub>design</sub> &gt; 400kW</b>	< 18°C	SEER/η <sub>sc</sub> low temperature application	2016/2281
	≥ 18°C	SEER/η <sub>sc</sub> medium temperature application	2016/2281
<b>Heat pumps only heating P<sub>design</sub> &gt; 400kW</b>		-	-

## PROCESS APPLICATION

PRODUCT	OUTLET WATER TEMPERATURE	COMPLIANCE INDEX	REGULATION
<b>Chiller</b>	≥ +2°C , ≤ 12°C	SEPR	2016/2281
	> 12°C	-	-
	> -8°C , < +2°C	-	-

- = exemption from Ecodesign

Some specifications and notes follow.

**EC fans:**

The only option that positively affects the performance of the unit, by increasing its seasonal energy efficiency ratio, is the VEC accessory.

A unit equipped with EC fans has a higher SEER (η<sub>sc</sub>) than the configuration with standard fans.

## KAPPA SKY FAMILY

The Ecodesign/ErP Directive (2009/125/EC) lays down new standards for more efficient energy use.

Several regulations are part of the directive, and set mandatory seasonal efficiency targets for sale in the European Union.

The unit therefore, to be CE marked and sold in the EU market, must comply with the minimum requirements imposed by the regulations in question.

For Kappa SKY family, in the different configurations, the reference regulation is as follows:

Regulation 2016/2281

$\eta_{sc}$  (SEER) for comfort applications and SEPR for process applications, with reference to regulation 2016/2281.

As regards the 2016/2281 regulation starting from 1 January 2021, the minimum required efficiency limit will be raised (Tier 2) compared to the current standard (Tier 1).

With reference to the Kappa SKY range, below is a list of concerned regulations relating to the different units in their various configurations.

### KAPPA SKY Xi

			25.1	31.1	34.1	43.1	51.2	59.2	66.2	74.2
<b>KAPPA SKY Xi (R513A)</b>										
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kW	257	302	344	441	508	589	672	741
<b>COMFORT</b>										
<b>Standard units</b>										
$\eta_{sc}$	(1)	%	171,8	172,6	173,4	179,8	179,8	179	180,6	180,2
SEER	(1)		4,37	4,39	4,41	4,57	4,57	4,55	4,59	4,58
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y
<b>Units with EC fans (VEC)</b>										
$\eta_{sc}$	(1)	%	196,6	198,2	196,2	203,4	198,2	191,8	198,6	193,8
SEER	(1)		4,99	5,03	4,98	5,16	5,03	4,87	5,04	4,92
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y
<b>PROCESS</b>										
SEPR	(2)		5,65	5,67	5,51	5,57	5,64	5,53	5,57	5,55
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xi

			81.2	89.2	95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xi (R513A)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	802	911	952	1035	1135	1249	1359
<b>COMFORT</b>									
<b>Standard units</b>									
$\eta_{sc}$	(1)	%	181,8	182,2	180,6	184,6	183,8	183,8	182,2
SEER	(1)		4,62	4,63	4,59	4,69	4,67	4,67	4,63
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y
<b>Units with EC fans (VEC)</b>									
$\eta_{sc}$	(1)	%	202,6	205,4	202,2	209	206,2	207,4	203
SEER	(1)		5,14	5,21	5,13	5,3	5,23	5,26	5,15
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y
<b>PROCESS</b>									
SEPR	(2)		5,59	5,62	5,52	5,65	5,79	5,7	5,61
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xi SLN

			25.1	31.1	34.1	43.1	51.2	59.2	66.2	74.2
<b>KAPPA SKY Xi SLN (R513A)</b>										
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kW	243	296	330	421	494	566	628	702
<b>COMFORT</b>										
<b>Standard units</b>										
$\eta_{sc}$	(1)	%	171,4	172,6	171,8	179,8	179	179,4	179	179,4
SEER	(1)		4,36	4,39	4,37	4,57	4,55	4,56	4,55	4,56
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y
<b>Units with EC fans (VEC)</b>										
$\eta_{sc}$	(1)	%	189,8	192,2	187,8	195,8	193	190,6	193	190,2
SEER	(1)		4,82	4,88	4,77	4,97	4,9	4,84	4,9	4,83
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y
<b>PROCESS</b>										
SEPR	(2)		5,51	5,58	5,4	5,53	5,56	5,56	5,51	5,57
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xi SLN

				81.2	89.2	95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xi SLN (R513A)</b>										
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kW		754	836	897	984	1063	1187	1260
<b>COMFORT</b>										
<b>Standard units</b>										
$\eta_{sc}$	(1)	%		180,6	180,6	179	183	181,4	182,2	179
SEER	(1)			4,59	4,59	4,55	4,65	4,61	4,63	4,55
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y	Y
<b>Units with EC fans (VEC)</b>										
$\eta_{sc}$	(1)	%		196,2	197,8	195,8	200,6	198,2	200,2	196,6
SEER	(1)			4,98	5,02	4,97	5,09	5,03	5,08	4,99
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y	Y
<b>PROCESS</b>										
SEPR	(2)			5,53	5,51	5,56	5,7	5,61	5,53	5,54
Compliance Tier 1	(2)			Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)			Y	Y	Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xh

				51.2	59.2	66.2	74.2	81.2	89.2	
<b>KAPPA SKY Xh (R513A)</b>										
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kW		503	588	642	720	807	856	
<b>COMFORT</b>										
<b>Standard units</b>										
$\eta_{sc}$	(1)	%		179	179,4	180,2	179,4	179,8	179,8	
SEER	(1)			4,55	4,56	4,58	4,56	4,57	4,57	
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y	
<b>Units with EC fans (VEC)</b>										
$\eta_{sc}$	(1)	%		188,2	191	192,2	193,4	191	197,4	
SEER	(1)			4,78	4,85	4,88	4,91	4,85	5,01	
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y	
<b>PROCESS</b>										
SEPR	(2)			5,54	5,52	5,51	5,54	5,57	5,55	
Compliance Tier 1	(2)			Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(2)			Y	Y	Y	Y	Y	Y	

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.



## KAPPA SKY Xh

				95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xh (R513A)</b>								
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kw	926	1050	1098	1235	1327	
<b>COMFORT</b>								
<b>Standard units</b>								
$\eta_{sc}$	(1)	%	179	181,4	180,6	180,6	179	
SEER	(1)		4,55	4,61	4,59	4,59	4,55	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	
<b>Units with EC fans (VEC)</b>								
$\eta_{sc}$	(1)	%	190,2	194,2	196,6	194,2	189	
SEER	(1)		4,83	4,93	4,99	4,93	4,8	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	
<b>PROCESS</b>								
SEPR	(2)		5,54	5,55	5,53	5,59	5,52	
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xh SLN

				51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Xh SLN (R513A)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kw	476	554	619	687	751	813	
<b>COMFORT</b>									
<b>Standard units</b>									
$\eta_{sc}$	(1)	%	171,4	170,2	171,4	171	170,6	176,2	
SEER	(1)		4,36	4,33	4,36	4,35	4,34	4,48	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	
<b>Units with EC fans (VEC)</b>									
$\eta_{sc}$	(1)	%	187,4	179,4	190,2	181,4	186,6	196,2	
SEER	(1)		4,76	4,56	4,83	4,61	4,74	4,98	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	
<b>PROCESS</b>									
SEPR	(2)		5,52	5,51	5,5	5,53	5,52	5,53	
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	Y	

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xh SLN

				95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Xh SLN (R513A)</b>								
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kw		879	980	1040	1170	1263
<b>COMFORT</b>								
<b>Standard units</b>								
$\eta_{sc}$	(1)	%		171	174,2	175,4	174,2	170,2
SEER	(1)			4,35	4,43	4,46	4,43	4,33
Compliance Tier 1	(1)			Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			N	N	N	N	N
<b>Units with EC fans (VEC)</b>								
$\eta_{sc}$	(1)	%		185,8	191,4	194,6	192,2	185,8
SEER	(1)			4,72	4,86	4,94	4,88	4,72
Compliance Tier 1	(1)			Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y
<b>PROCESS</b>								
SEPR	(2)			5,52	5,52	5,52	5,51	5,51
Compliance Tier 1	(2)			Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)			Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Si

				51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Si (R513A)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kw		489	562	650	710	790	865
<b>COMFORT</b>									
<b>Standard units</b>									
$\eta_{sc}$	(1)	%		172,2	171	175	172,6	179,4	181
SEER	(1)			4,38	4,35	4,45	4,39	4,56	4,6
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			N	N	N	N	Y	Y
<b>Units with EC fans (VEC)</b>									
$\eta_{sc}$	(1)	%		187,4	180,6	189,8	183,8	194,6	198,2
SEER	(1)			4,76	4,59	4,82	4,67	4,94	5,03
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y
<b>PROCESS</b>									
SEPR	(2)			5,43	5,28	5,35	5,41	5,52	5,52
Compliance Tier 1	(2)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)			N	N	N	N	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Si

				95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Si (R513A)</b>								
<b>REGULATION 2016/2281</b>								
Pdesign	(1)	kW	931	1006	1105	1233	1312	
<b>COMFORT</b>								
<b>Standard units</b>								
$\eta_{sc}$	(1)	%	180,2	183	182,6	182,6	180,6	
SEER	(1)		4,58	4,65	4,64	4,64	4,59	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	
<b>Units with EC fans (VEC)</b>								
$\eta_{sc}$	(1)	%	195,8	202,6	201	202,6	198,2	
SEER	(1)		4,97	5,14	5,1	5,14	5,03	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	
<b>PROCESS</b>								
SEPR	(2)		5,57	5,53	5,52	5,52	5,53	
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Sh

				51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Sh (R513A)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW	482	572	627	707	783	843	
<b>COMFORT</b>									
<b>Standard units</b>									
$\eta_{sc}$	(1)	%	166,6	162,6	171	167,8	172,6	176,2	
SEER	(1)		4,24	4,14	4,35	4,27	4,39	4,48	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	
<b>Units with EC fans (VEC)</b>									
$\eta_{sc}$	(1)	%	180,6	173	185,4	179,8	183,8	193	
SEER	(1)		4,59	4,4	4,71	4,57	4,67	4,9	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	N	Y	Y	Y	Y	
<b>PROCESS</b>									
SEPR	(2)		5,29	5,18	5,31	5,18	5,31	5,43	
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(2)		N	N	N	N	N	N	

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Sh

			95.2	104.2	114.2	125.2	135.2
<b>KAPPA SKY Sh (R513A)</b>							
<b>REGULATION 2016/2281</b>							
Pdesign	(1)	kW	918	1030	1073	1194	1287
<b>COMFORT</b>							
<b>Standard units</b>							
$\eta_{sc}$	(1)	%	173,4	177	176,2	176,2	173,4
SEER	(1)		4,41	4,5	4,48	4,48	4,41
Compliance Tier 1	(1)		Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
<b>Units with EC fans (VEC)</b>							
$\eta_{sc}$	(1)	%	184,6	189,4	193	189	186,2
SEER	(1)		4,69	4,81	4,9	4,8	4,73
Compliance Tier 1	(1)		Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y
<b>PROCESS</b>							
SEPR	(2)		5,23	5,38	5,44	5,29	5,21
Compliance Tier 1	(2)		Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)		N	N	N	N	N

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xi

			25.1	31.1	34.1	43.1	51.2	59.2	66.2	74.2
<b>KAPPA SKY Xi (R134a)</b>										
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kW	255	305	342	439	510	587	664	740
<b>COMFORT</b>										
<b>Standard units</b>										
$\eta_{sc}$	(1)	%	180,6	181,8	182,6	189	182,6	182,6	186,2	185
SEER	(1)		4,59	4,62	4,64	4,8	4,64	4,64	4,73	4,7
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y
<b>Units with EC fans (VEC)</b>										
$\eta_{sc}$	(1)	%	204,6	206,6	203,8	211,8	206,6	199,4	207	201,4
SEER	(1)		5,19	5,24	5,17	5,37	5,24	5,06	5,25	5,11
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y
<b>PROCESS</b>										
SEPR	(2)		5,88	5,91	5,72	5,8	5,87	5,66	5,8	5,68
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xi

			81.2	89.2	95.2	104.2	114.2	125.2	135.2	
<b>KAPPA SKY Xi (R134a)</b>										
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kW	804	905	953	1033	1134	1247	1343	
<b>COMFORT</b>										
<b>Standard units</b>										
$\eta_{sc}$	(1)	%	191,4	191,8	189,8	194,6	193	193,4	191,4	
SEER	(1)		4,86	4,87	4,82	4,94	4,9	4,91	4,86	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	
<b>Units with EC fans (VEC)</b>										
$\eta_{sc}$	(1)	%	211	214,2	211	217,4	215	215,8	211,4	
SEER	(1)		5,35	5,43	5,35	5,51	5,45	5,47	5,36	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	
<b>PROCESS</b>										
SEPR	(2)		5,82	5,85	5,72	5,88	6,03	5,93	5,84	
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	Y	Y	

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N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xi SLN

			25.1	31.1	34.1	43.1	51.2	59.2	66.2	74.2
<b>KAPPA SKY Xi SLN (R134a)</b>										
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kW	245	293	325	420	489	558	634	702
<b>COMFORT</b>										
<b>Standard units</b>										
$\eta_{sc}$	(1)	%	178,6	179,8	178,6	185	180,6	180,6	182,6	180,2
SEER	(1)		4,54	4,57	4,54	4,7	4,59	4,59	4,64	4,58
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y
<b>Units with EC fans (VEC)</b>										
$\eta_{sc}$	(1)	%	198,2	200,2	195	204,2	200,6	197,8	199,4	192,2
SEER	(1)		5,03	5,08	4,95	5,18	5,09	5,02	5,06	4,88
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	Y
<b>PROCESS</b>										
SEPR	(2)		5,73	5,79	5,61	5,62	5,63	5,66	5,59	5,63
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	Y	Y	Y

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xi SLN

			81.2	89.2	95.2	104.2	114.2	125.2	135.2	
<b>KAPPA SKY Xi SLN (R134a)</b>										
<b>REGULATION 2016/2281</b>										
Pdesign	(1)	kW	765	848	900	985	1078	1188	1272	
<b>COMFORT</b>										
<b>Standard units</b>										
$\eta_{sc}$	(1)	%	186,6	187,8	186,6	190,2	189	189,8	187	
SEER	(1)		4,74	4,77	4,74	4,83	4,8	4,82	4,75	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	
<b>Units with EC fans (VEC)</b>										
$\eta_{sc}$	(1)	%	203	205,8	204,2	208,6	206,6	209	204,2	
SEER	(1)		5,15	5,22	5,18	5,29	5,24	5,3	5,18	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y	Y	
<b>PROCESS</b>										
SEPR	(2)		5,62	5,58	5,65	5,79	5,7	5,61	5,62	
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(2)		Y	Y	Y	Y	Y	Y	Y	

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N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xh

				51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Xh (R134a)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW		497	590	642	721	800	853
<b>COMFORT</b>									
<b>Standard units</b>									
η <sub>sc</sub>	(1)	%		181,4	179,8	182,6	180,2	184,2	187,4
SEER	(1)			4,61	4,57	4,64	4,58	4,68	4,76
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y
<b>Units with EC fans (VEC)</b>									
η <sub>sc</sub>	(1)	%		196,2	189,8	199,8	193,8	199	205,4
SEER	(1)			4,98	4,82	5,07	4,92	5,05	5,21
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y
<b>PROCESS</b>									
SEPR	(2)			5,67	5,6	5,65	5,61	5,67	5,74
Compliance Tier 1	(2)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)			Y	Y	Y	Y	Y	Y

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N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xh

				95.2	104.2	114.2	125.2	135.2	
<b>KAPPA SKY Xh (R134a)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW		932	1037	1095	1220	1317	
<b>COMFORT</b>									
<b>Standard units</b>									
η <sub>sc</sub>	(1)	%		185	188,6	186,6	186,2	184,6	
SEER	(1)			4,7	4,79	4,74	4,73	4,69	
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	
<b>Units with EC fans (VEC)</b>									
η <sub>sc</sub>	(1)	%		198,2	202,2	204,6	201,8	196,6	
SEER	(1)			5,03	5,13	5,19	5,12	4,99	
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	
<b>PROCESS</b>									
SEPR	(2)			5,62	5,69	5,73	5,66	5,59	
Compliance Tier 1	(2)			Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(2)			Y	Y	Y	Y	Y	

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N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xh SLN

				51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Xh SLN (R134a)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW		477	559	613	684	761	816
<b>COMFORT</b>									
<b>Standard units</b>									
$\eta_{sc}$	(1)	%		180,6	179	180,6	179,8	179,4	185,4
SEER	(1)			4,59	4,55	4,59	4,57	4,56	4,71
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y
<b>Units with EC fans (VEC)</b>									
$\eta_{sc}$	(1)	%		195,4	189,8	197,4	189	194,2	204,2
SEER	(1)			4,96	4,82	5,01	4,8	4,93	5,18
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y
<b>PROCESS</b>									
SEPR	(2)			5,6	5,56	5,57	5,6	5,59	5,63
Compliance Tier 1	(2)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)			Y	Y	Y	Y	Y	Y

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N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Xh SLN

				95.2	104.2	114.2	125.2	135.2	
<b>KAPPA SKY Xh SLN (R134a)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW		886	987	1044	1163	1248	
<b>COMFORT</b>									
<b>Standard units</b>									
$\eta_{sc}$	(1)	%		179,8	183,4	184,6	183	179	
SEER	(1)			4,57	4,66	4,69	4,65	4,55	
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	
<b>Units with EC fans (VEC)</b>									
$\eta_{sc}$	(1)	%		193,4	198,6	202,6	199,8	193	
SEER	(1)			4,91	5,04	5,14	5,07	4,9	
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	
<b>PROCESS</b>									
SEPR	(2)			5,57	5,56	5,58	5,6	5,58	
Compliance Tier 1	(2)			Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(2)			Y	Y	Y	Y	Y	

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N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.



## KAPPA SKY Si

				51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Si (R134a)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW		495	567	647	719	786	872
<b>COMFORT</b>									
<b>Standard units</b>									
$\eta_{sc}$	(1)	%		180,6	179,8	183,8	181,4	188,6	190,2
SEER	(1)			4,59	4,57	4,67	4,61	4,79	4,83
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y
<b>Units with EC fans (VEC)</b>									
$\eta_{sc}$	(1)	%		195,4	189,8	197,4	191,4	202,2	206,2
SEER	(1)			4,96	4,82	5,01	4,86	5,13	5,23
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y
<b>PROCESS</b>									
SEPR	(2)			5,65	5,52	5,53	5,62	5,6	5,71
Compliance Tier 1	(2)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)			Y	Y	Y	Y	Y	Y

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N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Si

				95.2	104.2	114.2	125.2	135.2	
<b>KAPPA SKY Si (R134a)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW		926	1017	1116	1230	1324	
<b>COMFORT</b>									
<b>Standard units</b>									
$\eta_{sc}$	(1)	%		189,4	192,6	191,8	192,2	189,8	
SEER	(1)			4,81	4,89	4,87	4,88	4,82	
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	
<b>Units with EC fans (VEC)</b>									
$\eta_{sc}$	(1)	%		203,4	211	209	211	206,6	
SEER	(1)			5,16	5,35	5,3	5,35	5,24	
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	
<b>PROCESS</b>									
SEPR	(2)			5,69	5,71	5,8	5,74	5,76	
Compliance Tier 1	(2)			Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(2)			Y	Y	Y	Y	Y	

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Sh

				51.2	59.2	66.2	74.2	81.2	89.2
<b>KAPPA SKY Sh (R134a)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW		483	568	625	700	782	839
<b>COMFORT</b>									
<b>Standard units</b>									
$\eta_{sc}$	(1)	%		175,4	171	178,2	176,2	181,4	185,4
SEER	(1)			4,46	4,35	4,53	4,48	4,61	4,71
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			N	N	N	N	Y	Y
<b>Units with EC fans (VEC)</b>									
$\eta_{sc}$	(1)	%		187,8	179,4	192,6	186,6	191,8	200,6
SEER	(1)			4,77	4,56	4,89	4,74	4,87	5,09
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	Y
<b>PROCESS</b>									
Compliance	(2)			Y	Y	Y	Y	Y	Y
SEPR	(2)			5,51	5,51	5,5	5,53	5,53	5,64
Compliance Tier 2 (2021)	(2)			Y	Y	Y	Y	Y	Y

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(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## KAPPA SKY Sh

				95.2	104.2	114.2	125.2	135.2	
<b>KAPPA SKY Sh (R134a)</b>									
<b>REGULATION 2016/2281</b>									
Pdesign	(1)	kW		914	1020	1080	1205	1297	
<b>COMFORT</b>									
<b>Standard units</b>									
$\eta_{sc}$	(1)	%		182,2	186,2	185,4	185,4	182,6	
SEER	(1)			4,63	4,73	4,71	4,71	4,64	
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	
<b>Units with EC fans (VEC)</b>									
$\eta_{sc}$	(1)	%		192,2	197	200,2	197,4	193,4	
SEER	(1)			4,88	5	5,08	5,01	4,91	
Compliance Tier 1	(1)			Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)			Y	Y	Y	Y	Y	
<b>PROCESS</b>									
Compliance	(2)			Y	Y	Y	Y	Y	
SEPR	(2)			5,52	5,67	5,73	5,6	5,53	
Compliance Tier 2 (2021)	(2)			Y	Y	Y	Y	Y	

Y = unit in compliance with Ecodesign at the indicated condition.

N = unit not in compliance with Ecodesign at the given condition: it can be installed only in non-EU countries.

(1) User-side heat exchanger water inlet/outlet temperature 12/7°C (low temperature application), with reference to regulation 2016/2281 and standard EN 14825.

(2) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

## INSTALLATION ADVICE

The units described in this document are, by nature, strongly affected by the characteristics of the system, the working conditions and the installation site.

Remember that the unit must be installed by a qualified and skilled technician, and in compliance with the national legislation in force in the destination country.

The installation must be done in such a way that it will be possible to carry out all routine and non-routine maintenance operations.

Before starting any work, you must carefully read the "Installation, operation and maintenance manual" of the machine and do the necessary safety checks to prevent any malfunctioning or hazards.

We give some advice below that will allow you to increase the efficiency and reliability of the unit and therefore of the system into which it is inserted.

### Water characteristics

To preserve the life of the exchangers, the water is required to comply with some quality parameters and it is therefore necessary to make sure its values fall within the ranges indicated in the following table:

<b>Total hardness</b>	2,0 ÷ 6,0 °f
<b>Langelier index</b>	- 0,4 ÷ 0,4
<b>pH</b>	7,5 ÷ 8,5
<b>Electrical conductivity</b>	10÷500 µS/cm
<b>Organic elements</b>	-
<b>Hydrogen carbonate (HCO<sub>3</sub><sup>-</sup>)</b>	70 ÷ 300 ppm
<b>Sulphates (SO<sub>4</sub><sup>2-</sup>)</b>	< 50 ppm
<b>Hydrogen carbonate / Sulphates (HCO<sub>3</sub><sup>-</sup>/SO<sub>4</sub><sup>2-</sup>)</b>	> 1
<b>Chlorides (Cl<sup>-</sup>)</b>	< 50 ppm
<b>Nitrates (NO<sub>3</sub><sup>-</sup>)</b>	< 50 ppm
<b>Hydrogen sulphide (H<sub>2</sub>S)</b>	< 0,05 ppm
<b>Ammonia (NH<sub>3</sub>)</b>	< 0,05 ppm
<b>Sulphites (SO<sub>3</sub>), free chlorine (Cl<sub>2</sub>)</b>	< 1 ppm
<b>Carbon dioxide (CO<sub>2</sub>)</b>	< 5 ppm
<b>Metal cations</b>	< 0,2 ppm
<b>Manganese ions (Mn<sup>++</sup>)</b>	< 0,2 ppm
<b>Iron ions ( Fe<sup>2+</sup> , Fe<sup>3+</sup>)</b>	< 0,2 ppm
<b>Iron + Manganese</b>	< 0,4 ppm
<b>Phosphates (PO<sub>4</sub><sup>3-</sup>)</b>	< 2 ppm
<b>Oxygen</b>	< 0,1 ppm

Installation of water filters on all the hydraulic circuits is obligatory.

The supply of the most suitable filters for the unit can be requested as accessory. In this case, the filters are supplied loose and must be installed by the customer following the instructions given in the installation, operation and maintenance manual.

### Glycol mixtures

With temperatures below 5°C, it is mandatory to work with water and anti-freeze mixtures, and also change the safety devices (anti-freeze, etc.), which must be carried out by qualified authorised personnel or by the manufacturer.

<b>Liquid outlet temperature or minimum ambient temperature</b>	°C	0	-5	-10	-15	-20	-25	-30	-35	-40
<b>Freezing point</b>	°C	-5	-10	-15	-20	-25	-30	-35	-40	-45
<b>Ethylene glycol</b>	%	6	22	30	36	41	46	50	53	56
<b>Propylene glycol</b>	%	15	25	33	39	44	48	51	54	57

The quantity of antifreeze should be considered as % on weight

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## Minimum water content in the system

For correct operation of the unit, it is necessary to ensure a buffering on the system such as to comply with the minimum operating time considering the greater between the minimum OFF time and the minimum ON time. In short, these contribute to limiting the number of times the compressors are switched on per hour and to preventing undesired deviations from the set point of the delivered water temperature.

Larger amounts of water are in any case always preferable, because they allow a smaller number of starts and switch-offs of the compressors, less wear of them and an increase in the efficiency of the system as a consequence of a reduction in the number of transients.

It should also be pointed out that, for air-water units working in heat pump mode, the minimum amount of water must consider the need of the unit to carry out defrosting. Having an adequate buffering volume will allow prevention of too high drifts of the delivered water temperature at the end of the defrost cycle.

The following experimental formula allows to calculate the minimum water volume of the plant. The formula refers only to the operation of the unit in cooling mode.

$$V_{min} = \frac{P_{tot} \cdot 1.000}{N} \cdot \frac{300}{\Delta T \cdot \rho \cdot c_p} + P_{tot} \cdot 0,8$$

where

$V_{min}$  is the minimum water content of the system [l]

$P_{tot}$  is the total cooling capacity of the machine [kW]

N: number of capacity reduction steps

$\Delta T$ : differential allowed on the water temperature. Unless otherwise specified, this value is considered to be 2.5K

$\rho$ : density of the heat-carrying fluid. Unless otherwise specified, the density of water is considered

$c_p$ : specific heat of the heat-carrying fluid. Unless otherwise specified, the specific heat of water is considered

Considering the use of water and grouping together some terms, the formula can be re-written as follows:

$$V_{min} = \frac{P_{tot}}{N} \cdot 28,66 + P_{tot} \cdot 0,8$$

For the N values, consider the following convention:

- for units with 1 compressor N = 4
- for units with 2 compressors N = 8

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## Installation site

To determine the best installation site for the unit and its orientation, you should pay attention to the following points:

- compliance with the clearance spaces indicated in the official dimensional drawing of the unit must be guaranteed so as to ensure accessibility for routine and non-routine maintenance operations
- you should consider the origin of the hydraulic pipes and their diameters because these affect the radiuses of curvature and therefore the spaces needed for installing them
- you should consider the position of the cable inlet on the electrical control panel of the unit as regards the origin of the power supply
- if the installation includes several units side by side, you should consider the position and dimensions of the manifolds of the user-side exchangers and of any recovery exchangers
- if the installation includes several units side by side, you should consider that the minimum distance between units is 3 metres
- you should avoid all obstructions that can limit air circulation to the source-side exchanger or that can cause recirculation between air supply and intake
- you should consider the orientation of the unit to limit, as far as possible, exposure of the source-side exchanger to solar radiation
- if the installation area is particularly windy, the orientation and positioning of the unit must be such as to avoid air recirculation on the coils. If necessary, we advise making windbreak barriers in order to prevent malfunctioning.

Once the best position for the unit has been identified, you must check that the support slab has the following characteristics:

- its dimensions must be proportionate to those of the unit: if possible, longer and wider than the unit by at least 30 cm and 15/20cm higher than the surrounding surface
- it must be able to bear at least 4 times the operating weight of the unit
- it must allow level installation of the unit: although the unit is installed on a horizontal base, make slopes in the support surface to convey rain water or defrost water to drains, wells or in any case to places where it cannot generate an accident hazard due to ice formation. All heat pump version units are equipped with discharge manifolds for the condensed water; these can be manifolded to facilitate condensate discharge.

The units are designed and built to reduce to a minimum the level of vibration transmitted to the ground, but it is in any case advisable to use rubber or spring anti-vibration mounts, which are available as accessory and should be requested when ordering.

The anti-vibration mounts must be fixed on before positioning the unit on the ground.

In the event of installation on roofs or intermediate floors, the pipes must be isolated from the walls and ceilings.

It is advisable to avoid installation in cramped places, to prevent reverberations, reflections, resonances and acoustic interactions with elements outside the unit.

It is essential that any work done to soundproof the unit does not affect its correct installation or correct operation and, in particular, does not reduce the air flow rate to the source-side exchanger.

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## Installations that require the use of treated coils

If the unit has to be installed in an environment with a particularly aggressive atmosphere, coils with special treatments are available as options.

- e-coated microchannel coils
- coils with anti-corrosion treatment (accessory available only for units with Cu/Al coil)

A description of the individual accessories is available in the "Description of accessories" section.

The type of coil treatment should be chosen with regard to the environment in which the unit is to be installed, through observation of other structures and machinery with exposed metal surfaces present in the destination environment.

The cross observation criterion is the most valid method of selection currently available without having to carry out preliminary tests or measurements with instruments. The identified reference environments are:

- coastal/marine
- industrial
- urban with a high housing density
- rural

Please note that in cases where different conditions co-exist, even for short periods, the choice must be suitable for preserving the exchanger in the harsher environmental conditions and not in conditions between the worst and best situation.

Particular attention must be given in cases where an environment that is not particularly aggressive becomes aggressive as a consequence of a concomitant cause, for example, the presence of a flue outlet or an extraction fan.

We strongly suggest choosing one of the treatment options if at least one of the points listed below is verified:

- there are obvious signs of corrosion of the exposed metal surfaces in the installation area
- the prevailing winds come from the sea towards the unit
- the environment is industrial with a significant concentration of pollutants
- the environment is urban with a high population density
- the environment is rural with the presence of organic discharges and effluents

In particular, for installations near the coast, the following instructions apply:

- for installations between 1 and 20 km from the coast of units with microchannel coil, we strongly recommend using the accessory "E-coated microchannel coils"
- for installations between 1 and 20 km from the coast of units with Cu/Al coils, we strongly recommend using the accessory "Coil treated with anti-corrosion paints"
- for distances within a kilometre of the coast, we strongly recommend using the accessory "Coil treated with anti-corrosion paints" for all units.

To protect the exchangers from corrosion and ensure optimal operation of the unit, we advise following the recommendations given in the user, installation and maintenance manual for cleaning the coils.

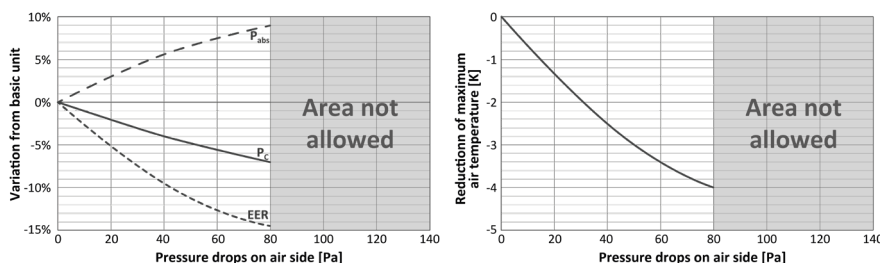
## Aeraulic head losses and options available for the ventilating section

With the exception of units for which oversize fans are required, as standard, the units are designed considering that, at the nominal air flow rate, the fans work with null available pressure.

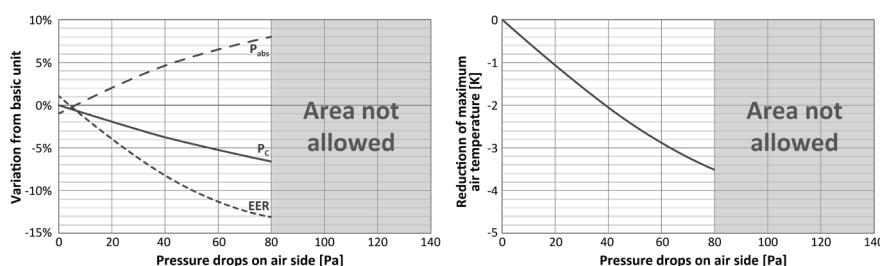
If there are obstacles to free air flow, you should consider the additional aeraulic head losses that will cause a reduction of the air flow rate and a consequent deterioration of performance.

The following diagrams show the trend of cooling capacity (PC), EER, total absorbed power (Pabs) and reduction of the maximum external air temperature in chiller operating mode, depending on the aeraulic head losses that the fans will have to overcome.

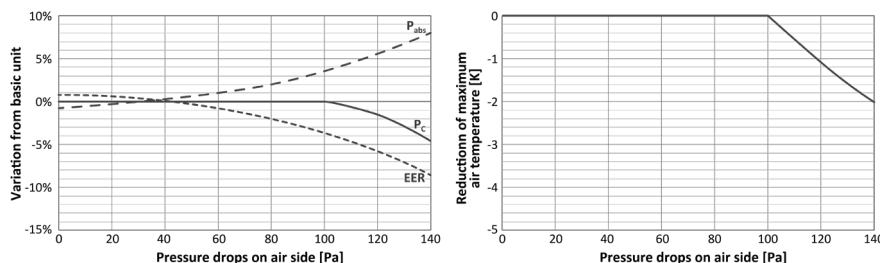
### AC fans (Ø 800)



### AC fans (Ø 800)



### EC fans (Ø 800)



The indicated values are for the standard machine, without accessories, with AC fans and in any case in the absence of air recirculation.

Example: supposing you expect there to be obstacles that will generate an estimated aeraulic head loss of 60Pa. In this case, there are 3 possibilities:

- use the unit with standard AC fans: compared to ideal conditions, the output power will be reduced by about 5.5%, the total absorbed power will increase by about 7.5%, the EER will be reduced by about 12.5% and the maximum allowed external air temperature for operation at 100% will be reduced by about 3.4K compared to the nominal limit
- use the unit with EC fans: compared to the unit with AC fans working in ideal conditions, the output power will be reduced by about 5%, the total absorbed power will increase by about 6.5%, the EER will be reduced by about 11.5% and the maximum allowed external air temperature for operation at 100% will be reduced by about 2.8K compared to the nominal limit
- use the unit with oversize EC fans: compared to the unit with AC fans working in ideal conditions, the output power of the unit will be unchanged, the total absorbed power will increase by about 1%, the EER will be reduced by about 2% and the maximum external air temperature will remain the one shown in the diagram of the operating limits.

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