



# Heat Pump Datasheet

## Installation of Air Source Heat pumps



## Streatham Ice & Leisure

390 Streatham High Road, Streatham, London SW16 6HX

Document Number	Revision	Issue Date
CN2302-ALT-STR-XX-DT-Z-0001	P01	28/07/2023

User Steve Webster (Alternative Heat)

Date 27/07/2023

Reference: Streatham WinPOWER ECO THAEQU 4450 P1 347 kW R454B A-3\_W45

## SELECTION

Family WinPOWER ECO  
THAEQU 4370-6830  
Model THAEQU 4450 P1  
Webcode WPE05



The images are for reference purposes only and may not represent exactly the models or the equipment subject of this document.  
The certified standard performances and the certified software tool version can be verified in [www.eurovent-certification.com](http://www.eurovent-certification.com)

## CONSTRUCTION FEATURES

Packaged air-cooled reversible heat pump with axial fans. Range with hermetic Scroll compressors and R454B refrigerant gas.

Q - Super-silenced version with soundproofed compressors and low fan speed

P1 - Installation with pump

POWER SUPPLY: 400V/3PH/50HZ

ANTIVIBRATIONS MOUNTINGS: SAM2-SPRING ANTIV.MOUNT.P/DP

TYPE OF COIL: BRA-COPPER/ALLUMINIUM COIL

CONDENSING CONTROL: FI-CONDENSING CONTROL

CONTROLS: LKD-GAS LEAK DETECTOR

VOLTAGE CONTROL: CMT-MIN-MAX VOLTAGE CONTROL

ELECTRONIC EXPANSION VALVE: EEV-ELECTRONIC EXPANSION VALVE

COMPR. SOUNDJACKET: CAC - COMPR. SOUNDJACKET

BMS CONNECTION: SS-RS485 SERIAL INTERFACE MODB

GAUGES HP/LP: GM-HIGH LOW PRESSURE GAUGES

EFFICIENCY METER: EEM - ENERGY EFFICIENCY METER

EFFICIENCY OPTIMIZER: EEO - EER OPTIMIZER

COIL PROTECTION: RPB-COIL PROTECTION GRILLES

LOWER COMPARTMENT PROTECTION: RPE-LOWER COMPART.PROT.GRILLE

DRAIN PAN HEATER: RAB-DRAIN PAN ANTIFREE.HEATER

ANTIFREEZE PUMPING GROUP: RAE1-SINGLE PUMP ELEC.HEATER

POWER FACTOR CORR.CAPACITOR: CR-POWER FACTOR CORR.CAPACITOR

BOARD ELECTRICAL HEATER: RQE-BOARD ELECTRICAL HEATER

EXCHANGER: PA-PLATE EXCHANGER

SOFT STARTER: SFS - SOFT-STARTER

SOUNDPROOFING: BCIP-INSULATED COMPR. BOX PLUS

PRESSURE VISUALISATION DISPLAY: SPS-HIGH-LOW PRESSURE DISPLAY

PACKAGING TYPE: PROTECTIVE PACKAGING

PUMPING GROUP MANAGEMENT: VPF\_R

- o Load-bearing structure and panels in galvanised and RAL 9018 painted sheet metal; galvanised steel sheet metal base.
- o The structure consists of two sections:
  - technical compartment that houses the compressors, the electrical panel and the main components of the cooling circuit;
  - aeraulic circuit dedicated to housing the heat exchanger coils and electric fans
- o Hermetic, Scroll-type rotary compressors complete with internal circuit breaker protection and crankcase resistance automatically activated when the unit stops (as long as the unit is powered).
- o Adequately insulated, braze-welded plate water side heat exchanger in stainless steel (tube and shell exchanger - STE option).
- o Air side heat exchanger consisting of MCHX microchannel coils for chillers (optional Cu / Al) or of a coil in copper pipes and aluminum fins for heat pumps with optimized distribution system to allow the correct distribution of the refrigerant to the coils in all working conditions, improving performance and efficiency in heat pump operation (Patent pending).
- o Electronic thermostatic valve in both summer and winter operation.
- o Electric helical fans with external rotor, supplied with internal circuit breaker protection and complete with protection mesh.
- o In the T-High efficiency and Q-Supersilenced versions, the proportional electronic device is standard for pressure and continuous regulation of the fan rotation speed up to an external air temperature of -10 ° C when operating as a chiller and up to outdoor air temperature of 40 ° C when operating as a heat pump.
- o Optional for all versions the EC type fan (FIEC accessory) with pressure and continuous adjustment of the fan rotation speed up to an external air temperature of -15 ° C in operation as a chiller and up to air temperature external temperature of 40 ° C in operation as a heat pump.
- o Victaulic-type hydraulic connections.
- o Differential pressure switch that protect the unit from any water flow interruptions.
- o Refrigeration circuits made with annealed copper pipe (EN 12735-1-2) and/or stainless steel complete with: cartridge filter drier, charging connections, safety pressure switch on the high pressure side with manual reset, BP and AP pressure transducer, valve / s safety valve on the high and low pressure side, cock upstream of the filter, liquid indicator, suction line insulation, electronic expansion valve, cycle reversal valve and liquid receiver, check valves, suction gas separator to the compressors (for heat pumps) and suction valve to the compressors (for heat pumps).
- o Unit with IP24 protection rating.
- o Control with AdaptiveFunction Plus operation.
- o The unit is complete with a charge of R454B refrigerant.

#### ELECTRICAL PANEL

- o Electrical panel with IP54 protection degree (as well as the rest of the electrical components) accessible by opening the front panel, compliant with the IEC standards in force, equipped with opening and closing using a special tool.
- o Complete with:
  - electrical wiring arranged for power supply 400-3ph-50Hz;
  - numbered electric cables;
  - 230V-1ph-50Hz auxiliary circuit power supply from an internal transformer;
  - main power supply switch with interlocking safety door isolator;
  - automatic thermal overload switch to protect the compressors and the motor-driven fans;
  - auxiliary circuit protection fuse;
  - compressors power contactore;
  - remote machine controls: ON/OFF and summer/winter selector;
  - remote machine controls: compressor operating light and general lock light.
- o Programmable microprocessor electronic board handled by the keyboard inserted in the machine.
- o This electronic board performs the following functions:
  - regulation and management of the set points for unit outlet water temperature; cycle inversion (heat pumps); safety timer delays; circulating pump; compressor and system pump hour-run meter; defrost cycles; electronic antifreeze protection with automatic activation when the machine is switched off; and the functions which control the operation of the individual parts making up the machine;
  - complete protection of the unit, possible shutdown and display of all the triggered alarms;
  - compressor protection phase sequence monitor;
  - unit protection against low or high phase power supply voltage (CMT accessory);
  - visual indication of the programmed set points on the display; of the in/out water temperature via the display; of the condensation and evaporation pressures, of the alarms via the display; and of chiller/heat-pump operating mode via display (heat pumps);
  - user interface menu;
  - automatic pump operating time balance (DP1-DP2, ASDP1- ASDP2 installations);
  - automatic activation of the pump in standby in the event of an alarm (DP1-DP2, ASDP1-ASDP2 set ups);
  - displayed inlet water temperature at the recovery unit/desuperheater;
  - alarm code and description;
  - management of alarms log.
- o In particular, for every alarm, the following are memorised:
  - date and time of intervention;
  - in/out water temperature values as soon as the alarm was triggered;
  - the evaporation and condensation pressure values at the time of the alarm;
  - alarm delay time from the switch-on of the connected device;
  - compressor status at the time of the alarm;
- o Advanced functions:
  - Pump Energy-Saving management;
  - evaporator pump control KPE, contactor recovery pump command KPR and KPDS desuperheater Pump Control in the case of external supply of electric pumps (to be installed by the installer). For the unit to operate properly, activation of the recovery pump, by the install-er, must be controlled by means of a specific discrete output provided in the board on the unit;
  - High-Pressure Prevent function with forced cooling capacity partialisation for a high outdoor temperature (in summer mode);
  - the EEO - Energy Efficiency Optimizer function allows unit efficiency to be optimised by acting on the electrical absorption, thereby mini-mising consumption. The algorithm identifies the optimal point that minimises the total absorbed power (compressors+fans) of the unit by actuating the fan rotation speed.

rotation speed.

- VPF\_R control: (Variable Primary Flow by Rhoss in the main exchanger). VPF\_R includes the temperature probs, the inverter management if the inverter is not supplied by Rhoss and the management software of the chiller;
- set-up for serial connection (SS/KRS485, FTT10/KFTT10, BE/KBE, BM/KBM, KUSB accessory);
- possibility to have a digital input for remote management of double set point (DSP);
- possibility to have a discrete input for total recovery management (RC100 contact) and desuperheating (DS contact);
- possibility to have an analogue input for the shifting Set-point (CS) via a 4-20mA remote signal;
- management of time bands and operation parameters with the possibility of daily/weekly functioning programs;
- check-up and monitoring of scheduled maintenance status;
- computer-assisted unit testing;
- self-diagnosis with continuous monitoring of the unit functioning status.
- MASTER/SLAVE management logic integrated in single systems (SIR - Sequenziatore Integrato - Integrated Sequencer) -Refer to the specific section for more details
- o Set-point regulation via the AdaptiveFunction Plus with two options:
  - fixed set-point (Precision option);
  - set-point sliding (Economy option).

**TECHNICAL DATA - THAEQU 4450 P1**

**Design parameters**

		Cooling	Heating
External air temperature	[°C]	35	-3
External air humidity	[%]	50	90
User side exchanger inlet fluid temperature	[°C]	12	40
User side exchanger outlet fluid temperature	[°C]	7	45
Altitude	[m]	0	
User side exchanger fluid		Water	Water
Fouling factor	[m <sup>2</sup> °C/kW]	0	0

**Performances**

At design conditions:		Cooling	Heating
Capacity (gross)	[kW]	430.0	347.7
Absorbed power (gross)	[kW]	138.3	125.1
EER (gross)		3.11	
COP (gross)			2.78
Capacity (UNI EN 14511)	[kW]	430.7	347.0
EER (UNI EN 14511)		3.09	
COP (UNI EN 14511)			2.75

**SCOP (EN 14825)**

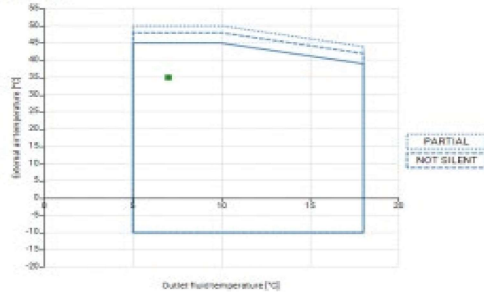
Reference heating season	<b>AVERAGE</b>
Application type	LOW
Application temperature [°C]	35
Water flow	FIXED
Outlet water temperature	VARIABLE
Pdesign [kW]	357
SCOP net	3.86
SCOP	3.83
Seasonal efficiency (Reg.813/2013 UE) [%]	150
Efficiency class (Reg.811/2013 UE)	-



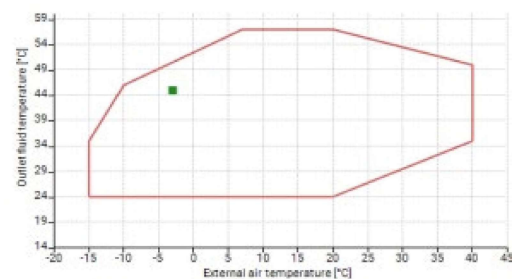
The SCOP values could be different from what published in the commercial documentation. This is possibly due to a different unit configuration and/or to different selected parameters

**Functioning limits**

**Cooling**



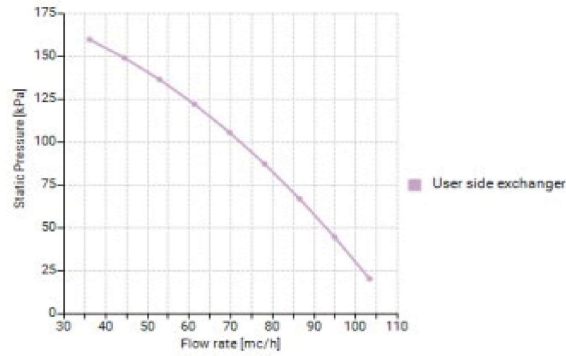
**Heating**



**User side exchanger**

		Cooling	Heating
Flow rate	[m <sup>3</sup> /h]	74	59.8
Static Pressure	[kPa]	97	124

## Static Pressure



## Fans

Type:	Axial
Fan number	8
Consumption for each	[kW] 0.9
Air flow rate	[m³/h] 120000

## Technical features

Refrigerant: (5)	R454B
Amount of refrigerant (7)	[kg] 84
Global Warming Potential (GWP)	466
Equivalent CO2	[ton] 39.14
Compressors	Scroll
Oil charge	[kg] 28.8
Number of compressors	4
Number of independent circuits	2
Number of compressor steps	4

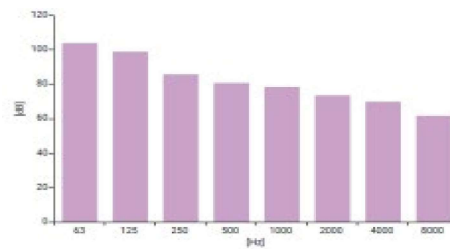
## Noise

### Unit without options

Sound Power level (1)	[dBA] 87
Sound Pressure level (10m) (2)	[dBA] 54.5
Sound Pressure level (1m) (2)	[dBA] 66.5

(Performance given without pump)

[Hz]	[dB]
63	104
125	99
250	86
500	81
1000	79
2000	74
4000	70
8000	62



### Unit with options

Sound Power level (1)	[dBA] 86
Sound Pressure level (10m) (2)	[dBA] 53.5

with the following options

CAC - COMPR. SOUNDJACKET

(Performance given without pump)

## Electrical data

		Cooling	Heating
Total electrical power (3)	[kW]	142.6	129.3
Pump nominal power (6)	[kW]	4.0	
Pump absorbed power	[kW]	4.26	
Electrical power supply	[V-ph-Hz]	400-3-50	
Nominal current (4)	[A]	234.8	
Maximum current	[A]	315.8	
Starting current	[A]	589.8	
Starting current SFS	[A]	452.8	

## Size and weight

Length	[mm]	4840
Height	[mm]	2480
Depth	[mm]	2260
Empty weight (7)	[kg]	3950
User side inlet/outlet connections	∅	DN80 VIC

## Partial loads

### Cooling

Outlet fluid temperature	°C	7									
External air temperature	°C	35									
Load	%	<b>100</b>	<b>90</b>	<b>80</b>	<b>70</b>	<b>60</b>	<b>50</b>	<b>40</b>	<b>30</b>	<b>20</b>	<b>10</b>
Capacity (GROSS VALUE)	kW	430	387	344	301	258	215	172	129	86	43
EER (GROSS VALUE)		3.11	3.06	3	2.93	3.02	3.16	3.38	3.45	3.59	3.31
Capacity (UNI EN 14511)	kW	430.7	387.6	344.5	301.5	258.4	215.3	172.3	129.2	86	43.1
EER (UNI EN 14511)		3.09	3.04	2.98	2.9	2.98	3.11	3.31	3.36	3.44	3.16

Flow rate determined at full load condition

## Partial loads

### Heating

Outlet fluid temperature	°C	45									
External air temperature	°C	-3									
Load	%	<b>100</b>	<b>90</b>	<b>80</b>	<b>70</b>	<b>60</b>	<b>50</b>	<b>40</b>	<b>30</b>	<b>20</b>	<b>10</b>
Capacity (GROSS VALUE)	kW	347.7	312.9	278.2	243.4	208.6	173.8	139.1	104.3	69.5	34.8
COP (GROSS VALUE)		2.78	2.77	2.75	2.74	2.74	2.72	2.6	2.44	2.27	2.02
Capacity (UNI EN 14511)	kW	347	312.3	277.6	242.9	208.2	173.5	138.8	104.1	69.4	34.7
COP (UNI EN 14511)		2.75	2.74	2.72	2.71	2.69	2.66	2.54	2.37	2.2	1.95

Flow rate determined at full load condition

## SEER (EN 14825)

Application type	LOW	LOW
Application temperature [°C]	7	7
Tdesign [°C]	35	35
Water flow	FIXED	VARIABLE
Pdesignc [kW]	430.7	430.7
SEER	4.55	4.87
Seasonal efficiency (Reg.2016/2281 UE) [%]	179	192

RHOSS reserves the right to make the changes it deems necessary to improve / update the data at any time and without prior notice.

## Note

- (1) Standard reference UNI EN-ISO 9614
- (2) Standard reference UNI EN-ISO 3744
- (3) Total absorbed power at selected conditions (compressors, fans if present and pumps if selected)
- (4) Referred to nominal conditions: Ta: 35°C Tw:12/7°C
- (5) Regulated transport ADR UN 3358
- (6) Contact RHOSS, in case you want to enable the VPF\_R function, to receive information about the inverter. The installation must be carried out by authorized technical staff.
- (7) The value is indicative and may be subject to change based on the selected accessories

User

Date

28.07.23

Reference: HP2337 Streatham Leisure Centre

## SELECTION

Family

Model

**TCHETZ 2220 HT EEV HPH**

The images are for indicative purposes only and may not represent exactly the models and fittings described in this document.



## CONSTRUCTION FEATURES

Packaged water/water unit equipped with hermetic scroll compressors and R134a refrigerant gas.

**POWER SUPPLY: 400V/3PH/50HZ**

**ELECTRONIC EXPANSION VALVE: EEV-ELECTRONIC EXPANSION VALVE**

**HEAT PUMP OPERATION: HPH-HEAT PUMP OPERATION KIT**

**PACKAGING TYPE: PROTECTIVE PACKAGING**

- o Structure in galvanised and RAL 9018 painted steel plate, internally coated with sound-absorbing panels.
- o Hermetic, Scroll-type rotary compressors complete with internal circuit breaker protection and crankcase resistance automatically activated when the unit stops (as long as the unit is powered).
- o Brazed plate heat-exchangers in stainless steel with closed-cell expanded polyurethane rubber insulation.
- o Electrical anti-freeze heater on the evaporator to protect it from the freeze.
- o Differential pressure switch on the evaporator and condenser to protect the unit from any water flow interruptions.
- o Cooling circuit realised in annealed copper pipes (EN 12735-1-2) and welded with precious alloys. Complete with: dryer filter, thermostatic valve, safety valves, liquid indicator and intake line isolation.
- o Unit for indoor installation (IP21 protection rating).
- o The unit is complete with a charge of R134a refrigerant.

**ELECTRICAL PANEL**

- o Electrical panel can be accessed by opening the front panel, in compliance with IEC Standards in force, fitted with opening and closing via specific tool.

o Complete with:

- electrical wiring arranged for power supply (400V-3ph-50Hz);
- auxiliary circuit power supply 230V-1ph-50Hz derived from main power supply;
- main power supply switch with interlocking safety door isolator;
- automatic compressor protection switch;
- auxiliary circuit protection fuse;
- compressor power contactor;
- remote machine commands and controls.



- Programmable microprocessor electronic board handled by the keyboard inserted in the machine.
- This electronic board performs the following functions:
  - Adjustment and control of the machine water outlet temperature set-points; of the safety timings; of the circulation pump; of the system pump and compressor hour-run meter; of the electronic anti-freeze protection; of the functions that regulate the intervention method of the individual parts forming the machine;
  - complete protection of the unit, possible shutdown and display of all the triggered alarms;
  - compressor protection phase sequence monitor;
  - display the programmed set-points via the display; the in/out water temperature via the display; the alarms via the display; the chiller or heat pump operation via the display;
  - self-diagnosis with continuous monitoring of the unit functioning status.
  - user interface menu;
  - alarm code and description;
  - alarm history management (menu protected by factory password).
- In particular, for every alarm, the following are memorised:
  - date and time of intervention;
  - alarm code and description;
  - in/out water temperature values as soon as the alarm was triggered;
  - alarm delay time from the switch-on of the connected device;
  - compressor status at the time of the alarm;
- Advanced functions:
  - set-up for serial connection (SS, KFTT10, KBE, KBM, KUSB accessory);
  - configured to manage time slots and work parameters with the possibility of daily/weekly operation planning;
  - check-up and monitoring of scheduled maintenance status;
  - computer-assisted unit testing;
  - self-diagnosis with continuous monitoring of the unit functioning status.

## TECHNICAL DATA - TCHETZ 2220 HT EEV HPH

### Design parameters

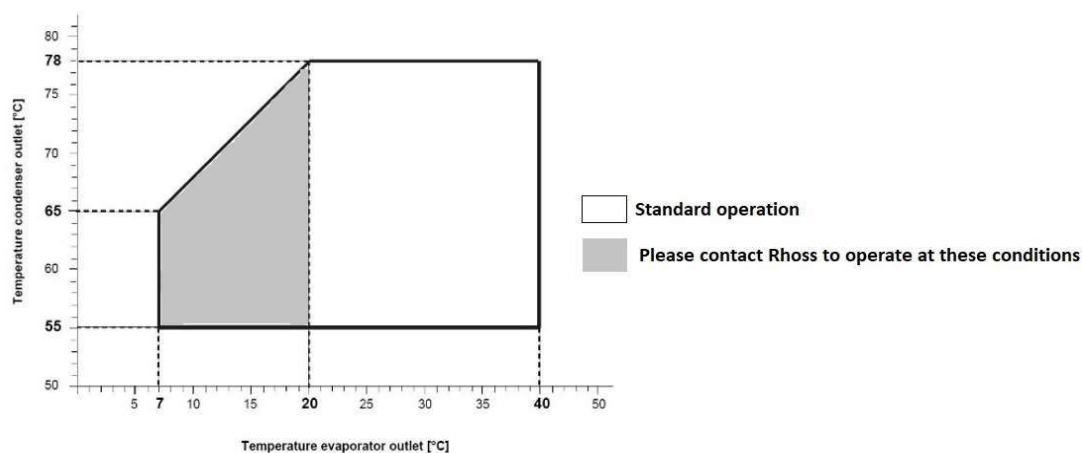
Evaporator Inlet fluid temperature	[°C]	45
Evaporator Outlet fluid temperature	[°C]	40
Condenser Inlet fluid temperature	[°C]	70
Condenser Outlet fluid temperature	[°C]	78
Main exchanger fluid		Water
Disposal unit side exchanger fluid		Water

### Performances

At design conditions:

Heating Capacity (gross)	[kW]	224.0
Absorbed power (gross)	[kW]	56.0
COP (gross)		4.00

### Functioning limits



### Evaporator

Flow rate	[m <sup>3</sup> /h]	29.2
Pressure drops	[KPa]	18

### Condenser (high temperature water production side)

Flow rate	[m <sup>3</sup> /h]	24.1
Pressure drops	[KPa]	13

### Technical features

Refrigerant:		R134a
Amount of refrigerant*	[kg]	18
Compressors		Scroll
Number of compressors		2
Number of independent circuits		2
Number of compressor steps		2

\*sum of the two refrigeration circuits. Attention: preliminary data.

### Noise

Sound power level (UNI EN-ISO 9614)	[dB(A)]	76
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### Electrical data

Maximum current	[A]	106
Starting current	[A]	325

### Dimensions and weight

Length	[mm]	1270
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Height	[mm]	1620
Depth	[mm]	870
Operating weight**	[kg]	825

\*\*includes refrigerant, water and oil. Attention: preliminary data.

### Includes

SFS - Compressor soft starter
DVS - Double high pressure safety valve with exchange valve
SS - RS485 interface for serial communication with other devices (proprietary protocol; Modbus RTU protocol).
Rubber AntiVibration Mounts

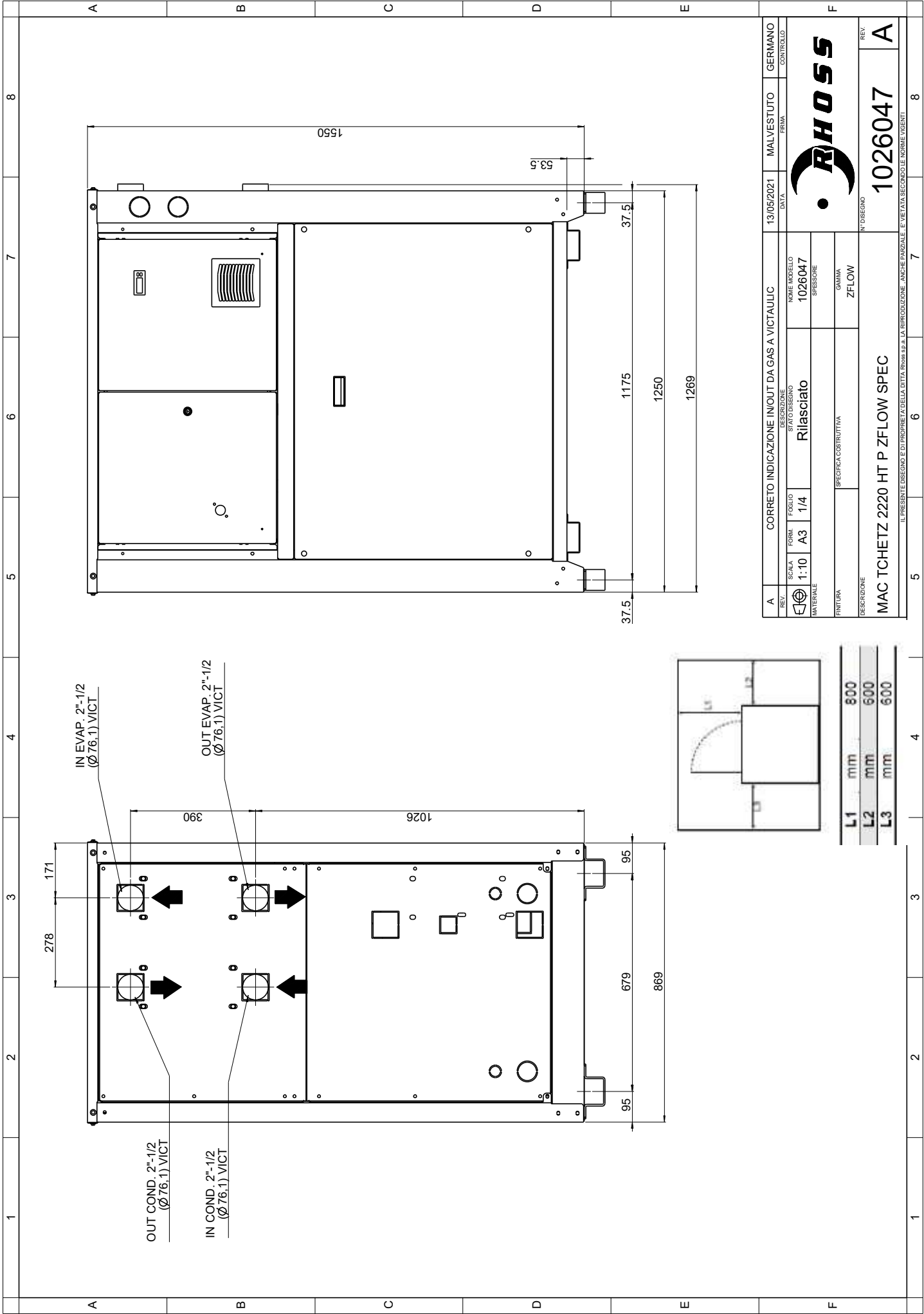
### Cascade combined SCOP Calculation

SCOP ASHP	3.86
SCOP WSHP	4.00

Cascade Combined SCOP *	=	$(3.86*4.00)/(3.86+4.00-1)$
	=	2.25

\*CIBSE AM17 4.5





REV. A	SCALA 1:10	FORMA A3	FUOGLIO 1/4	DESCRIZIONE STATO DISEGNO Rilasciato	DATA 13/05/2021	MALVESTUTO PERNA	GERMANO CONTROLLO
CORRETO INDICAZIONE INOUT DA GAS A VICTAULIC				NOME MODELLO 1026047	13/05/2021		
MATERIALE				SPESORE	GERMANO		
FINITURA				GAMMA ZFLOW	GERMANO		
DESCRIZIONE				SPECIFICA COSTRUTTIVA			
MAC TCHETZ 2220 HT P ZFLOW SPEC				N° DISEGNO 1026047			
IL PRESENTE DISEGNO È DI PROPRIETÀ DELLA DITTA RHOS S.p.A. LA RIPRODUZIONE, ANCHE PARZIALE, È VIETATA SECONDO LE NORME VIGENTI				REV. A			

