

Tetris 2

84÷913 kW



General

Reversible units and modular chillers for large systems . Wide range: multiple high efficiency combinations and low noise version

Configurations

HP: reversible heat pump

A and A+: high efficiency configurations

SLN: super low noise version

/HAT: execution for high external air temperatures

/LN: silenced unit

/DS: execution featuring a desuperheater

/DC: execution with recovery condenser

Strengths

- ▶ Tier 2 compliance: high efficiency configurations with EC fans.
- ▶ Chiller with low refrigerant charge
- ▶ Wide operating limits : #down to ambient -20°C
- ▶ Intelligent management of defrost cycles: Anti-Ice Circuit
- ▶ Night Shift function for noise control (option)
- ▶ BlueThink advanced control with integrated web server. Multilogic function and Blueeye® supervision system. (options)
- ▶ Flowzer: inverter driven pumps (options)

BlueBox 
by Swegon

Tetris 2

Technical specifications

Tetris 2 A	12
Tetris 2 SLN	14
Tetris 2 A+	16
Tetris 2 A SLN	18

Ecodesign

Tetris 2	24
Tetris 2 A	27
Tetris 2 SLN	29
Tetris 2 A+	31
Tetris 2 A SLN	33

Installation advice

Water characteristics	35
Glycol mixtures	35
Minimum water content in the system	36
Installation site	37
Installations that require the use of treated coils	38
Aeraulic head losses and options available for the ventilating section	39



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STRUCTURE

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.

REFRIGERANT

The unit is charged with refrigerant R410A, with GWP=2088 (value at 100 years).

COMPRESSORS

The compressors are hermetic orbiting spiral scroll compressors connected in tandem or in trio, fitted with oil level sight glass, oil equalization line, crankcase heater and electronic protection.

SOURCE-SIDE HEAT EXCHANGER

(for chiller unit)

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".

(for HP units)

The exchangers are made with finned pack coils with copper tubes and aluminium fins.

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".

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.

Fan speed is controlled as standard on all units through a phase cutting speed adjuster, in order to optimize the operating conditions and efficiency of the unit.

USER-SIDE HEAT EXCHANGER

The exchanger is a braze-welded stainless steel plate heat exchanger, insulated with a shroud of closed-cell insulating material.

Models with two refrigerant circuits are fitted with dual circuit heat exchanger with a single hydraulic connection.

Models with three or four refrigerant circuits are made with two manifolded heat exchangers.

For dual circuit models, the unit uses two exchangers already manifolded inside the unit and therefore with a single hydraulic connection.

Each heat exchanger is equipped with:

- a thermostat-controlled anti-freeze heater to protect it from ice formation when the unit is not running
- a temperature probe for freeze protection

REFRIGERANT CIRCUIT

Each refrigerant circuit of the basic unit (cooling only) comprises:

- shut-off valve in the liquid line
- 5/16" 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
- low pressure switches (only for models with parametric control)

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

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
- automatic circuit breakers for compressors with fixed calibration
- fuses for protecting the fans and auxiliary circuits
- thermal magnetic circuit breakers for pumps (if present)
- contactors for compressors, fans and pumps (if present)
- phase monitor
- potential-free general alarm contacts
- single potential free operating contacts for compressors, fans and pumps (if present)
- microprocessor controller with display accessible from the outside
- external air temperature probe
- summer/winter selection from digital input (only for / HP unit)

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

Standard power supply of the unit is 400V/3~/50Hz

CONTROL BLUETHINK

The unit is supplied with two types of control according to size and version:

- parametric control: Tetris 2 units from model 10.2 to 16.2. For these units, the advanced control can be ordered as an accessory.
- advanced control: all the other set-ups.

Main controller functions parametric

This is the standard control for models from 10.2 to 16.2. For these units, the advanced control can be ordered as an accessory.

The control allows the following functions:

- water temperature adjustment, with control of the water entering the user-side heat exchanger
- freeze protection
- compressor timings
- automatic rotation of compressor starting sequence
- recording of the alarm log
- RS485 serial port with Modbus protocol
- digital input for general ON/OFF
- digital input for Summer/Winter selection (only for HP units)

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 controller functions advanced

The control allows the following functions:

- water temperature adjustment, with control of the water entering the user-side heat 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
- RS485 serial port with Modbus protocol
- Ethernet serial port with Modbus protocol and integrated web server preloaded web page
- digital input for general ON/OFF
- digital input for Summer/Winter selection (only for HP units)

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 (only for units with advanced control)

As standard, the Bluethink controller integrates a web-server with a preloaded web page that is accessed via password.

The web page allows the following functions to be carried out (some of these are available only for users with advanced level rights):

- 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, external air temperature, mode (chiller or heat pump), evaporating and condensing pressures, suction and discharge temperatures
- display of the status of compressors, pumps, 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
- remote summer winter mode selection

Human-Machine Interface

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.

Management of defrost cycles

(only for HP units)

For defrost management, the control of the unit uses a sliding intervention threshold, depending on the pressures inside the unit and the external air temperature. By putting together all this information, the control can identify the presence of ice on the coil and activates the defrosting sequence only when necessary, so as to maximize the energy efficiency of the unit.

Sliding management of the defrost threshold ensures that, as the absolute humidity of outdoor air decreases, the frequency of the defrost cycles gradually decreases because they are carried out only when the ice formed on the coil actually penalizes performance.

The defrost cycle is fully automatic and is carried out using a patented defrost system (patent n° 1335232): during the initial stage, a defrost is carried out by cycle reversal with fans stopped. When the frost on the coil has melted sufficiently, reverse ventilation is activated, that is, with air flow in the opposite direction to that of normal operation, so as to facilitate the ejection of condensed water and detached ice. When the coil is clean, ventilation is reversed again and the unit resumes operation in heat pump mode.

The combination of the sliding intervention threshold and the patented defrost system allows the number and duration of defrost cycles to be optimized and reduced to the minimum.

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
- Mechanical paddle flow switch factory-mounted, except for single-circuit units. For these units, flow switch is supplied as kit; mounting support (1" female fitting) and installation are care of customer
- overtemperature protection for compressors and fans

TESTING

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

VERSIONS

Alongside the basic version of the unit, there are various versions that differ in efficiency and noise levels.

A and A+: high efficiency unit

The high efficiency units use larger coils than the basic unit, in order to increase the ratio between exchange surfaces and capacity of the compressors. This allows all models to achieve Eurovent Class A for both EER and COP and consequently also high ESEER values.

SLN and A/SLN: super low noise unit and high efficiency super low noise unit

The SLN and A/SLN version units use a soundproofed compressor compartment and oversize coils compared to the standard efficiency unit.

For SLN/HP version units working in heat pump mode, the fans always operate at 100% speed and therefore guarantee the same performance levels as high efficiency versions.

OPTIONS

/HP: reversible heat pump

In addition to the set-up of a chiller only unit, /HP units comprise (for each refrigerant circuit):

- 4-way reversing valve
- suction separator
- fluid accumulator
- second electronic expansion valve.

For defrost management, the control of the unit uses a sliding intervention threshold, depending on the pressures inside the unit and the external air temperature. By putting together all this information, the control can identify the presence of ice on the coil and activates the defrosting sequence only when necessary, so as to maximize the energy efficiency of the unit.

Sliding management of the defrost threshold ensures that, as the absolute humidity of outdoor air decreases, the frequency of the defrost cycles gradually decreases because they are carried out only when the ice formed on the coil actually penalizes performance.

The defrost cycle is fully automatic and is carried out using a patented defrost system: during the initial stage, a defrost is carried out by cycle reversal with fans stopped. When the frost on the coil has melted sufficiently, reverse ventilation is activated, that is, with air flow in the opposite direction to that of normal operation, so as to facilitate the ejection of condensation water and detached ice. When the coil is clean, ventilation is reversed again and the unit resumes operation in heat pump mode.

The combination of the sliding intervention threshold and the patented defrost system allows the number and duration of defrost cycles to be optimized and reduced to the minimum.

Summer/winter switching can be done from the control keypad, digital input or BMS (requires write enabling).

/LN: silenced unit

In the unit with /LN option, all the compressors are enclosed in a compartment that is fully soundproofed with sound absorbing material and soundproofing material.

/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.

This option is not available for /HP units

/DS: unit with desuperheater

/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 coil. 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).

The desuperheater can be used during operation in cooling mode. However, it can also be used in heating mode on condition that the following measures are taken:

- a valve (either 2- or 3-way) must be installed on the desuperheater water circuit;
- the valve must be monitored using a temperature control system;
- the valve must be operated to regulate the temperature of the input water into the desuperheater = IWTds.

First, enter the unit heating setpoint, which corresponds to the temperature of water delivered to the heating unit=LWTu_Heating. Then set the condition below:

- $IWTds > LWTu_Heating + 10 [K]$

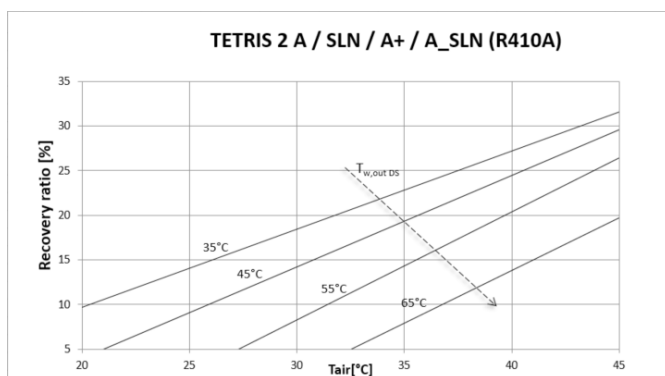
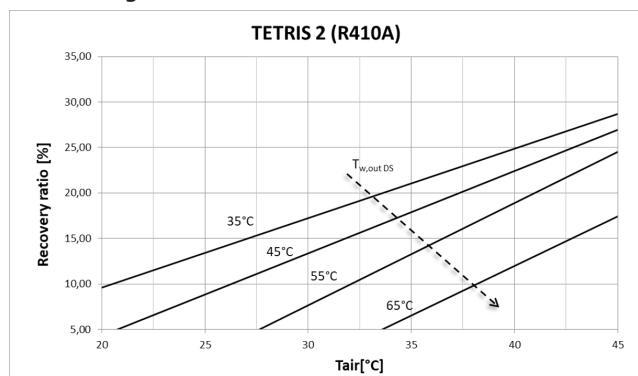
The valve, the control systems and their installation, setup operations, etc. are the responsibility of the client. If heat recovery is not required during operation in heat pump mode, or where the above requirements are not met, the water circuit of the desuperheater must be shut off. Desuperheater operation in heat pump mode reduces the heating capacity transferred from the unit to the user's hydronic circuit. When a desuperheater is fitted, irrespective of it running in either cooling or heating mode, the max. temperature of water delivered to the heating unit (LWTu_Heating) is reduced, as described in the section "Operating limits".

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).

Condensation heat recovery is a function of size, version and operating conditions.

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

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



To maximize the use of the accessory and optimize machine operation, combination with the speed adjuster of the fans or with the EC fans is recommended.

HYDRAULIC MODULES

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

- /1P: hydraulic module with one pump
- /2P: hydraulic module with two pumps
- /3P: hydraulic module with three pumps
- /1PS: hydraulic module with one pump and buffer tank
- /2PS: hydraulic module with two pumps and buffer tank
- /3PS: hydraulic module with three pumps and buffer tank

All the above-mentioned modules have pumps with standard discharge head.

The following are also available:

- modules /1Pr, /2Pr, /1PrS e /2PrS that have pumps with reduced available discharge head
- modules /1PM, /2PM, /3PM, /1PMS, /2PMS and /3PMS that have pumps with increased available discharge head

Hydraulic modules with one pump have:

- one pump
- an expansion vessel

Hydraulic modules with two pumps have:

- two pumps
- a check valve on the delivery side of each pump
- 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 three pumps have:

- three pumps
- a check valve on the delivery side of each pump
- an expansion vessel

The 3 pumps operate in parallel and each one processes a third of the total flow rate. If one of the three pumps fails, the unit will work in forced capacity reduction mode (to avoid low pressure alarms) and the remaining two pumps will in any case be able to guarantee about 78% of the rated flow rate.

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 of configurations that are not possible to check for availability of specific set-ups.

/HAT: unit for high external air temperatures

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

This enables the unit to work with external air temperatures of over 46°C as indicated in the section on operating limits;

operation is guaranteed with external air temperature up to 52°C.

For higher temperatures up to about 55°C, 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.

TECHNICAL SPECIFICATIONS

TETRIS 2

			10.2	12.2	13.2	15.2	16.2	20.3	24.3
TETRIS 2									
Cooling									
Refrigeration capacity	(1)	kW	108,3	117,7	125,6	139	159,2	194,4	228,9
Total absorbed power	(1)	kW	36,1	42,2	48,5	54,3	60,5	75,4	84,8
EER	(1)		3	2,79	2,59	2,56	2,63	2,58	2,7
Eurovent efficiency class	(1)		B	C	D	D	D	D	D
ESEER	(8)		3,91	3,61	3,53	3,52	3,52	3,75	3,9
TETRIS 2 / HP									
Cooling									
Refrigeration capacity	(1)	kW	105,2	114,3	122	134,9	154,6	188,8	222,3
Total absorbed power	(1)	kW	36,2	42,2	48,4	54,4	60,4	75,2	84,9
EER	(1)		2,91	2,71	2,52	2,48	2,56	2,51	2,62
Eurovent efficiency class	(1)		B	C	D	E	D	D	D
ESEER	(8)		3,81	3,51	3,44	3,43	3,43	3,65	3,79
Heating									
Heating capacity	(2)	kW	107,7	118,8	128,7	145,8	162,8	192,8	230,9
Total absorbed power	(2)	kW	37,9	42,9	47,5	51,2	57,7	70,4	85,8
COP	(2)		2,84	2,77	2,71	2,85	2,82	2,74	2,69
Eurovent efficiency class	(2)		C	D	D	C	C	D	D
Compressors									
Compressors/Circuits		n°/n°	2/1	2/1	2/1	2/1	2/1	3/1	3/1
Minimum capacity reduction step	(7)	%	50%	44%	50%	45%	50%	33%	33%
Refrigerant charge CH (MCHX)	(3)	kg	11,5	12	12	13	13	19	19
Refrigerant charge CH (Cu/Al)	(3)	kg	12,5	13	13	14	14	19,5	19,5
Refrigerant charge HP	(3)	kg	18	18	22	23	23	32	32
Fans									
Quantity		n°	2	2	2	2	2	3	3
Total air flow rate CH (MCHX)		m³/h	42000	42000	42000	42000	42000	63000	63000
Total air flow rate HP		m³/h	40000	40000	40000	40000	40000	60000	60000
User-side heat exchanger									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate CH	(1)	m³/h	18,7	20,4	21,7	24	27,5	33,6	39,5
Pressure drop CH	(1)	kPa	46	51	52	50	50	46	46
Water flow rate HP	(1)	m³/h	18,2	19,8	21,1	23,3	26,7	32,6	38,4
Pressure drop HP	(1)	kPa	44	48	49	47	47	43	43
Noise levels									
Sound power level cooling	(4)	dB(A)	89	89	89	89	89	92	92
Sound power level heating	(5)	dB(A)	89	89	89	89	89	92	92
Sound pressure level cooling	(6)	dB(A)	57	57	57	57	57	60	60
Sound power level of vers. LN cooling	(4)	dB(A)	86	86	86	86	86	87	88
Sound power level of vers. LN heating	(5)	dB(A)	86	86	86	86	86	87	88
Sound pressure level of vers. LN cooling	(6)	dB(A)	54	54	54	54	54	55	56
Dimensions and weights**									
Length		mm	1148	1148	1148	1148	1148	2297	2297
Depth		mm	2260	2260	2260	2260	2260	2260	2260
Height		mm	2440	2440	2440	2440	2440	2440	2440
Operating weight		kg	880	900	920	950	970	1430	1480

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) Outside air temperature 7°C and input/output water temperature into/from user-side heat exchanger 40/45°C Values compliant with standard EN 14511

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

TETRIS 2

			27.4	29.4	32.4	33.4	37.4	41.4	43.6
TETRIS 2									
Cooling									
Refrigeration capacity	(1)	kW	261,5	280,5	304,9	333,8	368,4	406,6	425,8
Total absorbed power	(1)	kW	97,6	112,2	121	134,6	135	147,9	163,1
EER	(1)		2,68	2,5	2,52	2,48	2,73	2,75	2,61
Eurovent efficiency class	(1)		D	D	D	E	C	C	D
ESEER	(8)		4	3,68	3,88	3,89	4,02	4,07	4,09
TETRIS 2 / HP									
Cooling									
Refrigeration capacity	(1)	kW	253,9	272,3	296,1	324,4	357,4	394,6	413,5
Total absorbed power	(1)	kW	97,3	112,1	120,9	134,6	134,4	147,8	163,4
EER	(1)		2,61	2,43	2,45	2,41	2,66	2,67	2,53
Eurovent efficiency class	(1)		D	E	E	E	D	D	D
ESEER	(8)		3,9	3,58	3,78	3,8	3,91	3,97	3,97
Heating									
Heating capacity	(2)	kW	256,7	282,2	307,5	341,1	355,6	400,6	423,2
Total absorbed power	(2)	kW	93	99,4	106,8	118,9	127	137,2	149,5
COP	(2)		2,76	2,84	2,88	2,87	2,8	2,92	2,83
Eurovent efficiency class	(2)		D	C	C	C	C	C	C
Compressors									
Compressors/Circuits		n°/n°	4/2	4/2	4/2	4/2	4/2	4/2	6/2
Minimum capacity reduction step	(7)	%	25%	23%	25%	23%	25%	25%	15%
Refrigerant charge CH (MCHX)	(3)	kg	26	27	28	34	37	37	40
Refrigerant charge CH (Cu/Al)	(3)	kg	28	29,5	30,5	37	40	40	42,5
Refrigerant charge HP	(3)	kg	47	48	50	57	62	63	65
Fans									
Quantity		n°	4	4	4	5	6	6	6
Total air flow rate CH (MCHX)		m³/h	84000	84000	84000	105000	126000	126000	126000
Total air flow rate HP		m³/h	80000	80000	80000	100000	120000	120000	120000
User-side heat exchanger									
Quantity		n°	1	1	1	1	1	1	1
Water flow rate CH	(1)	m³/h	45,1	48,4	52,6	57,6	63,6	70,2	73,5
Pressure drop CH	(1)	kPa	42	36	41	35	38	38	42
Water flow rate HP	(1)	m³/h	43,8	47	51,1	56	61,7	68,1	71,4
Pressure drop HP	(1)	kPa	39	34	39	33	36	36	40
Noise levels									
Sound power level cooling	(4)	dB(A)	95	95	96	97	97	97	97
Sound power level heating	(5)	dB(A)	95	95	96	97	97	-	-
Sound pressure level cooling	(6)	dB(A)	63	63	64	65	65	65	65
Sound power level of vers. LN cooling	(4)	dB(A)	89	90	91	92	93	93	93
Sound power level of vers. LN heating	(5)	dB(A)	89	90	91	92	93	-	-
Sound pressure level of vers. LN cooling	(6)	dB(A)	57	58	59	60	61	61	61
Dimensions and weights**									
Length		mm	2297	2297	2297	3834	3834	3834	3834
Depth		mm	2260	2260	2260	2260	2260	2260	2260
Height		mm	2440	2440	2440	2440	2440	2440	2440
Operating weight		kg	1790	1840	1870	2240	2300	2370	2770

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) Outside air temperature 7°C and input/output water temperature into/from user-side heat exchanger 40/45°C Values compliant with standard EN 14511

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

TETRIS 2

			47.6	50.7	53.8	58.8	62.8	67.9
TETRIS 2								
Cooling								
Refrigeration capacity	(1)	kW	456,2	490,6	523,2	566,6	610	650,9
Total absorbed power	(1)	kW	179,6	182,4	194,5	217,9	241,9	254,8
EER	(1)		2,54	2,69	2,69	2,6	2,52	2,55
Eurovent efficiency class	(1)		D	D	D	D	D	D
ESEER	(8)		3,99	3,9	3,98	3,97	3,95	3,99
TETRIS 2 / HP								
Cooling								
Refrigeration capacity	(1)	kW	443	476,4	508,1	550,2	592,3	632
Total absorbed power	(1)	kW	180,1	181,8	194,7	218,3	241,8	254,7
EER	(1)		2,46	2,62	2,61	2,52	2,45	2,48
Eurovent efficiency class	(1)		E	D	D	D	E	E
ESEER	(8)		3,89	3,8	3,88	3,86	3,83	3,87
Heating								
Heating capacity	(2)	kW	461,4	487,5	513,2	564	614,9	653,5
Total absorbed power	(2)	kW	160,8	178,6	185,9	200	213,5	230,9
COP	(2)		2,87	2,73	2,76	2,82	2,88	2,83
Eurovent efficiency class	(2)		C	D	D	C	C	C
Compressors								
Compressors/Circuits		n°/n°	6/2	7/3	8/4	8/4	8/4	9/3
Minimum capacity reduction step	(7)	%	17%	13%	13%	11%	13%	10%
Refrigerant charge CH (MCHX)	(3)	kg	40	45	52	54	56	59
Refrigerant charge CH (Cu/Al)	(3)	kg	42,5	47,5	56	58,5	61	62
Refrigerant charge HP	(3)	kg	65	80	95	97	99	96
Fans								
Quantity		n°	6	7	8	8	8	9
Total air flow rate CH (MCHX)		m³/h	126000	147000	168000	168000	168000	189000
Total air flow rate HP		m³/h	120000	140000	160000	160000	160000	180000
User-side heat exchanger								
Quantity		n°	1	2	2	2	2	2
Water flow rate CH	(1)	m³/h	78,8	84,7	90,3	97,8	105,3	112,3
Pressure drop CH	(1)	kPa	47	46	42	42	40,7	45,9
Water flow rate HP	(1)	m³/h	76,5	82,2	87,7	94,9	102,2	109,1
Pressure drop HP	(1)	kPa	44	43	39	39	38	43
Noise levels								
Sound power level cooling	(4)	dB(A)	97	98	100	100	100	100
Sound power level heating	(5)	dB(A)	-	-	-	-	-	-
Sound pressure level cooling	(6)	dB(A)	65	66	68	68	68	67
Sound power level of vers. LN cooling	(4)	dB(A)	93	94	95	95	95	96
Sound power level of vers. LN heating	(5)	dB(A)	-	-	-	-	-	-
Sound pressure level of vers. LN cooling	(6)	dB(A)	61	62	63	63	63	63
Dimensions and weights**								
Length		mm	3834	5019	5019	5019	5019	6168
Depth		mm	2260	2260	2260	2260	2260	2260
Height		mm	2440	2440	2440	2440	2440	2440
Operating weight		kg	2830	3340	3570	3650	3730	4170

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) Outside air temperature 7°C and input/output water temperature into/from user-side heat exchanger 40/45°C Values compliant with standard EN 14511

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

TETRIS 2

			70.9	74.10	78.10	80.12	87.12	93.12
TETRIS 2								
Cooling								
Refrigeration capacity	(1)	kW	685,4	717,8	761,2	792,9	852,9	912,6
Total absorbed power	(1)	kW	264,4	277,1	300,8	301,9	330,5	359,3
EER	(1)		2,59	2,59	2,53	2,63	2,58	2,54
Eurovent efficiency class	(1)		D	D	D	D	D	D
ESEER	(8)		4,15	4,15	4,05	4,18	4,15	4,13
TETRIS 2 / HP								
Cooling								
Refrigeration capacity	(1)	kW	665,6	697	739,1	769,9	828,1	886,2
Total absorbed power	(1)	kW	264,2	276,9	300,6	301,7	330,3	359,1
EER	(1)		2,52	2,52	2,46	2,55	2,51	2,47
Eurovent efficiency class	(1)		D	D	E	D	D	E
ESEER	(8)		4,03	4,03	3,93	4,06	4,03	4,01
Heating								
Heating capacity	(2)	kW	691,6	717,9	768,8	769,8	845,9	922,4
Total absorbed power	(2)	kW	246,1	253,5	267,5	278,2	299,7	321,2
COP	(2)		2,81	2,83	2,87	2,77	2,82	2,87
Eurovent efficiency class	(2)		C	C	C	D	C	C
Compressors								
Compressors/Circuits		n°/n°	9/3	10/4	10/4	12/4	12/4	12/4
Minimum capacity reduction step	(7)	%	11%	9%	10%	8%	8%	8%
Refrigerant charge CH (MCHX)	(3)	kg	59	66	68	78	78	80
Refrigerant charge CH (Cu/Al)	(3)	kg	62	70,5	73	85	85	85
Refrigerant charge HP	(3)	kg	97	112	114	126	126	129
Fans								
Quantity		n°	9	10	10	12	12	12
Total air flow rate CH (MCHX)		m³/h	189000	210000	210000	252000	252000	252000
Total air flow rate HP		m³/h	180000	200000	200000	240000	240000	240000
User-side heat exchanger								
Quantity		n°	2	2	2	2	2	2
Water flow rate CH	(1)	m³/h	118,3	123,9	131,4	136,8	147,2	157,5
Pressure drop CH	(1)	kPa	45,5	47,1	47,1	43,9	43,9	47,1
Water flow rate HP	(1)	m³/h	114,9	120,3	127,5	132,8	142,9	152,9
Pressure drop HP	(1)	kPa	43	44	44	41	41	44
Noise levels								
Sound power level cooling	(4)	dB(A)	100	101	101	102	102	102
Sound power level heating	(5)	dB(A)	-	-	-	-	-	-
Sound pressure level cooling	(6)	dB(A)	67	68	68	69	69	69
Sound power level of vers. LN cooling	(4)	dB(A)	96	97	98	99	99	99
Sound power level of vers. LN heating	(5)	dB(A)	-	-	-	-	-	-
Sound pressure level of vers. LN cooling	(6)	dB(A)	63	64	65	66	66	66
Dimensions and weights**								
Length		mm	6168	6168	6168	7316	7316	7316
Depth		mm	2260	2260	2260	2260	2260	2260
Height		mm	2440	2440	2440	2440	2440	2440
Operating weight		kg	4230	4480	4550	5060	5200	5350

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) Outside air temperature 7°C and input/output water temperature into/from user-side heat exchanger 40/45°C Values compliant with standard EN 14511

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

TETRIS 2 A

			11.2	17.2	23.2	28.4	34.4	38.4
TETRIS 2 A								
Cooling								
Refrigeration capacity	(1)	kW	111,6	160,8	229	273	322,5	361,2
Total absorbed power	(1)	kW	35,8	50,9	73,4	86,4	101,7	116,1
EER	(1)		3,12	3,16	3,12	3,16	3,17	3,11
Eurovent efficiency class	(1)		A	A	A	A	A	A
ESEER	(8)		4,01	4,05	3,96	4,23	4,2	4,22
TETRIS 2 A /HP								
Cooling								
Refrigeration capacity	(1)	kW	110,8	159,3	227,3	268,7	319	359,3
Total absorbed power	(1)	kW	35,7	50,7	73,3	86,1	101,3	115,9
EER	(1)		3,1	3,14	3,1	3,12	3,15	3,1
Eurovent efficiency class	(1)		A	A	A	A	A	A
ESEER	(8)		3,99	4,01	3,93	4,17	4,16	4,2
Heating								
Heating capacity	(2)	kW	134,8	179,9	247,8	302	356,3	383,5
Total absorbed power	(2)	kW	40,3	56	77	92,1	109,6	118,7
COP	(2)		3,35	3,21	3,22	3,28	3,25	3,23
Eurovent efficiency class	(2)		A	A	A	A	A	A
Compressors								
Compressors/Circuits		n°/n°	2/1	2/1	2/1	4/2	4/2	4/2
Minimum capacity reduction step	(7)	%	50%	45%	50%	21%	23%	25%
Refrigerant charge CH (MCHX)	(3)	kg	12	17,5	23	29,5	34	34
Refrigerant charge CH (Cu/Al)	(3)	kg	13	19	24	30,5	37	37
Refrigerant charge HP	(3)	kg	21	32	43	53	64	64
Fans								
Quantity		n°	2	3	4	5	6	6
Total air flow rate CH (MCHX)		m³/h	42000	63000	84000	105000	126000	126000
Total air flow rate HP		m³/h	40000	60000	80000	100000	120000	120000
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate CH	(1)	m³/h	19,3	27,8	39,5	47,1	55,6	62,4
Pressure drop CH	(1)	kPa	47	42	29	32	37	43
Water flow rate HP	(1)	m³/h	19,2	27,5	39,2	46,4	55	62
Pressure drop HP	(1)	kPa	46	41	28	30	35	40
Noise levels								
Sound power level cooling	(4)	dB(A)	86	88	89	90	91	91
Sound power level heating	(5)	dB(A)	86	88	89	90	91	91
Sound pressure level cooling	(6)	dB(A)	54	56	57	58	59	59
Sound power level of vers. LN cooling	(4)	dB(A)	82	84	85	86	87	87
Sound power level of vers. LN heating	(5)	dB(A)	82	84	85	86	87	87
Sound pressure level of vers. LN cooling	(6)	dB(A)	50	52	53	54	55	55
Dimensions and weights**								
Length		mm	1148	2297	2297	3834	3834	3834
Depth		mm	2260	2260	2260	2260	2260	2260
Height		mm	2440	2440	2440	2440	2440	2440
Operating weight		kg	890	1290	1360	2160	2290	2320

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) Outside air temperature 7°C and input/output water temperature into/from user-side heat exchanger 40/45°C Values compliant with standard EN 14511

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

TETRIS 2 A

			43.4	47.4	50.6	57.6	64.6	70.6
TETRIS 2 A								
Cooling								
Refrigeration capacity	(1)	kW	418,2	455	483,9	541,5	619,5	683,4
Total absorbed power	(1)	kW	134,5	146,3	152,2	170,8	198,4	219
EER	(1)		3,11	3,11	3,18	3,17	3,12	3,12
Eurovent efficiency class	(1)		A	A	A	A	A	A
ESEER	(8)		4,18	4,25	4,31	4,3	4,28	4,34
TETRIS 2 A /HP								
Cooling								
Refrigeration capacity	(1)	kW	416,1	453	479	536,7	615,5	679,1
Total absorbed power	(1)	kW	134,2	146,1	151,6	170,4	198,2	218,7
EER	(1)		3,1	3,1	3,16	3,15	3,1	3,1
Eurovent efficiency class	(1)		A	A	A	A	A	A
ESEER	(8)		4,15	4,23	4,27	4,27	4,26	4,32
Heating								
Heating capacity	(2)	kW	457,7	487,1	537,3	603,7	687	756,4
Total absorbed power	(2)	kW	140,8	150,3	164,3	185,2	212	232,4
COP	(2)		3,25	3,24	3,27	3,26	3,24	3,25
Eurovent efficiency class	(2)		A	A	A	A	A	A
Compressors								
Compressors/Circuits		n°/n°	4/2	4/2	6/2	6/2	6/2	6/2
Minimum capacity reduction step	(7)	%	21%	25%	15%	17%	14%	17%
Refrigerant charge CH (MCHX)	(3)	kg	44	48	59	59	71	75
Refrigerant charge CH (Cu/Al)	(3)	kg	47,5	51,5	63,5	63,5	73,5	81
Refrigerant charge HP	(3)	kg	77	86	95	106	116	120
Fans								
Quantity		n°	7	8	9	10	11	12
Total air flow rate CH (MCHX)		m³/h	147000	168000	189000	210000	231000	252000
Total air flow rate HP		m³/h	140000	160000	180000	200000	220000	240000
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate CH	(1)	m³/h	72,2	78,4	83,4	93,4	106,8	117,9
Pressure drop CH	(1)	kPa	42	25	24	30	31	36
Water flow rate HP	(1)	m³/h	71,8	78,1	82,6	92,5	106,1	117,1
Pressure drop HP	(1)	kPa	39	24	23	28	29	35
Noise levels								
Sound power level cooling	(4)	dB(A)	91	92	93	93	93	93
Sound power level heating	(5)	dB(A)	91	-	-	-	-	-
Sound pressure level cooling	(6)	dB(A)	58	59	61	60	61	61
Sound power level of vers. LN cooling	(4)	dB(A)	87	88	89	89	89	89
Sound power level of vers. LN heating	(5)	dB(A)	87	-	-	-	-	-
Sound pressure level of vers. LN cooling	(6)	dB(A)	54	55	57	57	57	57
Dimensions and weights**								
Length		mm	5019	5019	6168	6168	7316	7316
Depth		mm	2260	2260	2260	2260	2260	2260
Height		mm	2440	2440	2440	2440	2440	2440
Operating weight		kg	2650	2770	3500	3580	3850	3940

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) Outside air temperature 7°C and input/output water temperature into/from user-side heat exchanger 40/45°C Values compliant with standard EN 14511

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

Tetris 2 SLN

			11.2	17.2	23.2	28.4	34.4	38.4
TETRIS 2 SLN								
Cooling								
Refrigeration capacity	(1)	kW	105,1	151,7	214,7	256,1	304	339,3
Total absorbed power	(1)	kW	37,3	52,9	76,7	89,9	105,5	121,2
EER	(1)		2,82	2,87	2,8	2,85	2,88	2,8
Eurovent efficiency class	(1)		C	C	C	C	C	C
ESEER	(8)		3,62	3,67	3,54	3,81	3,8	3,79
TETRIS 2 SLN /HP								
Cooling								
Refrigeration capacity	(1)	kW	104,4	150,2	213,2	252,1	300,7	337,4
Total absorbed power	(1)	kW	37,7	53,5	77,5	90,7	106,6	122,7
EER	(1)		2,77	2,81	2,75	2,78	2,82	2,75
Eurovent efficiency class	(1)		C	C	C	C	C	C
ESEER	(8)		3,56	3,6	3,48	3,71	3,72	3,72
Heating								
Heating capacity	(2)	kW	134,8	179,9	247,8	302	356,3	383,5
Total absorbed power	(2)	kW	40,3	56	77	92,1	109,6	118,7
COP	(2)		3,35	3,21	3,22	3,28	3,25	3,23
Eurovent efficiency class	(2)		A	A	A	A	A	A
Compressors								
Compressors/Circuits		n°/n°	2/1	2/1	2/1	4/2	4/2	4/2
Minimum capacity reduction step	(7)	%	50%	45%	50%	21%	23%	25%
Refrigerant charge CH (MCHX)	(3)	kg	12	17,5	23	29,5	34	34
Refrigerant charge CH (Cu/Al)	(3)	kg	13	19	24	30,5	37	37
Refrigerant charge HP	(3)	kg	21	32	43	53	64	64
Fans								
Quantity		n°	2	3	4	5	6	6
Total air flow rate CH (MCHX)		m³/h	32000	48000	64000	80000	96000	96000
Total air flow rate HP		m³/h	40000	60000	80000	100000	120000	120000
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate CH	(1)	m³/h	18,2	26,2	37	44,2	52,5	58,6
Pressure drop CH	(1)	kPa	45	40	28	30	35	41
Water flow rate HP	(1)	m³/h	18	26	36,8	43,5	51,9	58,2
Pressure drop HP	(1)	kPa	44	39	26	28	33	38
Noise levels								
Sound power level cooling	(4)	dB(A)	79	82	82	84	85	85
Sound power level heating	(5)	dB(A)	82	84	85	86	87	87
Sound pressure level cooling	(6)	dB(A)	47	50	50	52	53	53
Dimensions and weights**								
Length		mm	1148	2297	2297	3834	3834	3834
Depth		mm	2260	2260	2260	2260	2260	2260
Height		mm	2440	2440	2440	2440	2440	2440
Operating weight		kg	890	1290	1360	2160	2290	2320

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) Outside air temperature 7°C and input/output water temperature into/from user-side heat exchanger 40/45°C Values compliant with standard EN 14511

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

Tetris 2 SLN

			43.4	47.4	50.6	57.6	64.6	70.6
TETRIS 2 SLN								
Cooling								
Refrigeration capacity	(1)	kW	392	426,4	455,8	510	581,9	641,8
Total absorbed power	(1)	kW	141	152,8	158,3	177,7	207,8	228,8
EER	(1)		2,78	2,79	2,88	2,87	2,8	2,81
Eurovent efficiency class	(1)		C	C	C	C	C	C
ESEER	(8)		3,73	3,8	3,9	3,89	3,84	3,9
TETRIS 2 SLN /HP								
Cooling								
Refrigeration capacity	(1)	kW	390	424,5	451,2	505,5	578,2	637,8
Total absorbed power	(1)	kW	142,9	154,9	160	179,9	210,2	231,6
EER	(1)		2,73	2,74	2,82	2,81	2,75	2,75
Eurovent efficiency class	(1)		C	C	C	C	C	C
ESEER	(8)		3,66	3,74	3,82	3,81	3,76	3,82
Heating								
Heating capacity	(2)	kW	457,7	487,1	537,3	603,7	687	756,4
Total absorbed power	(2)	kW	140,8	150,3	164,3	185,2	212	232,4
COP	(2)		3,25	3,24	3,27	3,26	3,24	3,25
Eurovent efficiency class	(2)		A	A	A	A	A	A
Compressors								
Compressors/Circuits		n°/n°	4/2	4/2	6/2	6/2	6/2	6/2
Minimum capacity reduction step	(7)	%	21%	25%	15%	17%	14%	17%
Refrigerant charge CH (MCHX)	(3)	kg	44	48	59	59	71	75
Refrigerant charge CH (Cu/Al)	(3)	kg	47,5	51,5	63,5	63,5	73,5	81
Refrigerant charge HP	(3)	kg	77	86	95	106	116	120
Fans								
Quantity		n°	7	8	9	10	11	12
Total air flow rate CH (MCHX)		m³/h	112000	128000	144000	160000	176000	192000
Total air flow rate HP		m³/h	140000	160000	180000	200000	220000	240000
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate CH	(1)	m³/h	67,6	73,5	78,6	87,9	100,3	110,7
Pressure drop CH	(1)	kPa	39	23	23	28	29	34
Water flow rate HP	(1)	m³/h	67,3	73,2	77,8	87,1	99,7	110
Pressure drop HP	(1)	kPa	37	22	22	26	28	33
Noise levels								
Sound power level cooling	(4)	dB(A)	85	85	87	87	87	87
Sound power level heating	(5)	dB(A)	87	-	-	-	-	-
Sound pressure level cooling	(6)	dB(A)	52	53	55	55	54	55
Dimensions and weights**								
Length		mm	5019	5019	6168	6168	7316	7316
Depth		mm	2260	2260	2260	2260	2260	2260
Height		mm	2440	2440	2440	2440	2440	2440
Operating weight		kg	2650	2770	3500	3580	3850	3940

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) Outside air temperature 7°C and input/output water temperature into/from user-side heat exchanger 40/45°C Values compliant with standard EN 14511

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

Tetris 2 A+

			8.2	13.3	18.4	23.5	27.6	31.4
TETRIS 2 A+								
Cooling								
Refrigeration capacity	(1)	kW	88,5	132,9	180,3	225,3	270,4	310,4
Total absorbed power	(1)	kW	26,9	40,4	53,7	67,2	80,7	93,2
EER	(1)		3,29	3,29	3,36	3,35	3,35	3,33
Eurovent efficiency class	(1)		A	A	A	A	A	A
ESEER	(8)		4,13	4,26	4,33	4,29	4,26	4,28
TETRIS 2 A+ /HP								
Cooling								
Refrigeration capacity	(1)	kW	85,8	128,8	174,9	218,5	262,1	306,8
Total absorbed power	(1)	kW	26,7	40	53,2	66,6	80,1	96,5
EER	(1)		3,21	3,22	3,29	3,28	3,27	3,18
Eurovent efficiency class	(1)		A	A	A	A	A	A
ESEER	(8)		4,03	4,16	4,23	4,19	4,16	4,08
Heating								
Heating capacity	(2)	kW	90,2	135,2	180,0	225,2	270,1	322,7
Total absorbed power	(2)	kW	27,1	40,5	53,7	67,4	80,9	99,6
COP	(2)		3,33	3,34	3,35	3,34	3,34	3,24
Eurovent efficiency class	(2)		A	A	A	A	A	A
Compressors								
Compressors/Circuits		n°/n°	2/1	3/1	4/2	5/2	6/2	4/2
Minimum capacity reduction step	(7)	%	50%	33%	25%	20%	17%	24%
Refrigerant charge CH (MCHX)	(3)	kg	11	16	23	28,5	33	38,5
Refrigerant charge CH (Cu/Al)	(3)	kg	11,5	16,5	25	31	35,5	41,5
Refrigerant charge HP	(3)	kg	21	32	44	53	65	75
Fans								
Quantity		n°	2	3	4	5	6	7
Total air flow rate CH (MCHX)		m³/h	42.000	63000	84000	105000	126000	147000
Total air flow rate HP		m³/h	40.000	60000	80000	100000	120000	140000
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate CH	(1)	m³/h	15,3	23	31,1	38,9	46,7	53,6
Pressure drop CH	(1)	kPa	35	36	23	35	35	34
Water flow rate HP	(1)	m³/h	14,8	22,2	30,2	37,7	45,2	52,9
Pressure drop HP	(1)	kPa	33	34	22	33	33	33
Noise levels								
Sound power level cooling	(4)	dB(A)	83	85	86	87	88	93
Sound power level heating	(5)	dB(A)	83	85	86	87	88	93
Sound pressure level cooling	(6)	dB(A)	51	53	54	55	56	61
Sound power level of vers. LN cooling	(4)	dB(A)	79	81	82	83	84	89
Sound power level of vers. LN heating	(5)	dB(A)	79	81	82	83	84	89
Sound pressure level of vers. LN cooling	(6)	dB(A)	47	49	50	51	52	57
Dimensions and weights**								
Length		mm	1.148	2297	2297	3834	3834	5019
Depth		mm	2.260	2260	2260	2260	2260	2260
Height		mm	2.440	2440	2440	2440	2440	2440
Operating weight		kg	720	1100	1380	1830	1970	2560

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

Tetris 2 A+

			36.4	41.5	44.6	49.6	54.6
TETRIS 2 A+							
Cooling							
Refrigeration capacity	(1)	kW	372	404	435,4	497,1	558,8
Total absorbed power	(1)	kW	111,7	120,6	130	148,8	167,3
EER	(1)		3,33	3,35	3,35	3,34	3,34
Eurovent efficiency class	(1)		A	A	A	A	A
ESEER	(8)		4,3	4,25	4,2	4,3	4,28
TETRIS 2 A+ /HP							
Cooling							
Refrigeration capacity	(1)	kW	360,6	398,4	432,1	489,5	541,3
Total absorbed power	(1)	kW	110,6	124,9	135	153,4	166
EER	(1)		3,26	3,19	3,2	3,19	3,26
Eurovent efficiency class	(1)		A	A	A	A	A
ESEER	(8)		4,2	4,05	4,01	4,09	4,17
Heating							
Heating capacity	(2)	kW	373,3	418,6	453,5	514,6	559,8
Total absorbed power	(2)	kW	112,1	128,8	140,4	157,8	168,1
COP	(2)		3,33	3,25	3,23	3,26	3,33
Eurovent efficiency class	(2)		A	A	A	A	A
Compressors							
Compressors/Circuits		n°/n°	4/2	5/2	6/2	6/2	6/2
Minimum capacity reduction step	(7)	%	25%	19%	17%	15%	17%
Refrigerant charge CH (MCHX)	(3)	kg	42	46	53	62	67
Refrigerant charge CH (Cu/Al)	(3)	kg	45,5	49,5	57,5	67	72,5
Refrigerant charge HP	(3)	kg	86	98	108	119	131
Fans							
Quantity		n°	8	9	10	11	12
Total air flow rate CH (MCHX)		m³/h	168000	189000	210000	231000	252000
Total air flow rate HP		m³/h	160000	180000	200000	220000	240000
User-side heat exchanger							
Quantity		n°	1	1	1	1	1
Water flow rate CH	(1)	m³/h	64,2	69,7	75,1	85,8	96,4
Pressure drop CH	(1)	kPa	32	33	34	35	34
Water flow rate HP	(1)	m³/h	62,2	68,7	74,5	84,4	93,3
Pressure drop HP	(1)	kPa	30	32	34	34	32
Noise levels							
Sound power level cooling	(4)	dB(A)	93	94	95	95	95
Sound power level heating	(5)	dB(A)	93	94	-	-	-
Sound pressure level cooling	(6)	dB(A)	61	62	63	63	63
Sound power level of vers. LN cooling	(4)	dB(A)	89	90	91	91	91
Sound power level of vers. LN heating	(5)	dB(A)	89	90	-	-	-
Sound pressure level of vers. LN cooling	(6)	dB(A)	57	58	59	59	59
Dimensions and weights**							
Length		mm	5019	6168	6168	7316	7316
Depth		mm	2260	2260	2260	2260	2260
Height		mm	2440	2440	2440	2440	2440
Operating weight		kg	2680	3140	3330	3710	3820

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

Tetris 2 A SLN

			8.2	13.3	18.4	23.5	27.6	31.4
TETRIS 2 A SLN								
Cooling								
Refrigeration capacity	(1)	kW	86,4	129,6	175,8	219,7	263,7	303
Total absorbed power	(1)	kW	26,9	40,3	53,6	67,2	80,6	92,9
EER	(1)		3,21	3,22	3,28	3,27	3,27	3,26
Eurovent efficiency class	(1)		A	A	A	A	A	A
ESEER	(8)		3,97	4,09	4,16	4,12	4,09	4,12
TETRIS 2 A SLN /HP								
Cooling								
Refrigeration capacity	(1)	kW	83,8	125,8	170,5	212,9	255,6	298,9
Total absorbed power	(1)	kW	27,6	41,2	55	68,9	82,7	100,3
EER	(1)		3,04	3,05	3,1	3,09	3,09	2,98
Eurovent efficiency class	(1)		B	B	A	B	B	B
ESEER	(8)		3,87	3,99	4,04	4	3,98	3,86
Heating								
Heating capacity	(2)	kW	90,2	135,2	180	225,2	270,1	322,7
Total absorbed power	(2)	kW	27,1	40,5	53,7	67,4	80,9	99,6
COP	(2)		3,33	3,34	3,35	3,34	3,34	3,24
Eurovent efficiency class	(2)		A	A	A	A	A	A
Compressors								
Compressors/Circuits		n°/n°	2/1	3/1	4/2	5/2	6/2	4/2
Minimum capacity reduction step	(7)	%	50%	33%	25%	20%	17%	24%
Refrigerant charge CH (MCHX)	(3)	kg	11	16	23	28,5	33	38,5
Refrigerant charge CH (Cu/Al)	(3)	kg	11,5	16,5	25	31	35,5	41,5
Refrigerant charge HP	(3)	kg	21	32	44	53	65	75
Fans								
Quantity		n°	2	3	4	5	6	7
Total air flow rate CH (MCHX)		m³/h	32000	48000	64000	80000	96000	112000
Total air flow rate HP		m³/h	40000	60000	80000	100000	120000	140000
User-side heat exchanger								
Quantity		n°	1	1	1	1	1	1
Water flow rate CH	(1)	m³/h	14,9	22,4	30,3	37,9	45,5	52,3
Pressure drop CH	(1)	kPa	33	34	22	33	33	32
Water flow rate HP	(1)	m³/h	14,5	21,7	29,4	36,7	44,1	51,6
Pressure drop HP	(1)	kPa	31	32	21	31	31	31
Noise levels								
Sound power level cooling	(4)	dB(A)	76	78	79	80	81	86
Sound power level heating	(5)	dB(A)	79	81	82	83	84	89
Sound pressure level cooling	(6)	dB(A)	44	46	47	48	49	54
Dimensions and weights**								
Length		mm	1148	2297	2297	3834	3834	5019
Depth		mm	2260	2260	2260	2260	2260	2260
Height		mm	2440	2440	2440	2440	2440	2440
Operating weight		kg	720	1100	1380	1830	1970	2560

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) Outside air temperature 7°C and input/output water temperature into/from user-side heat exchanger 40/45°C Values compliant with standard EN 14511

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

Tetris 2 A SLN

			36.4	41.5	44.6	49.6	54.6
TETRIS 2 A SLN							
Cooling							
Refrigeration capacity	(1)	kW	362,7	393,8	424,8	484,4	544,1
Total absorbed power	(1)	kW	111,9	120,8	129,9	149,1	167,9
EER	(1)		3,24	3,26	3,27	3,25	3,24
Eurovent efficiency class	(1)		A	A	A	A	A
ESEER	(8)		4,12	4,07	4,05	4,13	4,1
TETRIS 2 A SLN /HP							
Cooling							
Refrigeration capacity	(1)	kW	351,3	388	421,2	476,7	527
Total absorbed power	(1)	kW	114,4	129,8	140,4	160	171,7
EER	(1)		3,07	2,99	3	2,98	3,07
Eurovent efficiency class	(1)		B	B	B	B	B
ESEER	(8)		4	3,83	3,98	4,06	4,15
Heating							
Heating capacity	(2)	kW	373,3	418,6	453,5	514,6	559,8
Total absorbed power	(2)	kW	112,1	128,8	140,4	157,8	168,1
COP	(2)		3,33	3,25	3,23	3,26	3,33
Eurovent efficiency class	(2)		A	A	A	A	A
Compressors							
Compressors/Circuits		n°/n°	4/2	5/2	6/2	6/2	6/2
Minimum capacity reduction step	(7)	%	25%	19%	17%	15%	17%
Refrigerant charge CH (MCHX)	(3)	kg	42	46	53	62	67
Refrigerant charge CH (Cu/Al)	(3)	kg	45,5	49,5	57,5	67	72,5
Refrigerant charge HP	(3)	kg	86	98	108	119	131
Fans							
Quantity		n°	8	9	10	11	12
Total air flow rate CH (MCHX)		m³/h	128000	144000	160000	176000	192000
Total air flow rate HP		m³/h	160000	180000	200000	220000	240000
User-side heat exchanger							
Quantity		n°	1	1	1	1	1
Water flow rate CH	(1)	m³/h	62,6	67,9	73,3	83,6	93,8
Pressure drop CH	(1)	kPa	31	31	32	33	32
Water flow rate HP	(1)	m³/h	60,6	66,9	72,6	82,2	90,9
Pressure drop HP	(1)	kPa	29	30	32	32	30
Noise levels							
Sound power level cooling	(4)	dB(A)	86	87	88	88	88
Sound power level heating	(5)	dB(A)	89	90	-	-	-
Sound pressure level cooling	(6)	dB(A)	54	55	56	56	56
Dimensions and weights**							
Length		mm	5019	6168	6168	7316	7316
Depth		mm	2260	2260	2260	2260	2260
Height		mm	2440	2440	2440	2440	2440
Operating weight		kg	2680	3140	3330	3710	3820

CH: chiller unit; HP: heat pump unit; MCHX: unit with microchannel coils; CuAl: unit with copper/aluminium tube/fin coils

(1) External air temperature 35°C, user-side heat exchanger water inlet/outlet temperature 12/7°C. Values in accordance with EN 14511.

(2) Outside air temperature 7°C and input/output water temperature into/from user-side heat exchanger 40/45°C Values compliant with standard EN 14511

(3) Theoretical values referred to the basic unit. The amount of gas actually charged in the unit may differ.

(4) 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.

(5) unit operating at nominal operating capacity, with no accessories of any kind, with external air temperature of 7°C (6°C WB) and user-side heat exchanger water inlet/outlet temperature of 40/45°C. Values obtained from measurements carried out in accordance with standard ISO 3744.

(6) Values obtained from the sound power level (conditions: note 4), 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.

(7) 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.

(8) Former Eurovent's seasonal efficiency index. Value not certified by Eurovent from 2019. Reference: base unit, without any accessories

** Basic unit without included accessories

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

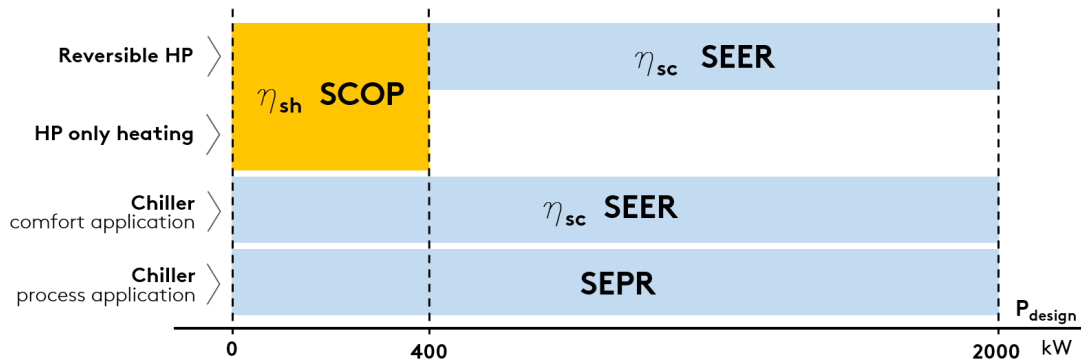
The other two regulations (2013/813 and 2016/2281) set seasonal efficiency targets that the products must comply with to be sold and installed in the European Union (essential requirement for CE marking).

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

- η_{sh} (SCOP), with reference to regulation 2013/813
- η_{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 η_{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	P _{design}	η_{sc} [%]	SEER	η_{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	P _{design}	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

REGULATION 2013/813

SOURCE	APPLICATION	MINIMUM REQUIREMENT	
		η_{sh} [%]	SCOP
air	low temperature application	125	3,2
water	low temperature application	125	3,325
air	medium temperature application	110	2,825
water	medium temperature application	110	2,95

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
Chiller	< 18°C	SEER/η _{sc} low temperature application	2016/2281
	≥ 18°C	SEER/η _{sc} medium temperature application	2016/2281
Heat pumps (reversible and only heating) P_{design} ≤ 400kW		SCOP/η _{sh}	2013/813
Reversible heat pumps P_{design} > 400kW	< 18°C	SEER/η _{sc} low temperature application	2016/2281
	≥ 18°C	SEER/η _{sc} medium temperature application	2016/2281
Heat pumps only heating P_{design} > 400kW		-	-

- = exemption from Ecodesign

PROCESS APPLICATION

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

- = exemption from Ecodesign

Some specifications and notes follow.

Partly completed machinery

The term partly completed machinery refers to all units without a user-side or source-side heat exchanger, and therefore to all LC, LE, LC/HP and LE/HP versions. Since these are "non-complete" machines, conformity with Ecodesign depends on combination with the remote heat exchanger.

All the partly completed machinery is CE marked and accompanied by a declaration of conformity. Installation in European Union countries is therefore allowed; correct selection and installation of the remote heat exchanger must be ensured, in accordance with the above cases.

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_{sc}) than the configuration with standard fans.

TETRIS 2 RANGE

As specifically regards the Tetris 2 range, the regulations of interest for the various units in various configurations are indicated below.

Tetris 2:

- chiller version: regulation 2016/2281
- /HP version: up to size 37.4 regulation 2013/813, from size 41.4 regulation 2016/2281

Tetris 2 A and Tetris 2 SLN:

- chiller version: regulation 2016/2281
- /HP version: up to size 43.4 regulation 2013/813, from size 47.4 regulation 2016/2281

Tetris 2 A+ and Tetris 2 A SLN

- chiller version: regulation 2016/2281
- /HP version: up to size 41.5 regulation 2013/813, from size 44.6 regulation 2016/2281

The tables below give information on the conformity of the units and the seasonal energy performance ratios with regard to the reference regulation.

TETRIS 2

			10.2	12.2	13.2	15.2	16.2	20.3	24.3
REGULATION 2016/2281									
Pdesign	(1)	kW	108	118	126	139	159	194	229
COMFORT									
Standard units									
ηsc	(1)	%	149,8	150,4	149,0	149,9	142,0	155,4	152,3
SEER	(1)		3,82	3,83	3,8	3,82	3,62	3,96	3,88
Compliance Tier 1	(1)		Y	Y	Y	Y	N	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
ηsc (23/18)	(2)	%	-	-	-	-	167	-	-
SEER (23/18)	(2)		-	-	-	-	4,25	-	-
Compliance Tier 1	(2)		-	-	-	-	Y	-	-
Compliance Tier 2 (2021)	(2)		-	-	-	-	Y	-	-
Units with EC fans (VEC)									
ηsc	(1)	%	152,6	155,8	150,6	154,2	149	160,6	157
SEER	(1)		3,89	3,97	3,84	3,93	3,8	4,09	4
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
PROCESS									
SEPR	(3)		5,21	4,99	4,99	4,86	5,18	4,87	5,19
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	N	N	N	Y	N	Y
			27.4	29.4	32.4	33.4	37.4	41.4	43.6
REGULATION 2016/2281									
Pdesign	(1)	kW	262	281	305	334	368	407	426
COMFORT									
Standard units									
ηsc	(1)	%	153,8	150,4	149,4	154,3	156,2	161,1	161,0
SEER	(1)		3,92	3,83	3,81	3,93	3,98	4,1	4,1
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
ηsc (23/18)	(2)	%	-	-	-	-	-	-	-
SEER (23/18)	(2)		-	-	-	-	-	-	-
Compliance Tier 1	(2)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(2)		-	-	-	-	-	-	-
Units with EC fans (VEC)									
ηsc	(1)	%	157,4	152,2	150,6	158,2	160,6	162,6	164,3
SEER	(1)		4,01	3,88	3,84	4,03	4,09	4,14	4,18
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
PROCESS									
SEPR	(3)		4,93	4,66	4,86	4,98	5,3	5,42	5
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		N	N	N	N	Y	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.

- = value not necessary: conformity is already provided at the most restrictive condition (1).

(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 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.

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

TETRIS 2

			47.6	50.7	53.8	58.8	62.8	67.9	70.9
REGULATION 2016/2281									
Pdesign	(1)	kW	456	491	523	567	610	651	685
COMFORT									
Standard units									
ηsc	(1)	%	161,1	161,1	161,1	152,9	153,4	161,2	161,0
SEER	(1)		4,1	4,1	4,1	3,9	3,91	4,1	4,1
Compliance Tier 1	(1)		Y	Y	Y	N	N	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
ηsc (23/18)	(2)	%	-	-	-	175	174,9	-	-
SEER (23/18)	(2)		-	-	-	4,45	4,45	-	-
Compliance Tier 1	(2)		-	-	-	Y	Y	-	-
Compliance Tier 2 (2021)	(2)		-	-	-	N	N	-	-
Units with EC fans (VEC)									
ηsc	(1)	%	162,2	162,1	162,2	161,2	161	163,8	163,7
SEER	(1)		4,13	4,13	4,13	4,1	4,1	4,17	4,17
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
PROCESS									
SEPR	(3)		5	5,03	5	5,15	5	5,02	5,06
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		N	N	N	N	N	N	N
			70.9	74.10	78.10	80.12	87.12	93.12	
REGULATION 2016/2281									
Pdesign	(1)	kW	685	718	761	793	853	913	
COMFORT									
Standard units									
ηsc	(1)	%	161,0	161	161,1	161,1	161,1	161,1	161
SEER	(1)		4,1	4,1	4,1	4,1	4,1	4,1	4,1
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
ηsc (23/18)	(2)	%	-	-	-	-	-	-	-
SEER (23/18)	(2)		-	-	-	-	-	-	-
Compliance Tier 1	(2)		-	-	-	-	-	-	-
Compliance Tier 2 (2021)	(2)		-	-	-	-	-	-	-
Units with EC fans (VEC)									
ηsc	(1)	%	163,7	163,8	162,2	167,9	166,1	164,4	
SEER	(1)		4,17	4,17	4,13	4,27	4,23	4,19	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	
PROCESS									
SEPR	(3)		5,06	5	5	5	5,02	5	
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(3)		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.

- = value not necessary: conformity is already provided at the most restrictive condition (1).

(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 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.

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

TETRIS 2 /HP

			10.2	12.2	13.2	15.2	16.2	20.3
REGULATION 2013/813								
Pdesign	(4)	kW	104,1	114,7	126,4	141,6	155,2	189,9
COMFORT								
Low temperature application								
ηsh	(4)	%	131,5	133,5	130,9	137,3	134,2	139,4
SCOP	(4)		3,36	3,41	3,35	3,51	3,43	3,56
Conformity with Tier 2	(4)		Y	Y	Y	Y	Y	Y
			24.3	27.4	29.4	32.4	33.4	37.4
REGULATION 2013/813								
Pdesign	(4)	kW	228	232,7	256,6	282,7	318,9	388,5
COMFORT								
Low temperature application								
ηsh	(4)	%	137,9	139,9	139,2	138,6	142,8	141,0
SCOP	(4)		3,52	3,57	3,56	3,54	3,64	3,60
Conformity with Tier 2	(4)		Y	Y	Y	Y	Y	Y

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

(4) User-side heat exchanger water inlet/outlet temperature 30/35, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

TETRIS 2 /HP

			41.4	43.6	47.6	50.7	53.8	58.8	62.8
REGULATION 2016/2281									
Pdesign	(1)	kW	394,6	413,5	443,0	476,4	508,1	550,2	592,3
COMFORT									
Standard units									
ηsc (12/7)	(1)	%	155,2	155,6	157	154,4	152,8	147	147
SEER (12/7)	(1)		3,75	3,97	4	3,94	3,9	3,75	3,75
Compliance Tier 1	(1)		N	N	N	N	N	N	N
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
ηsc (23/18)	(2)	%	168,0	171,0	166,1	164,0	168,1	162,2	161,5
SEER (23/18)	(2)		4,28	4,35	4,23	4,18	4,28	4,13	4,11
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)		N	N	N	N	N	N	N
Units with EC fans (VEC)									
ηsc (12/7)	(1)	%	156,5	158	158,3	155,6	155,8	152,1	151,6
SEER (12/7)	(1)		3,99	4,03	4,03	3,97	3,97	3,88	3,87
Compliance Tier 1	(1)		N	N	N	N	N	N	N
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
			67.9	70.9	74.10	78.10	80.12	87.12	93.12
REGULATION 2016/2281									
Pdesign	(1)	kW	632,0	665,6	697,0	739,1	769,9	828,1	886,2
COMFORT									
Standard units									
ηsc (12/7)	(1)	%	156,5	155,9	156	155,9	157,7	156,6	156
SEER (12/7)	(1)		3,99	3,97	3,97	3,97	4,02	3,99	3,97
Compliance Tier 1	(1)		N	N	N	N	N	N	N
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N	N
ηsc (23/18)	(2)	%	167,6	166,8	167,4	166,4	176,4	170,3	168,2
SEER (23/18)	(2)		4,26	4,25	4,26	4,23	4,48	4,33	4,28
Compliance Tier 1	(2)		Y	Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(2)		N	N	N	N	N	N	N
Units with EC fans (VEC)									
ηsc (12/7)	(1)	%	157,6	156,9	161,2	161,1	162	161	161
SEER (12/7)	(1)		4,01	4	4,1	4,1	4,13	4,1	4,1
Compliance Tier 1	(1)		N	N	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	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 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.

TETRIS 2 A

			11.2	17.2	23.2	28.4	34.4	38.4
REGULATION 2016/2281								
Pdesign	(1)	kW	112	161	229	273	323	361
COMFORT								
Standard units								
η_{sc}	(1)	%	151,8	158,2	152,6	162,2	165	159,8
SEER	(1)		3,87	4,03	3,89	4,13	4,2	4,07
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	Y	Y	N
Units with EC fans (VEC)								
η_{sc}	(1)	%	161	167,4	161,4	173,4	176,2	166,2
SEER	(1)		4,1	4,26	4,11	4,41	4,48	4,23
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y
PROCESS								
SEPR	(3)		5,28	5,36	5,5	5,42	5,41	5,32
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y

			43.4	47.4	50.6	57.6	64.6	70.6
REGULATION 2016/2281								
Pdesign	(1)	kW	418	455	484	542	620	683
COMFORT								
Standard units								
η_{sc}	(1)	%	162,2	165,4	168,2	169,4	169,4	169
SEER	(1)		4,13	4,21	4,28	4,31	4,31	4,3
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
Units with EC fans (VEC)								
η_{sc}	(1)	%	167	173,4	183,8	183,8	183	182,2
SEER	(1)		4,25	4,41	4,67	4,67	4,65	4,63
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	Y	Y	Y	Y
PROCESS								
SEPR	(3)		5,53	5,55	5,46	5,5	5,66	5,66
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	N	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.

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

TETRIS 2 A /HP

			11.2	17.2	23.2	28.4	34.4	38.4	43.4
REGULATION 2013/813									
P _{design}	(4)	kW	134,8	179,9	247,8	302,0	356,3	383,5	457,7
COMFORT									
Low temperature application									
η _{sh}	(4)	%	138,6	142,6	142,2	144,2	144,2	144,2	146,2
SCOP	(4)		3,54	3,64	3,63	3,68	3,68	3,68	3,73
Conformity with Tier 2	(4)		Y	Y	Y	Y	Y	Y	Y

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

(4) User-side heat exchanger water inlet/outlet temperature 30/35, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

TETRIS 2 A /HP

			47.4	50.6	57.6	64.6	70.6
REGULATION 2016/2281							
P _{design}	(1)	kW	453,0	479,0	536,7	615,5	679,1
COMFORT							
Standard units							
η _{sc}	(1)	%	162,2	165,8	167,8	165,8	165,4
SEER	(1)		4,13	4,22	4,27	4,22	4,21
Compliance Tier 1	(1)		Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Units with EC fans (VEC)							
η _{sc}	(1)	%	167,4	179,8	179,4	179,4	179,0
SEER	(1)		4,26	4,57	4,56	4,56	4,55
Compliance Tier 1	(1)		Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	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.

TETRIS 2 SLN

			11.2	17.2	23.2	28.4	34.4	38.4
REGULATION 2016/2281								
Pdesign	(1)	kW	105,1	151,7	214,7	256,1	304,0	339,3
COMFORT								
Standard units								
η_{sc}	(1)	%	149,8	157,0	149,0	161,8	162,6	158,2
SEER	(1)		3,82	4,00	3,80	4,12	4,14	4,03
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	Y	Y	N
Units with EC fans (VEC)								
η_{sc}	(1)	%	161,0	166,6	161,0	173,4	174,2	164,6
SEER	(1)		4,10	4,24	4,10	4,410	4,43	4,19
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y
PROCESS								
SEPR	(3)		5,28	5,36	5,5	5,42	5,41	5,32
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y
			43.4	47.4	50.6	57.6	64.6	70.6
REGULATION 2016/2281								
Pdesign	(1)	kW	392,0	426,4	455,8	510,0	581,9	641,8
COMFORT								
Standard units								
η_{sc}	(1)	%	158,2	161,0	164,2	166,2	166,2	165,8
SEER	(1)		4,03	4,10	4,18	4,23	4,23	4,22
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N	N
Units with EC fans (VEC)								
η_{sc}	(1)	%	165,4	169,4	183,0	182,6	180,6	179,8
SEER	(1)		4,21	4,31	4,65	4,64	4,59	4,57
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	N	Y	Y	Y	Y
PROCESS								
SEPR	(3)		5,53	5,55	5,46	5,5	5,66	5,66
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	N	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.

- = value not necessary: conformity is already provided at the most restrictive condition (1).

(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.

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

TETRIS 2 SLN /HP

			11.2	17.2	23.2	28.4	34.4	38.4	43.4
REGULATION 2013/813									
P _{design}	(4)	kW	104,0	152,0	215,6	256,2	304,9	331,2	383,6
COMFORT									
Low temperature application									
η _{sh}	(4)	%	138,6	142,6	142,2	144,2	144,2	144,2	146,2
SCOP	(4)		3,54	3,64	3,63	3,68	3,68	3,68	3,73
Conformity with Tier 2	(4)		Y	Y	Y	Y	Y	Y	Y

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

(4) User-side heat exchanger water inlet/outlet temperature 30/35, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

TETRIS 2 SLN /HP

			47.4	50.6	57.6	64.6	70.6
REGULATION 2016/2281							
P _{design}	(1)	kW	424,5	451,2	505,5	578,2	637,8
COMFORT							
Standard units							
η _{sc}	(1)	%	161,0	162,6	164,6	165,0	164,6
SEER	(1)		4,10	4,14	4,19	4,20	4,19
Compliance Tier 1	(1)		Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	N	N	N
Units with EC fans (VEC)							
η _{sc}	(1)	%	167,4	179,8	179,4	179,4	179,0
SEER	(1)		4,24	4,57	4,59	4,56	4,55
Compliance Tier 1	(1)		Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	Y	Y	Y	Y

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

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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.

TETRIS 2 A+

			8.2	13.3	18.4	23.5	27.6	31.4
REGULATION 2016/2281								
Pdesign	(1)	kw	88,5	132,9	180,3	225,3	270,4	310,4
COMFORT								
Standard units								
Compliance	(1)		Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	152,4	160,9	162,5	164,1	166,0	164,9
SEER	(1)		3,89	4,10	4,14	4,18	4,22	4,20
Compliance Tier 2 (2021)	(1)		N	Y	Y	Y	Y	Y
Units with EC fans (VEC)								
η_{sc}	(1)	%	164,0	178,2	174,6	182,1	183,1	178,9
SEER	(1)		4,18	4,53	4,44	4,63	4,65	4,55
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y
PROCESS								
Compliance	(3)		Y	Y	Y	Y	Y	Y
SEPR	(3)		5,66	5,66	5,69	5,74	5,6	5,57
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y
			36.4	41.5	44.6	49.6	54.6	
REGULATION 2016/2281								
Pdesign	(1)	kw	372,0	404,0	435,4	497,1	558,8	
COMFORT								
Standard units								
Compliance	(1)		Y	Y	Y	Y	Y	Y
η_{sc}	(1)	%	164,8	168,8	166,6	168,5	169,5	
SEER	(1)		4,20	4,30	4,24	4,29	4,31	
Compliance Tier 2 (2021)	(1)		Y	N	N	N	N	
Units with EC fans (VEC)								
η_{sc}	(1)	%	176,8	186,1	184,9	186,1	186,3	
SEER	(1)		4,50	4,73	4,70	4,73	4,73	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	
PROCESS								
Compliance	(3)		Y	Y	Y	Y	Y	Y
SEPR	(3)		5,68	5,64	5,66	5,69	5,55	
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		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 23/18°C (medium temperature application), with reference to regulation 2016/2281 and standard EN 14825.
- (3) User-side heat exchanger water inlet/outlet temperature 12/7°C, with reference to regulation 2016/2281 and norm EN 14825.

TETRIS 2 A+ /HP

				8.2	13.3	18.4	23.5
REGULATION 2013/813							
Pdesign	(4)	kW		85	132	176	216
COMFORT							
Low temperature application							
η_{sh}	(4)	%		139,6	144,2	144,5	141,2
SCOP	(4)			3,56	3,68	3,69	3,6,0
Conformity with Tier 2	(4)			Y	Y	Y	Y
				27.6	31.4	36.4	41.5
REGULATION 2013/813							
Pdesign	(4)	kW		260	306	353	399
COMFORT							
Low temperature application							
η_{sh}	(4)	%		141,5	143,7	143,0	145,1
SCOP	(4)			3,61	3,67	3,65	3,7,0
Conformity with Tier 2	(4)			Y	Y	Y	Y

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

(4) User-side heat exchanger water inlet/outlet temperature 30/35, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

TETRIS 2 A+ /HP

				44.6	49.6	54.6	
REGULATION 2016/2281							
Pdesign	(1)	kW		432	490	541	
COMFORT							
Standard units							
η_{sc}	(1)	%		164,0	164,2	164,8	
SEER	(1)			4,18	4,18	4,19	
Compliance Tier 1	(1)			Y	Y	Y	
Compliance Tier 2 (2021)	(1)			N	N	N	
Units with EC fans (VEC)							
η_{sc}	(1)	%		186,6	182,0	183,0	
SEER	(1)			4,74	4,63	4,65	
Compliance Tier 1	(1)			Y	Y	Y	
Compliance Tier 2 (2021)	(1)			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.

TETRIS 2 A SLN

			8.2	13.3	18.4	23.5	27.6	31.4
REGULATION 2016/2281								
Pdesign	(1)	kW	86,4	129,6	175,8	219,7	263,7	303,0
COMFORT								
Standard units								
η_{sc}	(1)	%	151,4	159,4	161,4	162,6	164,6	163,4
SEER	(1)		3,86	4,06	4,11	4,14	4,19	4,16
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		N	N	Y	Y	Y	Y
Units with EC fans (VEC)								
η_{sc}	(1)	%	163,4	177,4	173,4	180,6	180,6	178,6
SEER	(1)		4,16	4,51	4,41	4,59	4,59	4,54
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	Y
PROCESS								
SEPR	(3)		5,55	5,66	5,66	5,69	5,74	5,6
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(3)		Y	Y	Y	Y	Y	Y
			36.4	41.5	44.6	49.6	54.6	
REGULATION 2016/2281								
Pdesign	(1)	kW	362,7	393,8	424,8	484,4	544,1	
COMFORT								
Standard units								
η_{sc}	(1)	%	163,4	167,0	165,0	167,0	167,0	167,0
SEER	(1)		4,16	4,25	4,20	4,25	4,25	4,25
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	Y
Compliance Tier 2 (2021)	(1)		Y	N	N	N	N	N
Units with EC fans (VEC)								
η_{sc}	(1)	%	176,6	185,8	184,2	185,4	185,8	
SEER	(1)		4,49	4,72	4,68	4,71	4,72	
Compliance Tier 1	(1)		Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(1)		Y	Y	Y	Y	Y	
PROCESS								
SEPR	(3)		5,57	5,68	5,64	5,66	5,69	
Compliance Tier 1	(3)		Y	Y	Y	Y	Y	
Compliance Tier 2 (2021)	(3)		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.

- = value not necessary: conformity is already provided at the most restrictive condition (1).

(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.

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

TETRIS 2 A SLN /HP

				8.2	13.3	18.4	23.5
REGULATION 2013/813							
Pdesign	(4)	kW		85,3	131,6	176,4	216,3
COMFORT							
Low temperature application							
η_{sh}	(4)	%		139,6	144,2	144,5	141,2
SCOP	(4)			3,56	3,68	3,69	3,60
Conformity with Tier 2	(4)			Y	Y	Y	Y
				27.6	31.4	36.4	41.5
REGULATION 2013/813							
Pdesign	(4)	kW		259,5	305,8	352,9	399,0
COMFORT							
Low temperature application							
η_{sh}	(4)	%		141,5	143,7	143,0	145,1
SCOP	(4)			3,61	3,67	3,65	3,70
Conformity with Tier 2	(4)			Y	Y	Y	Y

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

(4) User-side heat exchanger water inlet/outlet temperature 30/35, Average climate profile, with reference to regulation 2013/813 and norm EN 14825.

TETRIS 2 A SLN /HP

				44.6	49.6	54.6	
REGULATION 2016/2281							
Pdesign	(1)	kW		421,2	476,7	527,0	
COMFORT							
Standard units							
η_{sc}	(1)	%		165,4	165,4	167,4	
SEER	(1)			4,21	4,21	4,26	
Compliance Tier 1	(1)			Y	Y	Y	
Compliance Tier 2 (2021)	(1)			N	N	N	
Units with EC fans (VEC)							
η_{sc}	(1)	%		182,2	181,8	182,6	
SEER	(1)			4,63	4,62	4,64	
Compliance Tier 1	(1)			Y	Y	Y	
Compliance Tier 2 (2021)	(1)			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.

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:

Total hardness	2,0 ÷ 6,0 °f
Langelier index	- 0,4 ÷ 0,4
pH	7,5 ÷ 8,5
Electrical conductivity	10 ÷ 500 µS/cm
Organic elements	-
Hydrogen carbonate (HCO₃⁻)	70 ÷ 300 ppm
Sulphates (SO₄²⁻)	< 50 ppm
Hydrogen carbonate / Sulphates (HCO₃⁻/SO₄²⁻)	> 1
Chlorides (Cl⁻)	< 50 ppm
Nitrates (NO₃⁻)	< 50 ppm
Hydrogen sulphide (H₂S)	< 0,05 ppm
Ammonia (NH₃)	< 0,05 ppm
Sulphites (SO₃), free chlorine (Cl₂)	< 1 ppm
Carbon dioxide (CO₂)	< 5 ppm
Metal cations	< 0,2 ppm
Manganese ions (Mn⁺⁺)	< 0,2 ppm
Iron ions (Fe²⁺ , Fe³⁺)	< 0,2 ppm
Iron + Manganese	< 0,4 ppm
Phosphates (PO₄³⁻)	< 2 ppm
Oxygen	< 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.

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

The quantity of antifreeze should be considered as % on weight

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.

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.

$$V_{min} = \frac{P_{tot} \cdot 1.000}{N} \cdot \frac{300}{\Delta T \cdot \rho \cdot c_p} + P_{tot} \cdot 0,25$$

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

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

ρ : 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:

$$V_{min} = \frac{P_{tot}}{N} \cdot 17,2 + P_{tot} \cdot 0,25$$

N is equal to the number of compressors installed in the unit.

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.

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.

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 (accessory not available for HP units)
- coils with anti-corrosion treatment (accessory available only for HP units or 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 reversible units or units with Cu/Al coils, is strongly recommended 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.

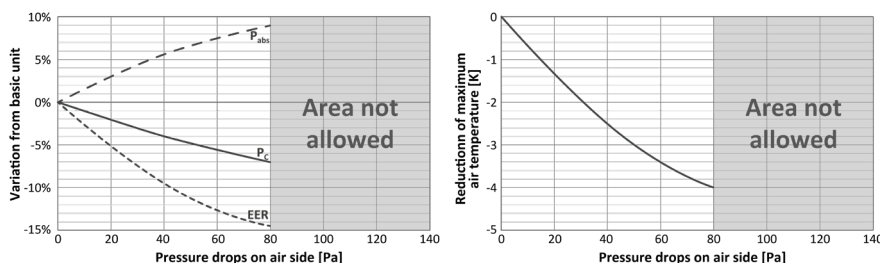
Aeraulic head losses and options available for the ventilating section

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.

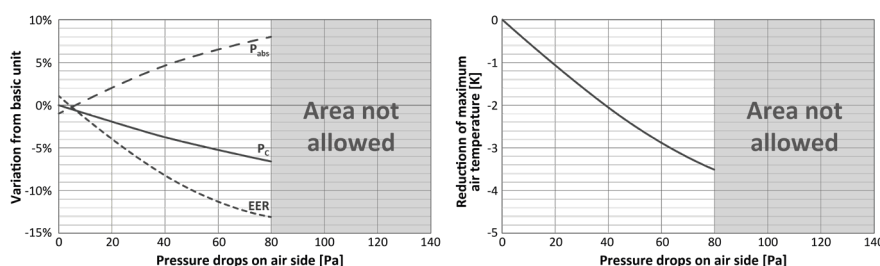
If there are obstacles to free air flow, you should consider the additional aeraulic head losses that will cause a reduction of the air flow rate and a consequent deterioration of performance.

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.

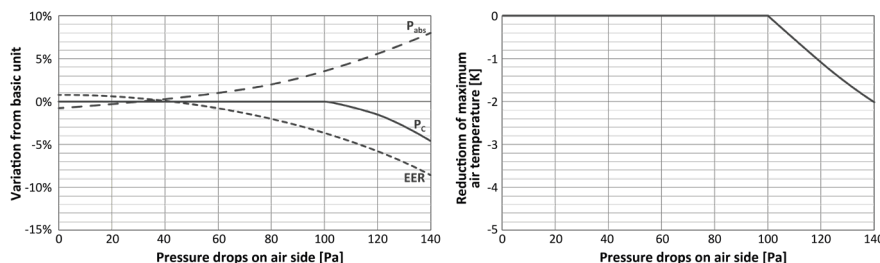
AC fans (Ø 800)



EC fans (Ø 800)



Oversize 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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